WORK, LEARNING AND SUSTAINABLE DEVELOPMENT

**UNESCO-UNEVOC Book Series**
**Technical and Vocational Education and Training:**
**Issues, Concerns and Prospects**

## Volume 8

# Work, Learning and Sustainable Development

## Opportunities and Challenges

*Edited by*

JOHN FIEN

*RMIT University, Melbourne, Australia*

RUPERT MACLEAN

*UNESCO-UNEVOC International Centre for Education, Bonn, Germany*

MAN-GON PARK

*PuKyong National University, Busan, Republic of Korea*


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UNESCO UNEVOC
INTERNATIONAL CENTRE
for Technical and Vocational
Education and Training

*Editors*

Prof. John Fien
RMIT University
Melbourne VIC 3001
Australia

Dr. Rupert Maclean
UNESCO-UNEVOC
International Centre for Education
Hermann-Ehlers-Str. 10
53113 Bonn
Germany

Prof. Man-Gon Park
PuKyong National University
599-1 Daeyoen-3 Dong
Busan 608-737
Nam-gu
Republic of Korea

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# Contributors

Damon Anderson
Senior Lecturer, Faculty of Education, Monash University, Melbourne, Australia

Alberto Arenas
Assistant Professor, College of Education, University of Arizona, Tucson, USA

Maria Lourdes Q. Baybay
Dean, College of Arts and Sciences, Miriam College, Quezon City, Philippines

Iris Bergmann
Research Fellow in Sustainability, RMIT University, Melbourne, Australia

France Boutin
Professor and Director of Graduate Studies, Department of Linguistics and Language Teaching, Université du Québec à Montréal, Canada

Chris Chinien
Professor, Workforce Development and TVET Consultant, Montreal, Canada

Judith Cohen
Programme Manager, Learning and Skills Network, London, UK

Linda Condon
Program Leader, National Centre for Sustainability, Swinburne University of Technology, Australia

Suresh K. Dhameja
Professor, Faculty in Entrepreneurship Development, Colombo Plan Staff College for Technician Education, Manila, Philippines; Department of Entrepreneurship Development and Industrial Co-ordination, National Institute of Technical Teachers Training and Research, Chandigarh, India

John Fien
Professor of Sustainability, RMIT University, Melbourne, Australia

David Goldney
Consultant, Western Research Institute, Charles Sturt University, Bathurst, Australia

Annette Gough
Head of School of Education, RMIT University, Melbourne, Australia

Stephen Gough
Deputy Director, Centre for Research in Education and the Environment, University of Bath, UK

Michael Haertel
Senior Researcher, Federal Institute for Vocational Education and Training, Bonn, Germany

Phillip Hughes
Professor Emeritus, Australian National University, Canberra, Australia

Tom Karmel
Managing Director, National Centre for Vocational Education Research, Adelaide, Australia

Johanna Lasonen
Adjunct Professor, Institute for Educational Research, University of Jyväskylä, Finland

John E.S. Lawrence
Former Principal Technical Adviser, United Nations Development Programme and Adjunct (Full) Professor, School of International & Public Affairs, Columbia University, New York, USA

Yu Liu
Deputy Professor, Chongqing Industry Polytechnic College, Chongqing, China

Heila Lotz-Sisitka
Chair of Environmental Education and Sustainability Unit, Rhodes University, South Africa

Rupert Maclean
Director, UNESCO-UNEVOC International Centre for Education, Bonn, Germany

Tariq Mahmood
Director of Research and Evaluation, National Institute of Science and Technical Education, Ministry of Education, Islamabad, Pakistan

Shyamal Majumdar
Professor and Head, Department of Computer Science and Engineering, National Institute of Technical Teachers Training and Research, Kolkata, India

Stephen McKenzie
Research Associate, Hawke Research Institute for Sustainable Societies, University of South Australia, Adelaide, Australia

Beth McLachlan
EMS Coordinator, Environment Protection Authority Victoria, Melbourne, Australia

Maureen Martin
Sustainable Development Consultant, UK

Stephen Martin
Sustainable Development Consultant; Visiting Professor in the Centre for Complexity and Change, Open University, Milton Keynes, UK

Frank Mitchell
Project Manager, National Centre for Sustainability, Swinburne University of Technology, Melbourne, Australia

Alan Montague
Lecturer, School of Management; and former Manager of Apprenticeships and Traineeships, RMIT University, Melbourne, Australia

Tom Murphy
CEO, Western Research Institute, Charles Sturt University, Bathurst, Australia

Lausanne Olvitt
Environmental Education and Sustainability Unit, Rhodes University, South Africa

Man-Gon Park
Head Professor, Division of Electronic, Computer and Telecommunication Engineering, College of Engineering, PuKyong National University, Republic of Korea

Margarita Pavlova
Senior Lecturer, School of Education and Professional Studies, Faculty of Education; Research Programme Leader (Education for Sustainable Development), Centre for Learning Research, Griffith University, Brisbane, Australia

William S. Pretzer
Associate Professor of History and Director of the Museum of Cultural and Natural History, Central Michigan University, Mt Pleasant, Michigan, USA

Lourdes R. Quisumbing
Founding President, UNESCO Asia-Pacific Network for International Education and Values Education (APNIEVE), Philippines

Jagmohan Singh Rajput
Former Director of the National Council of Educational Research and Training, New Delhi, India

Glenda Raven
Capacity Development Coordinator, South African National Biodiversity Institute, Cape Action for People and the Environment, South Africa

Andrew Rickard
Project Manager, National Centre for Sustainability, Swinburne University of Technology, Melbourne, Australia

Kurt W. Seemann
Senior Lecturer/Coordinator, Desert Knowledge Co-operative Research Centre in Sustainable Desert Settlements, Southern Cross University, Coffs Harbour NSW, Australia

Madhu Singh
Senior Programme Specialist, UNESCO Institute for Lifelong Learning, Hamburg, Germany

Sean Tate
Consultant, World Bank, Washington DC, USA

Elwyn Thomas
Education Consultant, Institute of Education, University of London, UK

Parmanand Varma
(Deceased). Formerly at University of Detroit and Central Michigan University, Mt Pleasant, USA and St Clair College, Windsor, Canada

Veronica Volkoff
Senior Research Fellow, Faculty of Education, University of Melbourne, Australia

Greg Waddell
General Manager, Teaching and Learning, Kangan Batman Institute of TAFE, Melbourne, Australia

Jiping Zhao
Deputy Professor, Chongqing Industry Polytechnic College, Chongqing, China

# Introduction by the Series Editor

**Rupert Maclean**

Despite many international and national policies that have evolved in recent years in support of promoting sustainable development, the global picture is not encouraging. The state of the planet and the lives of the people who call it home have been documented by such bodies as the United Nations Development Programme, the United Nations Environment Programme and the World Bank. Data collected by these organisations paint a generally bleak picture of a decending spiral of unsustainable development.

Internationally, the social and economic costs of environmental degradation are very high. This environmental decline and lost social and economic opportunities are adversely reflected in the broad patterns of living conditions in various countries.

Education, especially skills development for work, employability, citizenship and conservation, is a critical way of addressing such pressing concerns. In fact, most countries are reviewing and reorienting their education systems to respond to the challenges posed by unsustainable development.

While sustainable development is now an important issue in technical and vocational education and training (TVET), much more needs to be done to explore the implications of this trend and to clarify how tensions and problems can be addressed in culturally appropriate and locally relevant ways. For example, how is it possible to integrate skills development for poverty alleviation and economic vitality and, at the same time, conserve resources and promote social and economic equality? This is a challenging issue but one which must be resolved if the problems associated with unsustainable development are to be controlled, and hopefully eventually eliminated.

There is a pressing need to effectively share innovations and best practices concerning the integration of sustainable development into TVET.

Such considerations need to be considered within the context of the 'new human centred development paradigm' which was elaborated at the Millennium Summit of the UN General Assembly in September 2000. With an emphasis on poverty eradication, infant, maternal and sexual health, literacy, housing, water security and environmental protection, the Summit agreed a set of Millennium Development

R. Maclean
Director of the International Centre for Education, Bonn, Germany

Goals (MDGs) underpinned by a global partnership for sustainable development. It is widely recognised that skills development for employability, and TVET, have an important contribution to make in achieving the MDGs.

Parallel with such developments, the international Education for All (EFA) programme emphasises vocational preparation within a context of social and environmental responsibility. Thus Goal 3 in the Dakar Framework for Action includes a call to 'ensure that the learning needs of all young people are met through equitable access to appropriate learning and life skills programmes.' This Goal emphasises the importance of skills development for employment and for effective citizenship, and the important relationship between these.

This book is the first that provides a comprehensive overview of the way education systems and institutions in a wide range of countries have responded to the call for an integration of learning for work, citizenship and sustainability. These matters were discussed in detail at the Second International Conference on Technical and Vocational Education, which was held in Seoul in 1999, and the follow up (Seoul plus Five) conference held in Bonn in October 2005 on 'Learning for Work, Citizenship and Sustainability'. Discussions at both the Seoul and Bonn conferences led to the conclusion that a new paradigm of both development and technical and vocational education and training was needed.

This book showcases the wide range of international initiatives that have sought to put such ideas into practice. It includes case studies of national TVET policy reforms, reoriented curricula, sustainable campus management programs, and examples of innovative approaches to integrating learning in TVET with on-the-job training and in community service. It also focuses on the issues and challenges being faced and ways of moving forward.

# Introduction: The Legacy of the Bonn Declaration

**John Fien and Rupert Maclean**

> *We have considered the emerging challenges of the twenty-first century, a century that will be an era of knowledge, information and communication. Globalization and the revolution in information and communication technology have signalled the need for a new human-centred development paradigm. We have concluded that Technical and Vocational Education, as an integral component of lifelong learning, has a crucial role to play in this new era as an effective tool to realize the objectives of a culture of peace, environmentally sound sustainable development, social cohesion, and international citizenship.*
>
> *UNESCO, 1999, p. 61*

## Introduction

This book is a legacy of the Bonn Declaration. This important document is the key outcome of the International Conference on Work, Citizenship and Sustainability which was held in Bonn, Germany, in October 2004 (UNESCO, 2005a). The participants from over 100 countries committed themselves to reorienting Technical and Vocational Education and Training (TVET) so that it contributes positively to 'quality skills development that leads to economically viable, environmentally sound and sustainable communities' (See Box 1). The chapters in this book are the result of the many conversations, seminars, workshops and conferences inspired by the Bonn Declaration. They have been written to document leading-edge thinking and practice in this orientation of TVET to sustainable development.

**Box 1 The Bonn Declaration**

We, the participants in 'Learning for Work, Citizenship and Sustainability', a UNESCO meeting of international experts on technical and vocational education and training, are agreed that, since education is considered the key

J. Fien
RMIT University, Melbourne, Australia
e-mail: john.fien@rmit.edu.au

**Box 1 (continued)**

to effective development strategies, technical and vocational education and training (TVET) must be the master key that can alleviate poverty, promote peace, conserve the environment, improve the quality of life for all and help achieve sustainable development. Our conclusion was reached following deliberations among 122 technical experts from Member States, intergovernmental and non-governmental organisations and industry who met in Bonn, Germany, from 25 to 28 October 2004, on the threshold of the United Nations Decade of Education for Sustainable Development, to assess progress since the Second International Congress on Technical and Vocational Education, held in Seoul, Republic of Korea, in April 1999.

1. Following the deliberations at this meeting, and recalling:
   - the recommendations of the Second International Congress on Technical and Vocational Education (1999),
   - the goals set out at the World Forum on Education (2000),
   - the Millennium Development Goals adopted by the UN General Assembly (2000), and
   - the Revised Recommendation concerning Technical and Vocational Education (2001) adopted by the UNESCO General Conference at its 31st session,

   the participants in this meeting of experts affirm that the appropriate development of TVET is central to the attainment of those agreed goals.
2. Recognizing that the vast majority of the worldwide labour force, including knowledge workers, require technical and vocational knowledge and skills throughout life, we affirm that skills development leading to age-appropriate TVET should be integral to education at all levels, and can no longer be regarded as optional or marginal. It is especially important to integrate skills development in Education for All (EFA) programmes and to satisfy TVET demand created by learners completing basic education.
3. Preparation for work should equip people with the knowledge, competencies, skills, values and attitudes to become productive and responsible citizens who appreciate the dignity of work and contribute to sustainable societies. We call on all stakeholders to adopt this broader perspective for TVET.
4. The development of TVET since the Seoul Congress clearly shows that there is enhanced recognition of this branch of education as a means to productive livelihoods and social cohesion. However, the UNESCO TVET Survey of 2004 has revealed that progress has been uneven. Renewed effort to modernise TVET and ensure its enhanced status and

**Box 1 (continued)**

sustainability is necessary. Increased scope for TVET is recognised in 'sustainability industries' such as environmental conservation, cultural heritage site preservation and renewable energy production.

5. Accordingly, we invite the Director-General of UNESCO to urge Member States, the concerned agencies of the UN system and other relevant stakeholders, both public and private, to build partnerships and to revitalise efforts to implement the recommendations that have not yet received sufficient attention or resources.
6. Given the scale of the task and the complexity of the conditions in which action must be taken, we ask that particular priority be given to TVET initiatives that alleviate poverty, promote equity, especially in relation to gender, arrest the spread of the HIV/ AIDS epidemic, support youth in crisis, support rural communities and people in excluded groups, encourage North-South and South-South cooperation and assist the development of countries in transition and those in and emerging from crisis and conflict. These TVET initiatives are pivotal to human-centred sustainable development.
7. As TVET experts, we call for approaches to development that harmonise economic prosperity, environmental conservation and social wellbeing. We therefore call for responses to globalization that humanise rather than marginalise, and for applications of information and communication technology that narrow the digital divide.
8. We commit ourselves, in each of our own countries and organisations, to taking the action necessary for quality skills development that leads to economically viable, environmentally sound and sustainable communities.

Bonn, Germany
28 October 2004

The chapters in this book are organised in four sections, each of which explores a particular issue or theme relevant to the work needed to be undertaken by TVET system leaders, administrators, curriculum developers and teachers as they seek to reflect upon the relevance of the Bonn Declaration in their own countries.

The first section canvasses recent thinking about development and begins to ask questions about what the emphases on conservation, human rights, equality and justice, peace and democracy in current thinking about sustainable human development might mean for TVET. The chapters in this section ask questions about the implications of major global trends for sustainable human resource development and about the approaches to development that would be followed 'if the planet and its people really mattered'. The answers to these questions lead to a consideration of the contrasting discourses of 'productivism' and 'ecologism' possible within TVET.

The chapters in Part II examine how TVET is responding to such new thinking about development. These chapters trace the ways in which important new themes and issues have risen in prominence in discussions about the nature, purpose and scope of TVET. These include themes and issues such as sustainable development, sustainable livelihoods, social sustainability, gender, Education for All, basic education, cross-cultural understanding and intercultural education, entrepreneurship and rural development. These issues are placed within discussions about the changing history and purposes of technology as a focus in education.

Part III provides case studies of experiences in a wide range of countries where efforts are being made to reorient TVET for sustainable development. The countries include, alphabetically, Australia, Azerbaijan, Canada, China, Germany, India, South Africa and the UK while the case studies provide examples of actions ranging from the levels of national policy and development assistance to curriculum development and review.

Part IV continues the exploration of case studies begun in Part III but, instead of a national perspective, the chapters in Part IV examine different ways in which the reorientation of TVET for sustainable development is being supported and enhanced. This includes examples of the development of principles of practice, support for school enterprises, the preparation of new curriculum resources, government-college covenants and innovative approaches to evaluation.

None of the chapters in any of these sections prescribes what should be done. This is because a central principle of both quality education and sustainable development – and, hence, the reorientation of TVET for sustainable development – is that they need to be both locally relevant and culturally appropriate. As a result, each of the thematic sections contains examples and case studies from a wide range of countries and regions. Some of the ideas in different chapters support or complement each other while other case studies and chapters have been deliberately chosen to show the diversity of philosophies and practices possible in reorienting TVET for sustainable development in different political and cultural contexts. As a guide for readers, each section concludes with a synthesizing chapter that points to areas of similarity and difference and, where appropriate, identifies questions, issues or problems that were not addressed in the case studies in the respective sections. The final chapter was written as a cautionary note to raise important questions about the diversity of philosophies and practices in TVET for sustainable development and to emphasise the need for a reflective approach to be taken when considering the implications of the chapters for different country contexts.

## The Importance of TVET

Technical and Vocational Education and Training (TVET) for the world of work has been identified by UNESCO Member States as a priority area within UNESCO's range of programme activities. This is to be expected since there is overwhelming evidence to demonstrate that TVET can play an essential role in promoting economic growth and the socio-economic development of countries, with benefits

for individuals, their families, local communities and society in general. Improving education for the world of work can help improve the incomes of poverty-stricken farmers, provide citizens with more choices in their lives, help alleviate poverty and help empower individuals who would otherwise be marginalized. Thus, TVET for the world of work also helps promote good citizenship (Lauglo and Maclean, 2005).

Unfortunately, in the past, TVET was often considered to be 'a second-class education' compared to university studies. However, today, TVET is 'increasingly seen as the master key to poverty alleviation and social cohesion and a chance for countries to jump on the bandwagon of development and globalization' (UNESCO, 2005b, p.1). A concern, however, is that most work opportunities in the twenty-first century are likely to be centred on new processes and services that require specialized knowledge and skills not yet available in general education institutions, especially in least developed countries. More effective TVET is also particularly needed in such countries in order to cope with the demands of the informal sector, thus 'integrating education and training for decent work, empowerment and citizenship' (Singh, 2005).

But what has this to do with sustainable development?

All countries want development, since this implies improvement; and they also want development that is long term and therefore sustainable. But communities increasingly want development that does not only stress economic matters but which also pays increased attention to key social, cultural, political and environmental considerations. Increasingly countries are not willing to accept economic development at any cost and expect the benefits of development to reach all sections of the community (UNESCO-UNEVOC, 2004).

There has therefore been, in recent years, a major redefinition of the meaning of development. This is particularly apparent in the Human Development Reports published by the UN Development Programme (UNDP), where development is no longer mainly defined in economic performance terms. Rather, a holistic approach is adopted, where development is considered in terms of overall quality of life, such as enlarging people's choices in life; enabling them to lead a long and healthy life; to acquire knowledge through education and training; to enjoy a secure and peaceful environment where there is personal security; to have the resources needed for a decent standard of living; and to achieve equality and fairness for all men and women, while preserving the environment for future generations.

Numerous UN meetings (such as the first UN Conference on Human Development held in Stockholm in 1972; the 1992 Earth Summit in Rio de Janeiro; and the 2002 World Summit on Sustainable Development in Johannesburg) have stressed the importance of paying greater attention to achieving sustainable development.

As the report of the World Commission on Sustainable Development that began this process (1987, p.43) wrote:

> Sustainability refers to the integration of environmental, economic and social considerations in development that optimises human and natural welfare and integrity for present and future generations ... (It refers to) ... meeting the needs of the present without compromising the ability of future generations to meet their own needs.

In essence, this means not living beyond our collective ecological means and not mortgaging the future for present benefits. As a result, there has been a reorientation of thinking and action in many fields of endeavour. This has placed an increasing emphasis on the notion of 'sustainability' whether it be a sustainable environment, sustainable economic development, sustainable agriculture, sustainable rural development, sustainable food security, sustainable socio-economic development and so on.

It is also recognised that education and training systems need to adapt and change to best meet such challenges. As education systems are modified to accommodate the inclusion of education for sustainable development, it is now widely accepted that to be most effective, a transdisciplinary, holistic approach should be adopted which emphasises the importance and inter-relatedness of the environment as a whole and the interdependence of its parts.

Business and industry today often speak of the 'triple-bottom-line' of their operations. Triple bottom line reporting is an approach to corporate accounting that reports not only financial matters but also the outcome of a firm's environmental and social activities. In other words, it represents an integration of social, economic and environmental goals and a move away from a single priority only on economic growth and profit. In a related way, sustainable development is a concept that embraces environmentally sound production and consumption, social equity and economically viable work organisations.

TVET for sustainable development is a process of incorporating into TVET considerations that impact on the long-term future of the economy, ecology and society. Building the competencies and commitments needed for such future-oriented thinking is crucial. UNESCO-UNEVOC refers to this as TVET for sustainable development. The next sections of this chapter are structured around the three key areas of sustainable development:

- TVET and economic sustainability;
- TVET and environmental sustainability;
- TVET and social sustainability.

## TVET and Economic Sustainability

'Progress towards sustainable development makes good business sense because it can create competitive advantage and new opportunities' argues Stephen Schmidheiny (1992), the founder of the World Business Council for Sustainable Development. Perhaps the most important business asset today is knowledge, rather than capital. Unfortunately, however, TVET in many countries remains locked into the role of being a supplier of skilled traditional labour to industry and is, thereby, unable to respond effectively to the needs of organisations in the 'Information Age'. Damon Anderson, the author of Chapters 3 and 11 of this book, attributes this to the culture of 'productivism' in TVET. Productivism assumes that economic growth is essential to human existence, despite any environmental impact and consequences.

Giving precedence to economic interests, productivism subordinates the needs of individual learners to those of industry and strongly prioritises work and 'employability' over the non-economic outcomes of TVET. This has resulted in TVET being seen only as 'training-for-growth' and 'skills-for-work'. The broader general education needed for personal autonomy, citizenship and sustainability is often overlooked.

Although the economic aspects of sustainability are very important, TVET systems, institutions and instructors need also to ensure that students and workers develop a different, wider set of economically-related knowledge, skills and attitudes. Four important new areas for which skills need to be developed are: economic literacy, sustainable production, sustainable consumption, and small business management.

- **Economic literacy** involves gaining an understanding of economics and then using that knowledge to make informed economic choices as consumers, producers, savers and investors and as effective participants in the local, national and global economy. It involves understanding how changes in government policies, taxation, interest and exchange rates as well as demographic and market trends may impact upon decisions to be made by individuals, families, communities and enterprises. In relation to the world of work, greater economic literacy can lead to an understanding of sustainable production and ways in which resources can be conserved, waste managed through recycling and reuse, and toxic waste and pollution minimised and controlled (National Council for Economic Education, 2002).
- **Sustainable production** is an approach to the manufacturing and delivery of 'goods and services in ways that respond to basic human needs and bring a better quality of life, while minimising the use of natural resources, toxic materials and emissions of waste and pollutants over the life cycle' (Norwegian Ministry of the Environment, 1994). This involves adherence to a series of principles including:
  - Integrating economic and environmental goals in policies and activities by measuring and valuing all inputs, outputs and by-products from the production process;
  - Ensuring that environmental assets are properly valued by identifying and costing all environmental inputs to ensure that the sale price reflects the full costs of production and delivery;
  - Providing for equity within and between generations by reducing the consumption of inputs through the redesign of products and processes;
  - Dealing cautiously with risk and uncertainty by ensuring that the long-term impacts of production are reconsidered in decision-making.
- **Sustainable consumption** is the necessary corollary of sustainable production. People of developed countries are among the world's largest consumers of natural resources and their production and consumption patterns have major environmental, social and economic impacts around the world. As indicated in

the Worldwatch Institute's report, *State of the World 2004*, 20 per cent of the world's population earn 85 per cent of the world's annual income, consume 75 per cent of global energy and over 80 per cent of other resources annually, and generate 75 per cent of annual global pollution. On the other hand, 2.8 billion people around the world do not have adequate access to food, water and shelter. Consumption provides one of the most potent examples of the inequalities that exist today. Thus, a key aspect of education and training for sustainable consumption is the integration of concepts of sustainable consumption into the planning of workplace production processes and in the daily lives and expectations of what it means to live a 'good life' in the minds of workers and their families. The 'seeds' for change must be 'planted' in TVET facility planning, procurement and use of materials, as well as in curricula, instructor training and institutional practices.

- **Small enterprise management** is also important for sustainable development. Many skilled tradespersons, former employees of larger businesses and even unskilled workers operate as sole traders or as part of very small (micro) businesses. The skills of creating and managing one's own job are vital in the popular (informal) economy which has become the main vector for productive activity for the majority of the world's poor, especially those living in the world's rapidly expanding cities. The popular economy, which comprises a multitude of often very small businesses, run by families or by individuals, represents the last resort against extreme poverty, youth unemployment and social exclusion. Jobs vary greatly, for example: recycling discarded household equipment, repairing machines, sewing, selling and transporting water. To contribute effectively to sustainable development, TVET also requires to address training needs for these jobs. To ensure that this takes place, TVET curricula should include entrepreneurship and small business management for those who will start their own enterprises.

## TVET and Environmental Sustainability

Using resources wisely and minimizing waste and pollution are central to ensuring that the natural environment will be able to continually supply business and industry with the natural resources and energy supply needed for economic development. There can be no long-term economic growth on a planet depleted of natural resources, too infertile to support the production of the plant and animal products upon which people and industry depend, and too polluted for humans to enjoy a healthy and productive life.

Environmental sustainability requires a change from the 'business-as-usual' approach to the sustainable production ethos described above. This involves the responsible use of raw materials such as energy and water, awareness of the impacts of production processes and careful management to minimise any unintended results of production.

Environmental imperatives call for the integration of environmental sustainability into all aspects of TVET. This will involve designing programmes and courses that:

- Develop an understanding of a range of environmental concepts;
- Encourage reflection on the effects of personal attitudes, values and lifestyle choice; and
- Promote skills for critical thinking and practical action.

## *Concepts*

A number of important concepts, previously seen as technical concepts pertaining to environmental studies, are moving into more common usage. Concepts such as 'carrying capacity', 'ecological footprint' and 'natural resource accounting' need to be better understood if TVET for sustainable development is to mature with rigour and accuracy. Box 2 contains a list of concepts related to environmental sustainability, which are likely to become much more familiar over the next years.

**Box 2 Key concepts in environmental sustainability**

**Sustainable development**: A process by which the needs of present generations can be satisfied without compromising the ability of future generations to satisfy their needs.

**Carrying capacity**: The capacity of ecosystems to support continued growth in population numbers, resource consumption, and waste production.

**Eco-space**: The total amount of energy, land, water and other resources that can be used regionally or globally without environmental damage, disadvantaging the capacities of others to meet their basic needs or impinging on the rights of future generations.

**Ecological footprint**: The area of land and water needed to support the total flow of energy and materials consumed by a person, household, community or workplace.

**Natural capitalism**: An approach to managing workplace processes in ways that restore, conserve and expand natural resources (stocks of natural capital), use, recycle and reuse resource inputs as efficiently as possible. In addition, this approach assumes responsibility for making products last longer and easier to dismantle for reuse or recycling.

**Box 2 (continued)**

**Natural resource accounting**: A strategy that helps a household, corporation or government calculate its real wealth, that is the value of total economic production minus the value of the natural and social capital consumed to achieve it.

**Eco-efficiency**: A strategy for maximising the productivity of material and energy inputs to a production process that also reduces resource consumption and waste production and generates cost savings and competitive advantage.

**Life cycle analysis**: A management tool for identifying the net flows of resource and energy used in the production, consumption and disposal of a product or service in order to leverage eco-efficiency gains.

**'Triple Bottom Line' reporting**: An approach to corporate accounting that reports not only on financial matters but also the outcomes of a firm's environmental and social activities.

**Environmental management system**: A co-ordinated approach to ensuring that all environmental issues are taken into account in the workplace and regularly monitored and improved to ensure compliance.

**The 5 Rs:** Reduce, reuse, renew, recycle and rethink!

**Local-global links**: The recognition that the production and consumption of a product or service in one part of the world is dependent on flows of energy and materials in other parts of the world and that this creates potential opportunities and losses economically, socially and environmentally at all points in the local-global chain.

**Interdependence:** The relationships of mutual dependence between all elements and life forms, including humans, within natural systems.

**Biodiversity:** The diverse and interdependent composition of life forms in an ecosystem that is necessary for sustaining flows of energy and materials indefinitely.

**Interspecies equity**: A consideration of the need for humans to treat creatures decently, and protect them from cruelty and avoidable suffering.

**Intragenerational equity**: A consideration of the need to ensure that all individuals and societies have access to the resources required to satisfy basic human needs and rights.

**Box 2 (continued)**

**Intergenerational equity**: A consideration of the need to live of net resource production rather than natural capital in order to enable future generations to access a world that is at least as diverse and productive as the one each generation inherits.

Source: Compiled from various sources, including Wheeler (2001) and Fien (2000)

## *Attitudes and Values*

Environmental sustainability also requires a conscious commitment by all to reflect upon the values and principles that guide our actions. All cultures, communities, individuals and workplaces have their own views on what such values and principles should be. Given the need for sustainable development to be locally relevant and culturally appropriate, it is not possible to outline specific values to be encouraged by TVET. However, programmes should encourage students to reflect upon their own values, how they affect lifestyle choices and the social, economic and environmental impacts that would result if everyone in the world believed and acted as they did.

Such programmes might also provide opportunities to reflect upon the relevance and likely impacts of the values held by other communities and cultures and the applicability to consumption and production choices of the values in an ethic such as the 'Earth Charter', for example:

- Respecting Earth and life in all its diversity;
- Caring for the community of life with understanding, compassion and love;
- Building democratic societies that are just, sustainable, participatory and peaceful; and
- Securing Earth's bounty and beauty for present and future generations (See www.earthcharter.org).

## *Skills*

The critical thinking and practical skills to be enhanced to promote environmental sustainability include those of:

- Applying concepts related to environmental sustainability to the workplace;
- Evaluating the sustainability of the work environment;

- Identifying the environmental strengths of the work environment as well as areas in which change may be desirable and possible;
- Envisioning alternative ways of working and evaluating alternative possibilities for action; and
- Negotiating and justifying desirable changes with work colleagues and supervisors.

The importance of developing the knowledge, skills and attitudes that support environmental sustainability may be seen in a case study of the ethical issues associated with technological modernisation. One aspect of technological modernisation has been the development of modular technology which means rather than repairing components it is easier to replace an entire module. The contribution of this ethos to environmental degradation and the frivolous waste of resources present a moral dilemma. We must ask whether the price of 'progress' is too high. This question is even more poignant in developing nations, where replacement components are either unavailable or too expensive. Moreover, the cost for a TVET system to procure and stock modular replacement parts may be well beyond budgetary limits. Further, the question of how to dispose of replaced modular components raises issues of potential environmental damage, on the one hand and recycling potential, on the other hand.

Thus, TVET institutions and curricula need revision to include attention to the repair and recycling of modular components. If recycling is added to TVET curricula, it is possible for recycling industries to be developed. Examples are the recharging of expensive computer printer ink cartridges, the recycling of plastic containers, etc. into fence posts in countries with denuded forests. TVET has the potential to foster such 'culture change' by presenting alternative entrepreneurial models to students.

## TVET and Social Sustainability

On both the global and local scale, social sustainability involves ensuring that the basic needs of all people are satisfied and that, regardless of gender, ethnicity or geography, all people have an opportunity to develop and utilize their talents in ways that enable them to live happy, healthy and fulfilling lives.

As John Lawrence and Sean Tate argue in Chapter 12, sustainable livelihoods are central to social sustainability. Meaningful work plays an important role in this. The concept of sustainable livelihoods embraces existing concepts of work and employment but widens them to include the multiple forms of economic and non-economic activities through which people create opportunities to sustain themselves, their families and communities. The UN Development Programme defines the resources underpinning livelihoods as including not only natural resources such as land, water, air and vegetation, but also social resources (community, family, social networks political participation and empowerment, education and health) as

well as financial resources and physical infrastructure. The wide view of resources and abilities in the concept of sustainable livelihoods raises questions about the traditional 'person-job' relationship that forms the foundation of many approaches in TVET. It is important to ensure that young people receive the best education possible to prepare them for a life of productive employment and to have the entrepreneurial skills not only to develop work opportunities for themselves and others but also to have the commitment and initiative to contribute to the social, economic and environmental wellbeing of their communities.

Thus, basic education is central to effective TVET. Literacy and numeracy are vital here. The health and safety of workers often depends upon their ability to read instructions (for example on fertiliser bags) and to make accurate calculations (e.g. of mixing and application levels). The wider skills of scientific and social literacy are also important in terms of, for example, equipment maintenance and repair and understanding technological change (scientific literacy) and for group work, dialogue and negotiation with colleagues and supervisors, gender and ethnic tolerance and other skills needed for harmonious relations in the workplace (social literacy). The application of such literacies to the world of work and active citizenship need to become core dimensions of TVET if it is to respond to the imperatives of social sustainability.

Lourdes Quisumbing (2001), one of the authors of Chapter 33, has argued for a 'holistic and integrated human resource development programme for TVET' that 'aims to prepare the individual to become a responsible, free and mature person, equipped not only with the appropriate skills and know how of the latest technologies, but also with deep human and spiritual values and attitudes – a sense of self worth, self esteem and dignity'. Central to the development of knowledge, skills and attitudes for social sustainability, she argues, are the abilities:

- To work by oneself and with others in teams, with integrity and honour, with honesty, punctuality and responsibility;
- To adapt to varying situations; to know and understand problems and issues; and to work out solutions creatively;
- To resolve conflicts peacefully;
- To have a good grasp of the reality of the world, of oneself and of others;
- To possess some general knowledge with specialization in some field or area of work; and
- To continue learning and pursue lifelong education in a learning society.

A focus on the knowledge, skills and attitudes for social sustainability can develop all the powers and faculties of the individual – cognitive, affective and behavioural. From them can flow, according to Quisumbing, such 'work values and attitudes as creativity and adaptability, productivity, quality and efficiency, patience and perseverance, loyalty and commitment, freedom and responsibility, accountability, the spirit of service, a futures orientation, and a genuine love for work itself be developed'.

This view places ethics at the heart of developing social sustainability through TVET. The ethical and moral implications associated with social sustainability include:

- **Respect for cultural diversity** is a core value in social sustainability. All people have the right to employment regardless of their ethnic or racial heritage and their religious beliefs. The rights to employment of indigenous peoples are especially important. This applies also to opportunities for further training and promotion. The internationalisation of the workforce through globalisation and labour migration also emphasises the importance of developing respect for cultural diversity in all TVET programmes.
- **Gender equality** is also a core value in social sustainability. The rights of women to equality of outcomes from education and training (as well as access) and to equality of employment opportunities, working conditions, access to further training and promotion are important human rights that need to be enshrined in TVET programmes. The vital importance of freedom from discrimination and sexual harassment, associated monitoring, reporting and disciplinary processes also need to be taught. These are matters for both male and female students and workers: women need training in ways of protecting their rights and freedoms in the workplace while men need training in their obligations to respect and honour all their work colleagues.
- **Workplace relations:** One positive result of the reduction in levels of management and the increase in workers' levels of educational attainment has been the empowerment of workers to advise management of better ways to operate or produce finished goods. This reduction from as many as eight to as few as three levels of management has improved communications between labour and management. Historically, communications between employers and employees has been mainly top-down. Increasingly it has become the practice of enlightened employers to utilise ideas from their employees that improve production and reduce waste. The same holds true for the creation of sustainability, both in TVET and in the workplace. Relations between co-workers also benefit from improved communication and tolerance of others' differences. It goes without saying that a contentious workplace is not likely to be a sustainable one.
- **Teamwork at the workplace:** A harmonious workplace is one at which teamwork is both valued and practiced. Teamwork appears to have taken on new importance in the Information Age. Many writers exhort TVET institutions at all levels to concentrate upon the training of knowledge workers, defined as those 'who use logical-abstract thinking to diagnose problems, research and apply knowledge to propose solutions, and design and implement those solutions, often as a member of a team' (Wilson, 2001, p.23). The assembly line principles and practices in the Information Age – in particular the assembly of electronic equipment of all types – necessitate the enhancement of teamwork principles to ensure sustainability. Productivity measures, for example the failure rate of assembled equipment, highlight the importance of teamwork. Therefore, it is incumbent upon TVET institutions to foster the necessary climate and/or

'culture' of teamwork right from the initial entry of students and trainees into TVET institutions. It is also imperative that TVET teachers and instructors set a correct example by functioning as a team.

- **Relations between employers and employees:** Conflict between labour and management has been a long-standing impediment to harmonious relationships between employers and employees. However, in some countries enlightened employers recognise that harmony is directly related to improved productivity, reduced spoilage and even innovations suggested by employees. Many collective agreements now include mechanisms for continuing TVET, delivered either at the workplace or by means of released time for employees to attend off-site seminars, workshops and courses. In some instances employers pay or reimburse tuition fees. The contribution of such initiatives to employee retention constitutes yet another sustainable innovation. Regrettably, most employer-sponsored training in industrialised countries is provided to sales and managerial personnel, rather than to production and service personnel. In order for on-the-job learning to become sustainable, it will be necessary for larger numbers of employers to recognise the benefits of continuing TVET.
- **Safety:** Considerations of safety are of prime importance in TVET and at the workplace. Employers are responsible for the working conditions and well-being of their employees. Employees are responsible for actions that might place their peers in peril, produce dangerous or sub-standard goods or damage property. This suggests that another aspect of safety is the protection of TVET students/trainees and employees at the workplace. Making TVET more sustainable in the safety domain involves continuous attention to safe working conditions in all types of education and training, as well as at the workplace. Safety considerations should be prominent in the design of TVET facilities and the procurement of equipment. Safety is often given the highest priority in TVET curriculum development. During training there are limits to openness and participation because the teacher or instructor is responsible for the safety of the learners and at times must exercise firm control. Yet, despite this imperative, there is a need for a 'culture change' from the didactic rote-learning heritage of TVET to an experiential and facilitative approach by teachers and instructors.
- **Citizenship:** Social sustainability depends upon the willingness of people to co-operate in building and safeguarding a fair and democratic society. Reciprocal rights and responsibilities are important in a democracy, where the collective voice of citizens is the source of all legitimate authority. These rights include: quality before the law and the freedom to vote, to speak freely on public issues and to participate in public interest groups. The duties of responsible citizenship include: paying taxes, obeying laws, demonstrating commitment and loyalty to democratic ideals, etc. The rights and responsibilities of citizens extend to the workplace also. This is why respect for gender and cultural differences and skills for developing harmonious workplace relations, teamwork and negotiating improvements in work practices are so important to social sustainability. TVET has key responsibilities to ensure that these civic disposition and participation

skills are developed with experience. This can perhaps best be done through various kinds of learning experiences such as:

- Student participation in democratically conducted student organisations;
- College-facilitated community service that is connected directly to the curriculum and classroom instruction; and
- Co-operative learning activities in which groups of students co-operate to pursue a common goal, such as inquiring about a public issue or responding to a community problem (see Battersby, 1998).

## Conclusion

The discrete discussion of economic, environmental, social and political sustainability should not be taken as meaning that these different aspects of sustainability exist in isolation. Sustainable development depends upon the balanced integration of all systems. The discussion has separated them here as a way of illustrating the various dimensions of each one. Thus, it needs to be emphasized that access to sustainable livelihoods and the resultant personal fulfillment and social development underpin economic prosperity. While we need to have an economy that is innovative, with sensible competitiveness and good productivity, these will not last long unless we are also sensitive to environmental imperatives and develop an economy that is sustainable and resilient (see Ralph, 2001). TVET is vital to achieving this integrated view of sustainable development.

As stated at the beginning of this chapter, the chapters in this book examine various ways to orientate TVET to support sustainable development. All demonstrate the significance of skills development for employability and citizenship, and of improving the links between education and the world of work. All focus on how TVET can, in a number of diverse ways and settings, support sustainability. Together they provide the most comprehensive examination to date of how TVET is being – and can be – reoriented to support sustainable development. They make a well-argued case concerning the importance of education for the world of work as an essential aspect of education for sustainable development. However, as also stated at the beginning of this chapter, the contributions in this book have not been written as prescriptions to follow. Rather, readers are invited to consider the range of ideas in each section, reflect upon them in the light of the relevant synthesizing chapter and the cautionary note in the final chapter – and then to adapt the ideas as appropriate to different education and cultural settings. It is in this progressive contextualization that the value of this book resides.

## References

Battersby, M. (1998) Education for Citizenship: Service-Learning and the Reflective Citizen. *Learning Quarterly*, 2, 3–6.

Fien, J. (2000) Listening to the Voices of Youth: Implications for Educational Reform, in D. Yencken, J. Fien, and H. Sykes, (eds.) *Environment, Education and Society in the Asia-Pacific: Local Traditions and Global Discourses*. Routledge: London,

Lauglo, J. and Maclean, R. (eds.) (2005) *Vocationalisation of Secondary Education Revisited.* Springer: Dordrecht.

National Council for Economic Education (USA) (2002) *Campaign for Economic Literacy: Challenge and Response*. http://www.ncee.net/cel/. Accessed 8 March 2008.

Norwegian Ministry of the Environment (1994) *Report of the Symposium on Sustainable Consumption*. Ministry of the Environment: Oslo.

Quisumbing, L.R. (2001) *The Importance of Values Education for TVET and its Economic and Human Resource Development Program*, Paper presented at the UNESCO Asia Pacific Conference: Adelaide.

Ralph, D. (Australia) (2001) *New Directions in the Science and Art of Teaching*. http://www.decs.sa.gov.au/octf/files/links/5.2.pdf. Accessed 8 March 2008.

Schmidheiny, S. (1992) *Changing Course: Global Business Perspective on Development and the Environment, Business Council for Sustainable Development*. MIT Press: Cambridge MA.

Singh, M. (ed.) (2005) *Meeting Basic Learning Needs in the Informal Sector: Integrating Education and Training for Decent Work, Empowerment and Citizenship.* UNEVOC Technical and Vocational Education and Training Series, Volume 2. Springer: Dordrecht.

UNESCO-UNEVOC (2004) Technical and Vocational Education and Training and the 'Triple Bottom Line' of Sustainable Development. *UNEVOC Forum* Supplement 4, in *UNESCO-UNEVOC Bulletin*, September 2004, No 9.

UNESCO (2005a) Vocational Education: The Come-back? *Education Today*, No 13, April–June, pp. 4–7.

UNESCO (2005b) *Learning for Work, Citizenship and Sustainability: Final Report*. UNESCO-UNEVOC International Centre: Bonn.

United Nations Development Programme (annual) *Human Development Report*. Oxford University Press: New York.

Wheeler, K.A. (2001) Introduction, in K.A. Wheeler and A.P. Bijur, (eds.) *Education for a Sustainable Future: A Paradigm of Hope for the 21st Century*. Kluwer Academic: New York.

Wilson, D.N. (2001) Reform of TVET for the Changing World of Work. *Prospects*, XXXI, 1, 21–37.

World Commission on Sustainable Development (1987) *Our Common Future*. Oxford University Press: New York.

Worldwatch Institute (2004) *State of the World 2004: The Consumer Society*. http://www.worldwatch.org/pubs/sow/2004. Accessed 8 March 2008.

# Part I
# New Thinking on Development

# Chapter 1
# Global Trends and their Implications for Sustainable Human Resource Development through TVET

**Man-Gon Park**

## Introduction

The adoption of the UN Millennium Development Goals worldwide had made a significant impact on world trends *vis-à-vis* demography, economic size, the information and communication technology (ICT) divide and pressing problems in labour market systems. These trends traverse each other to create an integrated picture of the diversity of the world and all its regions, including the changing composition of its workforces, the movement of people, population growth and mix and access to technology, among others. An understanding of these forces of change strengthens the capacity of a country or a region and highlights how they will cope with resulting problems such as an increasingly aging population, low income, unemployment, inadequate access to information and communication technologies, the brain drain, rapid population growth and other forms of imbalance.

Researchers the world over are busy creating technologies that will change the way we conduct business and live our lives. These are completely new technologies that could soon transform computing, medicine, manufacturing, transportation and our energy infrastructure. *Technology Review*, the oldest technology magazine in the world owned by the Massachusetts Institute of Technology, has identified 10 emerging technologies which, when adopted, will revolutionize the world. These technologies are wireless sensor networks, injectable tissue engineering, nano solar cells, mechatronics, grid computing, molecular imaging, nanoimprint lithography, software assurance, glycomics and quantum cryptography (*Technology Review*, 2003). In addition, other technologies, such as the six technologies, digital cocooning, insperience and ubiquitous technology, have been diffusing through the world and are expected to transform the global technological landscape.

Besides the changing labour market and the challenges of globalization, these technological trends impact on evolution in the workforce and consequently, on the workplace as well. As workers are now heading from standard to non-standard

M.-G. Park
Division of Electronic, Computer and Telecommunication Engineering, College of Engineering, PuKyong National University, Republic of Korea
e-mail: mpark@pknu.ac.kr

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employment, from agricultural to services sectors and towards hypertext jobs, there is a need to readjust existing resources and reformulate strategies so that workers can seize the opportunities offered by the emerging trends. Without such adjustments, organizations will either collapse or will continue to work inefficiently, moving gradually towards eventual obsolescence.

However, this is not as simple as it sounds. Global disparities in education as well as in the economy, country-by-country imbalances in demography and technology and inequality in gender, race and family economic status remain conspicuous. There is divergence in the capacity of human resources in the various regions of the world to produce goods and services. Some workers in developed countries are adept at using sophisticated technological gadgets, while their counterparts in developing countries can hardly cope at all. Developed countries are troubled by the alarming increase of an aging population, while developing countries are experiencing a youth bulge. If nothing is done, this condition will aggravate the widening human resource gap, thus perpetuating, instead of arresting, the vicious cycle of poverty for developing economies.

The call of the moment is therefore to produce people with quality human resources who can function well in the changing society by redirecting resources to these national and global challenges. Labour market information systems should focus on providing for workforce mobility. Allied to this is the role of technical and vocational education and training (TVET) in addressing these hot issues and concerns. As the master key that unlocks the doors to poverty alleviation, greater equity and justice, TVET is not merely an option but a necessity.

The objectives of this chapter are twofold: first, to present a picture of the world in the light of demographic trends, changing work patterns, the workforce and the workplace, creating and pursuing regional trends, labour market openings for workforce mobility and the technological divide between rich and poor countries; second, to emphasize the importance of the role of TVET in facing the challenges posed by these global trends towards sustainable human resource development with changes in the technological environment.

## New World Trends in Human Resources Development

The widening global disparity in demography, imbalances in country-to-country economic trends and technological divide, and inequality in gender, race and family economic status continues to persist in contemporary times. These diversities pose greater challenges for all human resource development efforts to enhance productive capacities and optimize the resources for productive outputs.

The ensuing discussion considers new global trends resulting from recent specialized surveys conducted by international organizations such as the UN, the World Bank and the International Labour Organization. A review of these new global trends and future prospects provides the basis for assessing the progress made in achieving internationally agreed development goals, such as the Millennium Development Goals.

## *Demographic Trends*

Historians always claim that the rise and fall of civilizations are closely linked to demographic trends. A clear awareness of these trends and their implications for human resources development provides a foundation for future challenges, given certain projections. The drivers of these demographic trends, such as population size and growth, an aging population, international migration and urbanization, herald an ever-evolving set of challenges for educational administrators.

### Population Size and Growth

A stable world population would make a crucial contribution to the achievement of sustainable development. On the other hand, a high population growth rate demands more food and social services such as education, training and employment, health and recreation, and when these are not satisfied a decline in the standard of living often results.

The present population of the world is rather big, expanding from a modest 150 million people in AD 1 to a projected 8 billion by 2020 (CIA, 2001). The manner by which the population has grown has been very dramatic. It took the several million years of humans to reach their first billion in 1800, a hundred years to reach their second billion and a decade for each new billion to be added to the existing population. Figure 1.1 illustrates this trend.

Figure 1.2 shows the regional distribution of the projected population of the world by 2020. It shows a marked concentration of people in Asia, followed from a far distance by Africa, the Americas and Europe.

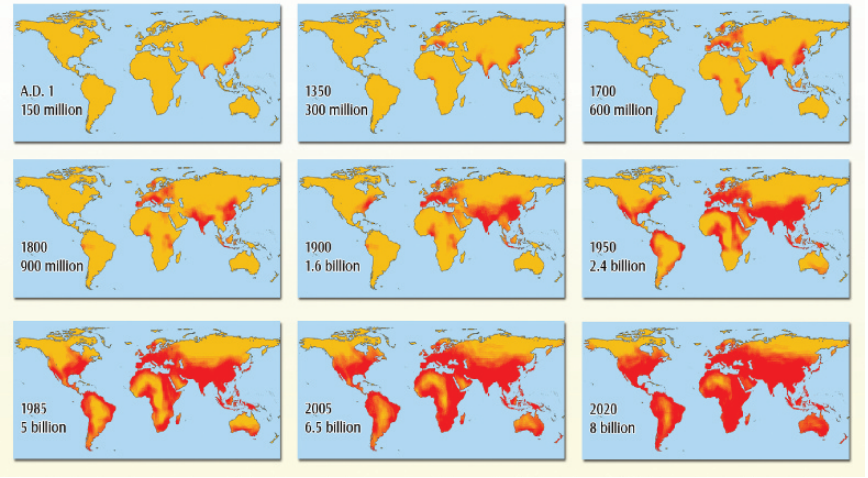
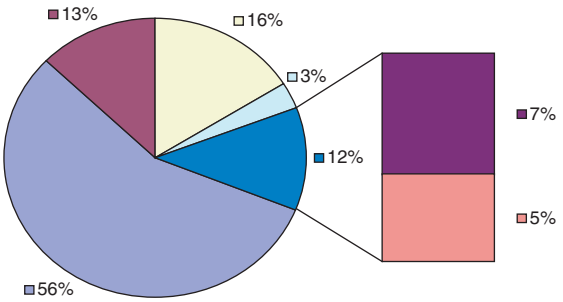



**Fig. 1.1** Growth of human population




| Percentage | Region |
|---|---|
| 56 | Asia |
| 13 | America |
| 16 | Africa |
| 3 | Middle East |
| 7 | Eastern Europe and former Soviet Union |
| 5 | Western Europe |

**Fig. 1.2** Regional distribution of the world population by 2020
Source: Central Intelligence Agency, 2001

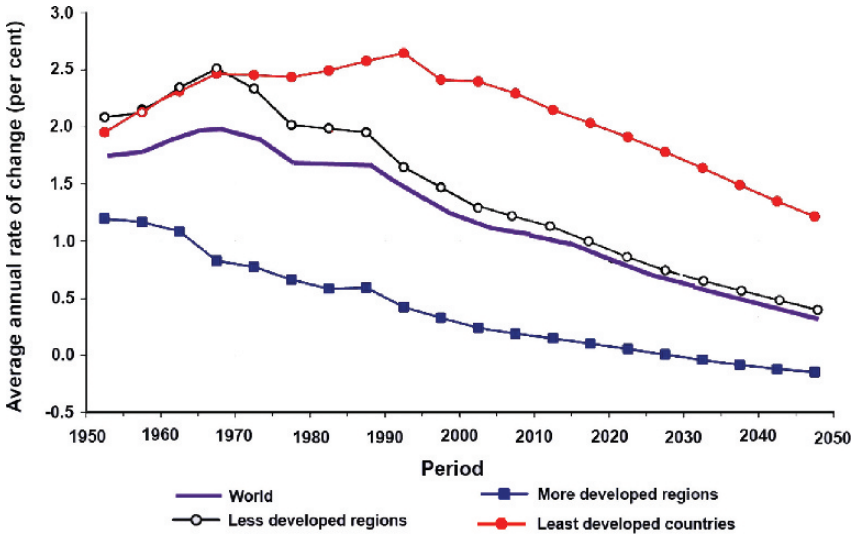



**Fig. 1.3** Average annual rate of change of the world's population
Source: UN, 2005

Figure 1.3 shows that the world population growth increased slowly in the 1950s but started to decelerate after reaching a peak at 2 per cent in 1965–1970 (UN, 2005). Since then the world population growth rate has continuously declined, so that it reached 1.21 per cent per year in 2000–2005 and it is expected to drop further to 0.37 per cent per year by 2045–2050. However, the growth rate in the less developed regions (1.4%) is higher than that in the more developed regions (0.3%), and the least developed countries, as a group, are experiencing even more rapid population growth at 2.4 per cent per year.

## The Ageing Population

An increase in the number of countries with an ageing population will slow down their economic growth, capital markets, investment and trade. By 2050 Europe, Japan, Russia and China will face the most immediate impact of aging, when more than 15 per cent of their population will be over the age of 60 (Fig. 1.4). In addition, the youngest regions of Latin America, Asia and Africa will also have a significant percentage of ageing populations.

As Figure 1.5 shows, by 2050 the rate of increase in the share of population aged 60+ is highest higher among the more developed countries (34%) and lowest among the least developed countries (17%).

The increasing ratio of retirees in the developed countries will strain social services, pensions and health systems. Governments will seek to address the problem by such tactics as delaying the retirement age, supporting small and medium

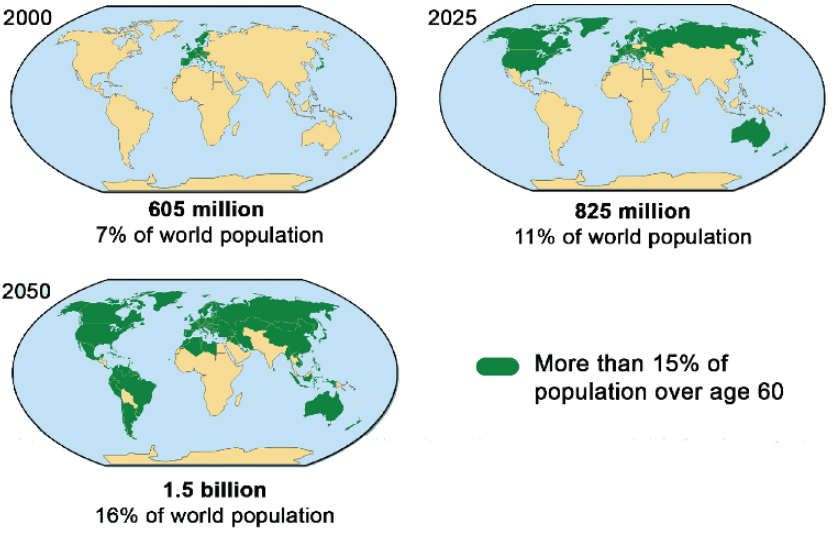



**Fig. 1.4** The world's ageing population

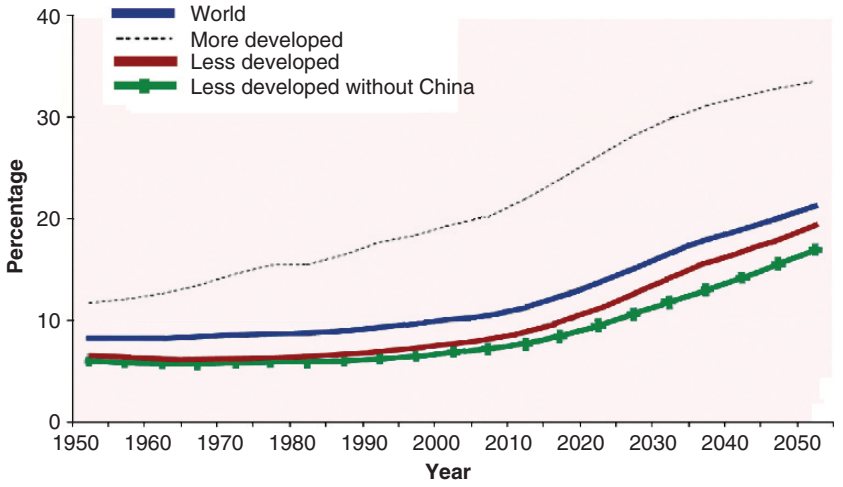



**Fig. 1.5** The rate of increase in the share of population aged 60 and above
Source: UN, 2005

enterprises for retirees, encouraging greater participation in the workforce by women and relying on migrant workers.

### International Migration

International migration is caused by several push and pull factors: widespread unemployment, lack of farmland, famine, or war at home; or a booming economy, favourable immigration laws or free agricultural land in the area to which the migrant is moving. One of the offshoots of international migration is the brain drain–brain gain syndrome in the migrant's country of origin and country of work, respectively. Because of the exodus of a significant portion of its intellectual capital, the country of origin cannot compensate for its investment in education. This will dampen economic growth at home. Measures must therefore be undertaken by the country of origin to minimize this alarming trend if it desires to retain its highly educated personnel.

The following patterns are expected in view of these immigration trends: (a) the mobilization of the workforce across national borders to continue, with outmigration from less developed to more developed countries; (b) a disparity of skills and competencies with the optimum qualifications required to remain a concern for both employers and migrants and (c) the growth of demands to standardize and harmonize TVET systems through accreditation and certification.

By 2040–2050, northern America, Europe and Oceania will be the recipients of 1.4 million, 700,000 and 100,000 immigrants, respectively (Fig. 1.6). Asia has been a substantial source of migrants since the 1990s, followed by Latin America and the Caribbean, and then Africa (UN, 2005).

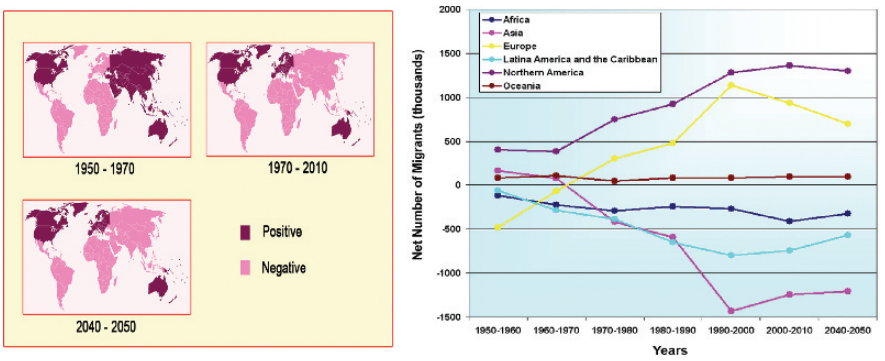



**Fig. 1.6** Trends in international migration, 1950–2050

## Massive and Rapid Urbanization

Urbanization may be an opportunity or a threat. It is an opportunity to share in the benefits of modernization and advanced technologies and a threat when urban sprawl uncontrollably depletes resources, pollutes the environment due to overcrowding and challenges the adequacy of existing services and infrastructures, thereby rendering development unsustainable.

Figure 1.7 indicates that the ratio of urban to rural dwellers is steadily increasing. Indeed, it shows that between 2005 and 2010 half of the world's population will be urban dwellers. Urban dwellers in the less developed regions are expected

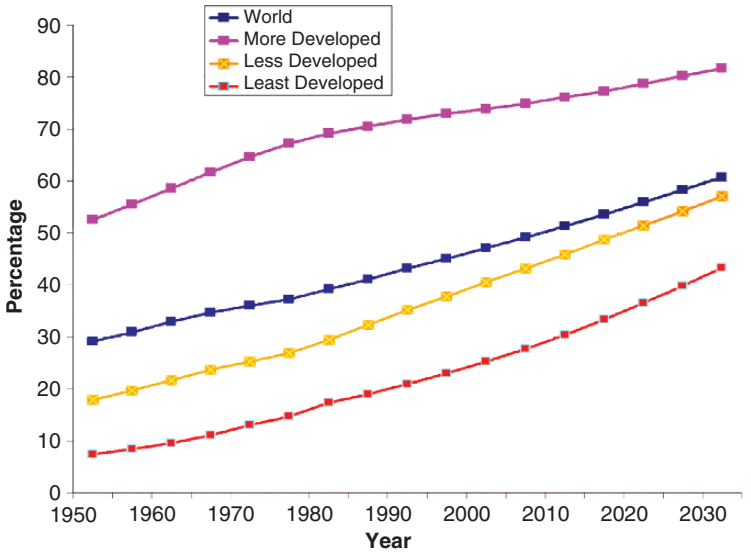



**Fig. 1.7** Urban population trends, 1950–2030
Source: UN, 2005

to outnumber rural dwellers by 2020, while the more developed countries become more urbanized to reach 81.7% of the total population by 2030 (UN, 2005).

## *Economic Trends*

The widening gap between the haves and the have-nots breeds unsustainability. The haves continue extravagantly exploiting resources while the have-nots remain deprived and vulnerable. Such a situation calls for a robust policy response at both the national and international levels, so that all countries can achieve the Millennium Development Goals and other agreed development objectives.

### Poverty

While the world is globalizing and economies are booming, a significant proportion of the populace remained shackled in the bondage of poverty. Poverty exists everywhere, and is an all-encompassing challenge. Through its Millennium Development Goals the UN aims to eradicate extreme poverty and hunger, with the specific target of halving the number of people in the world living on less than $1 per day between 1990 and 2015.

It is reported that although the ratio of the world's population living in absolute poverty (living on less than one US dollar per day) has diminished since the mid-1980s, the pace is still below what is required to achieve the specific Millennium Development Goals (World Bank, 2004, 2006). According to the same report, poverty rates in Asia will decline the fastest, with a marked reduction of poverty in China. South Asia, with the accelerating growth in India, will be able to exceed this goal. Further, the trends for countries of Europe and Central Asia as well as the Middle East and North Africa will follow a declining pattern such that in 2020 their poverty level will drop to half their current level.

### Unemployment

The world's unemployment figures cannot be ignored. Figure 1.8 shows that the unemployment rate for 2005 was 6.3 per cent, which is the same as in the 2004 and 3 per cent lower than a decade earlier. The highest unemployment rate was recorded in 2002 (6.6%) and the lowest in 1995 (6.0%). Almost 191.8 million people were unemployed around the world in 2005, an increase of 2.2 million since 2004 and 34.4 million since 1995 (ILO, 2006b).

### Technological Divide

Advances in ICT could transform the world by reducing poverty and fostering development, but access to ICT is highly unequal across and within countries. This increasing gap, otherwise known as the technology divide, marginalizes developing countries and makes it hard for them to attain sustainable development. The implications of the technological divide pose a challenge to counties to leapfrog communications into a new level and close the existing gap.

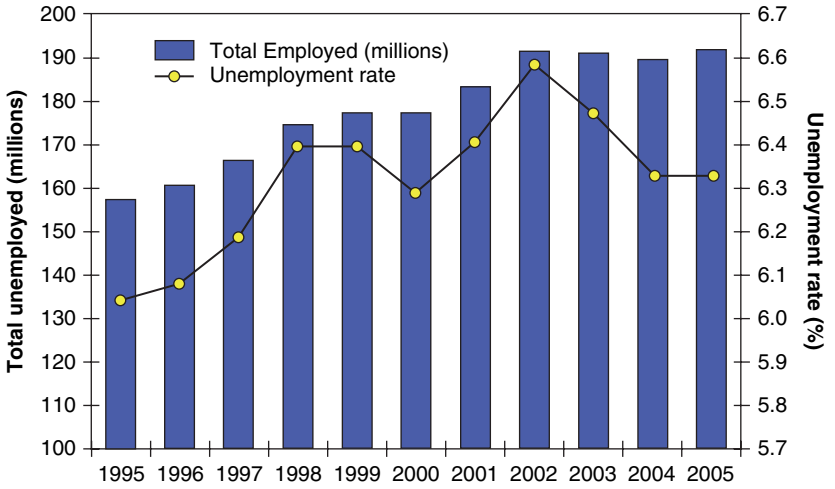



**Fig. 1.8** World unemployment rate, 1995 to 2005, in millions
Source: ILO, 2006

Use of mobile phones, telephone services and the Internet are the most common indicators of ICT access. Mobile phones provide links for all – farmers, entrepreneurs, teachers, skilled workers and more. The Internet also spurs a growing wave of innovation, ushers in new services and more cost-effective network solutions – especially in countries where service providers are allowed to build their own networks and gateways. By connecting people and places ICT has played a vital role in sustainable development.

Figure 1.9 shows that telephone services have opened out more of Europe and Central Asia, Latin America and the Caribbean, East Asia and the Pacific than the Middle East, sub-Saharan Africa and South Asia, both in 2001 and 2004 (World Bank, 2004). The same trend holds true for Internet subscribers.

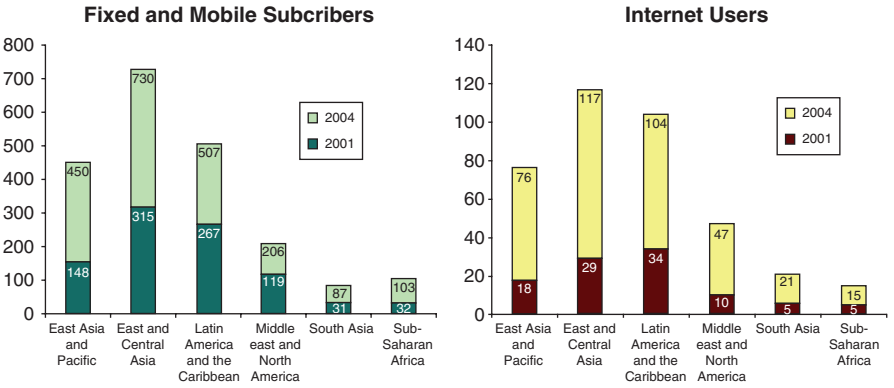



**Fig. 1.9** Telephone and Internet access per 1000 people
Source: World Bank, 2004

### *Pressing Problems in Workforce Mobility with Labour Market Openings*

The mobilization of the workforce across national borders (Fig. 1.10) is fast becoming seen not only as a natural phenomenon, but also as being good for the world. The movement of people and knowledge and technology is seen as the real driver and cause of globalization, generating the institutional and social changes that are taking place within and beyond national borders.

However, the workforce is faced with numerous problems due to the disparity between people's skills and competencies and the optimum qualifications required. Therefore there is a growing demand to standardize and harmonize TVET systems through accreditation and certification.

The trends described above are some of the indicators that may be important to consider when planning a TVET system for sustainable human resource development. Economic and labour market data are also important, as well as analyses of social frameworks to provide an orientation to needs and challenges.

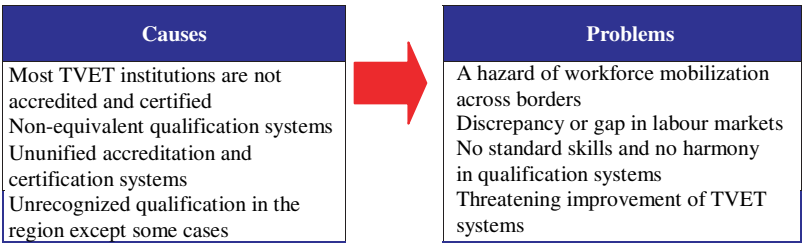



**Fig. 1.10** Causes and problems in workforce mobility

## Challenges for Sustainable Human Resource Development with Technological and Environmental Changes

Together with the disparities, imbalances and inequality across the world discussed above, new challenges in TVET for human resource development are fostered by technological and environmental changes, structural adjustments, labour market demands and workforce mobility. All these shape the future of TVET and the way TVET modules can help people to manage their future careers.

### *Technological Environmental Changes*

Having been considered the driving force in the transformation of civilization, the development and convergence of technologies has ushered in a revolution in every facet of human life.

### Ubiquitous Technology

Mark Weiser defined ubiquitous technology as a technology that is invisible, real, pervasive and transparent. It is invisible, or calm, because it uses tiny microchips and other computing devices and provides access to computing capability over a broadband network through lightweight devices. It is a technology that 'disappears', being inserted into various kinds of sensors (system-on-chip) into environments (such as the city, the home, the office or the factory) and objects (in objects, products, animals and plants). Ubiquitous technology is pervasive because computers are embedded everywhere with the help of MEMS, bio-MEMS, robots and thus support spontaneous self-acting and problem-solving. It is also transparent, offering free and effortless access, through networks, wireless and mobiles at ultra-high speeds (Park, 2006).

The networking environment for ubiquitous computing is a cross-space or a hybrid space, a convergence of electronic space and smart real space. Electronic space is the medium where the data flow around a computer network, such as its hardware, its software and the Internet. Physical space is composed of animate and inanimate matter. In ubiquitous technology, the environment is the cross-space which integrates the real with the virtual world.

### New Trends in Technologies

New trends are being created and pursued with technological evolutions such as (a) six technologies (IT, BT, NT, ET, CT and ST); (b) digital cocooning; (c) insperience (indoor + experience); (d) Web identity (Avata, MiniHome, and so on); (e) consumption curator; (f) ubitizen (ubiquitous + citizen); (g) digital multimedia broadcasting; (h) triple play service (Internet + tel + broadcast); (i) grid computing and (j) ubiquitous technology (Park, 2005a).

Digital cocooning is one of the new lifestyle trends springing up in South Korea, where more and more people are retreating to their homes instead of socializing with others. It is digital because the technology makes use of wireless gadgets to digital cocoons or the seclusion of their homes for privacy or escape. Cocooning is spawned by the creation of the Internet, home entertainment and progress in telecommunications so that most social and cultural interaction takes place at home. Digital zombies do not have to leave home at all. They can make money through work-at-home options and buy products by ordering them online. The trend is gathering momentum in Korea, a country is at the forefront of high tech, where four out of five homes are connected to the high-speed Internet and most people carry Internet-enabled phones.

Creating and pursuing new regional trends in works, workforce and workplace include (a) freeter (free + arbeiter); (b) the increasing number of freelancers telecommuters; (c) unstable professionals, such as doctors and lawyers; (d) mobilization of the workforce across national borders and (e) the advent of pan-Asia as a super growth block in Japan, the Republic of Korea, Taiwan, China, India and

**Table 1.1** Technology trends 2003

| | |
|---|---|
| **1** | Wireless sensor networks, small monitoring devices (motes) to monitor the environment, the machines and even people, and send reports wirelessly |
| **2** | Injectable tissue engineering, a technology of injecting joints with specially designed mixtures of polymers, cells and growth stimulators that solidify and form healthy tissue |
| **3** | Nano solar cells, use of nanotechnology to produce a photovoltaic material that can be spread like plastic wrap or paint |
| **4** | Mechatronics, the intersection of mechanics, electronics and computing, is being explored to make possible the generation of simpler, more economical, reliable and versatile systems |
| **5** | Grid computing, a technology that links almost anything else: databases, simulation and visualization tools, even the number-crunching power of computers |
| **6** | Molecular imaging, a technique that let researchers watch genes, proteins and other molecules at work in the body |
| **7** | Nanoimprint lithography, a method of fabricating nanometer scale patterns by mechanical deformation of imprint resist and subsequent processes |
| **8** | Software assurance tools to produce error-free software |
| **9** | Glycomics to understand the roles of carbohydrates in cell communication and lead to therapeutic approaches for treatment of human disease |
| **10** | Quantum cryptography, a tool in fortifying the security of electronic communications |

Source: Massachusetts Institute of Technology, 2003

the ASEAN countries. The 10 emerging technologies that will change the world are shown in Table 1.1.

Technology leaders should be aware of the need to improve existing common and special infrastructure in support of pervasive computing, digital convergence and stronger bandwidths. Provision of next generation Internet communication services, infrastructures and growth engines such as wireless broadband service, radio frequency identification, system-on-chip, embedded SW, digital multimedia broadcasting and others. Moreover, faculty and staff need retraining and uptraining in order to be responsive to the calls of the new technology in TVET institutions.

## Labour Market Demands with Workforce Mobility

Many countries have undergone major structural adjustment programmes in order to upgrade workers' skills to the level demanded by enterprise and the economy. Reforms were instituted to respond to the changing economic environment because countries were isolated from market forces and suffered from rigid political centralization and limited institutional autonomy. In Chile, South Africa and Australia reforms were built on the principles of (a) reduced public involvement in providing training; (b) partnership in governance and (c) increased reliance on market mechanisms. These reforms included adopting standard skills, providing a framework of regional vocational qualifications and moving towards the internationalization of education and the universalization of the curricula, accreditation and certification, improving the labour market information system, enhancing international networks for stronger collaboration and co-operation and providing

employment support systems in the form of WorkNet and CareerNet network systems, and improvements in employability. Table 1.2 outlines the reforms made in Asia–Pacific countries (Park, 2005a,b).

**Table 1.2** TVET reforms in Asia–Pacific countries

| Reforms | Description of Reforms |
|---|---|
| **Standard skills** | Some countries are moving toward national qualifications systems as a means to raise occupational standards and facilitate labour mobility. These standards, benchmarked from existing national standards, describe the abilities, skills, knowledge and operations to be possessed by an individual for a specific occupation, industrial process or technological application. The recognition of national skill competencies/qualifications in the region and in the world will spur the free movement of skills while focusing on common vocational standards. This will help the workers increase their marketability and job mobility through demonstrating the skills they have acquired in any context. It can also help the industries boost their overall productivity and competitiveness by applying standards of excellence. |
| **Accreditation and certification** | A regional accreditation and certification system is a response to the inevitable transmigration of workers and emergence of a multicultural environment. With this initiative, vocational and technical education training providers in the member countries are encouraged to adapt the best international practices for their institutions. |
| **Labour market information needs** | The labour market information system (LMIS) tracks and analyses the economy of a country by determining future workforce training needs, identifying the availability of labour, verifying the prevailing wage rates and discovering potential markets. By providing these data, unemployment will be reduced and employment will be generated. LMIS is also valuable to local and regional planners in the academe as well as in the industries and businesses for helping them to target locations, seek ways of attracting and retaining skilled workers or assess the scope and size of potential markets. Labour unions also find these studies useful for determining comparable wage and compensation levels, local working conditions and training needs. |
| **Enhancing international networks** | The development of sustainable human resources requires a concerted efforts and approaches from all national, regional and international training organizations. With globalizations of markets and economies, the challenges are not specific to one country or one institution. Hence strong network and partnerships among the regional and international organization and institutions are required in the development of sustainable human resources. |
| **Employment supporting systems** | An employment supporting system is a network system that provides employment, education and training services. Often established as one-stop career centres, these provide a wealth of information and assistance in finding a job; information and services related to employment, training and education links; and information and claims on unemployment insurance, disability insurance, employment and training, labour market information and employment taxes. |

## Shaping the Future of TVET

### *Hyperjobs to Adjust to the Labour Market*

Work, the workforce and the workplace need to evolve in accordance with these changing demographics. In this hyper-human economy, people need to adjust to acquire skills that cannot be automated if they wish to remain marketable and productive; else they will vanish together with the traditional jobs they currently undertake. To survive, workers need to create hyperjobs by identifying problems to be solved with their hyper-human skills, such as discovery, creativity and influence.

Hyperjobs are types of work that leverage on people's unique computerizable skills and abilities and power the emerging global society (Samson, 2004). Hyperjobs are a whole new kind of work based on five skills. The first of these is discovery; finding the 'why' of things in science business and daily life. Creativity, fashioning something new in one's head, comes next. Implementation, making the fruits of creativity available in the world is a necessary set, as is influence, interacting with others to inspire, direct or empower and physical action, interacting with things or the body in mindful ways.

The enabling skills that power the key aliveness skills are basic mental skills, such as perception, classification and emotional expression; symbolic thinking and interpretation, including language, mathematics, and scientific notation and responsibility, including global consciousness, ethics and religious sense.

### *u-Learning, as e-Learning plus m-Learning*

In the recent past ICT have improved rapidly and computers were more extensively used. Educational technologists introduced e-learning in the mid-1990s, a major breakthrough leading to the better management of education. E-learning has been proven useful in online and distance education delivery modes. With the introduction of mobile phones, personal digital assistants, portable computers and tablet PCs, e-learning is being developed into m-learning. This enables more concretely the realization of learning not only in school but also anywhere, anytime. The integration of mobile learning into the existing e-learning environments is known as u-learning (Park, 2005c).

### *Industry–Institution Linkages*

To produce competent human resources for TVET, and consequently attain sustainability, closer and more co-ordinated partnership with the industries should be established. International and bilateral development co-operation agencies have been playing a major role in financing technical and vocational education as well

as in providing policy directions. Among them are the Organization for Economic Cooperation and Development, Asia–Pacific Economic Co-operation, UNESCO and the ILO. Now, to further strengthen the TVET as the centre of tripartite co-operative arrangements among industries, academic communities and research institutions, techno-parks or science parks need to be established. These would function for business incubation, pilot production and technology transfer.

## Conclusions

Changes in demography, adjustment to economic structure, the technological divide and pressing problems in workforce mobility are among the world trends that affect all human resource development efforts for sustainability.

Demographers describe a trend towards a considerably enlarged world population and expanding ageing societies that affect the employment structure and social security programmes of the affected countries, a continuous exodus of Asians, Latin Americans and Africans to North America, Europe and Oceania and the overcrowding of mega-cities due to rapid urbanization.

In terms of economic trends, the widening gap between the haves and the have-nots and in which a significant proportion of the unemployed come from the developing countries remains an all-encompassing challenge.

The reality of the technological divide continues to marginalize developing economies and makes it hard for them to attain sustainable development. Basic communication technologies, such as telephones and the Internet, remain more accessible to developed regions, although they are increasingly available throughout the world.

Unaccredited TVET institutions, qualification systems that are not equivalent to each other, accreditation and certification systems that are not unified, and qualifications that are not recognized in other countries threaten workforce mobilization across borders and create discrepancies in labour markets where skills and qualification systems are not standardized. They also pose a threat to the improvement of TVET systems themselves.

The facts discussed above provide a clear picture of the real world situation and show the way to several solutions for addressing these concerns. Technological environmental changes, structural adjustment through labour market demands with workforce mobility, shaping the future of TVET and managing individual careers using TVET modules are some of the proposed challenges.

As discussed above, emerging technologies were aggressively pursued in some countries and have had a positive impact on their development. In addition, many countries have undergone major structural adjustment programmes. In shaping the future of TVET, the creation of hyperjobs, the shift from e-learning and m-learning to u-learning, and industry–institution linkages strengthen the ability of countries to produce competent human resources, and consequently to attain sustainable development. In all this a variety of rational, empirical and scientific techniques are needed

to forecast and assess change. Among them are scanning, trend analysis, monitoring and projection, scenario development and analysis, and visioning. In conclusion, it is to be hoped that TVET will play a significant role in facing the challenges posed by the global trends toward sustainable human resource development.

## References

Central Intelligence Agency (2001) Long term global demographic trends: reshaping the geopolitical landscape. http://www.cia.gov/cia/reports/Demo_Trends_For_Web.pdf. Accessed 4 March 2008.

International Labour Organization (2006a) 95th session 2006 Report I (C), ILO, Geneva. http://www.ilo.org/public/english/standards/relm/ilc/ilc95/reports.htm

International Labour Organization (2006b) Global employment trends, January 2006. http://www.ilo.org. Accessed 4 March 2008.

Massachusetts Institute of Technology (2003) Emerging trends that will change the world, technology review. http://www.wfs.org. Accessed 4 March 2008.

Park, M. (2005a) Building human resource highways through vocational training. Paper presented at the UNESCO-UNEVOC and UNESCO-CEPES International Seminar on Vocational Content in Mass Higher Education – Responding to the Challenges of the Labour Market and the Workplace, Bonn.

Park, M. (2005b) Knowledge workforce development for computer-supported collaborative in a Joint Asian Development Bank Institute (ADBI) and Korean Research Institute for Vocational Education and Training (KRIVET). Paper presented at the International workshop on Workforce Development for Knowledge Economy, Seoul.

Park, M. (2005c) u-world: future of e-community centers. Paper presented at the CPSC-ADBI Workshop on Managing Sustainable e-Community Centers, Agra.

Park, M. (2006) Educational leadership in the changing environment. Paper presented at the CPSC-ADBI Joint International Workshop on Developing e-Learning Contents, Manila.

Samson, R. (2004) From *The Art of Foresight: Preparing for a Changing World*, World Future Society, The *Futurist*, (2004) http://goliath.ecnext.com/coms2/gi_0199-546491/The-art-of-foresight-Preparing.html abstract. Accessed 3 March 2008.

UN (2005) *World Population Prospects: The 2004 Revision Highlights*. UN: New York.

World Bank (2004) World Development Indicators (WDI). Washington, DC. http://www.worldbank.org/data/wdi2003. Accessed 4 March 2008.

World Bank (2006) Information and communications for development 2006: global trends and policies. World Bank, Washington, DC. http://www.worldbank.org. Accessed 4 March 2008.

# Chapter 2
# Rethinking Development: As if the Planet and its People Really Mattered

**John Fien, David Goldney and Tom Murphy**

## The Planetary Context

The publication of *Silent Spring* (Carson, 1962) and *The Tragedy of the Commons* (Harden, 1968) galvanized a worldwide environmental movement that included many members of the scientific community and many civil society groups into thinking much more about the inherent connectivity between organisms and processes and, through parable, reminded us that humans live in a world where there are inherent limits to growth. This was possibly a watershed in human thinking and propelled us from observing and exploring species diversity to beginning to embrace the concept of biodiversity, that is, that species link together in complex pathways and systems that underwrite life itself and all that this entails. The Club of Rome built on this understanding with the publication of *Limits to Growth* (Meadows et al., 1972), which offered a major correction to economic models that offer humanity a seeming nirvana of wealth based on never ending consumption and growth, albeit often at the expense of less wealthy countries. James Lovelock's *Gaia* (1979) theory, that Earth is a complex organism with processes continually adjusting through multifaceted feedback processes also entered the psyche of twentieth century humans.

All this, of course, was but a belated rediscovery of what indigenous people and the world's great religions have known for millennia. One example of this comes from the Australian Aborigines, who possess the world's oldest surviving culture. The indigenous peoples of Australia came in a series of migratory waves from Asia and gradually populated the country, establishing a human ecology which was in harmony with the natural ecology. The land was respected and loved as a mother. Indeed, the land is considered sacred by Aborigines. The land not only yields resources to sustain life; it is life. Pat Dodson, a former Chairperson of the Australian Reconciliation Council, describes the Aboriginal land ethic in this way:

> For the Aboriginal people land is a dynamic notion; it is something that is creative . . . Land is the generation point of existence; it's the spirit from which Aboriginal existence comes.

J. Fien
RMIT University, Melbourne, Australia
e-mail: john.fien@rmit.edu.au

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> It's a place, a living thing made up of sky, of clouds, of rivers, of trees, of the wind, of the sand, and of the Spirit that has created all those things; the Spirit that has planted my own spirit there, my own country … It belongs to me; I belong to the land; I rest in it; I come from it. (Cited in Fien, 1997)

As might be expected, this sensitive vision produced only slight impacts on the environment. Yet it should not be assumed that the Aborigines lived in a static or passive relationship with the land during the many thousands of years prior to 1788 when the first European settlement was established. Aborigines had very clear goals for their use of the Australian environment, as evidenced, for example, in their use of fire in the process known as fire-stick farming to generate new grass growth in order to attract game.

The Aboriginal people also had elaborate systems for codifying their knowledge of the land, its cycles, the need to respect it, and the management practices that would allow them to use the land and its resources in a sustainable way. This knowledge was passed down through the generations through stories, dance, ceremonies and the establishment of a network of sacred places. The Aboriginal system of environmental education continues today through family relationships and through special programmes in Aboriginal community schools and even in some progressive non-Aboriginal schools.

However, the Aboriginal vision of the land has not been widely accepted by non-Aboriginal Australians, despite the work of many committed people over the last two centuries. The same story of 'paradise lost' can be told of almost everywhere on Earth and, as a result, we are now living in a world beset by deleterious changes, driven by a downward spiral of unsustainable development. Although the rate of population growth is slowing down, the world population continues to grow, placing unsustainable demands on natural systems as they are exploited to satisfy our basic human needs for food, shelter, clothing and transportation – and the ever-increasing demand for superfluous resource- and energy-wasteful products and services, especially by rich industrialized countries of the North and the members of the rapidly growing 'world consumer class' in the South. This human demand for more and more things in a world of rising population numbers is driving an exponential loss of naturalness and unparalleled rates of species loss and exponential increases in land degradation that are almost wholly due to inappropriate agricultural practices, with shortages of key resources, such as water and oil, beginning to appear. Furthermore there are signs that many of our natural and agricultural systems have been seriously impaired with the crossing of ecological thresholds, requiring expensive and resource-demanding restoration strategies rather than relying on natural regenerative processes. Cultural landscapes built up over millennia of human presence, that are very much ecosystems in their own right, are also being adversely affected due to population pressures and perceived needs to intensify agricultural production. The oceans have not escaped the pressures of development and there is genuine concern that many of our fisheries have been overexploited.

A more insidious set of exponential changes is the increase of thousands of pollutants that are caught up in critical system cycles (water and carbon in particular) that can and do contaminate our food chains and impact on personal health. Many

naturally produced substances such as greenhouse gases have led to accelerating global warming with the likelihood of very adverse impacts on our weather, oceanic heat transfer cycles and sea levels.

In the last 200 years worldwide we have created human-dominated cultural landscapes that are quite different from any in any previous human era. People flock to cities, thereby becoming disconnected from nature and from obvious links with food chains and water catchments. Cities, whilst often offering cultural gains, can be sinks for dysfunctional living, not to mention their very significant ecological footprints and their penchant for being associated with assorted pollutants and major heat sinks.

However, all over the world, people from diverse nations, cultures and religions have been reflecting on and struggling with concepts of conservation and sustainability for nearly two centuries, firstly responding to nature as wonder and mystery, then becoming concerned about the global loss of species, and latterly grappling with the notion of sustainability of the human species itself, as we face seemingly intractable problems. This reflection is seen in indigenous cultures, in the writings of the great nineteenth and twentieth century natural history mystics and in the rise of the global conservation and environmental movements. Scientifically, the study of natural history has given way to understanding the role of species in terms of ecosystem processes and communities of plants and animals that underwrite the very nature of our most fundamental economic activities.

The very core of human values has been vigorously re-appraised in the last half century by almost every major religion and philosophical worldview. People have examined their creation stories and/or historical roots in a re-evaluation of the whole of creation, in which humans, as but one small component, are completely dependent on the health of the whole. A defining moment in human history may well have been in our initial space explorations as we saw, for the first time from an outsiders' perspective, the rather frail earth spaceship in a new cosmic light. Initially 're-evaluation' appears to have led to a polarization of societies, with 'greens' on the left and developers to the right and every conceivable shade of green and pink in between. Conflict, both local and global, formed part of the milieu in the reflective process, with industry and global players in open cultural warfare with greens and their various political allies. Increasingly however, industry is beginning to drive development in ways that bring 'green' and 'brown' together, not just out of self-interest. The agricultural sector is urgently seeking ways to better integrate nature conservation and production to the point that exporting nations are already having to 'lift their game' in order to gain access to 'greening' markets that demand International Organization for Standardization accreditation.

## Sustainability and Sustainable Development

Definitions of sustainability and sustainable development are commonplace, often elusive as to their intent and meaning, and vague enough to allow almost anyone to participate under the sustainability banner. The roots of the most commonly held

definitions of sustainable development are found in the Brundtland Commission's oft-repeated argument:

> The environment does not exist as a sphere separate from human actions, ambitions, and needs, and attempts to defend it in isolation from human concerns have given the word 'environment' a connotation of naivety in some political circles. The word 'development' has also been narrowed by some into a very limited focus, along the lines of 'what poor nations do to become richer,' and thus again is automatically dismissed by many in the international arena as being a concern of specialists, of those involved in questions of 'development assistance.' But the 'environment' is where we live; and 'development' is what we all do in attempting to improve our lot within that abode. The two are inseparable. (World Commission on Environment and Development, 1987)

Thus, the Commission defined sustainable development as 'the ability to make development sustainable – to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs'. It went on:

> The concept of sustainable development does imply limits – not absolute limits but limitations imposed by the present state of technology and social organization on environmental resources and by the ability of the biosphere to absorb the effects of human activities.

However, so advanced is the state and rate of increase in planetary environmental degradation that the implementation of notions of sustainability and sustainable development must now realistically be seen as transitional processes. The US National Academy of Sciences pointed in the transition direction in its milestone report, *Our Common Journey: A Transition Towards Sustainability* (National Research Council, 1999). Figure 2.1 from this report captures the parameters that now appear to be most widely adopted in the range of definitions of sustainability. These parameters constitute a three-way matrix:

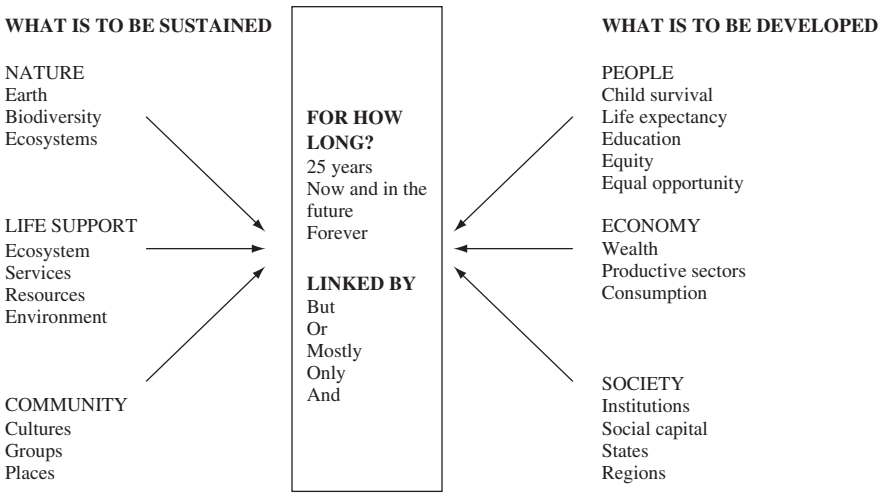


**Fig. 2.1** Analysing aspects of sustainable development
Source: National Research Council, 1999

- Interdependence of what are often described as the three pillars of sustainable development: economic, social and environmental (UN, 2002a).
- The time factor: over how long a period of time are different elements of the three different pillars to be sustained?
- Trade-offs: how are decisions to be made about apparent contradictions – at least in the short term – between elements of the environment and of development – in order to maximize sustainable outcomes?

What is fundamentally missing from such current thinking about sustainability, however, is the nature of the future world that we are creating. In a global context and over a very short period of human history, we have moved either from landscapes dominated by more-or-less pristine, albeit dynamic ecosystems, or long established cultural landscapes that embraced the very heart of sustainability over the periods that they were created (e.g. the terraced irrigation landscapes of South-East Asia and the hedgerows of England), to human-dominated landscapes where we are attempting to integrate nature and development without giving significant thought to the ultimate consequences. Worse still is the reality that cultural landscapes have already emerged or are emerging that are about as far removed from the Brundtland vision as one might imagine.

In their books *A Short History of Progress* and *How Communities Choose to Fail or Succeed*, Ronald Wright (2004) and Jared Diamond (2005), respectively, remind us there are all too numerous accounts of how once-prosperous societies have collapsed. While, as authors, we have no intention of adopting a doomsday philosophy, the reality is that we are moving globally into unchartered waters and it is almost certain that not all current societies are likely to be sustainable into the future and will be ousted by the laws of nature they intentionally or unintentionally flout. Instead of the collapse that Diamond predicts, we can choose to accelerate the transition to a sustainable future.

This transitional approach recognizes that sustainable development is at best a transitional process with different possible time lines (UN, 2000). The Global Scenario Group (1995) together with the US Board on Sustainable Development found that it was possible to achieve quite significant results in realizing a sustainable future, but this was only if nations were prepared to adopt a very disciplined commitment to resource conservation and eco-efficiency and to abandon wasteful consumption (Raskin et al., 2002).

The great many interpretations possible in Fig. 2.1 means that, as it stands, sustainable development is a grand compromise between ecosystem health, economics and improved social wellbeing and justice (Kates et al., 2005). So can there be an agreed international understanding of what sustainable development actually is?

In 1992 at the Rio Earth Summit, almost all countries became signatories to Agenda 21, which sets out an extensive action plan for development, society and the environment in the twenty-first century. The primary legacy of Rio has been an increased awareness and policy agenda concerned with achieving environmental sustainability. This is despite the requirement in Agenda 21 of substantial reforms across a broad range of social, cultural, economic and political arenas (Bennett,

2001). Ten years later at the World Summit for Sustainable Development in 2002b, however, a review of progress on the shift of nations towards sustainability indicated that little had changed (Parliamentary Commissioner for the Environment, 2004). The World Summit recognized that greater urgency was required to eradicate poverty for peace, security and global stability, and to adopt sustainable consumption and production practices. These priorities for global action, along with several others, make up the Millennium Development Goals that are now the major focus of the international sustainable development agenda.

All this requires an unpacking of what sustainable development means. The UK Sustainable Development Commission (2001) defined sustainable development as encompassing a range of processes for 'ensuring a better qualify of life for everyone, now and for generations to come' and that this would involve meeting four objectives at the same time:

- Social progress that recognizes the needs of everyone;
- Effective protection of the environment;
- Prudent use of natural resources; and
- Maintenance of high and stable levels of economic growth and employment.

The Commission's report then went on to outline a number of different ways of conceptualizing sustainable development, including the natural step approach, the 'five capitals' approach, the triple bottom line approach, the environmental space approach and the social justice approach. All, however, are complementary and, indeed, overlap and often duplicate each other. A summary of the first two of these illustrates the core principles of sustainable development, with particular relevance for technical and vocational education.

A Swedish cancer surgeon concerned to discover the scientific bases of sustainability conferred with the world's leading scholars over a period of many years to develop what he called 'The natural step'. Karl Henrik Robèrt's desire to ground sustainability in science led him to apply the basic principles of thermodynamics and cellular biology to identify four key concepts, or 'system conditions' necessary for human and ecosystem survival:

- Materials from the earth's crust must not systematically increase in the biosphere. This means that fossil fuels, metals and other substances should not be extracted at a faster pace than their slow redeposit into Earth's crust.
- Substances produced by humans must not systematically increase in nature. This means that products should not be produced at a faster rate than they can be broken down in nature or into Earth's crust.
- The physical basis for the productivity and the diversity of nature must not be systematically diminished. This means that the ecosystems should not diminished in quality or quantity, and we should not harvest more from nature than can be recreated.
- We must be fair and efficient in meeting basic human needs. This means that basic human needs must be met with the most resource-efficient methods possible, including a just resource distribution between people all over the world.

These system conditions are the principles of a sustainable society, providing a guide to how we need to operate our human systems so that they do not breach the limits set by the biophysical world. Approaching sustainability from an economic rather than a bio-physical framework, the five capitals approach identifies essentially the same principles for a sustainable society. An extension of the triple bottom line of financial, environmental and social accountability, the five capitals approach is based upon the five types of capital an organization needs to function properly:

- *Natural capital*: the life support systems that provide air, water, materials and energy that support all life both bio-physically and socio-economically. Natural capital provides the renewable (timber, grain, fish and water) and non-renewable (fossil fuels) resources used to satisfy human wants and needs, as well as the physical processes, such as wind and climate regulation, we depend upon, and the sinks that absorb, neutralize or recycle wastes.
- *Human capital*: the systems and processes developed by a society for advancing the health, knowledge, skills and motivation of individuals, and which give them the personal resources with which to engage with the world.
- *Social capital*: the structures or institutions such as families, communities, businesses, trade unions, schools and voluntary organizations that enable individuals to maintain and develop their dignity and skills in partnership with others, thus, enhancing the vitality and resilience not only of individual human capital but also of a community.
- *Manufactured capital*: the tools, machines, buildings and other forms of infrastructure produced by humans, which enable us to more efficiently utilize natural capital in the extraction, production, distribution and consumption of goods and services.
- *Financial capital*: the system of exchange value established by society that allows types of capital to be owned, compared and traded.

Maintaining a dynamic and balanced integration of the five forms of capital is essential for sustainable development. For example, where long-term (i.e., sustainable) economic development is the result of increasing the stocks of capital, underdevelopment or mal-development results when an unbalanced emphasis on consumption outweighs investment in maintaining natural, human, social and manufactured capital. However, if consumption results in net capital depletion, so that the stocks of any form of capital decline, then such consumption is not sustainable and will need to be reduced in the future. Similarly, the ongoing creation of manufactured capital is dependent upon sustainable stocks of the natural resources (natural capital) from which to make them, the workforce skills provided by human capital and the financial capital to invest in industry.

The natural step and five capitals approaches have much in common, especially in their integration of all aspects of sustainability and the values that underpin them. Increasingly, those values are transforming the consciousness of individuals, governments and industry alike. While the transformation is uneven and progresses at different rates, only those very few in the business and political world whose short-term interests are served by maintaining worldwide poverty and environmental

degradation – or those in thrall to the hedonism and materialism of contemporary society – dispute the need for such a transition. The rise of general public awareness and concern for such matters means that the sustainability debate no longer needs to focus on the need for change. The consciousness-raising task set by the environmental predicament has been completed successfully over the last 30 or so years, despite economic recession and the recent resurgence of political conservatism in many parts of the world. Thus, many world business and industry leaders have recognized the need to change direction. In its 1992 manifesto, *Changing Course: A Global Business Perspective on Development and Environment*, the Business Council for Sustainable Development argued that:

> The environmental challenge has grown from local pollution to global threats and choices. The business challenge has likewise grown – from relatively simple technical fixes and additional costs to a corporate wide collection of threats, choices, and opportunities that are of central importance in separating tomorrow's winners from tomorrow's losers. Corporate leaders must take this into account when designing strategic plans of business and deciding the priorities of their own work. (Schmidheiny, 1992)

Sustainable development is also about redefining the roles of the economic game in order to move from a situation of wasteful consumption and pollution to one of conservation, and from one of privilege and protectionism to one of fair and equitable chances open to all. Business leaders will want to participate in devising the rules of the new game, striving to make them simple, practical, and efficient.

> No one can reasonably doubt that fundamental change is needed. This fact offers us two basic options: we can resist as long as possible, or we can join those shaping the future. (Schmidheiny, 1992, p. 13)

## *Pathways to Sustainability*

There are two broad approaches to shaping a sustainable future. The first, sometimes labelled 'green growth' or 'sustainable growth', demands a continued emphasis on economic development to provide the financial capital needed to eradicate poverty (through building social and human capital) and solve environmental problems (and thus enhancing natural capital). The second calls for fundamental reductions in the resource and energy throughputs of present day levels of economic activity. The difference is more than one of semantics, however. Thus, it is necessary to review the differences in detail in this chapter.

The sustainable growth mode is reformist: it does not involve any radical transformation of the current system of production. In this approach, the environment is conceived in functional or utilitarian ways with conservation treated as one of several policy options. These include using technological and economic tools to shift the economic development path gradually towards one that maintains the regenerative capacities of renewable resources and switches from non-renewable to renewable ones. By contrast, the integrated sustainable development mode demands marked departures from the current system. Orr (1992) states that

> The primary differences between the two [approaches] have to do with assumptions about future growth, the scale of economic activity, the balance between top-down and grass-roots activism, the kinds of technology, and the relationship between communities and larger political and economic structures. Without anyone saying as much, the former approach reinforces a tendency toward a global technocracy and a continuation along the present path of development, albeit more efficiently. The other view requires a rejuvenation of civic culture and the rise of an ecologically literate and ecologically competent citizenry who understand global issues. (1992, p. 1)

Advocates of the sustainable growth mode of sustainability are often environmental or economic functionalists: they see the environment as functioning to provide all the goods and services people want and need. While functionalists share a technocentric worldview, they may be seen to occupy several points along a continuum, points that differ markedly in their social visions and in their ideas for attaining them (Rees, 1990). Combining these four with the integrated sustainable development approach, a total of five points may be identified on the continuum (Fig. 2.2).

The first position is not a genuine one: it uses environmental claims to promote particular products or development projects. To members of this group, for example, nuclear power is the clear alternative to the climate changes produced by fossil-fuel fired power stations, agroforestry plantations help reduce global warning and genetically engineered plants are beneficial to nature because they require reduced inputs of agricultural chemicals. Unfortunately, some green business, green industry and green consumerism are based on this opportunistic view of sustainable development in which any environmentally sensitive development can be justified under the umbrella of sustainability. However, in such cases, sustainability is little more than 'a bargaining device or marketing tool' rather than a policy objective (Rees, 1990, p. 438).

The second group of functionalists believe that sustainable development can be achieved through finding technological answers to specific environmental problems. Rees (1990) calls this the 'technological response and regulate' group. This is the approach to sustainability presently being adopted by the governments of most industrialized countries and many industries. However, it tends to be a reactive

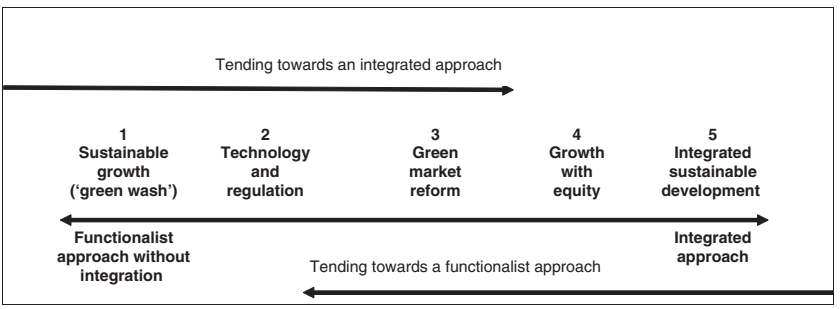


**Fig. 2.2** Five interpretations of sustainable development

approach in which technological solutions are introduced and legislative controls enacted after government and industry are convinced there is a problem. Rees argues that this approach to sustainability does not address the root causes of environmental problems but that therein lies its popularity:

> Although this damage repair approach tends to be costly and never addresses the roots of the environmental problems . . . it has the political advantage of not requiring any significant change in management institutions, investment patterns, economic policies, or economic structures. (Rees, 1990, p. 439)

The third group believes that sustainability can be achieved through the adoption of the principles and accounting tools of the new environmental economics. This 'market solution' equivalent of the technological response and regulate perspective is becoming increasingly popular. This group seeks to redirect the nature of economic growth through 'a shift in the balance of the way economic growth is pursued' so that a stock of natural and social capital can be reserved for future generations (Pearce et al., 1989, p. xiv). This redirecting economic growth approach to sustainability involves fundamental changes in the way businesses operate, e.g. changes in investment patterns towards conserving natural capital, changes in production and consumption patterns towards environmentally benign products and changes in government taxing and regulatory powers, so that individuals and corporations are encouraged to pay the real social and environmental costs of their actions as well as the surface economic costs.

The fourth group argues that economic growth needs to be directed towards solving the problem of global inequalities of wealth and social wellbeing. This viewpoint is central to the recommendations of the Rio Earth Summit and the Johannesburg World Summit on Sustainable Development. Sir Shridath Ramphal, a member of the original Brundtland Commission, expressed this viewpoint when he wrote,

> Eradicating the causes of poverty and making wealth creation more benign in its impact on the environment are the essential challenges we must meet if we are to find a path to sustainable development and ensure human survival. (Ramphal, 1992, p. 18)

The growth with equity group recognizes that poverty leaves many people with little option but to extract what they can from Earth's soils and forests in order to meet their basic human needs. For many in the South, poverty and environmental decline are interdependent parts of the cycle of underdevelopment. This growth with equity perspective argues that economic growth can be a way of breaking this cycle if it is directed, not at meeting rising living standards in the North, but at meeting the basic human needs of all people and at redressing the imbalance of resource consumption between rich and poor countries.

The third and fourth approaches to technological sustainability represent changes to the values, practices and institutions of industry and government that foster economic growth at the expense of natural and social capital.

There have been many attempts in recent years to outline the nature of the fifth position on the continuum. This is the integrated approach to sustainability and the

type of society it demands. All stress the integration of ecological principles into the practices of just, caring and democratic societies. In their 1991 document, *Caring for the Earth: A Strategy for Sustainable Living*, the world's leading environmental organizations, the International Union for the Conservation of Nature (IUCN) the United Nations Environment Programme (UNEP) and the World Wide Fund for Nature (WWF) stress that this would be

> a kind of development that provides real improvements in the quality of human life and at the same time conserves the vitality and diversity of the Earth. The goal is development that meets these needs in a sustainable way.
>
> Living sustainability depends on a duty to seek harmony with other people and with nature. The guiding rules are that people must share with each other and care for the Earth. Humanity must take no more from nature than nature can replenish. This in turn means adopting lifestyles and development paths that respect and work within nature's limits. It can be done without rejecting the many benefits that modern technology has brought, provided that technology also works within those limits. (IUCN, UNEP and WWF, 1991, p. 8)

Like the five capitals model, integrated sustainable development therefore represents a commonwealth of social, economic and environmental goals in which environmental, economic and social imperatives equally define the parameters of sustainable development. The previous four approaches do not do this. For example, they involve an integration of social and economic goals (growth with equity) or economic and environmental goals (technological response and regulating and redirect economic growth). Similarly, the conservation with equity sector represents a concern primarily for ecological and social values. All dimensions of development; ecological, social and economic, must be closely linked for integrated sustainable development.

*Caring for the Earth* also outlines four criteria for living and working sustainably which are almost identical to the goals set out by the UK Sustainable Development Commission outlined near the beginning of this chapter:

- **Improving the Quality of Human Life**

  Economic growth must not be identified with development. Development must be about ensuring that all are provided with adequate resources for a dignified, healthy and happy life. The limits to growth demand that our goal should be sufficient material living standards, not affluence. Appropriate development focuses on full and equal access to food, clean water, education, healthcare, political freedom and so on, not on endless increases in consumption.

- **Conserving the Earth's Vitality and Diversity**

  Development must aim at conserving the physical and ecological life-support systems that shape the climate, cleanse the air and water, recycle essential elements and create and regenerate the soil. This means preserving the diversity of species, especially by reducing the damage to habitats caused by the expansion of human activities.

- **Minimizing the Depletion of Non-Renewable Resources**

  Approaches to development must be found to reduce human dependence on oil, gas, coal and minerals, to use less resources and energy, to utilize renewable resources and to encourage recycling and reuse.

- **Respecting the Earth's Carrying Capacity**

  Human populations and resource consumption patterns must be in harmony with nature's capacity to provide. There is a biophysical limit to the impacts that the earth can withstand without deterioration. We must urgently stabilize population growth in many regions of the South and reduce resource consumption in the overdeveloped North.

Meadows et al., the authors of the original *Limits to Growth* (1972), describe a society that lives by such criteria for sustainability as one which is 'interested in qualitative development not physical expansion' and which applies 'its values and best knowledge of the earth's limits to choose only those kinds of growth that actually serve social goals and enhance sustainability' (Meadows et al., 1992, p. 210). These researchers recognize the quality of life imperative in a steady-state economy (Daly, 1991) or in what the liberal philosopher John Stuart Mill described as an ever-evolving and improving society within a 'stationary state'. They cite Mill's 1848 statement as a rationale for the viability and desirability of living by the principles of integrated sustainable development:

> I cannot ... regard the stationary state of capital and wealth with unaffected aversion so generally manifested towards it by political economists of the old school. I am inclined to believe that it would be, on the whole, a very considerable improvement on our present condition. I confess I am not charmed with the ideal of life held out by those who think that the normal state of human being is that of struggling to get on ... the trampling, crushing, elbowing, and treading on each other's heels ... It is scarcely necessary to remark that a stationary state of capital and population implies no stationary state of human improvement. There would be as much scope as ever of all kinds of mental culture and moral and social progress; as much room for improving the Art of Living, and much more likelihood of its being improved. (Quoted in Meadows et al., 1992, pp. 211–212)

Such principles for an art of living are central to integrated sustainable development. These principles also outline our duty of care for other people and other forms of life, principles that indigenous societies and the world's great religious have always taught and which now need to be re-disseminated through all sectors of society. This requires a comprehensive philosophy of education for sustainability.

## Towards a Philosophy of Education for Sustainable Development in TVET

Two principles are paramount in a philosophy for TVET based upon integrated sustainable development. Firstly, TVET must promote an understanding of our ecological predicament, the many problems involved, their origins in the unsustainable

nature of the 'growth and greed' modern world, and the need for a transition to a sustainable society. Secondly, integrated sustainable development demands that learners be tuned to the functioning of the whole global system and to the connections between its parts. This means having a deep concern about the welfare of the planet, its ecosystems, its cultures and its people, thinking in terms of whole systems, being aware of the effects parts can have on each other and avoiding attending solely to selected narrow aspects of the whole.

Thinking and living sustainably means overcoming many dualisms, especially those which encourage humans to distinguish the knower from the known. One of our mistakes has been to think that we are separate from nature and can understand, intervene and control nature as if we were not part of it. We must think more in terms of systems of which we are a part, rather than in terms of mechanisms we can understand, know and manipulate from a distance. This means understanding that most of the big problems confronting us have many common causes, interconnections and solutions. As Fritjof Capra (1983) emphasized in *The Turning Point*, we must learn to think less in atomistic, analytic, reductionist and mechanical terms. Above all, we must guard against the production of professionals obsessed with and aware of nothing but their own specialism, people who can, for example, produce a magnificent dam without any understanding of or concern for its ecological or social consequences.

These two imperatives mean that education for sustainability encompasses, but goes far beyond, education for the wise management of Earth's ecosystems in order to sustain yields. TVET for sustainable development involves developing respect, indeed reverence, for Earth through the detailed understanding and appreciation of the many miraculous processes through which nature maintains the conditions necessary for life. It must also involve some sense of community with, responsibility for and dependence on the other species with which we share this planet.

What contribution can TVET make if we are to achieve the transition to a sustainable society? There should be no doubt that the consequences of a failure to make the transition will be catastrophic for humans and for the biosphere and there is no possibility of making the transition without a huge educational effort of all kinds for all sectors of society. The transition is primarily an educational problem.

The transition to a sustainable society will involve a historically unprecedented revolution in institutions, systems, lifestyles and values. Much of Western culture has to be reversed in a few decades. We have to balance a long list of cultural traits by their opposites, particularly obsessions with material affluence (with a sense of 'enoughness'), getting richer (with being happy with one's lot), competing (with co-operating), winning (with sharing), exercising power (with sharing power) and controlling nature (with respecting and living within nature). Our powerful economic systems need to be turned on a war on global poverty and its effects, and vast sums of financial capital need to be invested in reorienting transport and production systems to ones that do not waste energy and resources.

All such changes require a skilled and committed workforce that appreciates the important roles it plays in either continuing 'business as usual' without heed to the future, or living and working in ways that advance the transition that is required.

We could easily make Ho Chi Minh City or London or Beijing into very satisfactory places in which to live and Siemens, General Motors or Aunty's Bakery great places at which to work – if there were the will to do so. That is the key: the task for TVET for sustainable development is primarily that of helping a sufficient number of people to understand that the transition to a sustainable society is necessary, to attain the skills to work towards it and, more importantly, to believe that the alternative will bring sustainable human development for all.

## References

Bennett, D. (2001) Development of sustainability concepts in Australia, in Venning, J. and Higgins, J. (eds) *Towards Sustainability: Emerging Systems for Informing Sustainable Development*. UNSW Press: Sydney.

Capra, F. (1983) *The Turning Point*. Flamingo: London.

Carson, R. (1962) *Silent Spring*. Houghton: Boston, MA.

Daly, H. (1991) *Steady-State Economics*. Island Press: Washington, DC.

Diamond, J. (2005) *Collapse. How Societies Choose to Fail or Succeed*. Viking Penguin: New York.

Fien, J. (1997) *Australia, Country Report to* UNESCO. Workshop of Learning for a Sustainable Environment, National Institute for Educational Research: Tokyo.

Global Scenario Group (1995). http://www.gsg.org/. Accessed 8 March 2008.

Harden, G. (1968) The tragedy of the commons. *Science* 162: 1243–1248.

IUCN, UNEP and WWF (1991) *Caring for the Earth: A Strategy for Living Sustainability*. IUCN: Gland.

Kates, R.W., Parris, T.M., Leiserowitz, A.A. (2005) What is sustainable development? *Environment: Science and Policy for Sustainable Development* 47(3): 8–21.

Lovelock, J. (1979) *Gaia – A New Look at Life on Earth*. Oxford University Press: Oxford.

Meadows, D.H., Meadows, D.L. and Randers, J. (1992) *Beyond the Limits: Global Collapse or a Sustainable Future*. Earthscan: London.

Meadows, D.H., Meadows, D.L., Randers, J. and Behrens, W. (1972) *The Limits to Growth*. Universe Books: New York.

National Research Council (1999) *Our Common Journey: A Transition Towards Sustainability*. National Academy Press: Washington, DC.

Orr, D. (1992) *Ecological Literacy: Education and the Transition to a Postmodern World*. State University of New York Press: Albany, NY.

Parliamentary Commissioner for the Environment (2004) *See Change*. Learning and Education for Sustainability: Wellington.

Pearce, D., Markandya, A. and Barbier, E. (1989) *Blueprint for a Green Economy*. Earthscan: London.

Ramphal, S. (1992) *Our Country, the Planet: Forging a Partnership for Survival*. Lime Tree: London.

Raskin, P., Banuri, T., Gallopin, G., Gutman, P., Hammond, A., Kates, R. and Swart, R. (2002) *Great Transition: The Promise and Lure of the Times Ahead*. Stockholm Environment Institute: Boston, MA.

Rees, J. (1990) *Natural Resources: Allocation, Economics and Policy*, 2nd edn. Routledge: London.

Schmidheiny, S. (1992) *Changing Course: Global Business Perspective on Development and the Environment, Business Council for Sustainable Development*. MIT Press: Cambridge, MA.

Sustainable Development Commission (UK) (2001) *Unpacking Sustainable Development*. http://www.sd-commission.org.uk/publications.php?id=12

United Nations (2000) *Millennium Declaration*. http//unstats.un.org/unsd/mi/pdf/MDG%20Book.pdf. Accessed 8 March 2008.

United Nations (2002a) *The Johannesburg Declaration of Sustainable Development*. http://www.alga.asn.au/policy/environment/sustainability/wssdDeclaration.ph. Accessed on 8 March 2008.

United Nations (2002b) *Plan of Implementation of the World Summit on Sustainable Development*.

World Commission on Environment and Development (1987) *Our Common Future*. Oxford University Press: Oxford.

Wright, R. (2004) *A Short History of Progress*. Carroll and Graf Publishers: New York.

# Chapter 3
# Productivism and Ecologism: Changing Dis/courses in TVET

**Damon Anderson**

## Introduction: Risk and Uncertainty

On 30 October 2006, a stern warning was broadcast to the human race:

> The scientific evidence is now overwhelming: climate change presents very serious global risks, and it demands an urgent global response. . . . Climate change . . . is the greatest and widest-ranging market failure ever seen. (Stern, 2006, p. i)

Drawing on an extensive body of research, the Stern Review (2006) on the economics of climate change concluded that climate change is '*global* in its causes and consequences'; its impacts are '*long-term and persistent*'; '*uncertainties and risks* in the economic impacts are pervasive' and there is 'a serious risk of major, irreversible change with *non-marginal economic effects*' (p. 23, original emphases). Speaking with the discursive authority of two powerful bodies of disciplinary knowledge, science and economics, the Stern Review has decisively and irrevocably altered the terms of debate about the future directions of economic development. After Stern, there is no alternative to more sustainable modes of development 'as the consequences of climate change . . . can no longer be avoided' (p. i).

Although the efficacy of its prescription is likely to be debated extensively, the Stern Review's diagnosis confirms that the threshold where current development practices are no longer sustainable has been reached, if not already breached. In short, the human race cannot avoid facing the realization that immediate and collective action must be taken on a global scale to address the consequences of its own mode of existence, particularly by moving rapidly to a low carbon economy. The Stern Review advises that new policies, new regulations, new technologies, new institutions and new ethics, values and behaviour will be required to underpin and drive the transition to more sustainable modes of economic activity.

Stern's sobering message underscores the extent to which the future of industrial society is 'overshadowed by the ecological question' (Beck, 1996, p. 31). It reflects the dawning realization that we live in a 'risk society', the advent of which

D. Anderson
Monash University, Melbourne, Australia
e-mail: damon.anderson@education.monash.edu.au

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Beck (1992, 1996) attributes to 'reflexive modernisation': the increasing capacity of human agents to reflect on the social conditions and consequences of their own existence. Reflexive modernization has led to the disturbing insight that the very scientific and technological innovations that have defined modernity, propelled industrialization and sustained the Enlightenment's promise of everlasting human progress and mastery of nature, have produced unpredictable and uncontrollable risks that are profoundly reshaping the future of humanity.

Due to the proliferation of hazards produced in and by modern science, technology and industry, new themes like ecological safety, biotechnological threats, labour market flexibility and social insecurity have emerged as core problems in post-industrial risk society. The axis of social problems has shifted from wealth production and inequality to the administration and distribution of socio-biological and ecological hazards and risks which, ironically, 'cannot (adequately) be addressed and overcome in the systems of industrial society' (Beck, 1996, p. 28). Moreover, while the problematics of industrial society were subject to resolution over time and open to redress within national boundaries, those of post-industrial risk society are global in scale and potentially irresolvable.

In a similar vein, Giddens (1994) characterizes the condition of modernity as one of 'manufactured uncertainty', in which humanity is faced with risks that differ in origin, nature and consequences from those in any preceding era. Giddens links the emergence of manufactured uncertainty and its attendant social, biological and ecological risks to the historical spread of capitalism, industrialism, militarism and administrative surveillance. Science, technology and industry are 'the very origins' of manufactured uncertainty. Like Beck, Giddens contends that 'Living in an era of manufactured risk means confronting the fact that the "side-effects" of technological innovations are side-effects no longer' (p. 175). Reflexive modernization has revealed to the human race the paradoxical nature and consequences of its own life practices: 'The paradox is that nature has been embraced only at the point of its disappearance' (Giddens, 1994, p. 206).

The Stern Review, which highlights the risks and uncertainty we face, is a historic instance and manifestation of reflexive modernization: of the human race coming to terms with the socially constructed conditions of its own potential finitude.

The central proposition advanced in this chapter is that, in the context of a post-industrial risk society characterized by manufactured uncertainty and global ecological crisis, it is imperative to question the truth claims and normative assumptions on which TVET resides and to re-envision TVET for an alternative future. The chapter begins by defining the globally dominant ethos of 'productivism', which presupposes that economic growth and work (as paid employment) are permanent and necessary features of human existence, regardless of their adverse impact and consequences, social, cultural and environmental. The role of productivism in the historical formation of TVET as an institution and its constitutive effects on current TVET policy and practice are examined. The normative assumptions that underpin contemporary constructions of TVET are then identified and critiqued. As Stevenson argues, although normative assumptions about the goals and purposes of education are rarely revealed:

> [T]hese assumptions are important, and should be made manifest for explicit analysis. They are certainly important when they become powerful in their influence on educational activity and on the knowledge that learners take away from those activities. (Stevenson, 1994, p. 102)

In light of this critique, it is argued that the ethos of productivism and its attendant logic and truth claims no longer constitute a rational or legitimate basis for defining the nature and purposes of TVET. Instead, a new post-productivist vision of TVET is required in which productivism and the untenable myth of perpetual economic growth are superseded by ecologically sustainable development and 'ecologism' as the bedrock of TVET.

This chapter traverses new terrain for which there are few, if any, existing maps. In doing so, it synthesizes and elaborates ideas and arguments that had their genesis in earlier papers about TVET and sustainable development in the Australian context (Anderson, 2001, 2002a,b). The arguments presented below are largely conceptual, and necessarily so, in a field that is nascent and in need of substantial theorization if debates about TVET policy and practice are to be framed and informed by reflexive understandings of the problems at hand. Eclectic in approach, the chapter draws upon diverse bodies of theory and research that are admittedly not always commensurable. Some licence is exercised on the grounds that we face a historically unprecedented rupture that calls for open and unconventional thinking, and, at times, counterintuitive logic. The arguments presented here are also provisional in nature and will continue to evolve as knowledge and understanding of the field expands.

## Productivism

According to Giddens (1994) the condition of manufactured uncertainty stems from modern industrial society over-reaching the limits of its own internal logic, manifested in productivism. Related to, but distinct from, 'productivity' (a measure of efficiency that refers to the quantity of output produced per unit of input, such as labour hours), productivism is

> . . . an ethos in which 'work', as paid employment, has been separated out in a clear-cut way from other domains of life . . . and where mechanisms of economic development substitute for personal growth, for the goal of living a happy life in harmony with others. (Giddens, 1994, pp. 175, 247)

Work as paid employment 'expresses the primacy of "industry"' and defines 'whether or not individuals feel worthwhile or socially valued', has become compulsive in character, crowding out and negating other human values and activities (p. 175). Giddens views productivism as a direct consequence of the capitalist imperative for unlimited economic growth, which presupposes the 'continuous production and consumption of goods' (p. 163). Although the environmental limits of population growth have been recognized in recent years, consumption, 'in contrast, is almost universally seen as a good – indeed, increasingly it is the primary goal of national economic policy' (p. 163).

If the human species is to avoid the fate of self-dissolution, Giddens argues, the logic of productivism must be actively and widely problematized. In his estimation, the answer to the contemporary dilemma of 'how much is enough?' relates only partially to the resource limits of nature. It can be fully addressed only by questioning the ethos of productivism and its associated life practices; the continuously expanding circuits of production and consumption. By challenging the rationality of productivism, it becomes possible to undercut the meaning of work as paid employment, and thereby create 'pressure to realize and develop other life values' (p. 163). While the main object of critiquing productivism is to expose the irrational nature of commodified work, 'its guiding positive aim is the expansion of human happiness' (p. 247).

While it is necessary to reject ' "overdevelopment" leading to suboptimal economic, social or cultural consequences' (p. 101) and to weaken the link between work and economic reason, this does not mean the end of economic development. Reducing the gaping chasm between the rich North and poor South is both an ethical and an environmental imperative:

> . . . there isn't any alternative *to* development, at least in the poorer regions of the world, if 'development' is understood as economic growth. But there are certainly different modes of development, with differing strategies and objectives. (Giddens, 1994, pp. 174–5, original emphasis)

What forms alternative modes of development should take, which (and whose) objectives and strategies should be pursued, and how the transition can be facilitated, remain open questions.

## Productivism and TVET

Productivism, as both ethos and discourse, has been omnipresent and omnipotent in TVET since its conception. As the major supplier of skilled and qualified labour to industry, TVET is the servant of productivism and has been, and continues to be, directly implicated in its reproduction. It is instructive, therefore, to examine briefly the historical relationship between productivism and TVET, as the resulting insights provide a basis for unravelling and rethinking taken-for-granted assumptions and practices in TVET.

TVET first emerged as a distinct educational form in response to the radically new social, economic, technological and cultural conditions created by the industrial revolutions of the late eighteenth and nineteenth centuries in Britain, Western Europe and North America (Greinert, 2004; Kliebard, 1999). Pre-industrial systems of production, which were generally small scale, decentralized and family based, and comprised farm work, domestic handicrafts and other cottage industries, were gradually overshadowed by larger scale industries dominated by entrepreneurial owners of capital (Watkins, 1987). The quest for efficiency and profit was the principal dynamic of the new industrial mode of production.

Work was increasingly individualized, routinized, disciplined and commodified as paid employment linked to work-time. In pre-industrial societies work had been an integral part of daily life: a social activity that was largely autonomous,

irregular, co-operative, integrated with leisure and family life, and 'dominated by agrarian rhythms, free of haste, careless of exactitude, unconcerned by productivity' (Le Goff, 1980, cited in Watkins, 1987, p. 1). For artisans, journeymen, farmers and others, work was 'a "way of life," not external to or separate from it' (Gorz, 1994, p. 16). But with the arrival of the machine and the development of centralized, mass production systems allied to new capitalist relations of production, all this changed:

> Productive activity was cut off from its meaning, its motivations and its object and became simply a *means* of earning a wage. It ceased to be part of life and became the *means* of 'earning a living'. (Gorz, 1994, pp. 21–22, original emphases)

As Giddens suggests, this new ideology of work is central to the ethos of productivism that took root during the late eighteenth and nineteenth centuries and prevails to this day, albeit in a more intensified form. As the second phase of the industrial revolution commenced and the development of the factory system proceeded apace during the latter half of the nineteenth century, 'skill' and 'industrial training' were increasingly viewed in the evolving discourse of economics not only as key elements of, but also preconditions for, increased efficiency, growth, productivity and wealth (Marshall, [1890]1949). Although skills were initially developed informally in the workplace, industrial training was increasingly delivered in the North through formal institutions from the late nineteenth century onwards (Greinert, 2005).

Over the course of the twentieth century, productivism and industrial training were progressively drawn together into a more direct and interdependent, if distinctly lopsided, relationship. As Grubb and Lazerson (2004, preface) argue in their study of the rise of vocationalism in North America, 'the evolution of economic purposes for schooling was the single most important educational development of the twentieth century'. The moral, civic and social purposes of public education were displaced by vocationalism, which 'emphasizes preparation for employment' (p. 5) and 'is responsive to external demands – in this case, for the "essential skills employers want" ' (p. 3). Framed in recent times as a necessary response by national governments to globalization, vocationalism had been enshrined by the close of the twentieth century as 'education gospel', not only in North America, but also across the globe:

> In virtually all developed countries, and many transitional countries as well, an orthodoxy . . . has emerged. I call this orthodoxy the Education Gospel because it expresses a faith in education as the principal route to salvation – as the source of economic growth and competitiveness, the mechanism of individual advancement, the solution to poverty and social exclusion. (Grubb, 2004, p. 1)

The influence of productivism and vocationalism has also spread from the advanced industrial nations of the North into the South as a result of historical colonization and post-colonial development programmes. As Middleton et al. (1993) state in their World Bank report, *Skills for Productivity: Vocational Education and Training in Developing Countries*, after the demise of colonialism, bilateral and multilateral aid agencies funded development projects on the premise that 'Economic growth was to be generated through accelerated industrialization, and this in turn would require a supply of skilled workers and technicians' (p. 37). Driven by the overriding objective to 'increase their productivity and expand their economic activity'

(Middleton et al., 1993, p. 19), TVET and labour market policies in developing countries remain in a state of almost continuous review and reform in line with the principles and specifications of international aid agencies, which typically reflect Western paradigms of economic development, industrialization and work (Watson, 1994).

## Neoliberalism, Human Capital Theory and Competency-Based Training (CBT)

Over the past two decades education and training have been increasingly subsumed within the discursive frame of economic rationality and subordinated to the demands of economic growth and industrial production due to the ascendancy of neoliberalism and neoclassical economics (Anderson et al., 2004; Green, 1997, 1999; Halsey et al., 1997; Marginson, 1993, 1997). Against the background of economic globalization, national economic problems and endemic long-term poverty, the World Bank, the International Monetary Fund and OECD governments initiated far-reaching processes of micro-economic reform during the 1980s and 1990s that aimed to promote structural adjustment and economic growth through the 'modernization' of industry and education systems. Central to such processes was the concept of 'skill formation' and the redesign of education and training institutions along productivist lines (Bennell et al., 1999; Jones, 1997; OECD, 1987).

Neoliberal reforms to TVET include the privatization, commercialization and marketization of its provision and financing, with the aim of increasing its efficiency and responsiveness to labour market demand. To this end, market mechanisms (including competitive tendering, contracting, fee charging and vouchers) have been inserted into TVET to stimulate competition among public and private providers and empower 'users' or 'clients' to exercise more choice and influence over 'suppliers'. Both the OECD and the World Bank have been strong advocates (as well as, in the latter case, an enthusiastic architect) of market-based and demand-driven approaches to TVET provision, which have now been adopted in many developed countries (Anderson, 2006; Anderson et al. 2004; Elson-Rogers and Westphalen, 2000; Finkelstein and Grubb, 2000; OECD 2002) and developing countries (Atchoarena, 1998; Bennell, 1996; Bennell et al., 1999; de Moura Castro, 1998, 2001; Gill et al., 2000; Middleton et al., 1993; Mok and Wat, 1998; World Bank, 1991).

A key feature of neoliberal policies in education and training has been the coupling of market reforms with human capital theory, which posits the existence of a virtuous circle between skill formation, industrial productivity and economic growth, leading to increased employment opportunities and individual earnings (Marginson, 1993; Rose, 2003). In human capital theory TVET is seen as a private investment in

> . . . a process that improves an individual's skills and abilities, and therefore his or her productivity, in the workplace. Thus, to the extent that it raises the skills of workers, and therefore productivity, greater educational attainment is expected to increase an economy's output of goods and services and, more generally, to contribute to the process of economic development. (Middleton et al., 1993, p. 39)

With near-universal currency in policy circles, despite its lack of conclusive empirical grounding, human capital theory is 'probably the theory of education which has had the most influence on contemporary education policies' (Marginson, 1993, p. 21). As economic markets have become increasingly global and competitive and are faced with persistent problems of unemployment, social fragmentation and dislocation, governments and supranational organizations have been exhorting individuals to invest more in their own human capital development, and intensifying pressure on TVET systems to increase their output of more 'skilled and adaptable' and productive workers (ILO, 2002; OECD, 1996, 2002).

One of the main effects of human capital theory has been a stronger emphasis in government policy on the instrumental and economic value of the knowledge, skills and attitudes acquired through formal education and training. Most TVET systems in developed and developing countries now conform to a generic model of curriculum design based on Taylorist, technical–rational, 'training needs analyses', in which the sole frame of reference is the workplace:

> Vocational and technical education and vocational training are by design intended to develop skills that can be used in a specific occupation or job. The objectives and the content of curricula in these programmes are derived from occupational standards or, more directly, from analysis of the tasks that are to be carried out on the job. (Middleton et al., 1993, p. 2)

An even more explicitly human capital model of curriculum, CBT, has been promoted recently as the global benchmark for a TVET curriculum (ILO, 2004; World Bank, 1991) and is now utilized in many developed and developing countries (Harris et al., 1995; ILO, n.d.; Winterton et al., 2005). CBT is based on the notion of employment-related competence, which is 'seen as a form of human capital and a source of economic growth' (Marginson, 1993, p. 149). By training and assessing TVET learners exclusively against industry-determined standards referenced to existing workplace practices and performance criteria, CBT strengthens the relationship between learning and work and binds TVET to the labour market.

As a micro-technology of human capital theory, CBT prioritizes economic over social and cultural development and subordinates individual and community needs to those of industry. Regardless of their value in socio-cultural and environmental terms, only work-related skills and competencies required by industry are deemed to be relevant, valuable and worthy of recognition in CBT courses and credentials. Notwithstanding the frequent, though often perfunctory, references to the importance of developing social and citizenship skills, the CBT universe is a virtual space constituted by an economic calculus, disconnected from culture and context and peculiarly devoid of humanity and nature. In effect, CBT has forged an even closer correspondence between TVET and productivism.

To summarize, TVET has been historically constituted by the ethos of productivism. Born of the industrial revolution, TVET has since fuelled the engine of economic growth and productivity. The institution of TVET as 'training for productive employment' (Middleton et al., 1993, p. 37) became emblematic of, and indispensable to, industrial society during the course of the twentieth century, the 'century of vocationalism' (Grubb and Lazerson, 2004). With the rise of neoliberal market

economics during the 1980s, TVET has been harnessed even more comprehensively to the logic of economic growth and industrial production through processes of structural adjustment in advanced industrialized countries and via international aid programmes in less developed countries. The confluence of human capital theory and CBT has tightened the links between skill formation and economic production, and prioritized work (as paid employment) over other non-economic purposes and outcomes of TVET.

## Universal Truths: Training for Growth, Skills for Work

Like all social institutions, TVET is discursively constituted within a regime of truth, an ensemble of universal truths whose status as 'truth' is considered self-evident and beyond doubt, despite their arbitrary and contingent nature (Foucault, 1980). As suggested by the preceding historical analysis, TVET is both the product and (re)producer of productivism as a regime of truth. TVET is enmeshed in the networks of power–knowledge relations that form productivism and construct human reality as a limited field of possibilities, in the process negating, displacing or obscuring alternative readings of reality. TVET authorizes, 'accepts and makes function as true' (Foucault, 1980, p. 131) the discourse of productivism by actively and methodically producing, regulating and distributing its truth claims: the necessity of unlimited economic growth as an end in itself, and paid work as the means to this end.

With neoliberalism on the ascent, the OECD report entitled *The Future of Vocational Education and Training* articulated with remarkable clarity and concision the two truth claims and normative assumptions that underpin productivism and industrial society and that form the invisible scaffold of contemporary constructions of TVET: 'The economy has to produce goods and services, and people have to have jobs' (1982, p. 21).

An extension of the logic behind this 'commonsense' statement, TVET policy and practice in most developed and developing countries are now premised on two fundamental assumptions that have acquired the status of self-evident truths that are reproduced systematically in and by TVET institutions and programmes; namely that the principal, if not sole, purposes of TVET are to:

- Promote economic growth by developing the human resources required by industry to increase productivity and profit (training for growth); and
- Produce graduates with skills and competencies for work in order to increase their economic output and employability (skills for work).

Consistent with human capital theory and the economic rationalization of education, these two normative assumptions are joined together in official policy discourse by the claim that the needs of industry and individuals are converging as a consequence of globalization and workplace change (OECD, 1989). The metaphor of convergence is used as a discursive device to justify subordinating the needs

and interests of individual worker–learners to those of industry and enterprises or, more specifically, to employers (Anderson, 1998). As stated in a paper for the ILO, 'there is today an unprecedented convergence of interests between employers and employees in relation to the skills of the latter' (de Silva, 1997). Not only do their needs and interests supposedly coincide, but enterprises/employers are also 'the end-users of skills acquired through training', who 'at the end of the day, create jobs for individuals' (Australian National Training Authority, 1996, p. 7). Thus, TVET should respond directly and primarily to the needs of the industry and enterprises and employers in particular: 'We must put employers' needs for skills centre stage, managing the supply of training, skills and qualifications so that it responds directly to those needs' (Secretary of State for Education and Skills, 2003, foreword, item 11).

The same logic and objective often underlie arguments for an increasing convergence of general and vocational education by reformulating the curriculum in terms of 'generic/core/key/essential' skills or competencies on the one hand, and employment-related and company/enterprise-specific skills or competencies on the other (Conference Board of Canada, n.d.; Finn, 1991; National Council for Vocational Qualifications, 1991; US Department of Labor, 1991). Within the core-skills paradigm in the UK, for instance, 'relevance' is one of two particularistic and selective cultural criteria for defining the purpose and content of core skills (Green, 1998, p. 28). Relevance, in this context means 'predominantly relevance to future work roles – as defined by employers – rather than to future roles as citizens' (Green, 1998, p. 28). However, as Penn (1999, p. 631) concludes in a study of decision-making in relation to skills formation, 'different actors have differing perceptions and differing goals'. Individual worker–learners' perceptions of relevance should be neither equated with each other, nor conflated with those of employers (Anderson, 1998). Yet this is precisely the intent and effect of the convergence metaphor. It fabricates an apparent reconciliation of the needs and interests of worker–learners and industry/enterprises–employers, so as to privilege the latter over the former while simultaneously masking differences, tensions and conflicts. Thus, the metaphor of convergence performs the crucial discursive function of joining and legitimizing the two core truth claims of productivism in TVET and homologizing the logic and assumptions that constitute its structural (policy) and cultural (curriculum) domains.

Implicit in the policy framework, organization, management and culture of TVET institutions and in the structure, content and delivery of TVET programmes, these normative assumptions routinely shape and direct the formation of learner subjectivities. The selection of knowledge, skills and dispositions dispensed, rewarded and recorded by TVET curricula, assessment and credentialing – in concert with the norms, values, orientations and relationships embedded in them – serve to recreate and legitimize the types of human subjects (skilled and competent workers) and specific forms of subjectivity (punctual, reliable, adaptable, honest, loyal, responsible, motivated, enterprising, self-managing, team-working) required by productivism and its social and economic institutions. TVET practitioners, many of whom come from industry, are trained to produce graduates with the skills, competencies and attributes required for work. For them to do otherwise would call into

question their own biographies, identities and expertise as industry practitioners and teachers/trainers, and this is unthinkable for most. From their position of relative powerlessness, TVET learners are unconsciously bound into the discursive logic that prestructures the study choices and vocational identities available to them, and they are denied access to other alternative and unauthorized ways of living and making sense of their life-worlds and futures.

Admittedly, learner subjectivities cannot be simply read off official curriculum documents and intended learning outcomes. Curriculum documents and intentions are recontextualized, reinterpreted and selectively experienced, often in unintended ways, by TVET actors. As Cho and Apple note:

> . . . although education is, at least partly, a process of producing certain forms of subjectivity . . . the transformation of concrete individuals into concrete subjects (being commercial high-school students, or being clerical or factory workers) is achieved in a complex, unstable, and often contradictory way. (1998, p. 287)

The process of developing and assessing key competencies and associated personal attributes in TVET programmes is 'necessarily a normalising exercise . . . subject to refusal, resistance, contestation, or appropriation in various ways by educators, trainers and worker–learners alike' (Williams, 2005, p. 33). Billett and Somerville contend that workers are agentic learners, who

> . . . actively participate in and appropriate core values and practices associated with their work . . . Yet, in exercising their agency, individuals' actions also work to remake cultural practices . . . The learning arising through workplace experiences may be quite different from what was intended or afforded by the workplace . . . Just as curriculum prescriptions are intents, which may or may not be realized, the learners are ultimately the construction of the curriculum, regardless of what is enacted. (2004, pp. 317, 322–323)

Nonetheless, while there is no unbroken chain of causality between the intended, enacted and embodied curriculum, and although worker–learners can and do actively construct their own meanings and values, they do so within a restricted cultural frame. The free play of meaning construction is delimited to a considerable degree by the existing range of discursive sources and vocabularies. Further, the structural articulations between economy, labour market, employment and TVET, with credentials at the nexus, impose significant, real constraints on the scope for exercising choice, agency and autonomy. Worker–learners who move outside these boundaries put their employment and economic security at risk.

## TVET and Truth Production

Cast within the ethos of productivism and the ideological framework of neoliberalism, the institution of TVET is based on a restricted and instrumental view of life-worlds which reduces people and the environment to the status of human and natural resources for economic exploitation. Such a perspective overlooks the complex and inter-dependent nature of human existence, the source and meanings of which are inextricably linked to social relations, cultural practices and natural material

conditions. TVET students are not only already, or aiming to become, workers. They are also human beings and citizens with a wide range of needs, relationships, duties, aspirations and interests beyond work; in the family, the local community, in civil society and the global environment. Over their life course they give birth, raise and care for family members, consume goods and services, manage finances, fall ill, experience unemployment and hardship, elect governments, get involved in community affairs and ultimately rely for their survival on the fruits of nature. Yet in TVET they learn only to labour and produce commodities.

This is not to deny that TVET often fulfils purposes and pursues goals other than training for growth and skills for work. Much TVET activity is undertaken in the interests of promoting, for example, regional/local development through industry and community partnerships, and improving social equity and inclusiveness through the provision of second chance learning programmes and pathways for disadvantaged students. TVET has often achieved significant positive results on these and other accounts. However, such roles and objectives are almost universally viewed as being subsidiary to and, indeed, ultimately dependent upon the promotion of increased economic growth and individual employability, and outcomes are typically evaluated in these terms (Middleton et al., 1993, OECD, various years).

Thus, as a principal site of subjectivity formation, TVET performs a critical role in the production and legitimation of the universal truths of productivism and their immanent power–knowledge relations. It does so by leaving unstated and unquestioned the truth claims, assumptions and interests that are inscribed in its policies, pedagogies and practices and which shape what is taught and learned in its classrooms and workshops. By representing productivism as the natural order of things, TVET places the corresponding universal truths and normative assumptions beyond question. In consequence, learners in TVET are reproduced as agents of productivism, lacking a reflexive understanding of their roles as ecological actors and of the negative environmental impact and consequences of their producing and consuming skills, values and behaviour.

Researchers of TVET, including those with a critical stance on socio-economic and political questions, are also often blind to these assumptions: they, too, have become embedded in the discourse of productivism and seem oblivious to its constitutive effects on their work. As universal truths, training for growth and skills for work are deeply embedded in the prevailing regime of truth and the discursive structure of TVET. Because they seem ‘so essential to the structure and functioning of our society’ (Foucault, 1980, p. 132) they tend to go unrecognized and uncriticized. Undoubtedly, training for growth and skills for work are essential to the processes of economic production and social reproduction, and of working and learning, in industrial societies – but only in a historically contingent sense, not forever, as shown in the preceding analysis. Nonetheless, it is difficult for TVET researchers to proceed and make sense without working from these two assumptions. Moreover, the research priorities, grants and consultancies of international aid agencies and governments systematically orient research on TVET towards productivist ends. Researchers who transact in the language of productivism attract funding and recognition: those who don’t are likely to be marginalized and ignored.

Thus, productivist discourse, constantly circulated through the disciplinary power–knowledge network of science, technology and economics, is normalized through the everyday practices and procedures of industry, government, research and education. Its truth claims are accepted as commonsense, and its economic rationality methodically frames and constrains what is thinkable, possible and doable. Productivism has prevailed and its regime of truth has remained seemingly impregnable, despite the magnification of the ecological question since the 1960s. As Foucault observes:

> . . . one cannot speak of anything at any time; it is not easy to say something new; it is not enough for us to open our eyes, to pay attention, or to be aware, for new objects suddenly to light up and emerge out of the ground. (1972, pp. 44–45)

For this to occur, the discursive conditions for the exteriorization of the ecological question as the central problematic of human existence must be present.

In spite of their apparent ineluctability and immutability, neither universal truths nor the institutions and practices through which they are reproduced are immune to challenge or change. While 'people accept as truth, as evidence, some themes which have been built up at a certain moment during history . . . this so-called evidence can be criticized and destroyed' (Foucault, 1988, p. 10). Voices from the margins have been problematizing the truth claims of productivist discourse in TVET for some time (Dippo, 1998; Potter, 1981, 1992; Stevenson, 1994) but to little or no avail. Paradoxically, through its deployment of scientific and economic knowledge to examine current development modes, the Stern Review (2006) has destabilized the productivist regime of truth and potentially created the conditions for a deep rupture in its discursive foundations. As the certitudes of productivism begin to fracture under such internal scrutiny, it becomes more possible to open up spaces for critiquing productivism in TVET and imagining alternative constructions. One such alternative is outlined below.

## Sustainable Development

'Sustainable development' is a mobile, polysemous and contested concept, a new discourse in formation. Widely regarded as the classic definition, the landmark Brundtland Report defines it as 'development that meets the needs of the present without compromising the ability of future generations to meet their needs' (World Commission on Environment and Development, 1987, p. 43). The Brundtland definition questions the primacy of economic growth and suggests the need to locate the goal of environmental sustainability in the social and economic context of human development. However, while enunciating key principles such as inter- and intra-generational equity, such definitions leave many fundamental questions unaddressed. Precisely what is to be sustained, how is it to be developed, and towards which ends? What must be sacrificed in the process, and by whom, given that different regions, countries and communities start from unequal stages of development? Which criteria will be used to determine the nature and extent of the

inevitable trade-offs between social, economic and environmental goals? Assuming that such questions can be addressed effectively, how and by whom will the process be planned, co-ordinated, and monitored at various spatial (or bio-spherical) scales: international, regional, national and local? Such complex questions apply both to sustainable development in general and to particular sites of human development, such as TVET.

Such considerations indicate that the concept of sustainable development requires greater clarity if the debate is to move beyond abstract generalities to more concrete formulations for policy and practice. Even then, however, translating the concept into practice will reveal further tensions and contradictions. While the need to act is urgent, it is important that policy and practice in TVET be informed and framed by well-considered theory, principles and critical reflexivity, lest there be a headlong rush in ad hoc, reactive and disconnected directions. Theory-blind or narrowly conceived innovation may produce desirable outcomes, but there is also a risk that unintended and potentially counterproductive effects could ensue, as Beck and Giddens suggest. The discussion below is intended as one preliminary contribution to the formulation of a conceptual framework for reconstructing TVET for a sustainable future.

## Ecologism

While acknowledging the need for a more holistic, balanced and integrated approach to the environmental, social and economic dimensions of sustainable development (Fien and Wilson, 2005) the ensuing discussion focuses primarily on the environmental dimension. It does so in the belief that future paths of social and economic development must be predicated upon a recognition of the fundamental materiality of human (and non-human) existence, and that failure to understand and embrace this reality is tantamount to self-delusion, if not self-dissolution. The term 'ecologically sustainable development' is used, in preference to sustainable development, to more explicitly reflect the triadic nature of sustainability, and the symbiotic relationship between its environmental, social and economic dimensions. In this respect, 'ecology' is used as a holistic, dynamic and integrative concept to capture and reflect the metabolic interaction and inter-dependencies of nature, society and economy.

In arguing that ecological sustainability must become the organizing principle of human development, the following discussion draws upon a body of ideas referred to as 'ecologism' (Baxter, 1999) or 'political ecologism' (Dobson, 1995). Ecologism is presented here as a new ethos on which to base TVET for ecologically sustainable development. In broad terms, ecologism rests upon three core premises:

- *The finitude of the planet, due to the absolute limits of the natural – material conditions of human (and non-human) existence*, which leads to a rejection of the beliefs that human needs (as distinct from wants) can be met only through the continuous expansion of production and consumption, and that limits to growth are temporary and surmountable by technological innovation and, therefore, an

acceptance that all future economic activities 'must operate within and not beyond the finite limits of the planet' (Porritt, 1984, cited in Dobson, 1995, p. 112).

- *The moral considerability of all life forms*, which leads to the acceptance that non-human life forms have intrinsic, not just extrinsic or human-instrumental, value.
- *The inter-connectedness and symbiotic relationship of all life-forms – human and non-human, sentient and non-sentient – within a single biosphere*, which suggests the need for an integrated, holistic and ecologically contextualized understanding of the diversity and complexity of human and non-human existence and evolution (Adapted from Baxter, 1999 and Dobson, 1995).

Common to all three premises is a refusal to subscribe to 'strong anthropocentrism', which assumes that the human species is biologically superior and morally prior to all other life forms, which are viewed as merely 'means to human ends' (Fox, 1984, cited in Dobson, 1995, p. 61). However, there are 'different ecologisms' (Dobson, 1995, p. 2), which vary in their interpretations of, and the relative weight attached to, each of the above core claims.

As suggested above, ecologism rejects 'technocentric' approaches to sustainable development, as they are based on the misleading claim that perpetual economic growth is both necessary and feasible because increased technical efficiency and scientific innovation will (eventually) overcome environmental limits to production. Ecologism is also irreconcilable with so-called 'green capitalism' and 'ecological modernization', which claim that environmental problems can be resolved most efficiently and effectively if left to the free and uninhibited operation of the market. As Jacobs (1991, p. 43) argues, green capitalism,

> . . . whether it is based on the development of new environmentally-motivated firms or . . . environmentally sensitive consumer behaviour, cannot be the solution to the crisis. Market forces have to be controlled, not promoted, if the overall environmental impact of economic activity is to be reduced.

Ecologism is also diametrically opposed to discourses that conflate sustainable development with 'sustainable growth', as in the World Bank's (1997, p. 7) claim that 'achieving sustainable development is at heart a process of creating and maintaining wealth'. Sustainable development, or at least ecologically sustainable development, aims to protect and secure public and common, as distinct from private and individual, wealth by creating and maintaining a more just, democratic, equitable and inclusive human society that lives within environmental limits and in harmony with nature.

'Green capitalism', 'ecological modernization' and 'sustainable growth' are discursive and linguistic strategies to prolong the uninterrupted operation of a growth-oriented political economy by concealing it behind a greenish smokescreen. As such, they are manifestations of neo-productivism, an ideological response to the ecological crisis of productivism and spread of environmentalism in recent decades. Neo-productivism entails little more than minor adjustments to industrial practices, for example by conceding the need for 'cleaner' production processes and 'triple bottom-line' accounting. Simultaneously, however, it extends the expansionary

logic of capital accumulation into the remaining uncommodified (and commercially verdant) forms of nature itself and capitalizes on environmental problems and awareness as commercial opportunities (green products for green consumers). In the process, neo-productivist strategies intentionally ignore the root causes of ecological problems and potentially exacerbate their scale and depth in unprecedented and unpredictable ways. The central problematic that motivates neo-productivists is not how to sustain Spaceship Earth in the face of eco-social risk, but rather how to sustain capitalism in the face of its natural, material and human contradictions and the emerging 'environmental revolution' (Elkington, 1997, p. 19).

Ecologism differs significantly from 'environmentalism', which focuses on protecting and conserving the remnants of Nature and limiting environmental damage via incremental reforms to industry and society. In short, it adopts 'a managerial approach to the environment in the context of present political and economic practices' (Dobson, 1995, p. 37). In contrast, ecologism insists on the need to question the assumptions and transform the practices that reproduce the growth economy:

> . . . because the Earth has a limited carrying capacity [for population], productive capacity (for resources of all types), and absorbent capacity [pollution] . . . continuous and unlimited growth is *prima facie* impossible . . . consequently, profound changes in our social and political behaviour need to take place. (Dobson, 1995, p. 16)

Crucially, therefore, ecologism highlights the fundamental contradiction of productivism: that industrial society, driven and deluded by the myth of scientific and technological progress, is unsustainably consuming and degrading the finite material base, the limited stock of natural resources, upon which it relies for its very existence, and without which its exponentially increasing human resources and consumer base (population) cannot survive.

For ecologists, the potential solution to the ecological question and poverty lies, at least in part, in abandoning the folly of quantitative growth and embracing the wisdom of 'qualitative development' (Baxter, 1999, p. 227). The latter can take the form of improvements to the quality and accessibility of, for instance, essential services (water supply) health care, education and social welfare, through policies to promote reduced aggregate consumption (less but better) and wealth redistribution, rather than economic growth and increased GDP. The important, but as yet unanswered, question is what mode(s) of development will enable social, economic and environmental goals to be reconciled? The nature of such development modes will necessarily differ between America and Africa, but will require at least two fundamental changes:

> The first is a comprehensive revision of policies and practices that perpetuate growth in material consumption and in population. The second is a rapid, drastic increase in the efficiency with which materials and energy are used. (Meadows et al., 1992, cited in Dobson, 1995, p. 22)

The proposed limitations on material consumption apply not only to the consumers of goods and services, but also to the producers, as (contrary to standard economic theory) production is inherently also a consumption process. Converting 'raw' natural materials into value-added economic goods, for example trees into matches,

involves the consumption (and extinction) of manifold natural resources in both the production process (e.g., water, electricity) and the product itself (wood and numerous chemicals, including animal glue). Moreover, as Dobson (1995, p. 88) observes, 'consumption implies depletion implies production implies waste or pollution'. Consequently, workers are implicated, albeit to varying degrees, in all phases of the inseparable, interactive and mutually degenerative cycles of economic production and consumption, and environmental depletion and waste production. Some implications of ecologism for the future of work and TVET will now be explored.

## Work and Sustainable Livelihoods

Ecologists accept that work 'is a necessity of the human condition, a defining characteristic of the sort of people we are' (Porritt, 1984, cited in Dobson, 1995, p. 105). But, like Giddens (1994), they 'question the dominant tendency to associate work with paid employment' (Dobson, 1995, p. 104). In their view, the nature and value of work needs to be reconceptualized, particularly so that unwaged work in the home, community and the informal economy can be recognized and legitimized as work and can be supported by reformed labour market policies and social security systems. Moreover, they contend that

> . . . traditional solutions to the problems of unemployment (like more growth) are doomed to failure either because of the context of a finite planet or because the technological infrastructure . . . is actually designed to reduce places of paid employment. (Dobson, 1995, p. 107)

In other words, worklessness is an inevitable corollary of productivism and, therefore, cannot be redressed within its own logic. The rise of precarious employment facilitated by neoliberalism suggests that productivism has reached the point where its anti-social effects are so significant that new vocational identities and forms of socially useful human activity, other than paid employment, must now be recognized and valued. As Gorz (1994, p. 46) observes:

> In actual fact, for almost half the active population, the ideology of work is a bad joke and identification with work an impossibility, since the economic system has no need – or regular need – of their capacities. The reality disguised by extolling 'human resources' or the work of the new skilled industrial personnel is that stable, full-time, year-round employment throughout an entire lifetime is becoming the privilege of a minority, and that for almost half of the active population, work no longer takes the form of an occupation which integrates them into a productive community and defines their place in society.

In a similar vein, a report for the OECD notes that 'the role of work . . . is coming to play a very minor role in human life, and badly distributed at that' (Pair, 1994, p. 16).

The concept of work as paid employment is even less applicable in the context of developing countries. Lawrence (1997, original emphasis) suggests that the traditional concept of a 'job' in development programmes is 'endangered' as 'a substantial proportion of the world's labour force has never had *a job* in the . . .

contractual or regularized sense of the term'. Often the relative few with full-time employment in the South do not earn enough to sustain their livelihoods, due to inadequate and declining wages. Moreover, even if economic growth was sufficient to create more jobs, the fact remains that already existing patterns of production and consumption are unsustainable. The implications for education are

> ... critical, since educating for 'jobs' ... while often controversial in the past, is today increasingly challenged by the need to build human capacity not only for employability, but for broader lifelong learning as well as for adaptive and 'coping' livelihood strategies in a fast-moving and complicated world. (Lawrence, 1997)

In both developed and developing countries, therefore, productivism and its skills for work assumption in TVET are becoming increasingly problematic as they are based on a concept of work that is often unattainable, socially unjust and ecologically unsustainable.

Dippo argues that a new 'ethic of sustainability for work education' is required as a framework for problematizing and countering the increasing polarization of the workforce and the inequitable distribution of secure and well-paid employment:

> What is required to resist increased polarization and to insure that more and more people have greater access to more sustainable livelihoods is a fuller range of employment opportunities for a fuller range of educational achievements. As educators, we can encourage students not to stop at the question, 'What do employers want?', but to ask, as well, the more critical question, 'What do employees need?' We can encourage them to expect more of their employers and provide them with the wherewithal to participate effectively in struggles over the terms and conditions of their own work ... It is only when equity, social justice, economic and environmental issues begin to be addressed within a context of a vocational education committed to citizenship and participation that the inevitability of such a bleak vision of the future can be challenged. (1998, pp. 335–336)

Certainly, reforms which aim to redistribute paid work more equitably, democratize workplace relations and improve the health, safety and environmental standards of workplaces would help to increase the availability and quality of paid employment. But as the limits to economic growth become more starkly evident in the form of increasing global employment scarcity, social insecurity and environmental degradation, reforms to existing models and patterns of work are likely to be insufficient by themselves to achieve ecologically sustainable modes of development over the longer term.

Ultimately, the epistemic foundations of our inherited, socially constructed and historically contingent concept of work may need to be dismantled and reconstructed. The planet cannot continue to support strong anthropocentric and dualistic forms of work that commodify, alienate and exploit human beings and non-human life forms. Beck argues that

> ... only a focus on the nature-destroying aspect of work could change the foundations of the work society in a meaningful direction that was up to the tasks of the future. (2000, p. 65)

In the wake of such a critique, it would be necessary to conceive and create radically new types of work and workplaces. New work forms could be based on

already existing alternatives, such as unpaid, volunteer and community work, in combination with redistributed paid employment and redesigned education and social security systems to support sustainable livelihoods. Shorn of its productivist assumptions and reconfigured for ecologism, TVET has the potential to contribute to such a critique and reconceptualization of work.

Although still nascent and underdeveloped, the concept of sustainable livelihoods opens up promising space for exploration and innovation. As Dippo (1998) and Stevenson (1997) suggest, there is a need for a new ethos and normative assumptions for TVET to overcome the artificial separation and compartmentalization of the needs and interests of individual learners, society, economy and nature. Stevenson (1997) proposes Dewey's (1916) liberal-humanistic construction of 'vocation' as a means for achieving greater 'connectedness amongst life's pursuits' and providing new sources of truth, meaning and purpose in vocational education: 'This idea of vocation is wider than, but inclusive of, paid employment (providing paid employment involves activity that the individual perceives as significant)' (Stevenson, 1997, p. 73). Framed within the ethos of ecologism, and with ecological stewardship adopted as the new meta-vocation, the concept of sustainable livelihoods could provide an integrative framework for transforming TVET into learning for ecological sustainability.

In sum, 'ecologism' is an ethos that recognizes the natural material limits to growth, the holistic inter-relationships and interdependence of the human species and the natural environment (recognizing that the latter is also a problematic concept, after centuries of human intervention and economic conversion) and the moral considerability of all life forms. Such considerations highlight the need for a comprehensive critique of productivism and its undergirding political, social and economic assumptions and practices. Ecologism views economic production and consumption as integrated and socially constructed processes that occur within natural ecosystems, in which the human species and nature interact with and reshape each other in a dynamic process of co-evolution. Economic growth per se is rejected as a legitimate basis for human development in favour of the equitable satisfaction of basic human needs under conditions of respectful co-existence with nature. Work, as paid employment, would no longer constitute the predominant source of social meaning, value and income, and would be replaced with a more inclusive notion of socially useful and ecologically sustainable livelihoods.

## Conclusion

From its emergence some two centuries ago, productivism has presided over and pervaded the development of the institution of TVET. Over this time, TVET has become one of the key agencies for producing skilled and adaptable workers, the human resources for industry and economic growth across the globe. The training for growth and skills for work assumptions continue to be reproduced systematically through TVET, despite unequivocal evidence of their adverse ecological consequences, and even though they no longer provide a rational or meaningful basis

for human development in a post-industrial era marked by profound risk and uncertainty. TVET is implicated in the global, negative-sum game of national economic competitiveness, which ignores the ecological limits and costs of training for growth and the increasingly problematic status of skills for work. As the human species confronts a progressively more unpredictable and hazardous future, due in large part to human-induced environmental damage and the deepening ecological crisis, TVET has an obligation to sow and cultivate the seeds of ecological sustainability and global citizenship. Only then will worker–learners become more skilful and adaptable in ecological terms, more mindful of their responsibilities to protect, conserve and renew natural life sources, and more capable of shaping their collective ecological destiny in democratic, equitable and sustainable ways.

TVET intersects with many of the key dimensions of change that the Stern Review (2006) and countless other reports have identified as necessary responses to climate change and environmental degradation, not least of all the far-reaching cultural transformation that is required in the workplace and beyond. All such reports, dating back to *The Limits to Growth* (Meadows et al., 1972) suggest the need for a fundamental shift in our ways of producing and consuming; and, by implication, in the way we become producers and consumers and the role of educational institutions in this process. As a principal site of subjectivity formation, and one that has been historically constituted by productivism, TVET must therefore reflect critically upon its own origins, assumptions and purposes, in order to adapt to its changing landscape and actively promote sustainable livelihoods for all. Ecologism offers TVET one possible course to this future.

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## References

Anderson, D. (1998) Students as clients: Refocussing training market reform, in Robinson, C. and Kenyon, R. (eds) *The Market for Vocational Education and Training*, pp. 307–322. National Centre for Vocational Education Research: Adelaide.

Anderson, D. (2001) Towards a new vision for TAFE: integrating social and economic goals, Invited paper presented to Education for Work – The Future of Education, Employment and Training in Victoria, First National Conference of the Education for Work Coalition, Trades Hall Council: Melbourne, 31 August.

Anderson, D. (2002a) Before and after Rio: sustainable development and VET in Australia. Keynote address to Educating for a Sustainable Future Workshop, Inaugural National Seminar, Swinburne University of Technology (TAFE) Industry Development Centre, Croydon Campus: Melbourne, 31 May.

Anderson, D. (2002b) Productivism, ecological sustainability and vocational education and training, in Searle, J. and Roebuck, R. (eds) *Envisioning Practice – Implementing Change* vol. 1, pp. 61–68. Australian Academic Press: Brisbane.

Anderson, D. (2003) Productivism, VET and ecological sustainability, Paper presented to The Changing Face of VET, 6th Annual Conference of the Australian VET Research Association, Australian Technology Park Conference Centre: Sydney, 9–11 April.

Anderson, D. (2006) *Trading Places: The Impact and Outcomes of Market Reform in Vocational Education and Training*, Adelaide: National Centre for Vocational Education Research, http://www.ncver.edu.au/publications/1641.html. Accessed 25 June 2007.

Anderson, D., Brown, M. and Rushbrook, P. (2004) Vocational education and training, in Foley, G. (ed.) *Dimensions of Adult Learning: Adult Education and Training in a Global Era*, pp. 234–50. Allen & Unwin with Open University Press: Crows Nest, NSW.

Atchoarena, D. (1998) Alternatives for the financing of vocational training: the example of emerging countries in Latin America, *Vocational Training European Journal*, 1(13): 56–66.

Australian National Training Authority (1996) *Developing the Training Market of the Future: A Consultation Paper*, Australian National Training Authority: Brisbane.

Baxter, B. (1999) *Ecologism: An Introduction*. Edinburgh University Press: Edinburgh.

Beck, U. (1992) *Risk Society: Towards a New Modernity*. Sage: London.

Beck, U. (1996) Risk society and the provident state, in Lash, S., Szerszynski, B. and Wynne, B. (eds) *Risk, Environment and Modernity: Towards a New Ecology*, pp. 27–43. Sage: London.

Beck, U. (2000) *The Brave New World of Work*. Polity Press: Cambridge.

Bennell, P. (1996) Privatization, choice and competition: the World Bank's reform agenda for vocational education and training in sub-Saharan Africa, *Journal of International Development*, 8(3): 467–487.

Bennell, P., Bandera, S., Kanyenze, G., Kimambo, E., Kiwia, S., Mbiriyakura, T., Mukyanuzi, F., Munetsi, N., Muzulu, J., Parsalaw, W. and Temu, J. (1999) Vocational education and training in Tanzania and Zimbabwe in the context of economic reform, Education Research Paper No. 28, London: Department for International Development. http://www.dfid.gov.uk/pubs/files/vocedtanzimedpaper28.pdf. Accessed 29 March 2007.

Billett, S. and Somerville, M. (2004) Transformations at work: identity and learning, *Studies in Continuing Education*, 26(2): 309–326.

Cho, M.K. and Apple, M.W. (1998) Schooling, work and subjectivity, *British Journal of Sociology of Education*, 19(3): 269–290.

Conference Board of Canada (no date) Employability Skills 2000+. http://www.conferenceboard.ca/education/learning-tools/pdfs/esp2000.pdf. 12 March 2008.

de Moura Castro, C. (1998) The stubborn trainers vs. the neoliberal economists: will training survive the battle? EDU-106, Sustainable Development Department, Inter-American Development Bank. http://www3.iadb.org/sds/SCI/publication/publication_103_12_e.htm. Accessed 2 April 2007.

de Moura Castro, C. (2001) Training in the developing world: issues and policies. Keynote address, Inter-American Development Bank and Faculdade Pitgoras. http://scholar.google.com/scholar?hl=en&lr=&q=cache:b_JWI37JzFIJ:iveta.itweb.org/KeynoteSpeeches/Claudio%2520di%2520Moura%2520Castro.doc++%22Training+in+the+ developing+world+issues+and+policies%22. Accessed 8 February 2007.

de Silva, S. (1997) Human resources development for competitiveness: a priority for employers. Paper presented at the ILO Workshop on Employers' Organizations in Asia–Pacific in the Twenty-First Century, Turin, Italy, 5–13 May. http://www.ilo.org/public/english/dialogue/actemp/papers/1998/srshrd.htm. Accessed 27 March 2007.

Dewey, J. (1916) *Democracy and Education: An Introduction to the Philosophy of Education*. Macmillan: New York.

Dippo, D. (1998) An ethic of sustainability for work education, *Journal of Vocational Education Research*, 23(4): 325–338.

Dobson, A. (1995) *Green Political Thought*. Routledge: London.

Elkington, J. (1997) *Cannibals with Forks: The Triple Bottom Line of 21st Century Business*. Capstone: Oxford.

Elson-Rogers, S. and Westphalen, S.-A. (2000) Funding continuing vocational training in the European Union, *Journal of Vocational Education and Training*, 52(4): 687–708.

Fien, J. and Wilson, D. (2005) Promoting sustainable development in TVET: the Bonn Declaration, *Prospects*, 35(3): 273–288.

Finkelstein, N.D. and Grubb, W.N (2000) Making sense of education and training markets: lessons from England, *American Educational Research Journal*, 37(3): 601–631.

Finn, B. (1991) *Young People's Participation in Post-Compulsory Education and Training. Report of the Australian Education Council Review Committee*. Australian Government Publishing Service: Canberra.

Foucault, M. (1972) *The Archaeology of Knowledge and the Discourse on Language*. Pantheon Books: New York.

Foucault, M. (1980) *Power/Knowledge: Selected Interviews and Other Writings, 1972–1977*. Harvester Press: Brighton.

Foucault, M. (1988) *Technologies of the Self: A Seminar with Michel Foucault*. University of Massachusetts Press: Amherst.

Giddens, A. (1994) *Beyond Left and Right: The Future of Radical Politics*. Polity Press in association with Blackwell: Cambridge.

Gill, I.S., Fluitman, F. and Dar, A. (2000) *Vocational Education and Training Reform: Matching Skills to Markets and Budgets*. World Bank/Oxford University Press: Washington DC.

Gorz, A. (1994) *Capitalism, Socialism, Ecology*. Verso: New York.

Green, A. (1997) *Education, Globalization and the Nation State*. Macmillan: Basingstoke.

Green, A. (1998) Core skills, key skills and general culture: in search of the common foundation in vocational education, *Evaluation and Research in Education*, 12(1): 23–43.

Green, A. (1999) Education and globalization in Europe and East Asia: convergent and divergent trends, *Journal of Education Policy*, 14(1): 55–71.

Greinert, W.-D. (2004) *Towards a History of Vocational Education and Training (VET) in Europe in a Comparative Perspective*, vol.1. Proceedings of the first international conference, October 2002, Florence Cedefop Panorama Series 103, Office for Official Publications of the European Communities: Luxembourg.

Greinert, W.-D. (2005) *Mass Vocational Education and Training in Europe: Classical Models of the 19th Century and Training in England, France and Germany During the First Half of the 20th*. Cedefop Panorama Series 118, Office for Official Publications of the European Communities: Luxembourg.

Grubb, W.N. (2004) The Anglo-American approach to vocationalism: the economic roles of education in England, Research Paper 52, SKOPE Publications, University of Warwick, Coventry, October. http://www.skope.ox.ac.uk/WorkingPapers/SKOPEWP52.pdf. Accessed 9 January 2007.

Grubb, W.N. and Lazerson, M. (2004) *The Education Gospel: The Economic Power of Schooling*. Harvard University Press: Cambridge, MA.

Halsey, A., Lauder, H., Brown, P. and Stuart Wells, A. (1997) *Education: Culture, Economy and Society*. Oxford University Press: Oxford.

Harris, R., Guthrie, H., Hobart, B. and Lundberg, D. (1995) *Competency-based Training: Between a Rock and a Whirlpool*. Macmillan Education: Melbourne.

ILO. (no date) Human Resources Development Recommendation Database. http://www.ilo.org/public/english/employment/skills/hrdr/instr/ins_top.htm#National. Accessed 4 January 2007.

ILO (2002) *Learning and Training for Work in the Knowledge Society*, Report IV (1) International Labour Conference, 91st Session, ILO, Geneva. http://www.ilo.org/public/english/standards/relm/ilc/ilc91/pdf/rep-iv-2.pdf. Accessed 25 November 2006.

ILO (2004) Recommendation concerning human resources development: education, training and lifelong learning, Recommendation 195. Adopted by the Conference at its Ninety-Second Session, Geneva, 17 June. http://www.ilo.org/public/english/employment/skills/hrdr/rec/r_main_4.htm. Accessed 4 January 2007.

Jacobs, M. (1991) *The Green Economy*. Pluto Press: London.

Jones, P.W. (1997) On World Bank education financing, *Comparative Education*, 33(1): 117–129.

Kliebard, H.M. (1999) *Schooled to Work: Vocationalism and the American Curriculum, 1876–1946*. Teachers' College Press. New York.

Lawrence, J. (1997) Adult education and jobs, or sustainable livelihoods? Presentation at UNESCO panel on Changes in the World of Work, CONFITEA V, Hamburg, July 12. http://www.cse.mrt.ac.lk/lecnotes/cs5171/texts/CONFINTE-PAP2000.pdf. Accessed 7 January 2007.

Marginson, S. (1993) *Education and Public Policy in Australia*. Cambridge University Press: Melbourne.
Marginson, S. (1997) *Markets in Education*. Allen & Unwin: St Leonards.
Marshall, A. ([1890]1949) *Principles of Economics*. Macmillan: London.
Meadows, D., Meadows, D., Randers, J. and Behrens III, W. (1972) *The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind*. Universe Books: New York.
Middleton, J., Ziderman, A. and Van Adams, A. (1993) *Skills for Productivity: Vocational Education and Training in Developing Countries*. Oxford University Press and the World Bank: Oxford and Washington, DC.
Mok, K.-H. and Wat, K.-Y. (1998) Merging of the public and private boundary: education and the market place in China, *International Journal of Educational Development*, 18(3): 255–267.
National Council for Vocational Qualifications (1991) *General National Vocational Qualifications*. National Council for Vocational Qualifications: London.
OECD (1982) *The Future of Vocational Education and Training*. OECD: Paris.
OECD (1987) *Structural Adjustment and Economic Performance*. OECD: Paris.
OECD (1989) *Education and the Economy in a Changing Society*. OECD: Paris.
OECD (1996) *Lifelong Learning for All*. OECD: Paris.
OECD (2002) *Beyond Rhetoric: Adult Learning Policies and Practices*. OECD: Paris.
OECD (various years) *Education at a Glance. OECD Indicators*. OECD: Paris.
Pair, C. (1994) The changing role of vocational and technical education and training (VOTEC) context, actors, challenges. OECD, ERIC No.ED387650. http://eric.ed.gov/ERICDocs/data/ericdocs2/content_storage_01/0000000b/80/22/e1/40.pdf. Accessed 27 March 2007.
Penn, R. (1999) The dynamics of decision-making in the sphere of skills' formation, *Sociology*, 33(3): 621–638.
Potter, J.F. (1981) The environment and technical education in the United Kingdom, *The Environmentalist*, 1(4): 275–281.
Potter, J.F. (1992) An environmental ethos for educators and trainers, *The Environmentalist*, 12(2): 81–83.
Rose, P. (2003) From the Washington to the post-Washington consensus: the influence of international agendas on education policy and practice in Malawi, *Globalisation, Societies and Education*, 1(1): 67–86.
Secretary of State for Education and Skills (2003) 21st century skills: realising our potential, DfES, London. http://www.dfes.gov.uk/skillsstrategy/uploads/documents/21st%20Century%20Skills.pdf. Accessed 1 April 2007.
Stern N. (2006) *The Economics of Climate Change* (Stern Review) H.M. Treasury. http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm. Accessed 7 November 2006.
Stevenson, J. (1994) Interests in post-compulsory education and training: vested or community-based, *Australian and New Zealand Journal of Vocational Education Research*, 2(1): 102–120.
Stevenson, J. (1997) Legitimate learning, *Australian and New Zealand Journal of Vocational Education Research*, 5(2): 77–96.
US Department of Labor (1991) What work requires of schools: a SCANS report for America 2000. The Secretary's Commission on achieving necessary skills. http://wdr.doleta.gov/SCANS/whatwork/whatwork.pdf. Accessed 24 March 2007.
Watkins, P. (1987) *An Analysis of the History of Work*. Curriculum Development Centre: Canberra.
Watson, K. (1994) Technical and vocational education in developing countries: western paradigms and comparative methodology, *Comparative Education*, 30(2): 85–97.
Williams, C. (2005) The discursive construction of the 'competent' learner-worker: from key competencies to 'employability skills', *Studies in Continuing Education*, 27(1): 33–49.

Winterton, J., Delamare-Le Deist, F. and Stringfellow, E. (2005) Typology of knowledge, skills and competencies: clarification of the concept and prototype. Research Report elaborated on behalf of Cedefop/Thessaloniki, 26 January. http://www.ecotec.com/europeaninventory/publications/method/CEDEFOP_typology.pdf. Accessed 8 January 2007.

World Bank (1991) *Vocational and Technical Education and Training*, A World Bank policy paper. World Bank: Washington, DC.

World Bank (1997) *Expanding the Measure of Wealth: Indicators of Environmentally Sustainable Development*. World Bank: Washington, DC.

World Commission on Environment and Development (1987) *Our Common Future* (Brundtland Report). Oxford University Press: Oxford.

# Chapter 4
# Towards Sustainable Human Development

**Parmanand Varma**

In this age of globalization, liberalization and rapid technological change, technical and vocational education is a development issue for countries of the North and South alike. This chapter highlights some of the many questions about what role technical and vocational education plays in the development process, and whether it can really reduce unemployment and exclusion.

Historically, technical and vocational education were seen as a way of preparing a work force for industry, then as a means to improve the formation of human capital and increase productivity and employment. More recently it has been seen as a tool to enhance human development by creating capabilities and putting them to use for further human development and sustainable growth.

Thus human development is both a means and an end. Investing in people raises their quality of life – the ultimate goal of economic development – while also making them more skillful and productive contributors to economic progress.

The new theory of economic development (emphasizing 'human' and 'sustainable') does not accept GDP as the prime indicator of wealth, because it can rise without enriching lives. But Partha Dasgupta and Martin Weale (1992) found, looking at 48 developing countries, a strong correlation between GNP per capita and human development indicators (life expectancy, infant mortality, literacy, political and civil rights). The new approach argues that growth of income is essential, as a means, not an end, and states explicitly that development's primary objective is to benefit people, enhancing human capabilities to make a better life available to all. Thus the human development index, which measures well-being, is the indicator of development level, not GDP, which merely measures output.

Past economic development has produced rapid growth in some countries, but it has also produced gulfs between rich and poor ones in many forms of inequality and environmental deterioration. The depletion of natural capital (the overuse of resources at the expense of future generations), due to markets' failure to reflect full costs, cannot continue forever. Thus, demands for growth that is sustainable

P. Varma (deceased)
University of Detroit; Central Michigan University, Mt. Pleasant, USA; St Clair College, Windsor, Canada

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have arisen. This requires that, if one component of the total stock of capital is reduced, it must be replenished (if renewable) or offset by greater investment in another component.

## Training and Human Capital

Increased potential output depends on increased capital (natural, physical and human). The new theory of development sees human capital as the prime engine of growth, with countries that have given priority to human capital formation performing well in growth, jobs, income equity and poverty alleviation.

New technologies are making brain power the productive force, not muscle or machine power, as before. Improved methods and more sophisticated products depend on customers and workers having sufficient information, training and education. Human development theory strongly emphasizes the formation of human capital for faster development and better sharing of benefits, because

- Investment in human capital (neglected because of market failure) will yield higher returns;
- It will sometimes reduce the use of physical or natural resources; and
- The benefits are not only bigger, they are also more equitably distributed than those from investment in physical or natural capital.

There are also complementary linkages between investment in people (primary healthcare, nutrition, education) and economic development.

## Training and National Competitiveness

The universally recognized importance of investing in education for economic growth and household welfare is becoming even more crucial as the world economy grows more integrated. All countries must keep improving their work force's competence to face international competition and restructure their own economies. For developing countries, skilled labour makes it easier to adopt technology transfer as well as attracting investment. Technical and vocational education is a vital element in raising productivity and remaining competitive.

Competitiveness has been defined as 'the ability to produce goods and services that meet the test of international markets, while our citizens enjoy a standard of living that is both rising and sustainable' (Tyson, 1992), and as depending not on the fortunes of a country's companies or industries but on the functions performed (the value added) by its workers within the global economy (Reich, 1992).

Countries that open their economies and raise productivity by enhancing human capital (rather than by lowering wages) can compete and eventually move into higher technology production. Investing in education and training leads to high

income growth, productivity, investment and output, as well as faster technical progress, innovation, modernization and the production of new capital goods. Such countries restructure industries efficiently and compete successfully on world markets. The effect is visible at plant level, where research shows dynamic firms providing much more training to far more workers than less dynamic firms.

Educated, skilled labour also draws foreign investment. Multinationals, whether their activities are low-tech (garments) or their industries use higher technology, site their units in countries where workers already have skills or can acquire them (because they are literate and trainable). Training provided by multinationals, locally or outside the country, deepens a country's pool of workforce skills and increases its capabilities. Thus foreign investment plus training sparks a virtuous circle of development that helps a country use its resources for more advanced processes, increasing its competitiveness and encouraging the restructuring of production and jobs, as technology changes and demand shifts.

Meanwhile, global competition is forcing developed countries to move away from traditional, labour-intensive 'sunset' industries (textiles, rubber, steel, autos), where imports are increasingly competitive, toward skill-intensive, high-tech 'sunrise' industries. Thus, to benefit from globalization and technological change, a country must open its economy and move up to a higher level of technical capability, while ensuring the best use of its resources – resulting in increased productivity, growth and the export of more goods of higher technologies.

Mounting evidence shows that technical and vocational education is vital to accelerated growth and that workforce education is a significant determinant of productivity.

A recent study based on worker output and education in 111 countries, from 1960–1990 finds that a one-year increase in schooling raises output by 5–15 per cent. Studies relating training to productivity and earnings in eight developed countries from 1989–1997 show that a training provided by employers has a large impact of on wages (in the USA a year of such training raised wages as much as a year of college). Apprenticeships also have a large impact on workers' earnings (Australia, Denmark, The Netherlands and the USA).

World Bank studies indicate the same effect holds, with a survey of firms (in Ghana, Kenya and Zimbabwe) suggesting that

> . . . if these countries double the mean number of workers trained by firms from the current average of 9 per cent to 18 per cent, this itself would increase average productivity by 6 per cent. (ILO, 1998, p. 120)

In-house formal training raises productivity more than training from external sources, and training skilled workers is more effective than training unskilled workers.

Another World Bank study comparing technological upgrading (value added, and intensive use of capital and skill) by developing countries found that East Asia is more integrated into the world economy than Latin American countries, which in turn are more integrated than South Asian countries. It also showed a direct relationship between technological upgrading and the amount and quality of workers' education (Barro and Lea, 1996, pp. 218–23; Pigato et al., 1997).

In East Asia, starting from a low base in 1960, when workers had on average 2.8 years less education than workers in Latin America and the Caribbean, the years in education of East Asia's workers soared by 1990 to become the highest in the developing world, with an especially marked improvement for women. This progress was hastened by government interventions in labour, training and education to circumvent market failures and speed adjustment.

Using well co-ordinated systems Singapore and Korea controlled educational activities and the curriculum, as well as the types of skills delivered by technical and vocational schools. Anticipating the impact of global technological change, they followed Japan's footsteps – initially into sunset industries, then (with enhanced human and physical capital) into higher value-added goods and sunrise industries – reflected in high-tech exports.

South Asia failed to take full advantage of new global opportunities because of infrastructure constraints such as widespread workforce illiteracy in India and Pakistan, where only a small percentage have any formal training. This means less efficient production and the trend toward low-waged, low-skilled employment in the informal sector, without access to training, affects some industries and exports. India's leather industry employs 1.65 million people, of whom 90 per cent are found in the informal sector, but her share of global exports has shrunk. Leather production fell from 10 per cent in 1980 to 2.4 per cent in 1994 and the production of leather goods fell from 16.4 per cent in 1985 to 6.4 per cent in 1994 as a result of insufficient flexibility in adjusting to new competition (unskilled workers, lack of training). In software production, however, India, with its skilled human resources and appropriate government support, has thrived: exports climbed roughly tenfold from 1987 to 1997.

Lagging behind East Asia and Latin America in overall technological upgrading, India needs a national movement to enhance human capital, supported by government, industry, international organizations and the public, in order to start a virtuous circle of development.

Latin America, where the crisis of the 1980s triggered liberalization, thus attracting investment, had to refocus its training systems from the needs of import substitution to those of modern technology. The annual growth of productivity has jumped. As an illustration, productivity increased in Brazil from 3.4 per cent in the 1980s to 27.3 per cent in the 1990s. These reforms made the region, with its relatively high literacy rates, increasingly competitive. But restructuring has displaced many workers, and more workforce upgrading is needed if stronger growth is to bring full employment.

Human capital investment is essential to a country's progress, but may not on its own be enough to generate growth. Vietnam and the Philippines, with higher literacy and education, have had lower rates of economic growth than other countries in the region (ILO, 1995, p. 37). Such outcomes could result if investment is poorly used (bureaucracy, poor standards, wrong skills) or if the country pursues inappropriate development strategies such as (central planning and import substitution).

Thus an educated, skilled workforce opens the door to opportunities, but a country must also have an enabling economic environment and policies that stimulate growth and must be alert to its international competitive position.

The right type of investment in human resources can take many forms – apprenticeships, on-the-job training, formal education, private study. It can be life long. It is an investment by employer and employee, with returns anticipated. Participation has been increasing recently, especially by educated workers and in skilled occupations.

## Convergence Hypothesis

Productivity (per capita output) largely determines standard of living. It is affected by many factors – like investment, technical progress and government rules – but variation in education and training is the strongest determinant.

One theory, the 'convergence hypothesis', holds that productivity in lagging countries will converge on US levels (where productivity grew steadily following World War II, but slowed after 1973) – provided they can absorb transferred technology. Worker productivity has in fact grown faster in the other G8 countries (1950–1990), with the century-long US lead (which was partly due to two world wars) shrinking as technology transfer helps others to catch up. This process could slow down as lagging countries run out of opportunities, or, with enough skilled workers in growth-stimulating environments, such countries could become equals, trading advanced technologies with today's leaders.

The growth of education in G8 countries has accompanied rising worker productivity, with younger workers approaching US levels of secondary school completion rates (though, except for Japan, still trailing in higher education).

However, the productivity gap between developed and developing countries has kept on growing, especially since the early 1980s, and may continue to increase rather than converge. In 1965, average income in G8 countries was 20 times that of the world's poorest seven countries; by 1995 it was 39 times as much. Only a few East Asian economies have grown enough to narrow the gap; Africa and Latin America have fallen farther behind.

The widening North/South gap is matched by a growing rich/poor gap within countries. Demand for skilled workers has increased their income advantage over the unskilled; capital and profit have gained, while labour and wages have lost ground.

### *Can Technical Training and Vocational Education Reduce These Inequalities?*

While market forces are increasing the share of capital in GDP, the concentration of income in fewer hands is not causing higher investment and faster growth. In

the North, profits at the level of the 1960s now generate much less investment; in the South, the rich often receive more than half of national income but invest too little to produce significant growth. This sharply limits the potential of education and training to reduce income inequality.

## Structural Transformation

Development means a profound change in the economy – a structural transformation that differs by country and time. The current, unprecedented global transformation challenges each society in various ways. Developing countries acquiring sunset industries and developed countries exploring high technology have different needs, and effective technical and vocational education must capture these swift changes and adjust quickly within a particular context, ideally with close co-operation between government, employers and workers.

In this information age, or post-industrial society, or (in Japanese terminology) this mechatronic era, technical and vocational education must cope with the impact of microelectronics, computer-aided design and manufacturing systems, information technology, materials technology, and biotechnology and an explosion of new industries. It must also cope with the transplantation and modernization of sunset industries, the move from agriculture and manufacturing to service industries and trends toward customized products, decentralized plants, cut-throat price competition and the more flexible organization of work.

For good measure, one-third of the world is moving from centrally planned (Communist) to 'transitional' economies, through a far greater leap of liberalization that requires teaching people to respond to market signals.

Restructuring is virtually universal and, influenced by countless variables, is creating everything from new opportunities to grim unemployment and social exclusion. Jobs are being created, modified and eliminated; job descriptions are constantly being rewritten.

## Country Experiences

Employment of skilled workers rose worldwide in the 1980s and 1990s, particularly in the developed countries, where job growth was mostly in the service sector and the information and communication technology industry, while administrative support staff and production workers have been displaced. Demand for higher skilled workers has grown less rapidly in the developing countries. Some countries (mainly in Asia) have needed trained staff as they build sunset, or even sunrise, industries (notably electronics). Others, with surplus workers, such as Kenya and Mauritius, have developed labour-intensive low-skill industries (with many clothing-sector jobs created in Indonesia, Bangladesh and Sri Lanka).

### *Global Trends*

- Decentralization with the service sector and micro-enterprises creating local jobs.
- New employment patterns: job rotation/sharing/enrichment; part-time, temporary and contract work.
- Rising demand for engineers, technologists, information specialists and upper-level managers and service personnel.
- Falling demand for blue-collar production and agriculture workers.

Increasingly, workers need self-training, transferable skills and more knowledge to perform a broader mix of tasks. A survey in Japan notes that mechatronics makes jobs more complex, creating the need for an 'all-round skilled worker' who understands every action and does a job intermediate between engineering and technical (UNESCO, 1992, p. 9). Similar surveys in New Zealand and the USA have stressed the need for such qualities as the ability to communicate information to others, a knowledge of system thinking and higher-level reasoning as much as having practical and technical skills.

Swift and revolutionary technical change means that retraining may need to be almost continuous (with access by older workers needing attention), and warrants a richer cognitive content in training, with the constant enhancement of workforce skill levels. While structural transformation has opened doors for skilled workers, it has created instability, job loss and the risk of exclusion for large segments of the population. Last year an estimated 150 million workers were unemployed, and about 300 million were underemployed (ILO, 1998, p. 1).

Globally, technical training and vocational education must reduce shortages of skilled workers, continuously upgrade workforce skill levels, respond to new forms of work organization, help vulnerable groups escape unemployment, adjust to service sector and micro-enterprise needs and cope with the special situation of transitional economies. But each society has its own specific problems and needs. The one universal prerequisite for successful training is a foundational education – literacy and numeracy.

## Can Unemployment Be Reduced?

Can technical and vocational education be effective in reducing persistent unemployment and underemployment, in the current context of rapid globalization and swift technological progress? The answer, like the issue, is complex. Countries with a skilled workforce and growth-oriented policies are making progress, partly through investing in skill development, which helps increase employment. In other countries, with less ideal conditions, if unemployment exists partly because of a skills mismatch, training can reduce joblessness. But if a skills mismatch is not the problem, training would have little impact. In any country, the effectiveness of training in reducing unemployment depends on many factors, including business conditions, enabling policies and the quantity and quality of capital.

Global unemployment persists because of labour force growth, economic contraction (ILO estimates that 10 million more people were unemployed after the Asian crisis), and a widespread slowdown, with too little economic expansion in most countries to create enough new jobs. Even in the USA business investment fell in the third quarter of 1998 and the share of wages in national income is declining, so consumer spending is unsustainable (and is declining in Canada).

### *Persisting Long-Term Unemployment Results from Poor Job Growth*

A study of selected OECD member countries (ILO, 1998, p. 27) shows that inadequate job growth has been a major factor in rising unemployment (1970–1997). As outlined earlier, training and education is an necessary but not sufficient condition for economic and job growth in the South, with various countries and regions facing specific situations that affect the impact of training. Another OECD study of whether increased training can reduce unemployment suggests that the highly educated are far less likely to become unemployed than the unskilled. Thus, analysis indicates that an increased emphasis on lifelong training and learning is essential for reducing unemployment, but its impact is conditional on a country's growth-stimulating environment.

## Can Exclusion Be Prevented?

Is technical and vocational education capable of reducing the risk of exclusion from employment for women, the jobless youth, the long-term unemployed, older displaced workers, the less skilled, disabled workers and ethnic minorities? Persistent unemployment which deepens poverty is putting governments and training systems under pressure to help vulnerable groups avoid social exclusion and overcome systemic discrimination. Such groups – first fired, last hired, as economies fluctuate – cannot afford to upgrade their skills, have little access to education and credit and are trapped in miserable marginalization. In developed countries they compete for casual temporary work; in developing countries, often with no social safety net, they rely on the insecure informal sector.

Training alone, without appropriate policies and social support, can do little to overcome the diverse obstacles to inclusion through employment: poor job growth; little access to education, training and credit; discrimination; government transfer policies that discourage work; rapid economic change; global competition; the segmentation of the labour market into formal and informal sectors and, above all, the lack of market-valued skill.

The experiences of various countries and vulnerable groups illustrate the challenge. Low-skilled workers have few opportunities in manufacturing (where modernization displaces workers) or even service industries that are increasingly

information-based. An analysis of OECD country statistics indicates that an economic contraction of one per cent increases unemployment by almost 23 per cent, while an expansion of one per cent reduces unemployment by less than 5 per cent (the latter figure is applicable to low-skilled women and men) but GDP contraction does not generate unemployment for high-skilled women and men. These results confirm the segmentation of the labour market by skill levels, and thus the polarization of the economy between classes defined by their skills.

Training must be supported by micro-economic policies to improve access and provide incentives to invest, as well as steps to encourage entrepreneurship and to counter discrimination.

The informal sector – consisting of small firms, household enterprises and self-employment – is huge and is growing in developing countries. Based on easily acquired skills, it offers only low-wage jobs and little opportunity for upgrading.

Case studies of micro-firms show that growth or decline depends on markets, links with larger firms and access to technology, credit, skills and marketing. In Sialkot, Pakistan, surgical equipment manufacturers managed to meet high international standards and compete globally, thanks to metal skills and good training through a *ustad* (master-craftsman) system, complemented by government institutes. In Brazil's Sinos Valley, however, footwear micro-enterprises failed to meet Asian competition, lacking the capital, skills, technology and institutional support to cut costs and raise quality. In enterprise clusters in Nairobi, small mixed firms survived by serving local markets and developing local skills.

Policy options are puzzling: to encourage the informal sector means perpetuating low-income poverty; to neglect it means leaving many people with nothing, or the dubious prospect of 'trickle-down' benefits from the formal economy – which would depend on strong mainstream growth and the possession of needed skills.

Recently, alternatives have been proposed based on integrated programmes to spark independent growth from the activities of the poor. Innovative programmes (modelled on Bangladesh's Grameen Bank) linking micro-credit directly to skill training and literacy have created employment for the poor in many countries. The Association of Cambodian Local Economic Development Agencies, for instance, targeted veterans, the disabled, female-headed households and later, low-income clients more generally, and now has 46,000 active members.

India's self-employment programme for rural youth trained 1.5 million from 1992 to 1997. Half are now working and half remain unemployed, with the results limited by inappropriate skills and inadequate support for setting up businesses (ILO, 1998, p. 175).

Training for the informal sector should help those already functioning, for instance, by supporting the informal apprenticeship system (by upgrading for master-craftsmen and complementary training for apprentices, materials and tools). But the impact will be reduced by other institutional gaps.

Young workers – about 60 million aged 15–24 (ILO, 1998) – face high and persistent unemployment especially in Western Europe and the developing countries. Targeted programmes include incentives to firms (youth contracts) in Italy,

Greece, France and Spain, Denmark's 1994 action plan, France's 1997 plan *Emplois-jeunes*, Britain's New Deal options and the US Job Corps – each tailored to a specific society. Chile's decentralized Joven scheme for low-income workers aged 16–24 involved the government, 1,000 training providers, 15,000 firms and 100,000 trainees (1991–1995). During the first three years, in a growing economy, it led to jobs for 60 per cent of participants. Thus, impact depends on the economy: training leads to jobs during growth periods, but during slowdown or recession it can do little more than keep the young in touch with the labour market, perhaps thereby reducing crime, drug abuse and vandalism.

Women, vulnerable to market trends, job insecurity and lingering discrimination, continue to struggle for equality, even though

> . . . investing in formal and non-formal education and training for women and girls, with its exceptionally high economic and social returns, has proved to be one of the best means of achieving sustainable development and economic growth. (UN, 1995)

Globalization and structural change has opened some opportunities, but mainly in outsourcing, subcontracting, data processing and part-time work, mainly in low-wage, labour-intensive jobs where there is little incentive to invest in training. Gender gaps in training schemes are pronounced in, for instance, Germany, Britain, Norway and Hungary. Equal opportunity laws largely omit on-the-job training.

An ILO programme launched in 1991 in Latin America to promote women's participation in training for non-traditional areas and self-employment has generated various successful initiatives in Central America. Women, who more likely to spend time outside the labour force, need renewal and lifelong training but face restrictions on access to training schemes that are designed for people registered as long-term unemployed. In addition, occupations and related training are traditionally male dominated. However, some targeted schemes (such as in Ireland, Britain and Germany) are helping in high demand areas such as information and communication. Self-employment is rising, with women launching a large share of new enterprises in the Americas, Africa and Europe, despite discrimination, because of their increased education levels and they are working largely in the service sector. Education and training can potentially offer women a route to non-traditional jobs, promotion, higher earnings and continuity of employment, as well as protection against occupational downgrading when they return to the labour market.

The long-term unemployed, including many older workers and women, have great difficulties in re-entering the labour market. In 1996 the EU had 9 million long-term unemployed people, most programmes having produced meagre results. The EU adopted a new strategy in 1998 aimed at earlier intervention with a job or training for adults before they reach 12 months of unemployment.

Workers with disabilities are an expanding group, many of whom face barriers from childhood on, resulting in painful exclusion as well as loss of human capital. Traditional welfare approaches are changing towards an emphasis on equal treatment and rights, although many disabled workers in transition economies have lost jobs that were once guaranteed. Vocational rehabilitation services are sparse

in the developing world, but some countries in Africa, Asia and elsewhere are launching community-based rehabilitation, often in rural areas. Disabled youth gain skills through apprenticeship with local artisans, then receive set-up support. Denmark and Norway, however, have opted for the full integration of disabled people into mainstream education, training and employment as the best route to equality. Sheltered (subsidized) employment is growing worldwide, with sheltered workshops in the USA and other countries and supported-employment programmes in Canada, Australia, New Zealand, the USA and northern Europe.

Some programmes in developing countries target disabled women, such as an initiative by the Malawi Council for the Handicapped that puts them into mainstream training. In France, Japan and Latin America (with help from Spain and the ILO) employers' organizations are helping disabled workers to gain training and jobs. Workers' organizations are often including disability issues in their collective agreements and are participating in a new process – disability management in the workplace. Equal opportunity and treatment in training, for persons with disabilities, is widely agreed to be a human right but most countries still need not only better policies, but more implementation in reality.

## Overview

Technical and vocational education can improve productivity, make people employable, enhance human capital, attract investment and ignite a virtuous circle of development if certain essential conditions exist. Otherwise, its role is very limited. Globalization, competition, structural change in economies, new forms of work organization and many other social and economic factors are creating a new context for education and training. Clearly, the growth of education helps close the gap in worker productivity and developing countries need a skilled and adaptable workforce to grasp growth opportunities, yet the North/South gap continues to grow, partly because, although developing countries are enhancing their human capital, progress is inadequate.

As liberalization transforms economies and work, unemployment persists and deepens into the exclusion of the vulnerable. New jobs require higher levels of cognitive and analytical skills, presenting complex new challenges for technical education and vocational training in an age of rapid, continuing, worldwide technological change, with different countries and regions facing quite different conditions.

Technical and vocational education for the twenty-first century must provide skilled workers, enhance skill levels continuously, meet the needs of new industries and production patterns, help overcome unemployment and social exclusion, cope with the requirements of the service sector and deal with the special problems of transition economies. It can play that demanding role only if one pre-condition is met and one supporting factor is present: workers must be able to read, write and do arithmetic, and governments must create an enabling environment with policies that stimulate economic growth and encourage human development.

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## References

Barro, R.J. and Lea, J.W. (1996) International Measures of Schooling Years and Schooling Quality, *American Economic Review, Papers and Proceedings*, 86(2): 218–23.

Dasgupta, P. and Weale, M. (1992) On measuring the quality of life, *World Development*, 20: 119–31.

International Labour Organization (1995) *World Development Report 1995: An ILO Report*. International Labour Office: Geneva.

International Labour Organization (1998) *World Employment Report 1998–99: Employability in the Global Economy – How Training Matters*. International Labour Office: Geneva.

Pigato, M., Farah, C., Itakura, K. et al. (1997) *South Asia's Integration into the World Economy*. World Bank: Washington, DC.

Reich, R. (1992) *The Work of Nations: Preparing Ourselves for 21st Century Capitalism*. Vintage Books: New York.

Tyson, L. (1992) *Who's Bashing Whom? Trade Conflicts in High-Technology Industries*. Institute for International Economics: Washington, DC.

UNESCO (1992) N*ew Directions in Technical and Vocational Education*. UNESCO: Paris.

United Nations (1995) *Report of the Fourth World Conference on Women: Beijing, China, 4–15 September*. http://www.un.org/esa/gopher-data/conf/fwcw/off/a–20.en. Accessed 29 September 2006.

# Chapter 5
# Towards a Synthesis

**Annette Gough**

As the implementation scheme for the United Nations Decade of Education for Sustainable Development 2005–2014 says, 'The concept of sustainable development continues to evolve' (UNESCO, 2004, p. 4). The chapters in this section support this assertion by providing different, yet complementary, perspectives and new thinking on 'development' – where sustainable is taken for granted – as well as discussing the implications of each of their perspectives for TVET.

The perspectives discussed here build on the way development has been linked with sustainability through nearly three decades of international discussion:

> Development is defined here as: the modification of the biosphere and application of human, financial, living and non-living resources to satisfy human needs and improve the quality of human life. For development to be sustainable it must take account of social and ecological factors, as well as economic ones; of the living and non-living resource base; and of the long terms as well as the short term advantages and disadvantages of alternative actions. (*World Conservation Strategy* (IUCN with UNEP and WWF, 1980, paragraph 1.3))
>
> . . . development that 'meets the needs of the present without comprising the ability of future generations to meet their own needs'. (*Our Common Future*, World Commission on Environment and Development, 1987, p. 43)
>
> . . . a kind of development that provides real improvements in the quality of human life and at the same time conserves the vitality and diversity of the Earth. The goal is development that meets these needs in a sustainable way. (*Caring for the Earth: A Strategy for Sustainable Living* (IUCN with UNEP and WWF, 1991), p. 8).

What has become accepted over the decades is that there are 'three key areas of sustainable development – society, environment and economy – with culture as an underlying dimension' (UNESCO, 2004). The chapters in this section elaborate and extend on aspects of these key areas. Together they enrich discussions related to the evolving conceptions of sustainable development through discussions of key social and economic issues such as demographic trends, growing economic and technological disparities, poverty and unemployment, gender and race inequalities, urbanization, and other environmental as well as social and economic concerns. Culture is an underlying dimension in these chapters but it is acknowledged more

A. Gough
RMIT University, Melbourne, Australia
e-mail: annette.gough@rmit.edu.au

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tacitly than overtly. Similarly, gender and racial inequalities are not emphasized, except by Varma.

A significant contribution of these chapters is that they bring education writ large, and TVET in particular, into discussions of sustainable development and by so doing prompt the reader to look at development differently, for example,

- By separating human resources development from social development (Park);
- By providing a philosophy for TVET based upon integrated sustainable development (Fien et al.);
- By arguing that it is time for TVET to change its discourse from 'productivism' to 'ecologism' as its basis for human development (Anderson); and
- By drawing attention to the human development index as an indicator of development level (Varma).

Together, the four chapters foreground a capital approach to development, and in particular its human capital and social capital dimensions, while recognizing the importance of maintaining a dynamic and balanced integration of the five forms of capital (that is, also integrating natural, financial and manufactured capital) in attaining sustainable development. In addition, Fien et al. clearly outline the natural capital basis for sustainable development within a context of social and economic capital while recognizing the need for a balanced integration of all five forms of capital. The five capitals approach is similar to an integrated approach to sustainable development in that social, economic and environmental imperatives equally define the parameters of sustainable development. This approach can form the basis of a new discourse for TVET.

The chapter by Park outlines the social context and human resource development dimensions for future sustainable development. His statistics on trends in population size, growth and distribution, the changing age distributions between the more and least developed countries as well as the widening wealth gap, international migration and urbanization trends conceptualise of a future that is very different from the present.

Skilling the workforce for sustainable development practices both now and in the future is essential in attaining such development, but to date it has been little heeded by governments and organizations. One exception is the research study by Chinien (2003) which has identified the broadly transferable sustainable development-related knowledge, skills and attitudes required by the Canadian workforce.

Each of the chapters discuss human capital/resource development issues in some detail, but from two different perspectives. Park and Varma are interested in training skilled workers for the technological jobs of the future, and the role of TVET in creating this workforce. Fien et al. and Anderson are more concerned with transforming society towards sustainable development by changing the underlying philosophy of TVET from one that is oriented to economic development without taking account of the environmental consequences, to one where workers are more knowledgeable about their ecological impact and capable of shaping their sustainable futures. As Fien et al. argue:

> . . . the task for TVET for sustainable development is primarily that of helping a sufficient number of people to understand that the transition to a sustainable society is necessary, to attain the skills to work towards it and, more importantly, to believe that the alternative will bring sustainable human development for all (p. 17).

Anderson similarly argues for TVET having 'an obligation to sow and cultivate the seeds of ecological sustainability and global citizenship. Only then will worker-learners become more skilful and adaptable in ecological terms'.

Park highlights the gap between people's current levels of skills and competencies and the optimum qualification requirements that a TVET for sustainable human resource development can provide. Focus is on a technological context where 'the movement of people and knowledge and technology is seen as the real driver and cause of globalization, generating the institutional and social changes that are taking place within and beyond national borders'. Varma also has a technological orientation – arguing 'new technologies are making brain power the productive force, not muscle or machine power, as before'. However, he also recognizes that a foundational education in literacy and numeracy is a prerequisite for successful training and that this is not yet a universal which is a major barrier to development – particularly for those who are already disadvantaged – and which draws attention to the different TVET issues in less developed and more developed countries.

For Park, the future of TVET lies in preparing people for hyperjobs 'that leverage on people's unique computerizable skills and abilities and power the emerging global society'. Hyperjobs are based on five skills: discovery, creativity, implementation, influence and physical action. It also lies in closer and more co-ordinated partnerships between TVET, industries, academic communities and research institutions. But most importantly, he argues that TVET institutions and qualifications systems need to be accredited and have standardized certification systems.

The authors of all these chapters share a concern about global poverty and its impact on sustainable development – and they see education, particularly TVET, as a pathway out of the poverty cycle, but also that this area needs more work as the theory and practice in education for sustainable development (ESD) through TVET advances. ESD has a very broad agenda and while there is much recognition of the role of education in poverty alleviation there are many challenges to be addressed – such as through achieving the Millennium Development Goals and basic education for all. Then there will be a base on which to build TVET – particularly for those who experience gender and racial inequalities and the long-term unemployed.

A noticeable silence in the discussions, as noted earlier, is around gender and racial inequalities in development. Varma is the only chapter author who pays detailed attention to the educational needs of women and how the education of women can have major benefits on all aspects of society and development. Recognition of the major role women can play in sustainable development goes back to *Agenda 21* (UNCED, 1992) where Chapter 36 had the overall goal of achieving the active involvement of women in economic and political decision-making, with emphasis on women's participation in national and international ecosystem management and control of environmental degradation. The activities for governments to achieve this goal were broadly concerned with achieving equality of opportunity for women

(such as through eliminating illiteracy): increasing the proportions of women among the decision-makers in implementing policies and programmes for sustainable development; and recognizing women as equal members of households both with respect to thier workloads and household finance. Consumer awareness is particularly mentioned, as are 'programmes to eliminate persistent negative images, stereotypes, attitudes and prejudices against women through changes in socialization patterns, the media, advertising, and formal and non-formal education' (UNCED, 1992: Paragraph 24.3[i]). Here, women's knowledge was being recognized and valued as something different rather than assuming that women will achieve equality simply through equality of opportunity, although there are some elements of a liberal view present (Gough, 1999).

It would be good to see the new thinking on development advanced in this section further developed to encompass discussions of gender and racial inequalities and strategies for overcoming these as part of advancing TVET for sustainable development.

As the authors of several of the chapters argue, skilling workers for the future is a shared goal of government, industry and education providers, and while employers need to take a more active role in training, government and industry also need to ensure that the employment opportunities will meet the needs of future generations. The partnerships that are developing are to be commended, but we will need more if we are to have a sufficiently skilled workforce to achieve the transition of society to sustainable development – and we need a different philosophy for TVET that incorporates sustainable development rather than a productivism discourse. The chapter in this section have set the scene for further discussions.

## References

Chinien, C. (2003) Skills to last: broadly transferable sustainable development skills for the Canadian workforce: A technical research report for Human Resources Development Canada, Human Resources Partnerships. Bonn, Germany: UNEVOC. http://www.unevoc.unesco.org/sustainable/docweb/SkillsToLast.pdf. Accessed 23 February 2007.

Gough, A. (1999) Recognising women in environmental education pedagogy and research: towards an ecofeminist poststructuralist perspective. *Environmental Education Research* 5(2): 143–161.

International Union for the Conservation of Nature and Natural Resources (IUCN) in collaboration with the United Nations Environment Program me (UNEP) and the World Wildlife Fund (WWF) (1980) *World Conservation Strategy*. Gland, Switzerland: IUCN.

International Union for the Conservation of Nature (IUCN) in collaboration with the United Nations Environment Program (UNEP) and the World Wide Fund for Nature (WWF) (1991) *Caring for the Earth: A Strategy for Sustainable Living*. Gland, Switzerland: IUCN.

United Nations Conference on Environment and Development (UNCED) (1992) *Agenda 21* (Rio de Janeiro, UNCED). Final, advanced version as adopted by the Plenary on 14 June 1992.

UNESCO (2004) *United Nations Decade of Education for Sustainable Development 2005–2014*. Draft Implementation Scheme. October 2004. www.portal.unesco. org/education/en/file_download.php/03f375b07798a2a55dcdc39db7aa8211Final+IIS.pdf. Accessed 1 August 2005.

World Commission on Environment and Development (WCED) (1987) *Our Common Future*. Oxford: Oxford University Press.

# Part II
# The TVET Response to the Challenges of Sustainable Development

# Chapter 6
# Sustainable Development: The Challenges and Prospects for a Sustainability Curriculum

**Elwyn Thomas**

## Introduction

At the time of writing we are into the second half of the first decade of the twenty-first century, and it is 15 years since the 1992 Earth Summit in Rio de Janeiro. At that summit it was clear that education could play an increasingly strategic role in making sustainability and sustainable development realistic goals. Since 1992 the importance and pace of globalization have accelerated at a breathtaking speed. Both sustainability and sustainable development, have to be considered in the context of the future effects and pace of globalization. In other words, how sustainable will our planet and its environment be in the next 20 years if we do not take urgent measures? According to *The Economist* (2006), the 'heat is on' for measures to tackle climate change and inaction is no longer an option. A further acknowledgement of the situation is also published by the World Wide Fund for Nature (WWF, 2006) in their bi-annual report, painting a more worrying future for our planet in which global ecosystems 'face collapse'.

This chapter analyses the notion of sustainability and the accompanying process of sustainable development in the changing context of globalization. The analysis focuses on the role that education and training could play, to meet the challenges and prospects that an acceptable level of sustainable development demands. However, the meaning of the term 'acceptable' is problematical as it will vary with changing contexts. Governments worldwide will always differ in their perceptions on what sustainable development is and how to attain it, mainly for reasons of self interest. So here, we can only apply that well-known political slogan; 'the art of the possible' and provide, at best, a working sketch that outlines the basics of how to proceed in the future as far as education and training is concerned.

'Sustainability', for the purposes of this chapter, refers to the capacity of people to adapt and cope with their environments as individuals and as a part of social organizations. 'Sustainable development' is a more dynamic notion, emphasizing the need for individuals and organizations to actively learn and develop. The purpose

E. Thomas
Institute of Education, University of London, London, UK
e-mail: e.thomas@ioe.ac.uk; elwynthomas@yahoo.com

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of this is not only to achieve sustainability, but to ensure that people and organizations can adapt to changing circumstances both general and specific (Thomas, 2006). To narrow the discussion for the purposes of manageability, the chapter focuses on education and training as part of further and higher education. 'Further education', a term in current usage in the UK, refers to post-secondary, technical and vocational training. The thesis of this chapter is that learning and the changing nature of knowledge will also be reflected in our understanding of sustainability and sustainable development, so the task of achieving both entails that education and training becomes more creative, relevant, continuous and, above all, adaptive.

## Sustainable Development and Education

The important task of achieving sustainability and sustainable development in the near future is being slowly acknowledged by governments, in the workplace, by business and, not least, by professionals in various branches of higher education. The work of Scott and Gough (2003, 2004) draws attention to both the theoretical and practical issues that relate to understanding the problems faced by all those involved trying to grapple with sustainable development. Central to much of the debate on sustainability and sustainable development is the role of lifelong learning as a crucial activity within the whole educational process (Blewitt, 2004). However, to assess the role of lifelong learning in this context it is necessary to know how society relates to nature and the environment. Again, Scott and Gough (2003) have raised this issue and discussed the extent to which the environment is determined by human behaviour or vice versa. They come to the fairly predictable conclusion that human behaviour and the natural environment are both capable of changes which can affect the other. This reciprocal view of humans and their relationship with the natural environment reflects a co-evolutionary stance, and one which puts learning at the centre of understanding this key relationship.

Whether it is the economy or nature that takes priority, the path of reciprocity is the only one to take if sustainable development is to be achieved. It is also necessary to point out that people's interests are a key factor, whatever form of sustainable reciprocity is employed, and these interests can be economic, political, social and, above all, cultural.

In developing countries the role of culture needs to be taken into account, especially if sustainable development is to be an ongoing and successful process. This is because there are strong cultural influences at play that stress deeply held values and attitudes, which are reflected in language, religion, cultural histories and established socio-cultural mores and traditions. These influences challenge both the micro- and macro-changes brought about by globalization. Therefore, the value of using different cultural theories such as acculturation, individualism versus collectivism and so on to understand the need for sustainable development, together with co-evolutionary ideas about sustainability, may provide some much needed optimism in tackling the task ahead.

As sustainable development is a global and regional as well as a national problem, the urgency for international co-operation and cross referencing grows more

strongly. Sustainability is not only confined to local concerns, such as conserving water, fuel consumption and the use of degradable materials in our day-to-day living, but it is part of a set of universal priorities for all of us on this planet. So what universal priorities need to be initiated and how should they be developed? Who will ultimately take the decisions and on what bases? What are the consequences and challenges that educators face? These are some of the key questions which governments and citizens need to actively address.

O'Riordan (2004) has argued the need for some form of governance for sustainability, especially from the standpoint of present education practices. According to O'Riordan, much of the school curriculum and indeed, that of most further and higher education, is geared towards 'a philosophy of economy and society that is not sustainable'. In other words, education systems worldwide are actually promoting, in the long run, a non-sustainability that emphasizes resource depletion and the runaway use of the natural environment. This in turn fuels consumerism and the never-ending depletion of the earth's reserves. O'Riordan's views underline the need for power-sharing within a framework of participatory democracy, which involves government and other centres of decision-making, for example, industry, commerce and key sectors of civil society.

Nevertheless, the key point is not only that the current rate of non-sustainability needs to be stemmed now, but that new forms of energy and other resources have to be found and developed to complement, and in due course replace, those we are already using at present. It is perhaps here that education, in combination with science and technology, the private sector and crucial government support, could play a crucial role through well-planned research and development programmes.

The universal need to understand the nature of sustainability and the related process of sustainable development prompts not only the identification of the main priorities, as stated in above, but the need to develop a set of attitudes and activities that combine the rigour of scientific methodology with socio-cultural modes of enquiry. O'Riordan discusses this idea as the beginnings of a 'science of sustainability'. The extent to which such a new disciplinary culture is desirable or even necessary at this juncture may be a matter of debate, but such ideas are useful when thinking about the challenges we have to face, and therefore should be addressed with the seriousness they deserve. The main issue for curriculum developers at all levels of education is to provide working models that promote the imaginative use of human learning and thinking; which could include a sustainability curriculum. Encouraging human creativity is the crux of any forward-looking curriculum. It is to the relationship between sustainable development and the curriculum that we now turn.

## Curriculum Development and Sustainable Development

We live in momentous times in which the need to spell out realistic goals, to make decisions about prioritization and to engage in risk-taking will be essential. We are also entering an age of super-complexity in which uncertainty is becoming a factor

alongside established ways of thinking and doing. Barnett (2000, 2004) and Thomas (2004) have discussed this new and challenging era of super-complexity in the context of higher education. However, the challenges go beyond higher education to affect all forms and levels of education and training, be they in schools, colleges, vocational institutions in the non-formal sector, or in the provision for formal/informal adult education. The challenges also affect other sectors of society in addition to education, including, agricultural production, oil exploration, manufacturing, commerce, banking/financial services and health and welfare provision.

This means that we have to rethink much of what is being done, not only in higher education, Cullingford (2004), but education and training in general. The notion of 'learning societies' has a particular resonance in an era of uncertainty and its implications for education and training. In order to accommodate change and uncertainty, the diverse features and enriching potential inherent in various forms of learning societies would act as a useful bridge between sustainable development and developing appropriate curricula and meet the challenges of both. However, the learning societies concept needs to be more succinctly defined and made relevant to particular contexts before such societies can be effectively planned and mobilized. It is one thing to have the idea, but putting the idea into action is quite another task; and for that action to be successful, the context will be a key consideration for the development of any form of learning society.

I argue here that, while sustainable development and curriculum development are separate processes, there is much that is common and compatible to both. For example, they both encompass time spans and promote change, and both (if managed appropriately) lead to beneficial outcomes. Thus, there are implications for educators who need to implement alternative ways of approaching learning in this era of uncertainty. In order that curriculum development, whether at formal, non-formal or informal levels, can meet the challenges posed by achieving a realistic level of sustainability, both learners and teachers need to operate in a system that is very different from the present one. The seminal work of Michael Young (1998) and his notion of 'the curriculum of the future' emphasizes the fact that most school curricula actually limit creative thinking, rather than enhance it. The way forward, according to Young, is for learners and teachers to learn from the community and adapt accordingly to provide for a more relevant curriculum.

However, this maybe easier said than done, requiring as it does considerable creative and sensitive foresight in order to include what is relevant and meaningful in a new curriculum. Young puts forward four curriculum models, namely: the schooling model; the credentialist model; the access model and the connective model. The latter model puts an emphasis on making schools and colleges more responsible for developing input into their own curricula, with opportunities of cross disciplinarity. The connective model seems to be a way forward for addressing key aspects of sustainable development. While there is considerable merit in the other three models that Young describes, the connective model, with its emphasis on cross disciplinarity and local contexts, is particularly pertinent to the development of a sustainability curriculum. It is to a discussion of the sustainability curriculum and the inputs from sustainability concepts that we now turn.

## Sustainability and a Sustainability Curriculum

In the UK it was realized by successive governments in the 1990s that sustaining the environment was the shared responsibility of all citizens. As a result, several reports have been produced about future policy and potential actions that could be taken to face up to some of the challenges discussed earlier in this chapter (Department for International Development, [DfID], 1996). In 1998, a government sustainability development education panel was set up with the aim of identifying gaps and opportunities in the provision of sustainable development education. Following on from these initiatives, a survey was taken of teacher education curricula in the UK to assess the status of sustainable education in higher education teacher education departments (HE 21, 1999). The results were far from encouraging, and even in 2006 there is still an enormous task facing education and training, and particularly teacher education. Figure 6.1 identifies a number of key sustainability concepts and related notions which are central to the task of developing a sustainability curriculum.

There are four key sustainability/sustainability-related inputs that play an essential role in providing a relevant, meaningful and forward-looking sustainability curriculum to meet the needs of achieving effective sustainable development. The four inputs are: bio-environmental, bio-social, psycho-social and education.

It is likely that a curriculum of this type would have two target groups. The first group would include students who might specialize in some form of environmental education, in which case a sustainability curriculum would form the main focus of study. The second group would be those students who need to study some elements of the curriculum apart from their major subjects. In effect, the second group of students would form the bulk of those learning about sustainability as part of their general education. All four of the above inputs would attempt to match the needs of

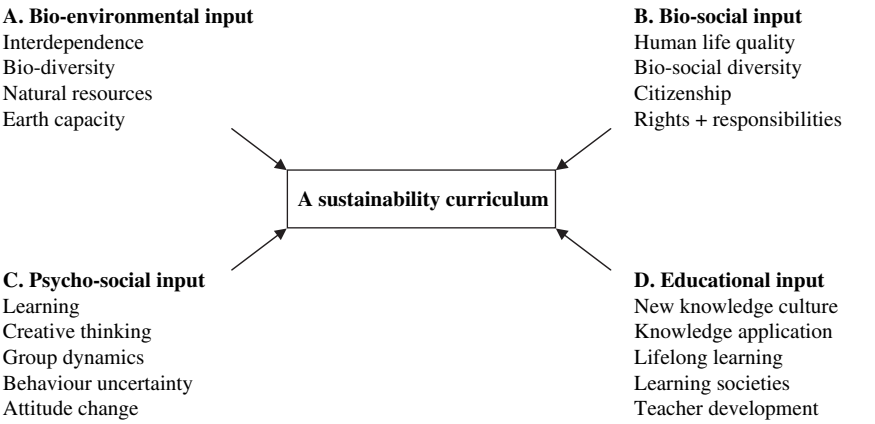


**Fig. 6.1** Sustainability concept inputs into a sustainability curriculum

sustainable development with the provision of a forward and ongoing approach, not only in the formal sector, but in the non-formal and informal ones as well. Each of the inputs is described in Fig. 6.1.

- *The bio-environmental input* includes the notions of interdependence, biodiversity and studying the earth's natural resources, for example, wind and wave power, solar energy and alternative fuels for transport and industry, as well as the earth's capacity to recycle and degrade materials and the use by people of all natural resources. There are many implications for technical and vocational education here. Technicians need to train in developing appropriate skills for 'on the job' applications relating to environmental issues, for instance, ways of ensuring that plastic materials are degraded and recycled for future use.
- *The bio-social input* includes the quality of human life and bio-social diversity, which refers to sustainability in terms of human health systems and the relationships of these inputs to cultural, social and political factors in society, including local knowledge systems. The issue of rights and responsibilities and the need for alternative versions of citizenship linked to sustainable development would also be included, as grasping these concepts is essential for the future of society.
- *The psycho-social input* embraces notions of human learning, creative thinking, individualism versus collectivism, social interaction, risk coupled with decision taking and changing the behaviour of individuals against a background of uncertainty.
- The *education input* would include new knowledge cultures, applications of knowledge, communication, lifelong learning, learning societies and their impact on non-formal education. The development of new skills and practices which relate to solving environmental problems in technical education would also be included here. Such curriculum development will be coupled to new training strategies and career-long teacher development. The task of developing a sustainability curriculum that attempts to reflect what the four inputs can provide is both exciting and challenging.

## The Challenges

There are at least six major challenges which relate to the development of a sustainability curriculum, as shown in Figure 6.2. Each of the challenges is briefly discussed below.

### *Changing Knowledge Cultures*

What counts as knowledge has been changing over the centuries and educational institutions have, albeit slowly, attempted to adapt by changing their curricula, access procedures and organize to meet the challenges which changing knowledge

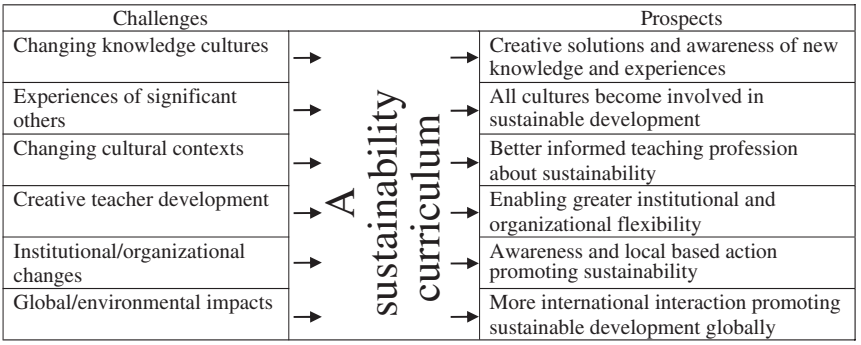


**Fig. 6.2** Challenges to the development of a sustainability curriculum and its prospects

has brought about. Many individuals nowadays have to handle many frames of reference in order to understand themselves and the world around them. In other words, we live in an era of super-complexity. As a consequence, the changing perceptions of the function of knowledge will present profound challenges, especially for the future of further and higher education.

Globalization and internationalism are now central issues worldwide, affecting all areas of higher education (Altbach, 2002), in which increased knowledge production, its distribution, and the consequences of globalization, open up new opportunities for the future (Gibbons, 1998). While the speed and complexity of change over the last decade has led to strong arguments for a more adaptable and integrated curriculum (Thomas, 2004), the issues of sustainability and sustainable development has made this an even more urgent issue.

The debate about conceptualizing curriculum change has intensified in higher education and has been a response to a number of factors not least, the increasing impact of the age of super-complexity (Barnett, 2004, Barnett et al., 2001, Thomas, 2004). Central to the debate has been the nature of knowledge and how the generation, production and distribution of knowledge have changed, and the extent to which such changes have initiated the complete re-examination of the curriculum of further and higher education, especially in developed economies.

The so-called Mode 1 curriculum in higher education is content-orientated and is alleged to make the student a passive recipient in the teaching–learning process. A Mode 2 curriculum embraces a knowledge culture which emphasizes active participation on the part of both student and tutor, with outcomes that focus on the 'how' rather than the 'what'. This is sometimes referred to as an 'emerging curriculum' (Barnett, 2000). The greater emphasis on the 'how' has lead to the claim that in further and higher education, knowledge is mainly perceived as a commodity to be bought by the consumer. This conflicts in the long run with the need for education and training to play a more enlightened and leading role in achieving sustainability, if the current emphasis on commodification persists.

Mode 3 curriculum, a term coined by Barnett (2004), refers to 'knowing in and with uncertainty' and is a knowledge culture that is about uncertainty, relevant to

the age of super-complexity. Mode 3 attempts to come to terms with an increasingly complex world where the conditions for human existence have become more unpredictable than ever. The integration of all three modes could form a valuable base from which a realistic sustainability curriculum could emerge in the future. However, Mode 3, or alternative versions of such an approach to knowledge production and application, is as yet embryonic. Meanwhile, we need to focus on careful and well thought out integration strategies for the development of sustainability curricula, embracing whatever modes will be effective and applicable for the education and training for all learners.

The notion of super-complexity and the attendant feature of uncertainty have resonance, not only in higher education, but especially in technical and vocational education. The range of potential uncertainties that could arise with increasing new technologies such as nano-technology, the advent of new biodegradable materials, and more environmentally friendly land and water practices, offer quite impressive challenges for the technicians of the future in these fields.

## *Experiential: Significant Others*

Educators will not be the only people who will play a key role in the development of a sustainability curriculum. The days are numbered when educators are seen as the sole arbiters of knowledge and training, in which much of what they taught is pervaded by their own values and attitudes. However, the access to knowledge and information for most societies has become not only wider but speedier with the use of the Internet. This has resulted in a more aware public in general, and especially more aware children of all ages. This is not to say that technical expertise is no longer important: in fact the opposite holds. There cannot be an effective policy relating to sustainability and its link to a sustainability curriculum, unless the research and development (RD) into environmental issues is carried out by well-trained professionals. However, some RD could be based on observations by local people in a particular community. Therefore, in trying to understand the problems associated with sustainability, all social members are potential 'significant others'. The teachers and their trainers will always be central players, but will increasingly draw on expertise from outside the formal educational, system.

The main challenge for the curriculum developer is to design a product in which the elements of the four inputs (referred to in Fig. 6.1) are melded into a workable curriculum. The task is not an easy one. Also, it is important that the gap between facts and research findings is effectively and meaningfully presented to all members of learning societies, so they can receive a balanced, yet informed approach to the issues and problems underlying sustainability. A greater degree of interchange between learners and significant others will, it is hoped, give a pragmatic and practical edge to learning, and provide a valuable input into a 'learning society'. This links naturally with the challenge posed by the cultural context, which should be part of any plan to provide a sustainability curriculum.

## *Changing Cultural Contexts*

An educational process that purports to be sensitive to cultural influences raises the question, should it include all cultural influences, whether they be culture-specific or culturally universal? In other words, how far can educators accept cultural inclusivity as it pertains to the theory and practice of education? The probable answer would be that a fair measure of cultural specificity, for example, cultural values, religion specifics, and much that is universally necessary would be desirable. This would give the learner a balanced view of the changing world. In the development of a sustainability curriculum, it is clear that cultural context has to be taken into account if it is to be a success.

However, the problem about cultural context in a discussion about sustainability is that culture is both all-inclusive and elusive, including many facets such as language, religion, traditional customs and different ethical codes, status and kinship patterns, all of which are culturally relevant. Furthermore, and pertinent to our discussion on sustainable development, different cultural groups perceive and manage their environment in terms of exploiting energy resources, water consumption, agriculture and other forms of land use in different ways. The cultural context also includes the growing realization that a global culture is becoming more pervasive. One aspect of global culture is the comprehensive and instantaneous effects of the Internet and other communication technologies, for example, cell phones and their impact on human information processing (Thomas, 1997, 2002). A sustainability curriculum will need to be sensitive to the age of information technology and the new cultures that stem from it.

These new cultures are not only enveloping industry and the world of commerce, but are increasingly becoming part of formal education and training, as well as in the home and the community. On the other hand, the new cultures should not be allowed to erode cultural traditions which provide security, continuity and richness to the life of a society. This is particularly pertinent in an education system that aims to uphold cultural and moral values. This means that a search for balance in the curriculum is a priority. However, the pragmatic nature of technical and vocational education provides a particularly difficult challenge to overcome in achieving such balance, not only in terms of what is taught but in the way its is taught. In many developing countries the gulf between preserving many aspects of the cultural context in the face of technical advance and innovation is often large. But bridging that gap is essential if sustainable development is to be a success.

In today's global world, it is an advantage to have a certain amount of standardization and uniformity, for example, transport, especially for safe air travel, scientific measurement and financial services. However, it is more controversial to extend the uniformity principle to policies affecting political and socio-cultural concerns, especially when they are likely to affect the environments in which different cultural groups live. The underlying concepts of desirability and societal acceptance will always be at the heart of any move to select what globalization has to offer in benefiting a society. So again, the goal of balance will be of paramount importance in achieving a *modus vivendi* between the forces of globalization and

anti-globalization. It is in this context that education and training has a key role to play, making the development of a sustainability curriculum an urgent necessity.

## *Creative Teacher Development and Training*

The notion of lifelong learning has already been briefly discussed above with reference to its potential role in achieving sustainability as part of sustainable development. The idea that teacher education can also be perceived as a career-long process of education and training is an essential addition to lifelong learning. The need for continuous teacher development provides the motivation and direction for a career-long teacher education. In fact, many countries already engage in versions of this notion through successful in-service programmes and professional upgrading (Thomas, 2003, 2004).

However, the difference today, as we enter the twenty-first century, is that the nature and pattern of career development must adapt to changing global demands in which the need to engage in effective sustainable development is a priority. The changing nature of knowledge, its production, its access and subsequent application, is a key factor in the way teachers are now trained in many parts of the world. The continuance of a teacher's professional career is, however, as important as the period of initial training. Teacher development is no longer an option but a necessity in light of the urgency of including sustainability education as part of the educational process. This means that any model of a sustainability curriculum, has to relate closely to the education and training of teachers.

## *Institutional and Organizational Change*

To bring about change through the development of a sustainability curriculum; institutional barriers to sustainable development and its management have to be overcome (Gough and Scott, 2001). For instance, good inter-institutional relationships are an essential part of environmental management, as in the case of water and land conservation. But difficulties may arise in relation to the professional attitudes and skills employed to solve an overarching problem like conservation, through peoples' past experience and loyalties to institutions and their organization. For example, professionals used to working only on land use will approach conservation differently from those working on water supply and storage.

Similarly, the knowledge and attitudes that each specialist group brings to the task will also differ until the problems common to both are identified and, it is to be hoped, solved. In other words, greater cross-institutional flexibility is required if sustainable development is to be achieved. More open access across subject areas providing multidisciplinary approaches is a necessity if we are to break down organizational rigidity. This applies not only between institutions but within them as well. This is evident in environmental management but it is also a problem for educational institutions as well.

Fien (1993, 2006) has shown that it is far from easy to change processes in school so as to make effective environmental education part of the curriculum. In higher education it is even more problematic to achieve flexibility, due to well-established patterns of subject specialization and the lack of staff expertise and training for working across disciplines. This is often coupled with resistance on the part of many staff to approaching problems from different multidisciplinary perspectives. This is a key issue when it comes to developing a sustainability curriculum in technical and vocational education. The sometimes rigid compartmentalization found in much of technical and vocational education will have to be replaced by a greater exposure to ideas and practices from other disciplines, reflecting the nature of sustainability.

## *Globalization and Environmental Impacts*

It has been clear for some time that both globalization and environmental change are major challenges of our time and that concerted efforts are needed to deal with the immense problems which these two processes present. In many ways the two processes are closely intertwined, as globalization has meant for many in the West (but by no means all), an increase in the quality of living, generating a greater a degree of consumerism. This results directly and indirectly in the overexploitation of the earth's natural resources. The major challenge for the curriculum developer who aims to develop a curriculum that addresses environmental and related global change, is to provide the learners with a clear understanding of the issues associated with sustainability. The next step is for the curriculum developer to equip the learner with strategies that actively involve all learners in real-life situations reflecting sustainability in their local context.

No future programme for curriculum development can ignore the wider global dimension that is reflected in the role of internationalism. This is of particular importance for the wider global concerns relating to sustainable development. Internationalism is the development of knowledge communities that transcend national boundaries, but in which national interests are able to persist. It is essentially a process of knowledge transfer and exchange, embracing administration, teaching, research and professional development. While the need to preserve knowledge in local contexts has been stressed above, for a meaningful solution to problems related to local sustainability, it is neither possible nor desirable to disregard the transfer of new ideas about sustainable development from other countries. To do so would deprive communities of new knowledge, skills and attitudes that would allow them to adapt global ideas to their own needs *vis à vis* sustainability. A sustainability curriculum would be the poorer if it did not address international issues affecting global concerns about the environment.

The changing nature of knowledge has raised challenges stemming from the emergence of new domains of knowledge and the need to rethink the task of knowledge integration, which has implications for a sustainability curriculum. For instance, Weiler (1996) has shown how new domains of knowledge have recently emerged, alongside the rise of so-called indigenous knowledge, and the effect such

developments will have, and are having, on the ways we need to look at the future of the curriculum and pedagogy. In a world that is rapidly becoming more internationalized and influenced by globalization, Weiler (1996) has discussed at length the need for higher education to embrace new domains of knowledge such as aesthetics, normative and spiritual studies, to widen both the appeal and relevance of higher education in a changing world. It is perhaps at this juncture that 'sustainability science' could be included as another new knowledge culture which would sit comfortably in a sustainability curriculum designed for technical and vocational students. The author has argued previously (Thomas, 1995) that more imaginative curriculum development was necessary to make technical and vocational education relevant to cultural and social contexts, especially in South East Asia. Not only was this true for the late 1990s, it is even more relevant for the new millennium in which sustainability and sustainable development relate closely to the development and use of technology. Furthermore, these issues are no longer regional but global as well.

## The Prospects

Figure 6.2 not only identifies the six challenges facing educators in developing a sustainability curriculum, but it also shows what favourable prospects could emerge if the challenges are met. The value of being aware of new knowledge cultures, and the opportunity to provide creative solutions to problem solving, goes some way in understanding the nature of sustainable development. The experiential input from significant others would encourage all cultures to be involved with their local concerns about sustainability. The prospect of different cultures forming an integral part of any sustainable development in a community, would not only be of value but a priority.

It is essential that we have a better informed body of professionals who are constantly in tune with the developments associated with sustainability, This can only be achieved by making creative teacher development a cornerstone of teacher education policies. If institutional structures become more flexible, co-operation between colleges, as well as within them, will be easier. This should result in an increased flow of ideas between staff and students. Institutions could also connect with organizations outside education that have mutual interests in understanding and solving problems related to globalization and sustainability.

A constant flow of authentic information about the impact of global and environmental events is needed to make a sustainability curriculum relevant and up to date. These would include events relating to climate change, the state of global ecosystems and population movements. The impact these events have in determining sustainable development is crucial, and all learning societies would need access to all or part of a sustainability curriculum. This links to the prospects for international interaction as an important source of new ideas from other societies. Internationalism, as far as higher education is concerned, is about the flow of ideas, practice

and research from countries around the world. A greater degree of internationalism would be help us to know how different countries tackle issues relating to globalization, environmental change and resource exploitation. In the final section of this chapter we discuss how the prospects could be translated into action.

## Prospects into Action

In this section we examine the domains of education and training for teacher preparation and career-long development against a backdrop of lifelong learning. Figure 6.3 indicates some of the key areas that could be included in programmes of teacher preparation that are designed to address sustainable development. The processes of education and training, it could be argued, are separate, as in its broader sense the notion of education concerns personal development relating to all areas of knowledge, including sustainability. However, training, on the other hand, aims to translate knowledge (when and where necessary), into practice and to provide action strategies for achieving pragmatic solutions to societal problems. As sustainable development is already a major societal and global problem, training is an integral part of teacher education, in which authentic knowledge about sustainability problems are translated into action-led solutions. Nevertheless, Figure 6.3 shows that there is an overlap between the two processes in which education interacts with training and vice versa. In other words, there is an integral involvement of ideas and practice between the both domains (OECD, 1996). Sustainability and sustainable development are notions which embrace such integral involvement. For instance, practice can generate new ideas and knowledge about the nature of the environment and add to our understanding of the factors involved. Similarly, new theories about climate change may act as an engine for more innovative practices, providing new and better techniques for problem-solving in general. Therefore, the integral involvement of education and training is the key for achieving sustainability.

Retuning to the thesis of this chapter, learning and the changing nature of knowledge influences our understanding of sustainability and sustainable development. To

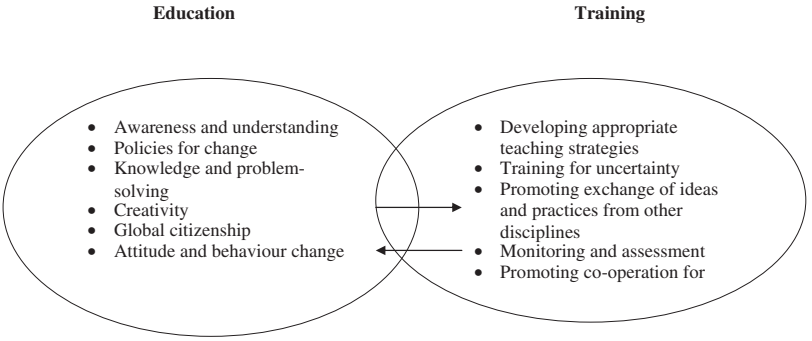


**Fig. 6.3** Education and training for a sustainability curriculum

achieve both, education and training for teachers and other professionals in higher education needs to be creative, relevant, continuous and above all adaptive. With this in mind, let us discuss the type of education and training that would embrace these tenets.

## *Prospects into Action: Education*

Figure 6.3 shows six key areas contained within the domain of education, which are now briefly discussed. These include awareness and understanding about current theories and research relating to environmental change, demographic movements due to economic reasons, conflict and natural disasters that cause conditions of non-sustainability. Linking knowledge to problem-solving takes the notion of 'awareness' to a higher level of analysis, for example, examining problems linked to energy conservation. To be aware is one thing, but framing the issues as potential problems, leading to a much deeper approach to sustainable development, is quite another.

Understanding policies for change generated by international organizations, governments and non-governmental organizations, for example, WWF and Friends of the Earth, to tackle the problems of the environment as they relate to sustainability, are important for the education of all students. This enables them not only to be aware of various social policies relating to sustainability and equity, Huby (2004), but to challenge them, where and when appropriate.

Creativity, in the context of developing new solutions and ideas about alternative ways of providing energy includes discovering a better use of natural resources such oil, coal and gas, improved land development, a search for new energy resources and capacity building. These are some examples where creative solutions are already urgently needed to meet the challenges of ecological meltdown (WWF, 2006). Perhaps the most important challenge facing the education system and society in general is to engender a sense of responsibility throughout the population. It is here that education has the greatest and also the most challenging role to play.

It is only by impressing on governments that global citizenship is the only way forward that we will achieve any reasonable measure of sustainable development in the future. The role of educators is paramount in this task. Global citizenship embraces firstly, local responsibilities, followed by national ones, but ultimately it is the global dimension that matters if we are to save the planet for future generations. At the heart of peoples' understanding of change is the subject of attitudes and behavioural change. Unless there is a reason and capacity for individuals to change their attitudes towards the practical issues associated with sustainable development, most of the efforts made by teachers and others will be wasted. The education of teachers should address this area, so that behavioural change can be made a realistic goal. For instance, students studying technical and vocational education should be given reasons for being actively involved in solutions relating to energy conservation, the practice of developing green solutions to industrial, agricultural production and the disposal of waste materials.

### *Prospects in Action: Training*

The domain of training shown in Figure 6.3 contains a number of areas in which teacher education could be more adaptive and relevant for future teacher preparation. Appropriate teaching strategies include making links between up-to-date information about sustainability and local knowledge, recognizing the differences between certainty and uncertainty and analysing the change in values that must accompany sustainable development. Using open and participative methods in approaching some of the issues relating to environmental change would help to realize these objectives. Training for uncertainty is not a new field of study, as management practice and social planning have always included elements that deal with risk-taking, risk assessment and decision-making in training programmes. Unfortunately, these types of skill do not figure prominently in most teacher education and training programmes. However, from what was discussed earlier in this chapter about the possible application of a Mode 3 curriculum in higher education, this is likely to change. Training techniques that include role-playing and the simulation of risk-taking situations, both real and virtual, would enable students to anticipate and face uncertainties relating to sustainability issues.

Finally, this leads on to the value of promoting the exchange of ideas and practices from other disciplines to enrich training regimens for educators at all levels. Teacher education would benefit substantively from more trans-disciplinarity during the period of training, in which the application of management practices, logistics and risk-taking are valuable course components. Monitoring and assessing the causes and effects of non-sustainability, in a variety of circumstances, should play an important part of any training that relates to understanding sustainability. This involves assessing the role of governments and contributions from science and technology, the community and individuals.

Promoting co-operation and sustainable development involves a wider assessment and monitoring of the global environment. This includes the policies and actions of international and regional organizations, for example, the UN environmental agencies, the EU, the World Bank and the WWF. The value of the wider picture provides the global view of the problems associated with sustainable development, and which not only teachers need to be aware of but all humankind as well.

## References

Altbach, P. (2002) Perspectives on internationalising higher education, *International Higher Education*, 28 (Summer) 2–5.

Barnett, R. (2000) *Realizing the University in an Age of Supercomplexity*. Society for Research into Higher Education and Open University Press: Milton Keynes.

Barnett, R. (2004) Learning for an unknown future, *Higher Education Research and Development*, 23 (3) 247–60.

Barnett, R., Parry, G. and Coate, K. (2001) Conceptualising curriculum change, *Teaching In Higher Education*, 6 (4) 435–49.

Blewitt, J. (2004) Introduction, In Blewitt, J. and Cullingford, C. (eds) *The Sustainability Curriculum: The Challenge for Higher Education*, pp. 1–9. Earthscan Publishers: London.

Cullingford, C. (2004) Sustainability and higher education, In Blewitt, J. and Cullingford, C. (eds), *The Sustainability Curriculum: The Challenge for Higher Education*. Earthscan Publishers: London.

DfED (1996) *Environmental Responsibility Review Report*. British Government Publication: London.

Fien, J. (1993) *Education for the Environment: Critical Curriculum Theorising and Environmental Education*. Deakin University Press: Geelong.

Fien, J. (2006) Education for sustainable development in education systems. Paper given at the 10th APEID International Conference Learning Together for Tomorrow: Education for Sustainability. Bangkok, Thailand, 6–8 December 2006.

Gibbons, M.A. (1998) Commonwealth perspective on the globalisation of higher education, In Scott, P. (ed.) *The Globalisation of Higher Education*, pp. 70–87. SRHE and Open University Press: Buckingham.

Gough, S.R. and Scott, W.A.H (2001) Curriculum development and sustainable development 'practices, institutions and literacies', *Educational Philosophy and Theory*, 33 (2), 137–52.

HE 21 (1999) *Sustainable Development Education: Teacher Education Specification*. Higher Education for the 21st Century: London.

Huby, M. (2004) Social policy and sustainable development, In Blewitt, J. and Cullingford, C. (eds), *The Sustainability Curriculum: The Challenge for Higher Education*, pp. 179–89. Earthscan Publishers: London.

OECD (1996) *Life Long Learning for All*. OECD: Paris.

O'Riordan, T. (2004) Education for sustainability: vignette, In Scott, W.S. and Gough, S. (eds) *Key Issues in Sustainable Development and Learning*, pp. 33–40. Routledge Falmer: London.

Scott, W.A.H. and Gough, S.R. (2003) *Sustainable Development and Learning: Framing the Issues*. Routledge Falmer: London.

Scott, W.A.H. and Gough, S.R. (2004) *Key Issues in Sustainable Development and Learning*. Routledge Falmer: London.

*The Economist* (2006) The heat is on. Leader article, 9 September: London.

Thomas, E. (1995) Educating and training youth for the world of work in Malaysia and Singapore. In Bash, L. and Green, A. (eds) *Youth, Education and Work, World Year Book of Education*, pp. 119–32. Kogan Page: London.

Thomas, E. (1997) Developing a culture sensitive pedagogy: tackling a problem of melding 'global culture' within existing cultural contexts, *International Journal of Educational Development*, 17, 13–26.

Thomas, E. (2002) Toward a culture-sensitive teacher education: the role of pedagogical models, In Thomas, E. (ed.) *Teacher Education: Dilemmas and Prospects*, pp. 167–79. World Yearbook of Education, Kogan Page: London.

Thomas, E. (2003) Strategies for teacher education and training in the context of global change. Plenary paper given at the International Conference on Teaching and Teacher Education, Islamic International University: Kuala Lumpur 16–18 September.

Thomas, E. (2004) Knowledge cultures and higher education: achieving balance in the context of globalisation. Paper given at the Forum Colloquium on Research and Higher Education Policy. UNESCO: Paris 1–3 December.

Thomas, E. (2006) Sustainable development in the context of globalisation: challenges and prospects for education and training Paper given at the 10th APEID International Conference Learning Together for Tomorrow: Education for Sustainability. Bangkok: 6–8 December.

Weiler, H.N. (1996) Knowledge, politics, and the future of higher education: elements of a worldwide transformation. In Hayhoe, R. (ed.) *Knowledge Across Cultures*, pp. 4–29. OISE Press: Ottawa.

WWF (2006) *Second Bi-annual Report*. WWF: London.

Young, M.F.D (1998) The curriculum of the future, In Scott, W.S. and Gough, S. (eds.) *Key Issues in Sustainable Development and Learning*, Routledge Falmer: London.

# Chapter 7
# Technology Education and the Search for Truth, Beauty and Love

**William S. Pretzer**

In her *Parade Magazine* column, Marilyn vos Savant identified in the *Guinness Book of World Records* as holder of the world's highest IQ, responded to a letter writer's earnest question, 'Is there anything in the world not affected by technology?' Her answer was 'Yes. There's truth, beauty, love and the hiccups' (vos Savant, 1996, p. 18). Leaving the hiccups for later, here I would like to suggest that technology actually embodies and actively promotes specific versions of 'truth, beauty and love' (Chandrasekhar, 1987; Mitcham, 1994).[1]

Technology education at the secondary and post-secondary levels should be the venue for ongoing conversations about the diverse, yet infinite quest for 'truth, beauty and love' within the very real limits of Spaceship Earth. No other part of our educational system so personally and explicitly connects individual values and actions with social and ecological consequences. With convincing authenticity rooted in its combination of theory and praxis, technology education could provide the critical forum for developing a much-needed twenty-first century technological integrity. Integrity, after all, is what artists and parents, as well as engineers and architects, want in their progeny.

Technology is one of the main ways in which humans impress their ideas and values, their world view, on the world at large, both natural and social. Through technology humans constantly remake the natural environment and human interactions in response to their ideas of what is truth, beauty and love. In the USA technological concerns have, in Neil Postman's words, transformed culture into a 'technopoly' where we draw our frames of reference and symbols from the technological realm and spend an inordinate amount of time trying to cope with technological issues rather than employing technology to cope with human issues (Postman, 1992).

Like it or not, this situation makes it all the more important that we all become more literate in the symbolism of technology, more expansive in our perspectives on technology and more creative, as well as critical, in our reflections on technology (Schuurman, 1995). This is precisely why students should be learning technology:

W.S. Pretzer
Museum of Cultural and Natural History, Central Michigan University, Mt Pleasant, Michigan, USA
e-mail: bill.pretzer@cmich.edu

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so that they can participate in these conversations, creating and contributing their own visions of truth, beauty and love. To paraphrase what Florman has written regarding engineering, 'although [technology] relies upon science and mathematical verities, in the end it responds to the demands of the human spirit' (Florman, 1996, p. 35; see also Chandrasekhar, 1987).

As Karen Zuga's (1994) review of the literature make clear, technology educators are overwhelmingly concerned with the what and how: the means of the curriculum, rather than with the rationales for having a curriculum at all, the question, why learn? We need more debate on goals than on criteria; less on how and more on why; less on skills and more on attitudes; less on techniques and more on relationships between technology and human values and goals. We need to focus more attention on ends than on means, for in discussions of ends we will frame the necessary contexts for the means.

Here I would like to address, in suggestive rather than definitive terms, several issues that can contribute to the flourishing of technology education. Firstly, this chapter assesses currently popular rationales for technology education. Secondly, it expresses the conviction that technology, like any part of a formal curriculum, should contribute not just to students' skill and knowledge but also to their capacity to develop moral perspectives and social wisdom. It then sketches the relevance of the contention that technology is more akin to art than it is to science and mathematics as a powerful way of knowing. Next, the chapter illustrates the importance of linking technology education to changes in social and economic structures. Finally, I suggest that broad social support for technology education will come only when educators see their mission as providing learners with opportunities to develop a personal sense of technological integrity.

## Reviewing Rationales

Nearly all discussions of motivations for learning technology have been directed at decision-makers, not students. Most of these investigations have been about why educational administrators should require students to study technology, not about why students might be enthusiastic about learning technology (*Camelback Symposium*, 1992; Savage and Sterry, 1990; Technology Education Advisory Council, 1988).[2] My reading of the literature suggests five basic categories of rationales for studying technology, each of which is, I am afraid, logically or historically flawed.

### *Personal Utilitarianism*

Students need to learn technology to get and hold a job. How do we know this? Well, employers and the government tell us. But do they? We can all cite various studies that indicate a lack of technological capabilities among today's students, be they in high school or college. Among the most potent is *What Work Requires of*

*Schools: A SCANS Report for America 2000* (US Department of Labor Secretary's Commission on Achieving Necessary Skills, 1991) (see also Boyett and Conn, 1991). But we should be careful of concluding that employment needs support technology education. A recent survey of the CEOs of *Fortune* 500 firms shows that maths, science, technical and computer skills were mentioned less frequently than analytical and conceptual problem-solving skills and higher-level proficiencies in writing and reading, along with effective individual and group communications skills. A lack of technical competency was not even mentioned in a list of student deficiencies that included their inability to diagnose and solve problems, a lack of initiative, their inability to apply their skills to new and unfamiliar problems, and their inability to work effectively in groups (Nidds and McGerald, 1995, pp. 27–8). Much the same is reported for college graduates. *Higher Education and Work Readiness*, the report from the American Council on Education's Business–Higher Education Forum, concludes:

> Corporate leaders agree that graduates are deficient in a number of areas, including leadership and communication skills; quantification skills, interpersonal relations, and the ability to work in teams; the understanding needed to work with a diverse work force at home and abroad; and the capacity to adapt to rapid change. (1995, p. 3)[3]

And before you object; 'but our students learn these skills in technology education', I have to point out that none of these capabilities are unique to technology education, nor are they traditionally associated with technical disciplines,[4] and most can be developed conveniently as part of a project-based, integrated curriculum that does not include technology (Florman, 1996, Ch. 8).

At the very least, we have to recognize that technological literacy without these other skills, will not necessarily increase the employability of our students. More importantly, we have to recognize that this simply has not proved to be a very powerful argument in favour of technology education. Parents and decision-makers have not flocked to technology education, as opposed to, say, school-to-work programmes, in an effort to prepare the next generation for its challenges and opportunities.

## *National Utilitarianism*

The nation progresses only to the extent that its citizenry is prepared to contribute to and benefit from technology. In fact, relatively few individuals have materially initiated basic technological changes and history suggests that factors like the cost of capital, governmental incentives for invention and the cultural support of innovativeness are greater influences on prosperity and growth than are workforce competencies (Mokyr, 1990; Rosenberg and Birdzell, 1986). This has certainly proved to be the case in the industrial development of nations such as Japan, Taiwan and India, where technological elites have propelled change in the past century.

Especially in times of rapid socio-technological change (say the eras 1820–1860, 1890–1910 and 1980–2010 in the USA) workforce skills commonly lag behind

leading edge and even best practice technologies.[5] In each era, innovative educational programmes have had to be introduced to assist the workers in catching up (Rosenberg, 1976, pp. 197–200; Stevens, 1995). The argument that technological literacy is critical to technological progress is not persuasive largely because it is not historically true.

## *National Security*

It is a competitive, global marketplace: either we win or we lose. The USA is in a fierce economic war with other nations that we will win or lose depending on our technological capabilities. Actually, international economics is not a zero-sum game; technology is only one of many influential factors and national employment is as affected by credit and monetary policy as it is by international competition for certain types of jobs (Krugman, 1996).

Additionally, many companies are coming to learn that co-operation is an important element within the competitive system. Technologies and their interactions with social, ecological and economic factors as well as with other technical systems have become so complex and so interrelated that companies, industries and nations now have to co-operate on many issues. Coalitions, partnerships and collaborations all require shared assumptions and an ability to communicate, even while different agendas are pursued. A group of executives of multinational auto companies recently concluded that 'to be more competitive, competitors feel they must cooperate' (Kurtz, 1996).

Further, in this global system, where cultures and languages separate people, technology is a potentially powerful cohesive element. Because technologies are potent systems of symbols, they are potentially effective forms of communication. People who cannot speak one another's language can – indeed, must – exchange with, understand and learn from one another's technological designs and systems. Focusing on individual and national competitiveness is not, in the long run, conducive to motivating learning or promoting achievement. Nor is competition a particularly effective frame of reference for working with people in the many countries where issues of appropriate scale, environmentally non-invasive technologies and collaboration with indigenous cultures and technological traditions are far more pertinent than considerations of international trade.

## *An Enlightened Populace*

An enlightened populace that is technologically literate will make better technological decisions (Brennan, 1990) This view rests on the presupposition that technology is somehow democratically determined and controlled. This reflects a broad and welcome faith in the democratic process, but a naive understanding of the processes of technological choice. Firstly, our experience does not show that

even an electorate with broadly held knowledge will provide good decisions in the political sphere (Wenk, 1989). Secondly, it has been issues of privilege and power, not knowledge and understanding, that explain the unwillingness of American businesses to accept even the minimal civic regulation of health, safety and environmental issues that have been legislated since the 1960s and more recently dismantled. Similarly, it is control of the workplace and preservation of 'management prerogatives' that underlay business rejection of the 'Technology Bill of Rights' proposed by the International Association of Machinists and Aerospace Workers in 1981 (Shaiken, 1984, Ch. 8). In other words, technological knowledge itself is not enough: what is critical are the goals, values and principles to which this knowledge is put.

### *Technology is a Pre-Eminent Example of Applied Problem-Solving*

Ironically, problem-solving – the buzz-word rationale that may be one of the most potent in terms of persuasiveness within the educational community – may also be one of the most problematic. Permeating contemporary discussions about technology is a negativity that denies what most inventors and designers feel: the exhilaration of technology in action, the sheer joy of creating something that does what is supposed to do.

If the generic benefit of technology is problem-solving it sets up a perspective of life as a set of problems; it establishes a psychology that is negative rather than optimistic and potentially feeds youthful cynicism and alienation. Further, it implies that technology can solve all kinds of problems although we know that technology by itself cannot solve war, famine or racism. Problem-solving 'techniques' (note the word) too often ignore the cultural, the political, the economic and the irrational. To concentrate on problem-solving de-emphasizes the human interactions and social processes of defining wants and satisfying needs, and promotes the notion that technology directly leads to human benefits. In other words, we confuse technological progress (problem-solving) with human progress (Postman, 1992).

Each of these five rationales asserts a crassly economic or utilitarian motive for education and assumes that such rationales are motivating to others. Additionally, these are generally presented as external motivations and, as educators know, emphasizing external motivation diminishes the internal motivation for trying and mastering anything. At their root these rationales are rooted in a technocratic view of the world. We need a new set of rationales that can only be built upon a different set of assumptions about how the world works.

## Technology and Values

Technology educators too often posit education as a mechanical system and suggest that, once the pedagogical mechanism is consistently fuelled with domains of

knowledge and process, the administration will turn the key and the machine will run. Unfortunately, this engine lacks a spark. Technology education will only gain its place on the educational agenda when its proponents make a moral commitment to human good; to love, in other words, and produce curricula that address that vision.

Here, I think, the experience of informal science and technology centres is instructive. Riding the wave of public interest in the space programme and environmental issues, science and technology centres sprang up in numerous metropolitan areas in the 1960s and 1970s. These educational organizations focused on hands-on, participatory experiences that demonstrated scientific principles and technological processes. Technology centres were created and existing ones expanded at an exponential rate, funding was lavish and visits to them increased dramatically.

Then an interesting thing happened. Attendance stagnated; funding became harder to find; the profession had an identity crisis and started assessing its programmes. The public, which had turned to the participatory nature of sci-tech centres after being turned off by the 'Do Not Touch' signs in art and history museums rather quickly got tired of hands-on 'bells and whistles'. Ultimately, the gadgets were technically elegant but sterile and unmotivating; they were unconnected to real life, real people, real challenges, real opportunities, real learning and personal meaning. The IMAX theatre, now in 3-D, a storytelling, indeed, myth-making medium of awesome imagery and larger-than-life proportions, has become the sci-tech centres' biggest audience draw.

The lesson is that you have to integrate human choices, authentic ambiguities and personal passions with technical virtuosity in order to hold onto the learner who has other options. Descartes' error, as Damasio has argued, was in trying to separate emotion from the intellect. We should know better. We need to acknowledge that self-esteem, motivation, feelings – our emotions – are part of the learning process, and recognize that without humanity and values there can be no true learning, no development of wisdom (Damasio, 1994; Goleman 1995; Perkins, 1992, Ch. 7). Passion for truth, beauty and love is at the heart of this enterprise.

Caught in its own technocratic worldview, the profession has failed to assert a clear and shared view of the key elements of a technological value system. The ultimate goal of education must be a more just, equal and participatory society, not just more technically proficient individuals. The moral imperative of (technology) education is to promote the capability of people to be engaged, influential, thinking and doing beings. This means that individuals must be able to criticize and challenge as well as create and cope. It means that value-laden terms like 'appropriate technology' and 'sustainable design' must be at the heart, not the periphery, of teaching and learning. These issues are essential to a twenty-first century education that contributes to

> . . . the formation of habits of judgement and the development of character, the elevation of standards, the facilitation of understanding, the development of taste and discrimination, the stimulation of curiosity and wondering, the fostering of style and a sense of beauty, the growth of a thirst for new ideas and visions of the yet unknown. (Israel Sheffler quoted in Bracey, 1996, p. 11)

A compelling ethical vision will rest heavily on the antithesis of the language commonly used in technology education. It will offer a better balance and interplay between values and skills, artistry and instrumentality; discipline and creativity, production and contribution; competitiveness and collaboration; standardization and multiplicity; problem-solving and opportunity-generating; the natural and the human-made; tradition and innovation. An effective rationale for learning technology would illustrate how technology is a fundamental human expression of the diverse forms of our individual and collective constructions of truth, beauty and love (Chandrasekhar, 1987; Florman, 1976, p. 150).[6]

This is not to argue that technology educators should necessarily teach a specific moral code. It is an observation that many technology educators already share an implicit set of values that they seldom explicitly recognize or reflect on and thus inadvertently pass on to their students. This value system is largely technocratic and positivistic in character. The position being advanced here is that technology education will be truly socially beneficial and valued when it is more balanced and worldly, and when it includes the explicit discussion of technological values, so that students can reflect upon and develop their own ethical standards. What is truly critical is not what we value in technology, but what values we express through technology.

In two major books the eminent educator Ernest L. Boyer has called for technology education so that elementary students 'recognise the value and dignity of work, distinguish wants from needs, and understand the importance of becoming creative producers, informed consumers, and responsible conservers' (Boyer, 1995, p. 99), while high school students should 'develop the capacity to make responsible judgements about [technology's] use' (Boyer, 1983, p. 111). Stated thus, few will dispute the goals; however, the devil is in the details.

Thus, technology education ought to be centred on a love for human beings and Spaceship Earth, not merely on the effort to extend human capabilities and their domination over nature. Herbert Read, the great scholar of industrial design, notes:

> Only a people serving an apprenticeship to nature can be trusted with machines. Only such people will so contrive and control those machines that their products are an enhancement of biological needs, and not a denial of them. (Read, quoted in Sale, 1995, p. 212)

Technology education will gain widespread public support only when the profession explicitly develops particular habits of mind; ways of thinking that consistently respect the environment, promote human welfare, support justice between peoples through, as well as in spite of, technology (McDonough, 1995).[7] As the social critic Paul Goodman has said, 'Whether or not it draws on scientific research, technology is a branch of moral philosophy, not of science' (epigram in Postman, 1992).

## Technology as Art

I think Ralph Waldo Emerson was aiming at something like this when he acknowledged that wisdom is revealed in many endeavours. In 1870 Emerson, who was hardly an apologist for technology, wrote:

> Raphael paints wisdom; Handel sings it, Phidias carves it, Shakespeare writes it, Wren builds it, Columbus sails it, Luther preaches it, Washington arms it, Watt mechanizes it. (Emerson, 1870, p. 47)

It is not surprising that Emerson's list includes the embodiment of wisdom[8] – in short, the ability to judiciously apply experience and knowledge – in the fine and practical arts as well as the more commonly recognized areas of religion and literature. Daedalus, in Greek legend the personification of the mechanical arts, was the patron of both the artists' and the craftsmen's guilds. Nicholas Negroponte, founder of the Media Lab at the Massachusetts Institute of Technology, reports that '[t]he traditional kinship between mathematics and music is manifested strikingly in contemporary computer science and within the hacker community' (Negroponte, 1995, p. 222). It was commonly acknowledged in the nineteenth century that art and technology had much in common. 'In fact', wrote one nineteenth-century chronicler of engineering, 'observation frequently shows, that the power of constructing poetry and machines are united in the same individual' (Ferguson, 1992; Hindle, 1981; Howe, 1840, p. 391). In other words, beauty and technology are intimately linked as expressions of human values and humane wisdom.

The point is that learning technology can be effectively promoted for the same reasons that arts education is promoted; namely that technology, like art, is a way of learning and knowing, of seeking truth, beauty and love. Remember that arts educators succeeded where technology educators failed in getting the arts officially included into the pantheon of the basic' school curriculum, the Goals 2000 legislation. In language that should be second nature to technology educators, arts educator Scott T. Massey proposes that the arts represent a powerful form of symbolic communication, like numbers and languages; employ non-linear forms of thinking and problem-solving and engage people in multi-sensory activities employing multiple intelligences. All these rationales apply to studying technology (Massey, 1995, p. 5).

Massey goes on to argue that arts education provides generic aptitudes 'centred in design, communication, and learning' (Massey, 1995, p. 6). Consider how closely this description of the artistic process parallels the technological process if we substitute a few words:

> . . . playfully responding to stimuli through aesthetic [technical] sensibilities; transforming and organizing these responses into rich, multi-sensory inner imagery; expressing the imagery through an artistic [technological] work; and evaluating the artistic expression [social and ecological impact] throughout. (Scheinfeld and Steele, 1995, p. 23)

It is no wonder that Rube Goldberg-inspired activities are so popular among teachers and learners! Students can learn through the arts much of what we want them to learn to learn through technology, and vice versa. We would do well to consider more systematically and promote more seriously the affinities between technology and art as ways of learning.[9]

## Technology as History

Finally, a persuasive argument for technology education can be made by acknowledging the course of historical change. This argument would have to be based on a broad sense of the history of learning technology and the importance of history. A historical perspective will suggest why learning technology is not just different from, but fundamentally unrelated to earlier arguments for learning manual or industrial arts or industrial technologies (Barella and Wright, 1981; Colelli, 1993; Foster, 1995).

This country is in the midst of its third industrial revolution. The first was mechanical and local in scope; the second was scientific and national; this one is electronic and global. Education has had a different role to play in each of those transformations.

The first industrial revolution was based on steam engines, machinery and the factory system. It relied little on science or book learning. Tinkerers, talented mechanics, practical problem-solvers and entrepreneurial dreamers made the great contributions. Knowledge about how to do things – on the farm or in the factory – continued to come from traditional know-how or on the job learning. In 1845, well before the Morrill Act Federal Land Grant Act of 1862, the educator Horace Mann concluded that Americans were 'a mechanical people' (Siracusa, 1979). This broad mechanical aptitude had everything to do with everyday experience, not formal education and Mann's educational reforms for public schools did little directly to change the situation. However, the nearly 100 mechanics' institutes founded between 1818 and 1850 and the innumerable lyceums, libraries and lectures aimed at mechanics, artisans and other skilled working people did make available opportunities to link learning and producing (Stevens, 1995).

The second industrial revolution was based on knowledge of the physical world that simply did not exist 50 years earlier. Electricity, chemistry and steel production became the catalysts of change. The goal of production shifted from individual to mass consumption and the ideal production process was transformed from the batch system to flow: electricity flowed, chemical processes flowed, livestock slaughtering flowed and the assembly line flowed. A new conception of the relationship between humans and technology was enunciated by Frederick Winslow Taylor, a relationship that trumpeted the primacy of a system that was mass production.

There was a paradoxical relationship of formal education to productivity under mass production. On the one hand, the new engines of change were increasingly operated by highly trained engineers and managers and were based on scientific knowledge developed in research laboratories staffed by university-educated researchers. On the other hand, education became more and more peripheral to the needs of masses of industrial workers. Assembly-line jobs were designed so that 'any idiot' could perform the job. A basic high school education was all that was needed. In this context, industrial arts (almost exclusively taught in grades 6–12) served as a basic introduction to materials and machinery for (almost exclusively male) students whose adult occupation might or might not directly rely on technological skills.

The third, and current, industrial revolution is based on the integrated circuit, powerful new methods and applications of information processing and intensified environmental pressures. This revolution is based on continuous change and fundamentally new ways of thinking about productive activity: from careers in an industry to jobs in various industries, from hands-on to hands-off production, from generic to customized products, from repetitious labour to novel work tasks, from bureaucratic control to team-oriented work, from more to better as an indication of quality, from disposal to re-using or recycling as the end of the product development process, from extractive to sustainable production.

The implications for education are enormous and it is those implications that we struggle with now. What we do know is that this work and education for work are qualitatively different from what any previous generation has known:

> The great majority of the new jobs require qualifications the industrial worker does not possess and is poorly equipped to acquire. They require a good deal of formal education and the ability to acquire and to apply theoretical and analytical knowledge. They require a different approach to work and a different mind-set. Above all, they require a habit of continuous learning…. At the very least [workers] have to change their basic attitudes, values, and beliefs. (Drucker, 1994, p. 62)[10]

Technology educators, regardless of their organizational lineage, have to articulate a vision that is, in fact, divorced from the industrial arts background. The fundamental questions have to do with how different generations of Americans have met their needs for understanding technology through formal and informal means. The relationships between technology education and its industrial arts antecedents in the formal educational community are but a small part of this. Where Americans once learned technological attitudes and aptitudes from direct daily experience, they now learn from the media, informal learning centres and on-the-job training. Technology educators will be better served by coming to grips with their unique role in this broad context rather than by examining narrow organizational or intellectual lineages.

A broader and truer sense of the history of technological knowledge beyond the realm of formal education will go far in aiding our understanding of the need and role of technology education in the future (Pannabecker, 1995). This means explicitly learning from historical examples of the processes of inventing, designing, utilizing and assessing technology. It means employing what we learn from experience and tradition in our present circumstances so that we can continue to learn.

## Technological Integrity

Studs Terkel's book, *Coming of Age*, is made up of reminiscences of people who have lived through much of the twentieth century. Terkel points out that technology has had much to do with the fact that so many people now live into and past their seventies. He also points out how much technology is on the minds of people reviewing their lives in this century:

> It is not technology per se that the grayheads in these pages challenge, though there are a couple of Luddites in the crowd. It is the purpose toward which it has so often been put. Among the grievances aired: the promiscuous use of the machine; the loss of the personal touch; the vanishing skills of the hand; the competitive edge rather than the cooperative centre; the corporate credo as all-encompassing truth; the sound bite as instant wisdom; trivia as substance; and the denigration of language. (Terkel, 1995, p. xiv)

If we want the reminiscences at the end of the twenty-first century to convey a different technological experience, we need to create a new, reflective (not reflexive) attitude toward technology. Marilyn vos Savant is correct in that the hiccups are an involuntary spasm in a biological system; technology is all about human values and volition.

To provide leadership and elicit commitment requires not primarily an intellectual agenda, the definition of a discipline, or a standardized curriculum, but a compelling vision of the future. To end racism and ensure civil rights, to create 'the great society', to put a man on the moon and return him safely to earth – those movements attracted massive support because they appealed to Americans' 'better angels', in Abraham Lincoln's memorable phrase. They specifically drew on the pursuit of 'life, liberty and happiness' (truth, beauty and love?) and 'America's traditions of ingenuity, resourcefulness and innovation'.[11]

Learning technology is essential precisely because it situates learners as participants in the process, provides them with real contexts for their actions, and requires them to reflect about the process, the product and the impacts (Technology for All Americans Project, 1996). Technology education is the primary opportunity for students to systematically and developmentally engage with technology as knowledge and process, acquiring concepts and reflecting on laboratory activities. They gain experience by assessing the impact of technology as artefact and volition in real world contexts, experiencing first-hand their material surroundings and examining actual social and ecological results. It is the one opportunity young people have to develop technological confidence yet cautiousness, ambition tempered by humility (Postman, 1995, p. 122).

The mission facing technology educators now is to educate the first generation of the twenty-first century to be neither technocrats nor techno-peasants, neither technophobes nor technophiles, to neither fear technology nor to place undue faith in it, to bridge, in other words, C. P. Snow's 'two cultures' (Snow, 1993). As an integrative way of thinking and acting, 'technological integrity' expands the meanings of a new basic by concentrating on principled action, rather than technical efficiency. It helps to shifts the profession's reliance away from the concept of 'technological literacy', which has been irretrievably adopted by the public and the US Department of Education to refer specifically to educational technology, computer-based skills, and Information Age capabilities (US Department of Education, 1996). Technological integrity implies the development of values and ethics as well as the mastery of concepts and skills. By fostering a sense of technological integrity, technology educators will contribute to their students' capacity to deal holistically with their natural, social, and technological environments. The twenty-first century will demand no less.

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## Notes

1. I use the term 'technology' with the all the varied meanings that Carl Mitcham has identified: material objects, knowledge, process and volition. Rather than identify each usage meaning, I rely on the reader to apply the proper meaning given the word's context. It will be obvious that I have been heavily influenced by Mitcham (1994). I discovered Chandrasekhar's *Truth and Beauty: Aesthetics and Motivations in Science* only while preparing this manuscript for publication, some five months after the original presentation. An astrophysicist and Nobel laureate, Chandrasekhar employs biographies of scientists in a series of lectures exploring the relationship between scientists' search for beauty and their conceptions of truth.
2. I refer to a large, heterogenous literature produced by the International Technology Education Association, including the association's journal, *The Technology Teacher*. Of the 82 responses given by teachers, teacher educators, supervisors and suppliers at a workshop held by the Technology for All Americans Project at the ITEA Conference in Nashville, on 28 March 1995, only six explicitly mention competitiveness and three directly note employment opportunities. Much more commonly noted are generalizable thinking skills and aptitudes and a commitment to the students' moral right to access of knowledge (R. E. Satchwell, personal communication to The Technology for All Americans Project Writing Team, 4 April 1995).
3. Specifically, one CEO notes: 'Technological skills appear to be getting better, but I think deficiencies in composition, reading, writing, logic, and clarity of thought processes are becoming more pronounced' (p. 12).
4. I am reminded of a comment made by then Attorney General Ramsey Clark at a public address at Stanford University in 1968 or 1969 that 'law school sharpens the mind by narrowing it'.
5. I consider these to be America's three industrial revolutions. These eras are associated with, in sequence, the growth of the public school system and technical associations; the definition of a new, discipline-based curriculum, trade schools and secondary schools and the current calls for educational reforms based on constructivism, authentic learning, project-based, integrated curriculum to replace the discipline-based curriculum that dominated the twentieth century. These are the dominant educational responses to the three industrial revolutions that have shaped the modern economy and society.
6. Florman (1976) p. 150, eloquently argues that 'to seek love, pleasure, wisdom, and beauty without having the solid roots in life which one achieves only by constructive activity, is to cast oneself adrift in the empty space of aimlessness'. I take his argument to apply to the general population as well as the professional engineers to whom the book is ostensibly directed.
7. McDonough, Dean of the School of Architecture at the University of Virginia, proposes a set of design protocols that includes cost, performance, aesthetics, ecology and social justice. Using a type of design filter, students in McDonough's Institute of Sustainable Design consider a wide range of issues relating to how people create, produce and interact with material culture and mechanical systems.
8. The *New Shorter Oxford English Dictionary* defines wisdom as 'the quality of being wise, esp. in relation to conduct and the choice of means and ends; the combination of experience and knowledge with the ability to apply them judiciously'. Surely this is what we mean, in general, when we talk about technological literacy.
9. Directing our attention to the connections between technology and art may have important consequences for issues of gender equity, at least in so far as cultural assumptions and perceptions of art and technology can be altered.
10. This essay, along with Postman, 1992, Carnevale, 1991 and Marshall and Tucker, 1992, should be required reading for all technology educators who are interested in both the development of employment skills and the liberating aspects of technology education.

11. The latter phrase is drawn from the mission statement of my place of employment, which reads: 'Henry Ford Museum and Greenfield Village provides unique educational experiences based on authentic objects, stories, and lives from America's traditions of ingenuity, resourcefulness, and innovation. Our purpose is to inspire people to learn from these traditions to help shape a better future'.

## References


Barella, R. and Wright, T. (eds) (1981) *An Interpretive History of Industrial Arts: The Interrelationship of Society, Education, and Industrial Arts*. McKnight Publishing Co. for the American Council on Industrial Arts Teacher Education: Bloomington, IL.

Boyer, E.L. (1983) *High School: A Report on Secondary Education in America*. Harper and Row: New York.

Boyer, E.L. (1995) *The Basic School: A Community for Learning*. Carnegie Foundation for the Advancement of Learning: Princeton, NJ.

Boyett, J.H. and Conn, H.P. (1991) *Workplace 2000: The Revolution Reshaping American Business*. Dutton: New York.

Bracey, G.W. (1996) Schools should not prepare students for work. *Rethinking Schools*, 10(4): 11.

Brennan, R.P. (1990) *Levitating Trains and Kamikaze Genes: Technological Literacy for the 1990s*. John Wiley: New York.

Business–Higher Education Forum, Task Force on High Performance Work and Workers (1995) Higher education and work readiness: the view from the corporation. Business–Higher Education Forum: Washington, DC.

Camelback Symposium (1992) *Critical Issues in Technology Education*. International Technology Education Association: Reston, VA

Carnevale, A.P. (1991) *America and the New Economy*. Jossey-Bass: San Francisco, CA.

Chandrasekhar, S. (1987) *Truth and Beauty: Aesthetics and Motivations in Science*. University of Chicago Press: Chicago, IL.

Colelli, L.A. (1993) *Tech Prep and Technology Education: A Positive Focus for Competitive Literacy*. International Technology Education Association: Reston, VA.

Damasio, A.R. (1994) *Descartes' Error: Emotion, Reason, and the Human Brain*. Avon Books: New York.

Drucker, P.F. (1994) The age of social transformation. *The Atlantic Monthly* (November 1994), 53–80.

Emerson, R.W. (1870) *Society and Solitude*. Fields, Osgood and Co: Boston, MA.

Ferguson, E.S. (1992) *Engineering and the Mind's Eye*. MIT Press: Cambridge, MA

Florman, S.C. (1976) *The Existential Pleasures of Engineering*. St Martin's Press: New York.

Florman, S.C. (1996) *The Introspective Engineer*. St Martin's Press: New York.

Foster, P.N. (1995) Industrial arts/technology education as a social study: the original intent? *Journal of Technology Education*, 6(2): 4–18.

Goleman, D. (1995) *Emotional Intelligence*. Bantam Books: New York.

Hindle, B. (1981) *Emulation and Invention*. New York University Press: New York.

Howe, H. (1840) *Memoirs of the Most Eminent American Mechanics*. W. F. Peckham: New York.

Krugman, P. (1996) *Pop Internationalism*. MIT Press: Cambridge, MA.

Kurtz, T. (1996) SAE blue ribbon panel debates cooperation in global market. US Auto Scene (Detroit) *New Center News*, 4 March, 5A.

Marshall, R. and Tucker, M. (1992) *Thinking for a Living: Education and the Wealth of Nations*. Basic Books: New York.

Massey, S.T. (1995) The arts as knowing. *On Common Ground*, (Fall), 5–8.

McDonough, W. (1995) Ecological ethics and the design revolution. Paper presented before the Society for the History of Technology, 21 October 1995, Charlottesville, VA.

Mitcham, C. (1994) *Thinking Through Technology: The Path Between Engineering and Philosophy*. University of Chicago Press: Chicago, IL.

Mokyr, J. (1990) *The Lever of Riches: Technological Creativity and Economic Progress*. Oxford University Press: New York.
Negroponte, N. (1995)*Being Digital*. Alfred A. Knopf: New York.
Nidds, J.A. and McGerald, J. (1995) Corporations view public education. *The Education Digest*, October, 27–28.
Pannabecker, J. R. (1995) For a history of technology education: contexts, systems, and narratives. *Journal of Technology Education*, 7(1): 43–56.
Perkins, D. (1992) *Smart Schools: Better Thinking and Learning for Every Child*. The Free Press: New York.
Postman, N. (1992) *Technopoly: The Surrender of Culture to Technology*. Alfred A. Knopf: New York.
Postman, N. (1995) *The End of Education: Redefining the Value of School*. Alfred A. Knopf: New York.
Rosenberg, N. (1976) *Perspectives on Technology*. Cambridge University Press: Cambridge.
Rosenberg, N. and Birdzell, L.E. Jr. (1986) *How the West Grew Rich: The Economic Transformation of the Industrial World*. Basic Books: New York.
Sale, K. (1995) *Rebels Against the Future: The Luddites and Their War on the Industrial Revolution: Lessons for the Computer Age*. Addison-Wesley: New York.
Savage, E. and Sterry, L. (1990) *A Conceptual Framework for Technology Education*. International Technology Education Association: Reston, VA.
Scheinfeld, D.R. and Steele, T.M. (1995) Expressive education: arts-integrated learning and the role of the artist in transforming the curriculum, *The New Art Examiner*, January, 22–27.
Schuurman, E. (1995) *Perspectives on Technology and Culture*. Dordt College Press: Sioux City, IA.
Shaiken, H. (1984) *Work Transformed: Automation and Labor in the Computer Age*. Holt, Rinehart and Winston: New York.
Siracusa, C. (1979) *A Mechanical People: Perceptions of the Industrial Order in Massachusetts, 1815–1880*. Wesleyan University Press: Middleton, CT.
Snow, C.P. (1993[1959]) *The Two Cultures and the Scientific Revolution*. Cambridge University Press: Cambridge.
Stevens, E.W. Jr. (1995) *The Grammar of the Machine: Technical Literacy and Early Industrial Expansion in the United States*. Yale University Press: Yale, NH.
Technology Education Advisory Council (1988) *Technology: A National Imperative*. International Technology Education Association: Reston, VA.
Technology for All Americans Project (1996) *Technology for All Americans: A Rationale and Structure for the Study of Technology*. International Technology Education Association: Reston, VA.
Terkel, S. (1995) *Coming of Age: The Story of Our Century by Those Who've Lived It*. The New Press: New York.
US Department of Education (1996) *Getting America's Students Ready for the 21st Century: Meeting the Technology Literacy Challenge*. US Department of Education, Washington, DC.
US Department of Labor Secretary's Commission on Achieving Necessary Skills (1991) *What Work Requires of School: A SCANS Report for America 2000*. Government Printing Office: Washington, DC.
vos Savant, M. (1996) Ask Marilyn. *Parade Magazine*, 18 February.
Wenk, E. Jr. (1989) *Tradeoffs: Imperatives of Choice in a High-Tech World*. The Johns Hopkins University Press, Baltimore, MD.
Zuga, K. (1994) *Implementing Technology Education: A Review and Synthesis of the Research Literature*. ERIC Clearinghouse on Adult, Career and Vocational Education: Columbus, OH.

# Chapter 8
# TVET as Sustainable Investment

**Stephen Gough**

## Introduction: Thinking about Investment

It is a commonplace to describe technical and vocational education and training as an investment. To do so implies that TVET is similar to more tangible capital assets (machinery, for example) in the following ways. Firstly, TVET requires the commitment of financial and/or other resources in the present. As a result, other alternatives presently available will be foregone, that is, there will be an opportunity cost. Secondly, an asset or assets are acquired through TVET which are expected to generate a flow of returns over a number of future time periods. Thirdly, those expected future returns justify the cost in the present.

It is also quite usual to think about nature and society in this way. We do this when we invoke the terms 'natural capital' or 'social capital', and, in fact, when we talk about 'sustainable development', since the implication of such development can only be that acceptable, sustainable, future returns are securely expected at some acceptable present cost. There remains scope for extensive disagreement around such questions as, 'what is acceptable, now or in the future?' 'acceptable to whom?' 'how far into the future?' and so on. But the point should be clear that, given human time preference – that is, that all other things being equal, we would rather have a thing sooner than later – there is an underlying issue about how we presently value future possibilities. This is important in our consideration of TVET, of sustainable development and, perhaps particularly, of the two taken together.

The purpose of this chapter is to argue that, while it is perfectly appropriate to think about TVET and sustainable development as involving forms of investment, this requires no less clarity and sophistication than the most complex business decision-making.

S. Gough
Centre for Research in Education and the Environment, University of Bath, UK
e-mail: edssrg@bath.ac.uk

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## TVET as Investment

The following is an outline list of the courses on offer at the institution of technical and vocational education and training closest to the author's place of work: art and design, graphic design, fashion and clothing, accounting foundation, marketing, catering, computing, construction, stonemasonry, carpentry, manufacturing engineering, air conditioning, English, floristry, hairdressing, media studies, music, performing arts, public service, sports, travel and tourism, work-based training. It will be apparent straight away from the number of service options here that this is a college in a rich Western country, but at the same time there are a number of course offered that might be found almost anywhere.

Each of the above areas of TVET provision competes for resources within the institution. The institution itself competes for resources with other institutions offering TVET, and the sector as a whole competes for resources with other sectors, both educational and non-educational. Finally, when students select a particular course at this particular college they are setting aside other possibilities for the best use of their own time, energies and, in some cases, money. Hence, we can see that when a student enrols in a class, there are opportunity costs at the societal, institutional and personal levels. And the individual, the institution and society as a whole will normally all tend to justify these costs, at least in part, in terms of expected future returns.

However, these expected returns are anything but homogenous. To illustrate this let us consider the example of courses in travel and tourism. Such courses are found in TVET institutions all over the world. This is because tourism is an important part of the economic development strategies of very many (almost all) countries, whether rich, poor or transitional. There are a number of states for which it is simply crucial. It frequently seems to offer a bridge between 'traditional' and 'developed' lifestyles and is of demonstrated relevance to issues of sustainable development and learning (see Gough and Scott, 2002, for a discussion). Individual students studying such a course are likely to be looking for returns in the form of future income, though they may also have less tangible concerns, such as a desire to travel or, perhaps, a wish to promote sustainable development. Their exact hopes and plans will vary from one student to the next, but there is likely to be an overall preference for larger rather than smaller incomes, incomes which are expected to increase over time, or offer other opportunities for advancement over those which are more fixed, and increasing incomes which increase sooner rather than later.

The size and security of these expected returns will depend on a wide range of parametric factors. For example, newly enrolled students of tourism immediately acquire an interest in the status of tourism in government planning. Only those determined to consider the public good independently of personal advantage will refrain from wishing for resource allocations and schemes of regulation which favour not only their chosen industry but also, within it, the occupations and rewards structures that they themselves would prefer. Since government-allocated resources are inevitably scarce and decisions about regulation or de-regulation usually controversial, this means that some of those who have enrolled in non-tourism TVET courses

(in manufacturing engineering, say) may tend to develop interests at odds with those of tourism students and graduates. At the same time, others (for example those studying construction) may find the interests of the tourism industry complementary to their own. In parenthesis, it should be clear that to say this is not to assume that people only act in their own self-interest, and it is certainly not to argue that the pursuit of self-interest is synonymous with rational choice, as we shall see. It is, however, to say that people often do act in their own perceived interest and that this is not necessarily irrational.

The returns which society expects from investment in the TVET tourism sector are rather different. They are also rather more difficult to generalize, even if we allow terms like 'nation state' or 'government' to act as a proxy for 'society'. It may be that TVET provision is primarily seen by decision-makers as a means to help students help themselves in the anticipated future. Or it may be seen as providing them with an opportunity to serve some corporate whole (the people; the nation) in that future. But in either case the returns expected are accounted in terms of a benefit to society as a whole rather than as simply a benefit to the student. The detail just depends on whether the operational vision of a thriving society is, for example, one made up of lots of self-interested individuals or one in which the collective whole is more than the sum of its parts. By contrast, the concerns of a TVET institution when choosing to invest in course provision in the tourism sector seem quite prosaic. Expected future returns might include increased student recruitment, increased income from teaching, regulatory compliance, efficient staff deployment and so on.

A further group which often considers itself to be an investor in TVET is business. Businesses may provide direct inputs of expertise or real resources. They usually pay taxes. Their expected return from the TVET process is a trained workforce, the suitability of which is typically assessed when labour demand occurs rather than when training is instigated. This seems rather unfair on TVET practitioners who may feel that neither they nor, in fact, the business community have complete foresight as to what future labour demand will turn out to be. This raises the question of uncertainty in TVET planning and investment, and to this we shall return later.

## Nature as Capital

Mention has already been made of the terms 'natural capital' and 'social capital'. In illustrating the link between sustainable development and investment this chapter draws on recent research funded by the UK's Economic and Social Research Council (Foster and Gough, 2005) which focused on natural capital.

Natural capital is an economic idea which has been particularly influential in relation to sustainable development. Though it is conceptually extremely complex, it also lends itself to simplification for the purposes of policy formulation. For example, it has not been uncommon in recent years to hear keynote speakers at environmental conferences of one sort or another describing sustainable development as a state in which the human species would 'live off the interest' of natural capital. Natural capital may be thought of as follows:

> Natural capital refers to the various ways that the environment powers production – and indeed supports most aspects of human existence. Natural capital provides a major extension of the concept 'land', one of the classical factors of production in economic theory. It has both non-renewable and renewable dimensions, the latter including its generation of eco-system services and other life-supporting functions. (Ekins et al., 2003, p. 160)

According to Åkerman (2005), the concept of natural capital was first introduced by David Pearce (1988) as a response to the then recently developed notion of sustainable development. Three particular aspects of the extensive body of subsequent work on this concept seem particularly significant for the present argument. They are:

- The importance for scientific rigour of maintaining methodological caution in the face of irreducibly incomplete knowledge. Things are so complicated that tried-and-trusted techniques sometimes do not work or, worse, lead us astray.
- The certainty (it is more than mere possibility) that learning will occur as the developing relationship between society and its environment unfolds. Our actions trigger changes in the world around us. As we adapt to them (smoothly or otherwise) we trigger further changes.
- While ecosystem functions are often relatively obvious, and to this extent likely to be valued by humans, the same cannot be said of the underlying environmental functions which sustain ecosystems themselves. Therefore, valuation and choice may be impeded not only by incomplete information, but also by the lack of any coherent intellectual framework for transforming such information as is available into rankable preferences (Ekins et al., 2003). For example, we place a high absolute value on access to an adequate supply of clean water, but are likely to be confused about the relationship between our own actions and the medium-to-long-term maintenance of aquifers.

We might further illustrate these points by reference to the issues surrounding the spread of genetically modified (GM) crops. The following conflicting possibilities arise in deciding whether to invest (perhaps through TVET) in the conservation and protection of non-GM crops, that is, in a form of natural capital:

- The development of GM might turn out to have benefits in excess of anything we imagine at present and the costs will be minimal; or
- The costs might be catastrophically large and the benefits minimal; or
- What will actually emerge is a messy mixture of costs and benefits distributed unevenly across society and over time.

The chances of successful, detailed prediction are close to zero for two reasons. Firstly, our scientific knowledge is incomplete. The 'best available science' at a moment in time may very well turn out subsequently to be quite wrong (this does not make it bad science). Secondly and relatedly, the value attached to particular outcomes depends on who is doing the valuing and on the values they have. So, over time, we may learn new factual information and we may learn to have different preferences from those we have now. While there is insufficient space to discuss it here, the history of the management of Kenyan elephant stocks provides an excellent

example of this. As with our analysis of TVET, the expected returns to investment in natural capital turn out to be hard to pin down.

## Valuing Investment

We began by noting that thinking of TVET as a form of investment means finding elements of similarity between it and other kinds of capital assets. Before going any further it should be emphasized that there are also dissimilarities. TVET doesn't just 'generate future returns'. It can enrich peoples' lives in the present, it can be part of an ongoing, vibrant society in the present and it can happen through institutions that provide an arena for human action and interaction in the present. In the same way, nature is not just a source of returns to humans. It is, apart from anything else, the source of the materials from which we are constituted and the repository of laws that we can under no circumstances repeal or ignore. But while this is important, it is not the focus of the following discussion, which is concerned with those aspects of what TVET institutions and aspects of the natural world do which are like investment. What we really have here is a set of economic metaphors (investment; capital) which are being applied to help our understanding of an educational activity (TVET) and an aspect of the human condition (the species' relationship with its environment).

If TVET or nature were simply machines for generating future returns, perhaps through established technologies and within well-understood business parameters, then valuing them in the present would be easy. The process is well established, sophisticated and rigorous and might be described in very simple terms. Future year-by-year returns to the machine would be estimated and then discounted to a net present value (NPV), using a rate of discount which takes account of human time-preference, the alternatives available in the present, the degree of risk and uncertainty involved and other factors, if necessary. If it were further the case that investment in TVET or some form of natural capital were the sole prerogative of a single individual or group, then a decision could be made by comparing this nett present value with the initial outlay required. If the value of discounted future returns exceeded the initial outlay then the investment would go ahead.

However, valuable though it certainly is, this technique may not be adequate by itself for complex business decision-making. Mun (2002, p. 10) writes, 'Some of the answers generated through the use of the traditional discounted cash flow model are flawed because the model assumes a static, one-time decision-making process'. Moore (2001, p. 191, original emphasis) makes the same point rather differently:

> The cash flow series forecast used in the familiar NPV model contains forecasts *conditioned* on accepting the proposal now (at time t = 0) and seeing it through as planned. In essence, for a risky project you spend a given amount now (initial outlay) in exchange for a series of (probability) distributions of cash flows. The means of these distributions, i.e. the expected cash flows, are discounted to the present to obtain the NPV. This works fine for projects that present one decision-point, or more precisely, one condition. ... But conditions may change for many capital investments, and you as a decision-maker may be able to switch to a new probability distribution given certain conditions. In such a case, use of NPV analysis as it is often presented may lead to the wrong decision.

We are therefore entitled to ask if the net present value approach is adequate (by itself) for thinking about something as complex and multi-faceted as either TVET or natural capital. Both Mun and Moore suggest that, under the particular circumstances of complexity they describe, there is also a place for 'real options' analysis (we should note here that theoretical economists use the term 'real options' in a rather different way). Mun, in particular, identifies an impressive list of corporate investors (HP, General Motors, Boeing, AT&T) who use this technique. It is extremely complex in application, but the point here is to ask whether it provides any metaphorical purchase in thinking about TVET and sustainable development as forms of investment.

A real option is a feature of a capital asset that provides an opportunity to make a future choice about how the asset is to be used in the future. This concept is an extension of thinking from financial markets to physical assets (Amram and Kulatilaka, 1999). The basic forms of real options can be seen in:

- Capital equipment that can function to the same purposes in different ways, or can be turned without significant adaptation to different future purposes, as required;
- Technological R&D platforms that can support various different possible future applications; and
- Stock that can be liquidated, or its value otherwise realized under different sets of future circumstances.

The common element is that in all such cases valuing the asset depends on seeing it as rational to accept – indeed, to welcome – uncertainty about the future, rather than trying (as on the standard discounted cash flow model) to diminish it as far as possible. This means that there is additional value in an investment if it creates future potential opportunities which cannot be fully evaluated in the present. Mun (2002, p. 10) puts it like this:

> The real options approach takes into consideration the strategic managerial options certain projects create under uncertainty and management … The real options approach incorporates a learning model such that management makes better and more informed strategic decisions when some levels of uncertainty are resolved through the passage of time.

The next section considers separately the implications of this approach for TVET and for natural capital.

## Real Options, TVET and Natural Capital

We saw earlier that TVET produces quite different future returns from the perspectives of different groups, and that these groups may 'invest' in it in quite different ways. This does not mean that nett present value analysis is useless, but it does complicate matters because there are, in fact, a number of different nett present values to be derived from different expected future returns. Further, these future returns are in some ways connected, and this compounds the uncertainty which surrounds them.

So, for example, it is possible to imagine a situation in which the development of a new information technology leads to a widespread expectation that there will be a future shortage of individuals with a particular skill. Governments may support TVET related to that skill for reasons of national competitiveness, individual students may eagerly enrol because they anticipate high demand in the labour market, businesses may complain that they already cannot recruit staff to help them cope with planning for the mass introduction of the technology, and TVET institutions may close marginal departments to free up space and resources for the expected influx of enthusiastic students. Subsequently it may (or may not) happen that all this rational forethought creates market oversupply and that the technology fails at the trial stage, or turns out to have been over-hyped, or surpassed by an alternative, or to be much more expensive than previously expected. Other opportunities, previously unimagined, may come along and the marginal departments may close just as their expertise becomes the focus of international retro-fashion. In a system guided by real options thinking, all those involved would be willing to incur some extra costs in the present in order to maintain options. So, for example, a TVET college might:

- Retain staff with broad rather than exclusively narrow skills in order to maintain curriculum switching options;
- Develop space in generically useful ways in order to accommodate curriculum switching;
- Delay capital development projects, accepting that the potential extra cost of subsequent rapid development is balanced by the value of an abandonment option if things do not work out as expected;
- Retain sufficient expertise is marginal areas to provide an expansion option at a later date;
- Initially pursue parallel strategic plans in order to create an option to choose.

All the above have corporate parallels (Mun, 2002). Governments and business might take a similar perspective on their own best sets of choices when faced with these same uncertainties. The situation facing students, however, is rather special and is considered below.

To illustrate real options in relation to natural capital we can return to our example of GM food. Here, society might consider undertaking exploration of the possibilities while deliberately maintaining an option to revert entirely to non-GM, or to organic production on a much enhanced scale. This option would cost something to create and maintain, and that cost would be analogous to the purchase price of a financial option. The option in question might be seen in two ways: as an expansion option on non-GM/organic production, or as an abandonment option on GM production. If we take the first of these perspectives by way of illustration, we can say that the value of our expansion option on non-GM/organic production will be higher:

- The higher the value of such production;
- The longer the future time-period under consideration;
- The greater the uncertainty.

If the value of non-GM and/or organic crops does not increase over time, then the loss incurred by society will be the full cost of setting up and maintaining the option. This, at least, we might expect to be calculable. Whether or not an option-value can ultimately be calculated to compare with this cost, we should note that the real options approach responds positively in its valuations to high uncertainty and long time periods. In this at least it offers a qualitative 'sobriety test' and an invitation to reflect rationally on our preferences. This is extremely important, given the tendency of NPV approaches which increase the rate of discount in the face of uncertainty and time lags to produce minimal evaluations of environmental assets. Finally, if the value of non-GM does increase, this might happen either because GM proves damaging or because non-GM turns out to offer opportunities of which we are presently unaware. In either case, the value of the option may then have exceeded its cost.

## Conclusion: TVET as Sustainable Investment

We have seen that a real options approach embodies a learning orientation to the future and creates an enhanced and rather different perspective on its valuation. What that perspective might mean, in outline, has been explored from the perspective of both TVET and an important aspect of sustainable development, natural capital. However, what is crucially important about TVET is that it constitutes an essential part of the learning which takes place in society as the human/environment inter-relationship develops and events unfold. This returns us finally to the situation confronting the individual student.

It was argued earlier that to pursue one's self-interest is not necessarily irrational. Of course, there is a great deal of academic literature, particularly in economics, which assumes, on the contrary, that rational behaviour is synonymous with the pursuit of self-interest. However, this view is rejected by Amartya Sen (2002), who argues instead that a rational person is one who is concerned to subject their own values, purposes and actions to reasoned scrutiny. If this is so, we might expect to find evidence of rational behaviour in the continuous development of a person's preferences in the light of increasing knowledge and experience. A rational education would be one which, starting from wherever the learner was, maximized such increase in their capacity – in all its dimensions – to do this.

Such an education might still be described as an investment, but it should be quite clear that a nett present value approach to curriculum design is by itself inadequate to the task of valuing it. The future returns cannot be fully specified, and present value is in any case only cautiously privileged. The addition of real options thinking to our investment metaphor, however, enables us to cope much more readily with the requirements of students who are learning their way into a presently indeterminate future.

There is more to it than that, because sustainable development requires the same learning orientation, as we strive to adjust successfully to ecosystem responses to our past and present actions. We might therefore conclude that TVET as sustainable

investment would, starting from the existing capabilities and contexts of learners, seek to increase

- The options available to them;
- Their skills in exploiting options they already have;
- Their skills in valuing, revaluing and ranking their preferences.

This might still involve learning the techniques of marketing, hairdressing, tourism management or construction. Without the means to make a living in the world as it is, a person's capabilities are severely limited and, anyway, these are important and useful skills. But around that core focus, such TVET would wrap other layers of learning, focusing on, for example the ability to learn new skills and adapt established ones to changing social and environmental contexts, understanding sustainable supply chains and more sustainable alternatives for the sourcing of inputs, alternative products, markets and marketing and, innovative methods of business organization, value creation and distribution. It would explore the links between what is produced, what is consumed and what is wasted. It would confront the issues of scarcity and opportunity cost as a challenge in achieving balance and justice as well as (but not instead of) a spur to competition and efficiency. It would accept the inescapability of uncertainty and teach learners to rejoice in it. Ultimately, such TVET would aim to equip learners to make progressively better choices for themselves, into the future.

After that, it would trust them to strike their own bargain with the world. We cannot write that bargain for them. We do not know what their world will be like. And we do not know what they will be like, either.

## References

Åkerman, M. (2005) What does 'natural capital' do? The role of metaphor in economic understanding of the environment. *Environmental Education Research*, 11(1): 37–57.

Amram, M. and Kulatilaka, N. (1999) *Real Options: Managing Strategic Investment in an Uncertain World*. Harvard Business School Press: Boston, MA.

Ekins, P., Folke, C. and de Groot, R. (2003) Identifying critical natural capital. *Ecological Economics*, 44: 159–63.

Foster, J. and Gough, S. (eds) (2005) *Learning, Natural Capital and Sustainable Development: Options for an Uncertain World*. Taylor and Francis: London.

Gough, S. and Scott, W. (2002) Learning for sustainable tourism: possibilities, problems and cautious first steps, in Winnett, A. (ed.) *Towards a Collaborative Environmental Research Agenda: A Second Selection of Papers*. Palgrave Macmillan: Basingstoke.

Moore, W.T. (2001) *Real Options and Option-Embedded Securities*. John Wiley: New York.

Mun, J. (2002) *Real Options Analysis: Tools and Techniques for Valuing Strategic Investments and Decisions*. John Wiley: Hoboken, NJ.

Pearce, D. (1988) Economics, equity and sustainable development. *Futures*, 20(6): 598–605.

Sen, A.K. (2002) *Rationality and Freedom*. Belknap/Harvard University Press: Cambridge, MA.

# Chapter 9
# Technacy Education: Understanding Cross-cultural Technological Practice

**Kurt W. Seemann**

A review of education in Australia's Northern Territory identifies the importance of developing technacy skills that are

> . . . critical skills for negotiating the varying and ever changing technologies increasingly integral to daily life, even in remote [Australian Aboriginal] communities. Our social lives are becoming more and more technologically textured, . . . and this demands teaching and learning pedagogies that allow students to engage authentically with our technologically constructed worlds. (Northern Territory Government, 2003, p. 56)

Technology studies are both highly visible but rarely valued in almost every national curriculum. It is often spoken about and yet it is barely understood. In addition, while technology is perceived as being the root cause of much of humanity's ills and our climate's current problems we trust in it to save our future and much of our health and economic productivity. Technology is seen in limited terms: if it is not computers then it is vocational technical training, and rarely ever is the whole spectrum of technology that constitutes its existence between these bookends made apparent, explored or debated. In the curriculum of many nations technology is portrayed as a process or thing one simply is taught to use, rather than study. It is at best the metaphor for building the skills of a labour force to given standards, and at worst it is the school subject that offers students mental recess before carrying on in the more noble studies of subjects associated closely with literacy and numeracy such as language, mathematics or science.

What is not understood is how technology presents and represents a mirror of our values, our means for building new knowledge (that is, its role in the knowledge-creation process itself) and our relationship to our eco-environmental futures. We are yet to unveil and articulate the universal characteristics in technology. Technacy is the ability to understand, communicate and exploit the characteristics of technology to discern how human technological practice is necessarily a holistic engagement

K.W. Seemann
Desert Knowledge Co-operative Research Centre in Sustainable Desert Settlements, Southern Cross University, Coffs Harbour NSW, Australia
e-mail: kseemann@scu.edu.au

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with the world that involves people, tools and the consumed environment, driven by purpose and contextual considerations.

In the first part of this chapter I explore case studies of the way values, culture and context are implied in all technologies. To illustrate core ideas in technological practice I draw on my cross-cultural work with technical projects in remote Australian Aboriginal contexts. I argue that when technologies, technical processes or technical education curriculum are transferred across cultures or contexts, considerable potential exists to reveal the values embedded in their design. The insights that technologies offer concerning both the technology donor and the technology end user lead to an understanding of why some are virtuous in their impact and some inevitably fail. Informed by the cases explored, the second part of this chapter develops a theoretical model for the universal elements of technology. Teaching the skill of exploiting this holistic and universal approach to understanding technology is referred to as technacy education. Technacy in education is proposed as a third essential pillar for new learning alongside literacy and numeracy, one that is well-placed to help address in its own right ideas leading to a sustainable future for humanity.

## Part One: Case Studies

It is significant that there are few authentic case study examples in the literature showing how values affect task performance. The available literature is largely restricted to the macro level of exploring the way that values broadly affect the development of a field of knowledge, rather than understanding how, at the micro level, values are a factor in teaching and assessment that affects task performance in technology studies. Teaching task-values is based on teaching and learning how to judge the selection and execution of tasks, based on their importance. This is especially so when task importance comes into competition with other values that learners perceive are of higher importance to them. The learner is faced with committing to matters of importance for a learning requirement, and the contestation between values and revaluing importance forms the central idea for how values drive the well-executed task.

### *Values in a Cross-Cultural Technology Settings*

The first case study presents learning in a vocationally oriented cross-cultural and Australian Indigenous outback technology education context. In this case example, one's values are defined as one's judgment of what is important in life. Accordingly, teaching and fostering what is important in technology education are critical to improving task performance for the technology educator and learner.

In Central Australia an innovative organization, now earning considerable research income and regard in appropriate technology, advises the Australian Government and manages a significant renewable energy programme for all desert Aboriginal settlements in Australia. This organization, the Centre for Appropriate

Technology Inc./Desert Peoples Centre is run by a handful of Aboriginal and non-Aboriginal technicians, professional engineers, architects, industrial designers and educationists. Its main expertise is cross-cultural technology transfer, education and the research and manufacture of innovations for desert settlements. It is a vertically integrated organization controlling the value chain from research, development and innovation diffusion to production and education and to government policy and programme advice. A certain realm of values thus drives the performance of this organization, rather than skills alone.

### Case 1: Values for Construction With Steel Frames, Concrete Slabs and Mud Brick

The education and training programmes at the Centre for Appropriate Technology were mostly in the field of construction. The projects included stand-alone (not connected to mains systems) toilet, shower and shelter constructions. Typically, an experienced builder–trainer led the work teams where indigenous students learned on-the-job skills in construction. These teams worked on many projects and it was expected that after many hours spent in repeating the tasks task performance would improve.

It was, however, perceived that some of the students appeared to struggle with basic skills, especially on those tasks that required more sustained demands in the timing of their execution. One illustration of this emerges from comparing the value of laying concrete slabs, with steel frame construction and with mud brick construction (Fig. 9.1). The task of concrete laying required a relatively simple set of manual skills after the slab formwork was erected of in-fill concrete. However, the training crews were not initially taught about the importance and personal ethic or value of the timing of critical tasks. The Aboriginal students on occasions broke away from the task, because conflicting values encouraged them to attend to cultural family demands, leaving the wet concrete to cure just when they needed to be at hand to trowel off the surface. This task was not based on great skill or complicated knowledge but students needed to judge it to be more important than the competing cultural value of family and obligation.

In such cases the experienced builder would lament and automatically judge that the few who stayed to trowel off were better skilled than the others. However, the builder instructor had not taken time to inculcate in the students the values necessary for the task, and instead, merely showed them the industry skill and tool processes as a normal mode of pedagogy. What he failed to teach was the more important associated values of how the process of slab construction requires the slab laying process to be put above any other item of personal importance once the wet concrete has been laid. Without such a commitment the slab task is ruined and proves very costly to rectify.

In contrast, steel frame construction seemed to fit more naturally with the students having to reconcile competing family and cultural demands with the technological task. Steel frame assembly, especially where it arrives on site in kit form, permitted stop and start activity with little negative effect on the final job.

Steel Frame Concrete Mud Brick

**Fig. 9.1** Values required for different technical tasks
Source: Photos courtesy Centre For Appropriate Technology Inc

Mud brick construction presented two very interesting values issues in the process of production. Mud brick is, in theory, a logical choice for the outback if the soil types prove appropriate near the site of construction. It is a cheap resource, it can be produced on site, it has excellent thermal properties for extreme temperature climates and it does not need accurate construction methods in most domestic cottage-style housing. However, it is very labour intensive and once the mud slurry quarry is created near the site, time and water factors are critical. A team effort is essential for good brick production while weather patterns permit. This work ethic in the process of mud brick production is core to the success of the task, and is much more important than the lower level manual tool skills actually taught.

The second set of values in mud brick housing is the perceived aesthetic value of the material. Mud brick construction looks unusual and for most people directly conflicts with the conventional appearance of cement block constructions that dominate the built landscape in desert communities. In theory, mud brick is a far more appropriate building technology, permitting locally sustainable constructions with good climatic properties and using lower levels of skills, so all local unskilled members in the community could participate. This applies to both its possibilities for local employment in the production of housing, extensions and renovations, and repair and maintenance. However, in my discussions with Aboriginal community members and mainstream builders in the few places where mud brick houses have been constructed, I found a common strong value bias against the technology. Mainstream builders dislike it often because of negative myths about its technology and its base in non-conventional knowledge that had not been integrated into their mainstream training. The community people were influenced both by the mainstream builders' views and their own views that it was a risky technology compared with the climatically inappropriate and limited local participation and employment potential of cement block building methods.

Values are therefore clearly determining factors in the use of a technology and are often much more important in many cases than the skills required to gain access to the technology. A final example of this is the issue of housing in some cross-cultural settings. Walker (2006) notes that 'owning a house requires you to own a set of values, and networks' when you require services. This poses a challenge to the individual, sometimes presenting a contested set of values between those embedded and assumed in the technology and those held by the householder.

> Whilst Indigenous housing suffers from overcrowding it is possible for more than four people to live happily and healthily in a house – but you have to live by a set of rules that accommodate a shared view and use of the components of the house. To get my meaning, ask yourself the following. What causes you to pick up something off the floor or to remove food scraps from the floor of a house? How did you learn this response? (Walker, 2006, p. 15)

This example from the cross-cultural context of remote Aboriginal communities highlights a general value conflict that is directly related to performing a task using a technology and house design that conflicts with one's own personal values, choices and preferred way of living in a house. Either the house technology or the user's values ought to change. This is also the basis of appropriate technology studies.

In summary, the values required to execute steel frame constructions are different to those for laying concrete slabs and mud brick construction. Steel construction is a forgiving process, permitting stop and start activity. Laying concrete is less forgiving, demanding attention to its cure-timing as a critical task value. Mud brick is highly labour intensive, demanding sustained timing on the processes and drying of bricks. However, technical modules of training do not assess or emphasize the personal values required to execute correctly the different demands of the tasks and processes involved. They focus on tools, sequence and practice, but not on teaching and assessing learners on their work process values that the nature of the technology itself demands.

### Case 2: The Steel Axe

Most remote indigenous communities today use the short-handled steel axe for hunting and gathering and for crafting goods for the tourism market. However when missionaries first handed out the axes to encourage church patronage, a ripple effect disrupted long standing social structures (Sharp, 1952). The axe was traditionally a man's tool. The prized smooth stones of traditional axes were tradable items linking local groups with trade lines across the country. For groups in the far north the hardwood axe handle had to be traded with desert groups to the south as local woods were less suitable. Some men held a particular status because of their skills as trade negotiators, and because they had established friendships across vast lines of trade. Skills of diplomacy in trade gave the men rights to regulate the use of the axe. Women, who had similar tools that defined their own roles, were not denied the axe but, as it was a very important survival tool, the men had primary responsibility for its care. To gain a traditional education in the production of axes was to develop social trading skills, technical knowledge and techniques in assembling

and the selective extraction of local natural resources. One can imagine that the traditional knowledge that assured sustainable axe supplies for community survival was something akin to having passed through an education in technacy. The present day antithesis of this process would be for a school to teach a module that leads to the fabrication of a traditional stone axe without genuinely developing skills in trade negotiation, and in the selective extraction of raw timber from the environment in a socially acceptable way.

When steel axes were handed out to uninitiated men and to women and children, in the above example, the trading skills and social status of men changed. In time a new balance was achieved where all used the steel axe. But now, rather than having artisans to sustain local subsistence economies, indigenous Australians depend on having a cash income in order to buy, repair and sharpen their axes. In effect, from a sustainability perspective, they have taken a backward step. They have had to move from being technologically competent (technate) to being merely technical. The steel axe is technically superior to the stone version, but it could not be incorporated into the socio-economic and cultural context. While the axe is a relatively insignificant example, the principles of its introduction and effects could be replicated many times over in relation to other new technologies introduced to indigenous communities since western colonization (Seemann, 1997).

### Case 3: *Pandanus* Baskets

Traditional knowledge has sustained indigenous Australian cultures for over 60,000 years, during which technology and technical activity were inseparable from social and environmental knowledge, which was the only framework for practicing technical knowledge. To produce an artefact, a tool or a shelter was to integrate all three forms of knowledge. To illustrate this point consider how women in small island communities in northern Australia integrate skills to produce *pandanus* baskets or carry bags for their own use. They start by organizing a work group, in which each woman has a particular task, including food preparation and child care. They arrange transportation to a site in the natural bush to harvest the best *pandanus* trees. Each tree requires a keen, informed eye to pluck the best leaves for weaving. Roots also are collected for dye. While this is going on, children are encouraged to watch carefully to learn not only *pandanus* harvesting but the social protocols and organization of the whole day. Some of the tools for manufacturing the baskets are fashioned by the women themselves, while others are purchased (Seemann et al., 1990).

The technology of *pandanus* basket construction could clearly not be conveyed adequately by a compilation of segregated competency modules. Yet much of technical education being imposed on indigenous peoples is still based on an industrial worldview that emphasizes the compartmentalization of knowledge through modularized learning. For women in island communities, learning the technical skills of basket construction is necessarily a social event deeply embedded in sustainable human and environmental relationships. The whole exercise integrates social, technical and environmental knowledge and skills. To represent the *pandanus* basket curriculum in a series of parts would be to misrepresent the quality of the integrated

knowledge these women have developed. A disintegrated curriculum simply produces disintegrated judgements and hence inadequate solutions to the project or problem at hand.

In all the cases described above, the technical does not adequately manifest itself without the social. And moreover, both the technical tools and systems employed are interdependent with the social knowledge, social organization and techniques required to execute the task. Neither the social nor the technical aspect of technological practice could have occurred without for drawing on and accessing the material consumed from the eco-environment in the task process, and we could not imagine any of the social, technical and shaped resources coming together if there were not some at least initial purpose and context for the designed practice.

## Part Two: The Basic Principles of Technacy

Many approaches exist for understanding the phenomenon we label technology. Presented here is a phenomenological view to offer the reader a deeper grounding into why certain conclusions are drawn and schemas proposed. A schema gives teachers a framework in which to evaluate just how holistic a lesson or curriculum is, to guide them in the educational tasks to include and in constructing the educational context and experience that fosters holistic understanding in technology and design.

I begin with the premise that holistic technology education is a necessary, rather than a merely desirable, outcome of schooling, especially cross-cultural schooling in technology. The classical holist position in education is

> . . . to know things is to know things in relation; to know a part is to know how it connects with the whole. In the process of codification, different impressions of the same object or process are utilized so that interrelations might be recognized. It is the total vision which we call knowledge. (Matthews, 1980, p. 93)

Many teachers argue that they already teach technology holistically. However, the question we must pose is, how do we know this?

### *Q1: How Do We Know We Are Teaching Technologies Holistically?*

Teachers' responses to this question may range from 'because my students discuss many issues in the design process' to 'I make sure they engage in social and environmental perspectives'. The problem with such responses is that what is holistic is not grounded in universal reason or a coherent schema of dependent relations. Why should discussing social and or environmental issues be included for claims of holistic technological learning? Can one choose to discuss these elements or must one connect the dependence of these elements on the technology being learned? Such musings can quickly frustrate teachers who often conclude that to teach holistically one needs to teach and consider everything. At this point some teachers may be lost and very often some revert to teaching traditional particulars like tool skills and task

techniques. That is, they revert to their narrow, but comfortable zones of assessing tools and technique skills and particular knowledge for a product so that the student can take home the object as a sign of successful learning. This chapter suggests that such patterns of pedagogy should be redressed.

The phenomenology of technology and knowledge development allows a teacher to use a basic principles approach to formulate a universal schema or cognitive framework. Using this approach a teacher can determine what to include in lessons and evaluations to ensure reasonably a holistic coverage in technical education. In it we also discover that technology education and practice is not only a 'how-to' experience, but also a 'know-why' experience and that the latter is fundamental to the human act of creating new knowledge itself not just using knowledge. A 'know-why' capability is important for principles development. It fosters in many different settings a knowledge of the reasons why things should be learned or done to the benefit of situational learning, and enables learning transfer or innovation to occur. Holistic education in technology can be transferred to novel encounters throughout the course of our lives, a quality lacking in much of 'how-to' training in technology particulars.

## Knowing and Understanding Through Technological Practice

When can we claim we know something? Dialectics and practice are very useful reasoning tools for understanding the nature of an answer to this question in the context of technology education. Why is this important? This section of the chapter makes the case that knowing and especially understanding occurs best through holistic technological practice. The dichotomy between theory and practice in technology used in many secondary and tertiary schools is at the heart of the problem. 'Theory is taught through practice and good practice is grounded in good theory' as my education lecturer often said to me as a student. We do not really want to present technology education as separating conceptual tools (how to think skills) from physical tools (how to do skills). Theory classes should not be estranged from practical classes, nor should theory be devalued or even employed as a punishment in learning technology and design. It is not the product or the technical process we assess as educators, but the learners and their learning.

A tool is defined here as anything we value and use as an instrument. A brick or a fist is a tool if we use it as a club. A car is a tool if we use it as a means to get us from one place to another. An engineering algorithm is a tool if we to use it to determine a load on a beam. In each case, tools help us do things to manipulate a material, whether that material is at a scale we relate to in ordinary experience or something out of the realm of ordinary experience, like information and data that we manipulate with an algorithm or virtual tool.

Curriculum and pedagogy that normally segregates knowing and doing raises substantial educational concern and has so for many years. For Dewey,

> A divided world, a world whose parts and aspects do not hang together, is at once a sign and a cause of a divided personality. When the splitting up reaches a certain point we call the person insane. A fully integrated personality, on the other hand, exists only when successive

> experiences are integrated with one another. It can be built up only as a world of related objects is constructed. (Dewey, 1963, p. 44)

Dewey was firm on this issue. We need to show how things are interconnected as necessary interdependencies to give the technology or technique meaning to students. This prepares the importance for holistic education. A segregated education for Dewey was not an education:

> On the intellectual side, the separation of 'mind' from direct occupation with things throws emphasis on things at the expense of relations or connections . . . [Education] must find universal and not specialized application. (Dewey 1966, p. 143)

Dewey's work opened out one of the differences between technology education and technical training, as the latter was geared to specialized vocational short-term task skills, while to former lifelong human capability. Our concern is technology education that shows us the basic principles for teaching technology holistically: the interconnectedness or dependencies of technologies.

## *Q2: What Exactly Should Be Interconnected in Teaching Technology?*

### Foundations of Technological Practice

The road from dialectics to practice addresses twists and turns (even head flips) from knowing as an essentially theoretical (idealistic) process to a social-material (surprisingly like the design and technology) process. We begin with Hegel (1770–1831), a German idealist philosopher born in Stuttgart for whom thought does not merely correspond to reality; it produces reality (Speake, 1979). Our thoughts are our reality, and so all knowledge can be formulated through pure reason. The 'dialectic' was Hegel's term for the pattern that thought must logically follow. Broadly, he argued that conscious thought proceeds by contradictions. Its process is by triads, where each triad consisted of a thesis, an antithesis and a synthesis. The concept of 'sharp' is thus not adequately understood without reference to an alternative, 'blunt'. Both the thesis 'concept of sharp' and the antithesis 'concept of blunt' define each other and therefore require each other. To see each concept as related, as mutually defining, is their synthesis. At this moment a new level of reasoned understanding is achieved. This is the level of conscious thought as reasoned understanding. From here, the whole triadic process may be repeated, the synthesis leading to a new thesis' and so on. This is elaborated in Hegel's *Phenomenology of Mind* (1807) (Vazquez 1977, p. 143).

The essence of Hegel's dialectics is 'the grasping of opposites in their unity' (Hegel, 2007 [1830]): a significant first step in building our basic principles for holistic technology education. This is the immanent goal, or telos of Hegel's philosophy. In the words of Sutchting:

> So, in Hegel, Spirit is essentially rational freedom and the source of the dialectical development; the conflict between the necessity for Spirit to attain its telos and the various

> successive inadequate conditions for this to occur . . . in so far as the system has an immanent telos the development envisaged is one towards reconciliation of conflicts in a larger harmony, hence, the Hegelian dialectics is conservative in its very foundations and not merely as a consequence of certain historical and personal factors. (Sutching 1983, p. 181)

In Hegel's philosophy of dialectics knowing begins, proceeds and ends at the level of ideas. For him, matter is a product of mind and all knowledge comes from pure theoretical reasoning.

## Feuerbach and Hegelian Dialectics: The Head Flip

Feuerbach (1804–1872) was a Bavarian philosopher and theologian. Although he was Hegel's student, much of his work was critical of Hegel's idealism. Feuerbach was a materialist in the sense that he distinguished between consciousness of an object and self-consciousness, while at the same time connected the material object with the subject by pointing out that consciousness of the object always reveals some element of self-consciousness: 'In the object which he contemplates, man becomes acquainted with himself, consciousness of the objective is the self-consciousness of man' (Vazquez, 1977, p. 75).

This view of knowing and understanding introduced material objects (the world or environment outside the reasoning mind) as a necessary, not merely desirable, condition for knowledge, thus further building our basic principles for holistic technology education. Experiences from the environment outside the mind are now significant. For Feuerbach humans are sensual beings, not theoretical beings as the Hegel believed:

> I unconditionally repudiate absolute, immaterial, self-sufficing speculation, that speculation which draws its material from within . . . I found my ideas on materials, which can be appropriated only through the activity of the senses. I do not generate the object from the thought, but the thought from the object. (Feuerbach, 1843)

It is often said that Feuerbach inverts Hegel by conceiving of mind as the highest product of matter rather than matter being a product of mind. All our knowledge comes from pure material experience.

## Marx on Hegel's Idealism and Feuerbach's Materialism: Resolving the Views of Knowledge That Oppose Theory and Practice

Marx (1818–1883) was regarded by some as a social theorist, interested more in economics and history than in any particular philosophical doctrine. Essentially Marx, too, inverts Hegel's idealism, extracting and making use of Hegel's notion of dialectics, but rejecting his idealist approach. He differed from Feuerbach in his concept of materialism in terms of the central notion of human practice, specifically the social dimension of practice.

Marx rejected Feuerbach's relation between subject (the person) and object (the environment) in which subjects are passive and contemplative, restricting themselves to receiving or reflecting reality. Feuerbach's notion of knowledge was simply the result of the actions of objects in the external world and their effects

upon the sense organs (Vazquez, 1977, p. 118). Marx was not, however, prepared to accept such passivity in materialism. He attempted to resolve the problems of idealism and materialism in his system of historical materialism, the central concept of which is the practical interaction that must occur between individuals and their material and social environment. As a dialectical result of such practical human socially contextualized activity, people and their environment become a new synthesis such that a new level of awareness was achieved, transforming both the individual and the environment (Vazquez, 1977, p. 193).

Technological learning has a central role to play in a society. Not only does the usefulness of studying technology have obvious applied and economic value, but, if it connects the general elements of the human (as an agent) to tools and materials (as the environment) brought together via a purpose in an applied context, then learning this system of dependencies in technology becomes a necessary feature of knowledge formation and discovery:

> ... there is no such thing as genuine knowledge and fruitful understanding except as the offspring of doing ... Men have to do something to the things when they wish to find out something ... The laboratory is a discovery of the condition under which [human] labor may become intellectually fruitful and not merely externally productive. (Dewey, 1966, p. 275)

Technology is not the slave of science or the neutral tool of design. Rather technology is symbiotically locked into science and design, as it plays an active role in knowledge formation. Holistic technological experiences are necessary in helping learners to develop new knowledge.

In question one above, this chapter initiated an inquiry into the need to learn technology holistically. In question two, the essential interconnected elements were explored for the constituents of the holistic foundations of technological understanding. To progress to the final stage in this chapter we need to establish both the structure and nature of a holistic understanding of technology that establishes its status as a study area that is essential both to knowledge development and to application. The integrating notion of practice is proposed as a useful mental tool to address the final step of synthesizing the mutual work of the elements of the individual (as agent), tools and environment over time.

## *Q3: How do the Applied Context, Human and Social, Material and Tool Elements Combine Holistically So That a Person Comes to Know Something of the World?*

### Technacy Genres: Forms of Technological Practice

Marx departs from Hegel and Feuerbach by the importance he places on actual human labour, or practice. He adopts a dialectic methodology in which he identifies the inadequacy of pure idealism and pure materialism and synthesizes them at the new level of historical materialism. This introduces the importance of time. The

applied setting is subject to evolutionary influences. Both theory and practice in the applied setting are best resolved, according to Marx, through human material practice in social and historical contexts. Marx's thesis of historical materialism is essentially the foundation of praxis, or practice. Practice and technical activity require instruments and tools for the transformative experience. The contributions of Don Ihde (1979) on instrumentation are key notions to a schema for constructing basic principles in holistic technology and design education.

Practice so far has been concerned with practical human activity and the interaction of mind and matter, or between humans and the environment. Ihde's work identifies additional features of this interaction when modified by instruments or artefacts. The paradigm is shown in Fig. 9.2.

The observer in this model no longer simply gains feedback from the world, but from the world via the instrument or tool. That is, tools and technologies are values rich in their design use and context active in their causal tendency. However, Ihde points out that although this modified interaction is not neutral, this is not necessarily a problem:

> My thesis is that any use of technology is non-neutral. However, non-neutrality is not a prejudicial term because it implies neither that there are inherently 'good' or 'bad' tendencies so much as it implies that there are types of transformation of human experience in the use of technology. (Ihde, 1979, p. 66)

Ihde acknowledges that technologies need to be understood in the context and in purpose of their application. That is, different kinds of technologies and tools transform our knowledge differently just as the same tools and technologies in different geographical settings or in social and or material environments do, that is, in different world contexts.

This highlights the necessity to understand that the choice and design of tools and of world settings alter our knowledge. The context-sensitive nature of technologies is a key to technology choice, transfer and innovation diffusion. Designing tools and environments are socially and environmentally interdependent actions and to imply that technology teaching and learning is neutral as to value and context is to misinform the learner. The ability of learners to take social and environmental factors naturally into account when seeking solutions to design and technical challenges is fundamental to success. The agent, tools and the environment in an applied setting

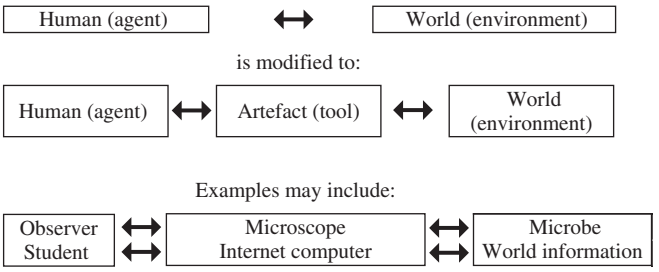


**Fig. 9.2** Interaction between individuals and the environment modified by tools

are the minimum elements to any technological activity. Each element is a resource and constraint and each requires the other to produce value and so technology is their joint product. We therefore may need to understand and teach these elements and their dependent relationship explicitly.

Ihde's work shows that, although practice produces artefacts from the interaction between individuals and the environment, the artefacts themselves must increasingly be included as modifiers in this interaction. Hence, the model in Fig. 9.3 shows that, while each of the elements has its own identity (shown as a lobe in Fig. 9.3), it is necessarily mutually dependent on the other elements when it is applied.

We now have a basis for determining the absolute minimal conditions of holistic technology education (Seemann and Talbot, 1995) of technological processes and evaluations and for making design decisions. In the words of Dewey, the interconnectedness of knowledge constitutes a key feature of education:

> Any experience is mis-educative that has the effect of arresting or distorting the growth of further experience ... Experiences may be so disconnected from one another that, while each is agreeable or even exciting in itself, they are not linked cumulatively to one another ... Each experience may be lively, vivid and 'interesting', and yet their disconnected-ness may artificially generate dispersive, disintegrated, centrifugal habits. The consequence of formation of such habits is inability to control future experience. (John Dewey, 1963, p. 49)

The basic principles of holistic technology education now appear to have structure, articulated elsewhere as technacy education (Seemann and Talbot, 1995). When teachers can without hesitation claim to include social (human) factors, technical (tool factors) and environmental (material) factors in their lesson for specific applied settings, they have good reason to believe their pedagogy is heading towards being holistic. However, holism cannot be delivered in a general way. The interconnections need to be spelt out in explicit detail, highlighting the necessary

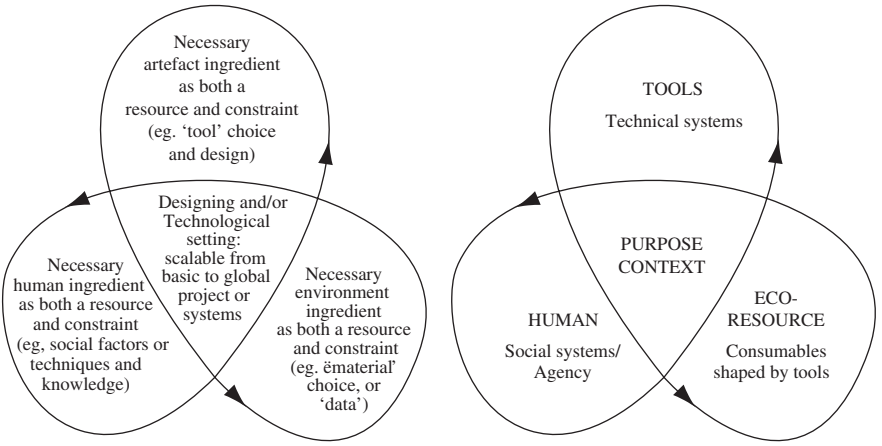


**Fig. 9.3** Technacy genres showing the essential four elements and their particular relationships of interdependence

and specific dependencies in each case. A key requirement is to set learning experiences and assessment tasks for each lesson and unit of work that not only address highly specific links that define the elements in relation to each other, but also lead to grasping their total effect as a design and technology solution in their practical application.

## Conclusion

In the first part of this chapter I introduced examples of how technology as a phenomenon in human activity and intellect appears to consistently demand that we recognize certain characteristics in order to better realize its value. With reference to cross-cultural values, these examples offered insight to our own bias not only as teachers of technology but also as designers, users and transferers of technologies into the context of other cultural groups.

In the second part I provided a brief outline of key ideas about the theoretical and philosophical foundations that allow us to understand technology as the interaction of at least four key elements. This is especially important in our collective future where we all, in every vocation, need to understand the links between all technological choices and designs and with the environment, the people involved and the technical tools chosen. The outcome, it is hoped, will be society-wide learning in technacy, along with literacy and numeracy, to better guide rounded and creative judgements for a sustainable future. Understanding technology practice and choice, whether for our own ordinary consumption and choice of products, technical design and accountancy investments or for innovations across different cultures and geographies can all be improved with a technologically oriented perspective. The talents of our future will be more secure if society is in agreement in using a richer understanding of technologies than that which is currently accepted. Technacy education is thus not merely a subject in which you learn the know-how, but one in which you also must learn the know-why. Only then may we make reasoned claims to learning technology holistically. Peters provides a fitting end to round off this idea:

> We would not call a man who was merely well informed an educated man. He must also have some understanding of the reason why of things. The Spartans, for instance, were militarily and morally trained. . . . But we would not say that they had received a military or moral education; for they had never been encouraged to probe into the principles underlying their code. (Peters 1970, p. 8)

## References

Dewey, J. (1963 [1938]) *Experience and Education*, Collier: New York.
Dewey, J. (1966 [1916]) *Democracy and Education*, The Free Press, New York.
Feuerbach, L. (1843) Essence of Christianity (Translated by George Eliot, 1854), http://www.marxists.org/reference/archive/feuerbach/works/essence/ec00.htm. Accessed 29 November, 2007.
Hegel, G.W.F. (2007 [1830]) *Philosophy of Mind*, Oxford University Press, Oxford.
Ihde, D. (1979) *Technics and Praxis*, D. Reidel: Dordrecht and Boston, MA.

Matthews M (1980) *The Marxist Theory of Schooling: A Study of Epistemology and Education*, Humanities Press: Englewood Cliffs, NJ.

Northern Territory Government (2003) *Report on Future Directions for Secondary Education in the Northern Territory*, led by D. G. Ramsey, Northern Territory Government, Department of Employment, Education and Training, and Charles Darwin University, Darwin: http://www.betterschools.nt.gov.au/history/sec_ed_report.shtml. Accessed 12 December 2007.

Peters, R. (1970) *Ethics and Education*, Allen and Unwin: London.

Seemann, K. (1997) The Socio-technical Sustainability of Shelter Systems and Hardware in Remote Indigenous Australian Communities, unpublished PhD dissertation, University of New South Wales: Sydney.

Seemann, K. and Talbot, R. (1995) Technacy: Towards a holistic understanding of technology teaching and learning among Aboriginal Australians, *Prospects* 25(4): 760–775.

Seemann K., Walker, B. et al. (1990) The Aboriginal technical worker feasibility study report (ATWORK): A national co-operative curriculum development project of the Australian Conference of TAFE Directors, Centre for Appropriate Technology, Alice Springs College of TAFE: Alice Springs.

Sharp, L. (1952) *Steel Axes for Stone Age Australians, Human Problems in Technological Change: A Case Book*, E Spicer, John Wiley: New York.

Speake, J. (1979) *A Dictionary of Philosophy*, Macmillan Press: London.

Sutching, W. (1983) *Marx, An Introduction*, Wheatsheaf Books: Brighton.

Vazquez, A. (1977) *The Philosophy of Praxis*, Merlin Press: London.

Walker, B. (2006) Housing, *Our Place*, No. 28, 15.

# Chapter 10
# Education for All and TVET: The Creative Synergy

**Phillip Hughes**

*Never before has the world community had so many resources, so much knowledge and such powerful technologies at its disposal which, if suitably redirected, could foster sustained economic growth and sustainable development*

*UN, 1994*

## Unprecedented Change

The period since World War II has been one of continuing change in almost every aspect of life. While there has been no global war since 1939–1945, it has been a period of continuing violence in which as many people have been killed as in that war. The impact of violence has been felt most strongly in countries that are ill-equipped to deal with it. At the same time the world population has trebled, with most of the growth in the poorest countries. Medical advances have been striking, increasing life expectancy to over 70 in some countries, but in developing countries the advance is slight. Education is now one of the world's largest industries as the number of students in schools rose from 252 million to over 1,200 million. Nations are now linked together in ways that are unique, including a global economy and an environment that is struggling to survive the impact of its use and abuse. In an attempt to solve problems which are no longer confined to individual countries major international bodies focused around the UN have been established. The major issues of building peace and security and attaining environmental sustainability constitute the agenda for these bodies.

Given the nature of changes around the world, all who are involved in education will need to consider what forms of education are most likely to be effective for all people to cope with such a different world. Institutions such as UNESCO, with special responsibilities for education throughout the world, must play an active part in such rethinking.

P. Hughes
Australian National University, Canberra, Australia
e-mail: phillip.hughes@anu.edu.au

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## Education for All: A Continuing and Developing Goal

The goal of Education for All (EFA) has been, in one form or another, the key priority in education for the UN system for almost 60 years. That history has seen both the development in the concept of EFA itself and also the continued frustration of its achievement. It is now urgent for the international body either to find means by which that valued goal can be achieved or to change the priorities of EFA. The concept of EFA offers a great promise to enhance the quality of living for all persons, but the continued failure of past efforts brings into question its validity as a future goal. If the policies of the past seem likely to fail again, new patterns of education may be needed to achieve success. This is especially important since achieving success, an effective education for all people, is now more urgent than at any time in the 60-year quest for it. For millions of people the achievement of EFA offers their major hope of release from exclusion, repression and deprivation. Given the changes in world society over this period, a broader concept of EFA to include the varied forms of TVET provides new possibilities.

## *EFA and the Declaration of Human Rights: A Call to Action*

UNESCO, founded in 1946, was envisaged as a major means of building a harmonious and prosperous world community after a war which had brought so much destruction. Education was a major priority from the inception but took on special force with the 1948 Declaration of Human Rights by the UN. Article 26 declared the Right to Education. The first of the three points of this Article reads:

> Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages. Elementary education shall be compulsory. Technical and professional education shall be made generally available and higher education shall be equally accessible to all on the basis of merit. (UNESCO, 1949)

At the time of the Declaration the Director-General of UNESCO stressed not only its importance but the necessity of action to implement it:

> The Declaration of 10 December 1948 is more than a historical summary, it is a programme. Every paragraph is a call to action, every line a condemnation of apathy, every sentence a repudiation of some moment of our individual or national history, every word forces us to scrutinize more closely the situation in the world today. The destiny of mankind is an individual responsibility which we all must share. (UNESCO, 1948)

As conceived, that right to education was to be implemented by the concept of universal primary education (UPE) as a target for all countries. At that time UPE was a reality in most developed countries but only a distant prospect for the developing countries, many of which were just about to become independence. Yet all nations were aware of the importance of education as a national asset. Education provides major benefits to those who succeed in it. Its links with advantageous work possibilities, healthy lives, social participation and political effectiveness are well documented. For those who miss out, or for those who do not succeed in education,

the ill effects in all those areas are equally clear. Social, economic and technological changes have added to the uses of education and to its potential benefits and this pattern continues.

## *Progress, but Continuing Frustration*

EFA in the form of UPE became an international as well as a national goal in 1946 as UNESCO and other UN bodies took this aim as central to their charters. Progress was made in many countries but still, in 1960, 14 years after UNESCO made its commitment to education as a basic right for all, almost half the children in the world were still receiving no education:

> There are about 550 million children aged 5–14 in the world today and 300 million boys and girls are enrolled in school. For 250 million no schooling is possible . . . The economic, social and individual effects of this deprivation are well-known. The provision of education is indispensable for social and economic progress. (Fernig, 1960)

By 2000, 40 years after the Fernig assessment and its enrolment of 300 million, more than 650 million children were enrolled in primary schools. This is a remarkable achievement, but there were still more than 100 million children out of school with almost all of this number in the developing countries. In some countries the record of school enrolment was low and in some cases it was falling further. One major factor in this failure was the rapid growth in population. In the face of the problems in achievement of EFA new initiatives were launched at Jomtien in 1990.

## *Jomtien, 1990: An Extended Concept – Basic Education*

In 1990, 155 countries, 20 intergovernmental bodies and 150 non-governmental organizations met at Jomtien at the request of the major international agencies to consider again how best to achieve this aim. The meeting issued the *World Declaration on Education for All*, agreeing unanimously to stress the current significance of the 1948 Declaration that 'everyone has a right to education'. The Jomtien Declaration spelled out the current meaning:

> Every person – child, youth and adult – shall be able to benefit from educational opportunities designed to meet their basic learning needs. Those needs comprise both essential learning tools (such as literacy, oral expression, numeracy and problem solving) and the basic learning content (such as knowledge, skills, values and attitudes) required by human beings to be able to survive, to develop their full capacities, to live and work in dignity, to participate fully in development, to improve the quality of their lives, to make informed decisions, and to continue learning. The scope of basic learning needs and how they will be met varies with individual countries and cultures, and, inevitably, changes with the passage of time. (UNESCO, 1990)

The declaration at Jomtien of the need to achieve EFA was significant in that it went beyond the idea of universal primary education to use the term 'basic education' which comprises the form of education that is a foundation for the key aspects of

life. Whereas primary education, with its emphasis on verbal and numeric literacy, had once been a useful common basis for work or continued education, our knowledge-based contemporary society requires a more comprehensive base. The move has been from literacy to 'multiple literacies', a more complex base to enable individuals to move into a society where the options have multiplied. This ambitious requirement sets new and extended aims which no country, then or now, developed or developing, has met for its whole population. It adds to the concept of literacy in the sense of basic skills to include the idea of competence for living as a further literacy. This requirement was developed into six goals for implementation by the co-operative efforts of individual countries and the international agencies, with UNESCO playing the major role in monitoring and coordinating those efforts. The Jomtien meeting set the year 2000 as the target date to meet this goal.

## *Dakar, 2000: The Continuing Need*

The report card of progress after Jomtien is bleak. In spite of major efforts, nationally and internationally, the situation faced at Dakar in 2000 was grim. UNESCO estimates show that there were 130 million children out of school in 1998, almost as many as in 1990. In sub-Saharan Africa 43 million children of school age were out of school, as against 65 million who were in school. The gross enrolment ratio (GER) for primary education in sub-Saharan Africa in 1985 was 76.1 per cent. This decreased to 73.9 per cent by 1999, with the enrolment rate for boys at 66 per cent in 1998, as compared with 54 per cent for girls (UNESCO, 2000a). Gender disparity was still evident in many other areas. In some states of India net enrolment rates are low for girls, e.g., 36 per cent in Uttar Pradesh in 1997, compared with a national figure for girls of 64 per cent and boys of 78 per cent. (UNESCO, 2000b). In Liberia only 12 per cent of all school-aged children and only 6 per cent of all girls were in school. The increase in population was largest in those countries where resources were most limited.

The low school enrolment figures in many countries were echoed in the literacy figures for adults:

- In 1970 the figure for illiterates in the age group 15 and over was 760 million;
- In 1980 it was 824 million;
- In 1990 there were 882 million;
- In 2000 Dakar reported 875 million;
- In 2005, the estimate is 870 million (UNESCO, 2000a).

These patterns in literacy and school attendance figures are paralleled by other social indicators: birth rates, infant mortality, agricultural productivity, life expectancy, housing quality, availability of clean water, employment opportunities and political participation. There is a strong correlation between all these figures and education: where there is deterioration in one indicator there tends to be a deterioration in all. The Jomtien Conference had called this grim conjunction 'the convergence of disadvantage'.

The Dakar Conference recognized the same pattern of convergence, noting the multiple effects of a lack of basic education. It saw education as the essential tool for breaking this cycle of disadvantage but emphasized that words and proclamations were not enough and that there must be a high priority for carefully directed action. The Inter-regional Conference organized by the International Institute for Educational Planning (IIEP) in 2004 looked at the implications for some of the less developed countries. For example, in Senegal, it was found that

> Sustainable economic growth is threatened by low levels of education in Senegal. As elsewhere, most attention has been given to achieving universal primary education and developing early childhood education. There is a noticeable gap when it comes to addressing the needs of excluded and disadvantaged groups and many young people have not benefited from vocational education and training . . . In terms of the target group, 56 per cent of the population is under 20 years of age and 46 per cent of this group live in urban areas. The number of out-of-school youths (aged 13 to 18 years) without basic education and training is estimated at more than 1 million. The population is growing faster than the number of jobs and 53.9 per cent of the population can be considered as poor. (IIEP, 2004)

The case of Senegal illustrates the inadequacy of UPE as the sole means for achieving EFA, given the number of young people this will leave without any means of improving their position and the number of adults whose lack of literacy limits their prospects of self-improvement. The special needs of the most disadvantaged are emphasized in the report, together with the potential benefits of vocational education.

The situation is not without hopeful examples that show that directed effort over a period can help. It is easy to forget that there are many situations where great improvements were made.

In Oman, for example, in 1970 there were only three schools with enrolments of 909 pupils, all boys. By 1990 there were 838 schools with 365,000 students, both boys and girls. By 1997 the number of schools had grown to 1,062 and the number of students to 529,000. These schools included early childhood, primary and secondary schools where gender equity had been achieved and there were technical and higher education options available. Similarly there have been striking advances in adult literacy rates. The country, which has a high proportion of migrant workers, is moving towards a situation where it can supply its own needs for skilled people and also contribute to other countries.

The achievements in China were significant as enrolment rates rose from less than 50 per cent in primary education to the GER of 118.3 per cent in 1999. After achieving UPE China set a new target, EFA for nine years. The country has made striking progress towards this more ambitious target even though the numbers involved are so massive. It has entailed a major programme of teacher education.

Given this picture of mixed success and failure, the international meeting at Dakar in 2000 took on particular significance when UNESCO together with the international agencies and 160 countries joined to review progress. The high hopes from Jomtien had been disappointed and the particular challenge for the countries at Dakar was whether to continue or seek new goals. Again, there was a massive

interest and attendance at Dakar. The meeting recognized that the six Jomtien targets had not been met, although some progress had been made. Dakar pointed out the harsh reality that the limited goal of UPE had not been achieved, let alone the more demanding requirement of EFA, a basic EFA, as identified by Jomtien:

> In the half-century that has passed since the Universal Declaration of Human Rights established education as a fundamental right for all, many countries have achieved the goal of universal primary education (UPE) or have made substantial progress towards doing so. Some countries have proven this is possible despite difficult economic circumstances, natural disaster or a history of conflict. Yet more than 100 million children in the world are still deprived of access to primary education, while a number of countries are clearly not on track to achieve its universal provision. Some have actually been moving away from it. Nearly all out-of-school children live in developing countries, and a majority of them are girls. (UNESCO, 2000a)

Dakar set up continuing mechanisms to monitor the situation for EFA. These have provided means of regular assessment and reporting. In a striking observation on the scale of the challenge that remained at the end of the decade following Jomtien, the authors of the 2004 *Monitoring Report* stated:

> Almost one-third of the world population lives in countries where achieving the goals set out in the *Dakar Framework for Action* will remain a dream unless strong and concerted effort is made to reverse the observed trends. Countries in the region of South and West Asia, sub-Saharan Africa and the Arab States and North Africa are hardly even moving in the right direction at present, and there is a high risk that they will not be able to achieve the goals by 2015. The populous countries of East Asia and Pacific are making some progress but will not achieve the goal without intensified effort. (UNESCO, 2004a)

The Dakar participants also reaffirmed the Jomtien Declaration and stressed the need to translate good intentions into action, reflecting the growing awareness that access and equity in education are inadequate without effective achievement. Six specific goals were adopted to achieve EFA:

1. Expanding and improving comprehensive early childhood education, especially towards the most vulnerable and disadvantaged children.
2. Ensuring that by 2015 all children, particularly girls, in difficult circumstances and those belonging to ethnic minorities, have access to and complete free and compulsory primary education of good quality.
3. Ensuring that the learning needs of all young children and adults are met through equitable access to appropriate learning and life skills programmes.
4. Achieving a 50 per cent improvement in levels of adult literacy by 2015, especially for women, and equitable access to basic and continuing EFA adults.
5. Eliminating gender disparities in primary and secondary education by 2005, and achieving gender equality by 2015, with a focus on ensuring that girls have full and equal access to and achievement in basic education of good quality.
6. Improving all aspects of the quality of education and ensuring excellence of all so that recognized and measurable learning outcomes are achieved by all, especially in literacy, numeracy and essential life skills.

It is important in assessing the progress of EFA to note both the areas of failure and of success, particularly areas which can provide leads for the future. Literacy programmes are an appropriate example of the improvement in effectiveness of educational programmes. These have been greater in magnitude and more effectively directed in recent years, with evidence of accelerated improvement since Jomtien. The *World Education Forum Report* (UNESCO, 2000a) show that world adult illiteracy percentages went from 27.5 to 22.6 to 18.6 for the years 1985, 1995, and 2005 (estimate), respectively. The figures are significant. While the absolute numbers have improved only slightly, standing at 870 million in 2000, for the first time in 60 years literacy growth outpaced population growth and the change in literacy rates is significant. The Jomtien numbers quoted earlier showed population growth outstripping literacy growth, with an estimated number of 912 million illiterates by 2000. That 1990 figure has been improved on by approximately 40 million people, an impressive and encouraging achievement in terms of longer range possibilities.

## *Multiple Literacies*

If verbal and numerical literacy can be improved substantially this provides hope for the more complex literacies which are increasingly required. The improvement so far has resulted from increased effort and also from better planned and directed effort. Those people working on literacy programmes have benefited from earlier work and a great degree of accumulated practical wisdom is available through their experience. There is now wide agreement among key stakeholders that, while traditional literacy is more important then ever, other literacies are required in a more globalized world affected by rapid technological change. Multiple forms of literacy are required to meet the increase demands of both economic and social participation, including employment, health and social and personal relationships. It is from this aspect of multiple needs that a concept of multiple literacies has arisen:

> The dramatic multiplication of computer, information, communication, and multimedia technologies has been changing everything from the ways people work, to the ways they communicate with each other and spend their leisure time. It poses tremendous challenges to educators to rethink their basic tenets, to deploy the new technologies in creative and productive ways, and to restructure schooling to respond constructively and progressively to the technological and social changes currently underway. In a period of dramatic technological and social change, education needs to help produce a variety of types of literacies to make current pedagogy relevant to the demands of the contemporary era.

Competence in these multiple literacies is now a mandatory part of the EFA response to current social and economic demands. TVET is particularly well placed to provide access to and competence in these literacies because of its focus on technology. It is not only a matter of access to productive work but also to the creative attitudes relevant to seeking and finding work.

## TVET: A New Ally for EFA

### *UPE – An Incomplete Goal*

Over the 60 years of the attempts to achieve EFA most attention has been given to primary education and the achievement of UPE. It is already apparent that this goal is a necessary but not sufficient one, if that education is inadequate to the needs of people in both developing and developed societies. The Director-General of UNESCO, Mr Matsuura, further stressed this evolution:

> Basic education denotes the minimum skills and knowledge needed in order to be able to make a full contribution to one's local environment and to be in control of one's life. In an increasingly interdependent world, the contents, and therefore the very notion of the 'quality' of basic education, are evolving. It can no longer be reduced to learning reading, writing and arithmetic. It must also teach individuals to be, to do, to learn and to live together. (Matsuura, 2000)

The Director-General is referring here to the four pillars of the *Report of the International Commission on Education for the 21st Century* (Delors, 1996). In the four pillars the Commission emphasized the need for education at all levels, and particularly basic education, to be a balanced education 'to be, to do, to learn and to live together'. In 2004 the International Conference on Education in Geneva also stressed the need for a wider view of EFA:

> It has become increasingly clear in all parts of the world that basic education can no longer be limited to primary education. Currently education systems do not provide young people opportunities to obtain and strengthen the complex set of competencies for life, including technical and vocational education. Lack of technical and vocational education and training, including entrepreneurship and training for creativity, hampers employability. (IBE, 2004)

### *Preparing for Life and for Work*

The comments at the 2004 International Conference on Education (ICE) are significant. The Director-General of UNESCO emphasized the new meaning of 'education' in EFA as the basic education which prepares individuals for work and life, enabling them to make a full contribution to their own society as well as to grow personally (UNESCO, 2004b). Simple literacy and numeracy are essential, but not enough. The ICE comments identify the breadth of the current concept of EFA and its necessary relationship to TVET, with its capacity to add essential aspects. Particularly in the developing countries EFA must provide entry to productive work. In 2002 UNESCO, in concert with the German government, established the UNESCO–UNEVOC International Centre for Technical and Vocational Education and Training in Bonn (UNESCO–UNEVOC). This signalled a renewed commitment by UNESCO to put TVET firmly to the task of providing a powerful backing to EFA; 'basic EFA', with especial emphasis on those countries where the need was most urgent. In reviewing the EFA initiatives in relation to results on four of the less developed countries, Nozawa sees a particular role for TVET in the quest:

> EFA initiatives in the LDC's have concentrated too exclusively on UPE and literacy. There is a need to reach and empower marginalized groups through vocational skills training programs. UNESCO's Section for TVE and IIEP have launched a project in four LDC's: Mali, Senegal, Laos and Nepal, to integrate a vocational skills training project in their EFA National Action Plans to meet the needs of out-of-school youth, particularly rural poor, girls and women. (Nozawa, 2003)

EFA is, and will remain, the key priority for UNESCO. The difficulties in fully achieving the goals of EFA have identified the need to link EFA more strongly with aspects of education which are most socially and economically empowering of people and societies. In the Dakar goals the original emphases of EFA have been expanded to stress the importance of eliminating gender disparity and achieving valued life skills. EFA is also linked to the concept of quality education, recognizing that the mere delivery of education is not enough, that education must be effective in the lives of those who receive it. In these further developments of EFA, the important role of technical and vocational education has also become apparent. At the opening of the 2004 ICE 47th International Conference in Geneva on quality education, UNESCO's Director-General Matsuura affirmed the priorities of UNESCO following the strategic review of the organization, noting that EFA is not an end in itself but a means to continue, a foundation:

> One of the key outcomes of our strategic review is the clear re-affirmation of the centrality and priority of EFA in the work of UNESCO. And within that perspective, the promotion of quality basic EFA is strongly re-affirmed as an ongoing priority of UNESCO precisely because it is the foundation on which all subsequent education, training and learning are built. (IBE, 2004, p. 1)

The effectiveness of the link between EFA and subsequent education, training and learning must be developed if EFA is to move from being a perennial priority that is never achieved. It must become a reality that will provide hope for those who are currently disenfranchized and do not have effective opportunities in life. In breaking the repeated pattern of new commitments, followed by partial success and partial failure, EFA must link with the most productive elements of education, including technical and vocational education and training. The Swedish International Development Agency, SIDA, identified the necessity of extending or changing the form of primary education if it were to be the only avenue open to students. SIDA points out that the great majority of students in developing countries have no education after primary school. This emphasizes the need to provide more vocational emphasis in this period:

> In what way can the primary school curricula be made more relevant for all students who pass through primary education? At present some 80% of students in the developing countries do not continue education after primary school. Have their needs for a relevant curriculum been sufficiently accounted for? Should the curriculum perhaps contain practical elements not present today? Are there lessons to be learnt for primary education from what is done in practical training in non-formal education? (SIDA, 1996)

This plea by the Swedish agency for a recognition of the advantage, the necessity even, of linking primary education, and formal education more generally, with aspects of technical and vocational education is highly relevant today, given the

failure of so much of formal education to address the needs of all students, particularly those who have suffered some forms of exclusion or lack of opportunities that have reduced their life chances.

In Paris in 2004 UNESCO facilitated a meeting of the Inter-Agency Working Group (IAWG) on life skills in EFA. The meeting included a number of key agencies in addition to UNESCO, such as ILO, OECD and the European Training Foundation. The meeting recognized that EFA can only be achieved if the education provided is improved to ensure that the learning needs of all young people are met. The meeting found that this means 'giving everyone the means to acquire recognized and measurable learning outcomes especially in literacy, numeracy and essential life skills' (IAGW, 2004).

## *The Convergence of Advantage: Linking Life Opportunities to Education*

In the developed countries technical and vocational education has too often been the Cinderella of the education system The sector has suffered from the perception that TVET was a fall-back position for those who did not succeed in the 'more academic stream'. This affected its general standing and has also influenced the approach to TVET in many developing countries which have often inherited their systems from the developed countries or have adopted similar patterns. It is only in recent decades that this perception has been challenged and gradually altered. A major reason for the change has been the changing role of work and its impact on national and international economies. With work becoming more technologically based and more diverse, leading to a consequent reduction in unskilled work opportunities, technical and vocational education has assumed a key role in the education system and in the wider society, now more dependent economically on knowledge-based industries. The enhanced role of TVET as an entry point to the 'knowledge society' is reflected in the place the sector plays in UNESCO and other international organizations.

One of the striking concepts to emerge from Jomtien was that of 'the convergence of disadvantage': the concept that limitations on many separate aspects of life: employment, health, community development and political influence were all linked to the lack of an effective education. To move ahead against the difficulties and barriers that limit people's opportunities, the reverse of this concept must be used: 'the convergence of advantage'. The lack of quality education can limit people in their search for richer, more satisfying lives. Equally, the motivation of people to have better employment opportunities, to have better health and to have more control over their own lives and their own communities can add to their motivation to learn, because that learning can enhance those multiple areas of life. The same motivation can assist governments also, as they accept that better education for their citizens can provide a more productive, a healthier and a more harmonious society.

TVET can help in various ways:

> The Youth Employment Summit (YES) Country Networks in Burundi and Holland have been building trust and respect with each other since they met in Alexandria in 2002 by collaborating on a joint project. Youth in Reconstruction of World in Destruction (DRWD), the lead YES agency in Burundi, teamed up with the Dutch YES 2002 delegates from Foundation Zero-Kap, to fund a micro-credit scheme for Burundian families. About 37 families received 100 Euros each to begin micro-enterprise activities in late 2002. Other activities included technical training provided by the lead agency for youth to set up small businesses in different villages. In addition, a shipment of school materials arrived in Burundi from Europe in late 2002. The shipment consisting of basic classroom items such as notebooks and pens was donated by HEMA, a Dutch department store and Villa Zebra, a children's art museum. (Lyndoh in UNESCO–UNEVOC, 2005, p. 2)

An example of a different kind comes from South America:

> The Chilean Centre for Research and Development has created training modules to help students acquire basic skills together with their vocational training. In addition the Youth Forum in Uruguay and the network of Vocational Training Centres in Argentina have also developed strategies for providing basic skills in tandem with technical skills. (Jacinto, 2003)

The early successes reported from these ventures is a measure of the growing flexibility of TVET to meet different needs in appropriate ways but ways which achieve EFA goals as well as those of TVET.

## *A Complex Need: UPE Plus Employment Skills*

The situation of Mali, one of the less developed countries, provides an interesting example of a country which has made great advances but still faces severe problems:

> Mali has a population of 12 million unevenly distributed across the country . . . more than 75 per cent live in rural areas. Mali's population is among the poorest in the world . . . Mali adopted the Jomtien Declaration in 1990 . . . and reaffirmed by supporting Dakar . . . The gross enrolment rate (GER) for the first primary level, which stood at 7 per cent in 1962 rose to 30 per cent in 1991 and to 50 per cent in 1998. In the last few years increases have been particularly marked, with the GER reaching 60 per cent in 2000 and 62 per cent in 2002. An effort on this scale has its costs. The education sector currently accounts for 30 per cent of the overall central government budget compared to 24 per cent in 1998. (IIEP, 2004)

The gains in primary enrolment are striking but they come at a heavy price as the country devotes more of its limited resources to increasing primary enrolments. This success leaves a difficult problem untouched. Primary education has been very successful but many people are left out because of their limited access and limited vocational skills:

> Despite many gains in the socio-economic development of the country, the special challenges that face disadvantaged groups limit their access to vocational skills. The government's interventions towards addressing this issue include non-formal education (NFE) programmes through the provision of literacy and basic education classes as well as basic vocational and rural skills training combined with the establishment of micro-finance schemes at village level. (IIEP, 2004)

The problems of Mali are not unique. The effort made to improve primary enrolments is admirable and the UNEVOC Centre believes that such cases need and deserve special help from EFA funds to assist the disadvantaged groups with access to vocational skills and also to literacy. Where the country has made such significant advances it offers good prospects to make use of special funds. To this end, the Inter-regional Seminar 2004 made the following recommendation:

> The effective implementation of Mali's skills development strategy in the framework of the EFA National Action Plan will require increased mobilization and technical and financial support from all parties involved in the EFA process. Such support is all the more important in that it is directed as a matter of priority towards the most deprived and economically distressed segments of the population. (IIEP, 2004)

A similar case can be made out for Bangladesh, which has made good progress with UPE since Jomtien, when it adopted EFA as part of the national plan. Government programmes have helped by providing incentives for poor families to send their children to school. Six million children have benefited from these programmes but there are still 6.3 million working children, largely from excluded and disadvantaged groups, for whom the future is bleak. They lack both literacy and work skills to enable them to move from their present disadvantaged state. Support from EFA funds could change this situation dramatically, providing these children with the means to improve their prospects (IIEP, 2004).

The failure of the conventional system to succeed with all students, even in developed countries, has caused many to reconsider the way that the system works and to seek alternatives for some students. In Australia the Dusseldorp Skills Foundation investigated other approaches precisely because, for a substantial minority, the conventional approaches were failing:

> Our sense is that the educational needs of a sizeable number of young people are not being well catered for in conventional learning settings during the compulsory years. Practitioners tell us this group of young people is growing. Frequently the local response to students with challenging behaviours, learning difficulties, who 'don't fit' traditional schooling and may be at risk of leaving has been to transfer them to alternative settings, community schools and teaching units. A distinguishing feature very often of these settings is an attempt to develop a stronger connection with practical skills related to the world of work. (Dusseldorp Skills Foundation, 2003)

A special programme in Canada to assist school drop-outs through skills development has had encouraging results in changing the attitude of these students to further education. The link between the practical skills and attitudes to further education has changed life prospects for many students (Maurice, 1999). An interesting and slightly different example is the pattern developed in Denmark to meet this need for those who are not helped in the conventional stream:

> Alternative learning settings are an established, integral part of the Danish education system. Currently there are more than 100 'Production Schools' (PS) catering at any one time for about 5,700 young people and an annual throughput of about 11–12,000 participants or 2 per cent of the youth population. The target is young people who have difficulties making the transition from junior secondary to middle and senior levels of schooling, and exist alongside primary schools (to year 10), senior secondary schools, technical schools. . . .

> They operate under a discrete Act of Parliament, which provides them with relative independence and autonomy and frees them from the bind of having to award qualifications.
>
> The goals are to develop a renewed appetite for learning; to impart tangible skills including improved literacy and numeracy through the practice, enjoyment and discipline of work; and for participants to take responsibility for their own learning and the conditions under which their learning takes place. In this sense the schools seek to create a coherent youth environment built around a binding, social, working community shaped by young people. (Dusseldorp Skills Foundation, 2003)

EFA should thus be seen as a strategy and process which aims at achieving poverty eradication and greater equity and justice in societies, with particular reference to meeting the needs of girls and women, the socio economic poor and marginalized groups such as ethnic and racial minority groups and those living in remote areas. Existing methods have often proved to be ineffective in motivating learners to undertake education programmes, formal or non-formal. UNESCO must be innovative in its approach and look at what measures and content are most likely to motivate learners. If programmes promoting EFA are to be effective and relevant to meeting the perceived needs of the populations concerned, then the emphasis should include education for good citizenship and for employment. This was one of the recommendations arising from Second World Congress on TVET.

This stress should improve the relevance of the curriculum with regard to literacy programmes in primary and secondary education, to ensure that what is taught is relevant to preparing individuals for most effective entry to the world of work. Such a shift will also help counteract common complaints that what is taught in such programmes is not 'relevant to the real world'. Any perceived lack of relevance contributes to low participation and the high drop-out rates:

> Recognizing that the vast majority of the worldwide labour force, including knowledge workers, require technical and vocational knowledge and skills throughout life, we affirm that skills development leading to age-appropriate TVET should be integral to education at all levels, and can no longer be regarded as optional or marginal. It is especially important to integrate skills development in Education for All (EFA) programmes and to satisfy TVET demand created by learners completing basic education. (UNESCO–UNEVOC, 2005, p. 2)

## References

Delors, J. (1996) *Learning: The Treasure Within*. Report of the International Commission on Education for the 21st Century. UNESCO: Paris.

Dusseldorp Skills Foundation (2003) *A Note on Educational Diversity, Compulsory Schooling and DSF*. Dusseldorp Skills Foundation: Glebe.

Fernig, L. (1960) No schools today for one in two. *The UNESCO Courier*, March.

Inter-agency Working Group (IAWG) (2004) *Life Skills in EFA*. UNESCO: Paris.

IBE (2004) *Report of the ICE International Conference. On Quality Education*. IBE: Geneva.

IIEP (2004) *Promoting Skills Development*. Report of an inter-regional seminar. IIEP: Paris.

Jacinto, C. (2003) Latin America: developing life skills for youth in disadvantaged areas. *IIEP Newsletter*. December.

Lyndoh, B. (2005) in UNESCO–UNEVOC skills development for employability and citizenship. *UNEVOC Bulletin*, April.

Matsuura, K. (2000) Address at closing meeting at Rencontres, Paris, July 2000. (DG/2000/22) UNESCO.
Maurice, N. (1999) No diploma, no future. True or false? in *Class Acts*. UNESCO: Paris.
Nozawa, M. (2003) *UNEVOC Bulletin*, 7.
SIDA (1996) *Paper 1 Donor Policies on Technical and Vocational Education and Training, Swedish National Paper*. Working Group for International Cooperation in Skills Development: Geneva.
UN (1994) *Report of the International Conference on Population and Development*. UN: New York.
UNESCO (1948) Director-General's Message, in *50 Years for Education* 1997. UNESCO: Paris.
UNESCO (1949) The right to education. *The UNESCO Courier*, October.
UNESCO (1990) *World Conference on Education for All*. UNESCO: Paris.
UNESCO (2000a) *World Education Forum, Final Report*. UNESCO: Paris.
UNESCO (2000b) *Statistical Document*. UNESCO: Paris.
UNESCO (2004a) *Global Monitoring Report*. UNESCO: Paris.
UNESCO (2004b) Address by Director-General, in *Report of the ICE International Conference*. IBE: Geneva.
UNESCO–UNEVOC (2005) Skills development for employability and citizenship. *UNEVOC Bulletin*, April.

# Chapter 11
# TVET and Ecologism: Charting New Terrain

**Damon Anderson**

## Introduction

This chapter builds upon the understandings of the discourses of 'productivism' and 'ecologism' in technical and vocational education and training (TVET) outlined in Chapter 3. The natural environment is a silent stakeholder in technical and vocational education and training (TVET). Yet as a major supplier of skilled labour to industry, TVET is directly implicated in the reproduction of 'productivism', the globally dominant ethos that presupposes economic growth is a permanent and necessary feature of human existence, regardless of its environmental impact and consequences. Productivism gives precedence to the needs of industry over all others and reifies work (as paid employment) as the principal source and measure of social worth, to the virtual exclusion of other human values and vocations (Giddens, 1994).

Although omnipresent since the birth of TVET as an institution, productivism has become more pervasive and deeply embedded in contemporary constructions of TVET as a result of the ascendancy of neoliberalism (sometimes referred to as economic rationalism) and human capital theory over the past two decades. As markets become increasingly global and competitive, governments and supranational organizations faced with the problems of structural unemployment and underemployment are intensifying pressure on TVET systems to produce more economically productive and employable workers (ILO, 2002; OECD, 1996; World Bank, 1991).

TVET has been systematically harnessed to the logic of economic growth and industrial production since the mid-1980s through processes of structural adjustment and training reform. These processes, which emphasize the economic importance of skills formation and involve the marketization of TVET and the introduction of competency-based training (CBT), have tightened the connections between TVET and economic production (Anderson et al., 2004; Bennell et al., 1999; Gill et al., 2000; Marginson, 1993). Discursive strategies have been mobilized to justify the

D. Anderson
Monash University, Melbourne, Australia
e-mail: damon.anderson@education.monash.edu.au

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subordination of individual learners' needs to those of industry and to prioritize work and employability over the non-economic outcomes of TVET (Anderson, 1998).

In consequence, TVET policy and practice are now premised on two fundamental assumptions that have acquired the status of self-evident truths and are routinely reproduced in TVET institutions and programmes; namely that the principal, if not sole, purposes of TVET are to promote economic growth through the development of the human resources required by industry to increase productivity and profit (training for growth) and to produce graduates with skills and competencies for work in order to increase their economic output and employability (skills for work) (Anderson, 2002, 2003a). Implicit in the structure, content and delivery of TVET programmes, these two assumptions systematically shape and direct the formation of learner subjectivities. In effect, learners are reproduced as agents of productivism, lacking a reflexive understanding of their roles as ecological actors and the negative impact and consequences of their producing and consuming behaviour.

This chapter starts from the proposition, first articulated in Anderson (2002, 2003a) and elaborated in Chapter 3, that in an era of manufactured uncertainty and ecological risk (Beck, 1992; Giddens, 1994), productivism and the training-for-growth and skills-for-work assumptions no longer constitute a rational or meaningful basis for TVET. Firstly, mounting scientific evidence of deep-seated and potentially irreversible environmental problems shows that permanent economic growth is untenable. Secondly, the erosion of full-time and secure and equitably distributed employment undermines both the ideology of work and the discourse of employability. In consequence, a new post-productivist vision of TVET is required, based on values and aspirations that aim to promote 'a society which *displays international and ecological responsibility*: concern for persons throughout the planet; ecologically sustainable developments; protection of flora and fauna' (Stevenson, 1994, p. 117, original emphasis). In effect, the myth of perpetual economic growth must be superseded by ecologically sustainable development as the bedrock of TVET.

## Sustainable Development and TVET

Although an ambiguous and contested term, 'sustainable development' has been defined as noted in Chapter 3, as 'development that meets the needs of the present without compromising the ability of future generations to meet their needs' (World Commission on Environment and Development, 1987, p. 43). Socially critical advocates of sustainable development refute the primacy of economic growth in favour of a more balanced and integrated approach to economic, social and ecological development (Fien, 1993; Fien and Wilson, 2005; Huckle, 1991). Social equity, economic justice, and a general improvement in human welfare, especially in the poor South, are seen to be essential preconditions for environmentally sustainable development. Along these lines, the UNESCO *Hamburg Declaration on Adult Learning* (1997, Articles 1 and 17) declared:

> . . . only human-centred development and a participatory society based on the full respect of human rights will lead to sustainable and equitable development . . . Education for environmental sustainability should be a lifelong learning process which recognizes that ecological problems exist within a socio-economic, political and cultural context. A sustainable future cannot be achieved without addressing the relationship between environmental problems and current development paradigms.

Recognizing that TVET comprises a key element of current development paradigms, UNESCO/UNEP (1986, cited in Hardy and Salasoo, 1987) argued for the adoption of both proactive and reactive approaches to environmental education to enable graduates to respond to and anticipate environmental problems.

This chapter adopts a socially critical definition of and approach to sustainable development, but focuses primarily on its environmental dimension. The term, ecologically sustainable development is used herein in preference to 'sustainable development' to more explicitly reflect the triadic nature of sustainability and the holistic, dynamic and symbiotic relationship between its environmental, social and economic dimensions. Related to ecologically sustainable development, ecologism refers to an ethos which recognizes the finite (natural and material) limits to growth, the moral considerability of all life forms (human and nonhuman), and the interconnectedness and interdependence of humanity and the natural environment (Baxter, 1999; Dobson, 1995). It views economic production and consumption as integrated and socially constructed processes that occur within natural ecosystems and interact with and reshape each other. Economic growth per se is rejected as a legitimate basis for human development in favour of the equitable satisfaction of basic human needs under conditions of relative ecological equilibrium. In this framework work no longer constitutes the primary source of social meaning and value, and is be replaced with a more diverse and inclusive notion of socially productive activity and sustainable livelihoods including, but not limited to, paid employment (for a more extended discussion, see Chapter 3 in this volume).

Significantly, ecologism differs from environmentalism, which concentrates on protecting and conserving nature, and limiting environmental damage via incremental reforms to industry. In effect, environmentalism adopts 'a managerial approach to the environment within the context of present political and economic practices' (Dobson, 1995, p. 37). In contrast, ecologism insists on the need to call into question the assumptions of productivism, expose its contradictions and consequences and transform the practices that reproduce the growth economy.

Given its role in the reproduction of productivism and its contribution to global environmental problems, TVET has a dual responsibility to initiate a critical examination of the consequences of unfettered economic growth and to actively facilitate the transition from productivism to ecologically sustainable development and ecologism. At present, however, there are few resources to guide this process, as research in TVET is as deeply embedded as its policies and practices in the discourse of productivism. The remainder of this chapter explores some key issues and dilemmas for TVET and charts a preliminary course through the untraversed terrain of ecologism, the shape and contours of which will only emerge over time through more research, experience, critical reflection and dialogue.

## Reorienting TVET to Ecologism: Issues and Strategies

Despite the hold of productivism on TVET, there have been many innovative and often far-sighted examples of environmentally sound policy, programmes and practices in TVET, in some cases dating back two decades or more (Bruan, 1992; Disinger et al., 1988; Gagliardi and Alfthan, 1993; Hardy and Salasoo, 1987; Loos et al., 2000; Potter, 1981, 1986, 1992; Walters et al., 1981). However, such initiatives have been generally isolated, marginal to mainstream thought and unstable over time, due to fluctuating public, governmental and corporate interest, shifting institutional and budget priorities and the departure of committed individuals (leaders and teachers) upon whom their existence and survival often depended (Disinger et al., 1988; Guthrie and Cesnich, 1995). TVET programmes across a range of occupational fields other than environmental studies, such as animal care, community development, construction, engineering, health sciences, horticulture, mining and tourism are sometimes designed and delivered in ways that develop environmental awareness and skills. But subjects and modules with relevant content within such programmes tend to be ancillary to the core curriculum and are framed within a reformist-environmentalist, rather than a transformative-ecologist, paradigm.

As institutions involved in the processes of economic production and lifelong learning, TVET providers are strategically well positioned to propagate the principles and practices of ecologically sustainable development. Given the extent to which the training-for-growth and skills-for-work assumptions currently constitute TVET, however, the transition to ecologism is likely to be highly contested. In particular, opposition is likely to emerge from external and internal stakeholders with vested interests in maintaining the status quo in TVET. Industry associations, employer groups and some unions whose core constituencies derive economic benefits from prevailing industrial practices, in the form of profit or wages, are likely to be among the most active opponents of change.

A major challenge facing educators, therefore, is to raise the awareness of decision-makers, stakeholder groups (including industry) and the general public about the contradictions and consequences of productivist policies and programmes in TVET, in addition to the need to retrain displaced workers. The meaning and implications of sustainable development for TVET require extensive debate. A new post-productivist discourse, or set of conceptual and linguistic tools, needs to be devised in the process of articulating a coherent agenda for change. This dual process of critiquing productivism and re-envisioning TVET for a post-productivist future, though complex, is indispensable if cultural change on such a large scale is to be realized.

### *Rethinking Markets in TVET*

The demand-driven market context in which TVET is increasingly funded and delivered poses a major dilemma for promoting ecologically sustainable development. As noted earlier, TVET providers have an obligation and the capability to

adopt a proactive approach to environmental education. An ecologically oriented TVET system would entail providers taking responsibility for engaging stakeholders in open debate about the adverse effects of productivism, such as resource depletion and environmental degradation, and equipping students and trainees with the knowledge, skills, values and dispositions to address such problems. Market-oriented policy frames and financial mechanisms, however, require TVET providers to be directly responsive to market demand, particularly from industry and enterprise clients. Rather than developing programmes in anticipation of new and emerging needs, TVET providers are forced to adopt a reactive approach to programme design and delivery based on the existing demands of prospective clients. As Guthrie and Cesnich (1995) found, the provision of environmental education and training in the marketized South Australian technical and further education (TAFE) system is constrained by the nature of industry demand. Rather than being motivated by the perceived need for an environmentally literate workforce, industry demand for environmental skills tends to be spasmodic and largely reactive to legal requirements and negative publicity.

Although providers act as training brokers to some extent, providing advice and negotiating with clients about content and delivery modes, they are by no means equal partners in the decision-making process. Due to their growing reliance on commercial income, TVET providers must adopt a subservient 'customer-knows-best' position, regardless of whether or not client demands are inappropriate or ill informed. Under such conditions they have little scope or incentive to incorporate environmental education into their programmes, if no such demand is expressed. Yet it is only through proactive educational strategies implemented over the longer term that industry and the wider community are likely to recognize the need to promote ecologically sustainable development in TVET. Providers find themselves in a double bind, therefore, as not only are they forced to respond to existing client demand, but they are also unable to generate new demands to which they could subsequently respond. In effect, they are locked into a set of unequal power relations that results in a more or less closed cycle of reproductive skills formation. As demand driven markets, in combination with CBT, give employers effective control over learning outcomes (Anderson, 2006), environmental skills development in TVET remains hostage to short-term profit imperatives and, by extension, to the logic of productivism itself.

Such issues cast serious doubt on whether the transition to ecologically sustainable development can be facilitated in a market-based TVET system. Even if industry is forced to improve its environmental skills and performance by stronger government regulation, market-driven educational responses are likely to remain marginal, restricted and reactive. If, however, a more profound shift in industrial practices is sought – which the growing body of scientific research suggests is necessary – the transformative potential of TVET must be unleashed as a complementary driver of cultural and attitudinal change. This would require a rebalancing of power relations between TVET providers and clients within a policy and financial framework that assists providers to become new knowledge and skills incubators for ecologically sustainable development, and active agents of cultural change and

alternative futures. If TVET providers are to adopt a more proactive role along these lines, they will have to be freed from the constraints of market logic. What form a post-market TVET system should take requires further analysis and debate.

## *Remaking TVET Policy and Planning Strategy*

A healthy environment, like clean air and water, is a public good and cannot be readily commodified for market exchange (Marginson, 1993). With some exceptions, such as emerging 'green' industries and occupations, environmental knowledge and skills cannot be produced and consumed for private benefit, nor can their use-value be measured precisely in monetary terms. Left to market forces, environmental education in TVET is likely to suffer from under-investment by individuals and industries, and hence under-supply by TVET providers.

Market failure in turn highlights a role for government in formulating policies and plans to stimulate and co-ordinate the supply of, and demand for, environmental education in TVET. Yet the current reliance on market mechanisms and consumer choice in TVET reflects the diminished willingness of neoliberal governments to develop longer term policy and planning strategies to promote public interest objectives, such as environmental protection and sustainable development. Guthrie and Cesnich (1995) identified a plethora of environmental training providers in the South Australian Technical and Further Education (TAFE) system, but found that provision was organized and delivered largely on an *ad hoc* basis, due to the absence of any coherent policy and planning framework. Rather than leaving the provision of environmental education to the vagaries of the market, they concluded that 'TAFE . . . has to develop its response within a strategic framework' (p. 100). Such evidence underscores the need for government to assume greater responsibility for guiding and supporting the transition to ecologically sustainable development in TVET.

The reorientation of TVET towards ecologically sustainable development will require more than a simple reordering of current government policy and planning priorities and rhetorical commitments to the import of TVET for sustainable development. Developing a strategic framework for ecologically sustainable development necessitates a new vision for TVET based on goals and values that give precedence to ecological over exclusively economic outcomes, and which take responsibility for educating learners about the environmental consequences of, and alternatives to, their production and consumption practices in TVET, workplaces and beyond. As Dippo (1998) argues, a new ethic of sustainability is required in work education: one that is situated 'within a larger project of social, political and economic change aimed at dealing with equity, social justice, and environmental issues' (p. 329), and which 'recognizes and begins from the assumption that there are interrelations among personal, social, economic, and environmental problems' (p. 326). This underscores the need for a new ethos of ecologism in TVET and suggests that alternative assumptions to those of training for growth and skills for work must be developed. Dialogue among stakeholders is required to determine

the types of goals, values and interests required to reorient TVET for ecologism and reconstitute its purposes as learning for sustainability and skills for sustainable livelihoods.

Developing a strategic framework for ecologically sustainable development in TVET will also require structures and processes in TVET for developing industry training plans to be reformed. As Ferrier (2001, p. 228) notes in her study of two green industries in Australia: 'Sustainable development takes a long-term view [and] creates training/re-training needs because it can entail substantial shifts from existing practices'. The short time horizons of current industry training plans need to be recast within a long-range strategic framework, informed by an understanding of ecological problems, processes and timescales.

Furthermore, in Australia as elsewhere, the creation of an industry-driven TVET system 'has had the effect of consolidating the links between TVET and existing industries or traditional industries, such as Agriculture, Mining and Manufacturing' (Ferrier, 2001, p. 223). All three industries have been principal beneficiaries of productivism and major sources of greenhouse gas emissions and environmental degradation in general. Conversely, less powerful and influential sectors, including green industries, have generally been marginalized in policy, planning and financial arrangements in TVET. If ecologically sustainable development is to be fostered, industry needs to be reframed in more inclusive and equitable terms, existing structures and processes for developing industry training plans must be correspondingly overhauled and the priorities currently accorded to the re/training needs of traditional and emerging industries rebalanced. In the process, highest priority must be given to developing skills for ecologically sustainable development across all industry sectors.

## *Changing TVET Organizations*

Like any other organization, TVET providers consume (and therefore deplete) raw materials, fossil fuels and other suppliers' goods and services and also produce wastes and pollution, thereby contributing to environmental despoliation. Beside recognizing that it is no longer acceptable for any organization to engage in such practices, TVET providers have a responsibility to 'practice what they teach' in environmental education (Potter, 1993, p. 82) or damage their credibility in the eyes of students, industry and the wider community. They also have the potential as educational institutions to become exemplary green organizations and to model good practice in ecologically sustainable development.

However, 'The reality is that further and higher education institutions are only just beginning to wrestle with the challenges of sustainability in the campus' (Tilbury et al., 2005, p. 8). In most cases a piecemeal approach is taken. While some incremental improvements in staff and student awareness and practices ensue, such an approach 'fails to address the underlying causes of unsustainable practice in further and higher education institutions or prepare students to contribute to a more sustainable society' (p. 23). Instead, an institution-wide approach is required on an

ongoing basis, involving among other things, learning-based strategies for change, multiple (internal and external) stakeholder engagement in the development of a shared vision for sustainability and participatory planning and collaborative learning through integrated approaches to professional, curriculum and organizational development.

In tandem with their promotion of ecologically sustainable development in workforce training programmes, therefore, TVET providers should aim to become innovators and beacons in ecologically sustainable development in their own right. To this end, TVET providers need to formulate and implement comprehensive policies and organizational development strategies within a common and coherent framework of ecological principles, values and commitments. Such policies and strategies should cover all aspects of their governance, management, staff development and operational arrangements and be applied consistently across their domestic and offshore campuses, including franchized outlets. Adequate time, resources and democratic and participatory decision-making processes involving all key stakeholders, including students and teachers, will be required for effective processes of organizational learning and change for ecologically sustainable development (Potter, 1993; Tilbury et al., 2005).

## *Redesigning Programmes, Curriculum, Assessment and Qualifications*

The question of how best to promote ecologically sustainable development through TVET programmes is by no means clear and entails consideration of alternative approaches to programme design, curriculum and assessment and their ramifications for ecologically sustainable development in general. A key issue concerns the need for, and relative merits of, developing environmental specialists, as distinct from generalists, across all industries and occupations. This issue has significant implications for determining the extent to which TVET providers should concentrate on offering stand-alone programmes for environmental specialists on the one hand and/or exposing all TVET learners to ecological principles and practices. Drawing on his substantial experience as an engineer, environmentalist and principal of Farnborough Technology College in the UK, Potter argues that a combination of both is desirable:

> An expanded programme in technical and allied colleges should contain elements of environmental education for nearly all technicians as well as specialist full-time training schemes for persons such as environmental monitoring technicians. . . . In fact, all students in the Further Education sector would benefit from the inclusion of some environmental education in their curriculum. (1981, p. 275)

More research on industry needs for environmental specialists and generalists would help to clarify this issue. However, a small body of environmental specialists in industry, while necessary, is insufficient in itself to achieve the breadth and depth of change required in workplaces and work practices as a whole. Also, while industry

requirements are an important consideration, the wider ecological interests of individual learners and their communities, local and global, are also at stake and must therefore be central to such determinations. An environmentally capable and aware populace is a precondition for promoting and maintaining ecologically sustainable development in and beyond the workplace. A mix of stand-alone courses for trainee environmental specialists, short and intensive training programmes for existing workers and the inclusion of environmental content in all other TVET programmes would appear to be the most prudent, equitable and effective approach for TVET to adopt.

A related question concerns the relative merits of curricular segregation and integration in the context of programmes for most TVET learners. Training in occupational health and safety (OHS) is often a core requirement in TVET programmes and is typically delivered in the form of segregated subjects or stand-alone modules. This approach could also be adopted for ecologically sustainable development. Unlike OHS, however, skills for ecologically sustainable development are not as readily amenable to compartmentalization, as the causes and consequences of environmental problems often cannot be isolated and addressed in the context of individual workplaces. Nor can they always be traced to single job roles. The development of skills for ecologically sustainable development, therefore, should be fully integrated across the curriculum to promote a better understanding of the inter-relationships between production and consumption processes and between upstream and downstream effects. In this way, ecological principles and practices could inform and reshape the structure and acquisition of production-oriented competencies and also foster a multidirectional and contextualized awareness among worker–learners and organizations of their place within, and impact on, natural ecosystems.

Redesigning TVET curricula, especially those within a CBT-based system, poses significant additional issues for the promotion of ecologically sustainable development. Although work has commenced in some countries to identify skill profiles and competency standards for sustainable development (for example, see Baines et al., 2005; Chinien, 2003; National Centre for Sustainability, 2005, n.d.), there is a worldwide deficit of relevant competency standards in most existing TVET programmes. In large part, this problem stems from the fact that competency standards are determined by industry parties with little or no understanding of ecologically sustainable development and a limited interest in encouraging enterprises and their employees to adopt appropriate practices. Even where environmental competencies have been incorporated into TVET programmes, they are typically defined as elective rather than core components (Russell, 2003). As a consequence, the norms, values and practices of productivism continue to be systematically and uncritically recycled.

The problem of narrow industry interests is compounded by the frequent emphasis in TVET programmes on the development of enterprise-specific competencies, particularly where such programmes are delivered entirely in the workplace. As previously noted, the effects and consequences of ecologically unsustainable development extend well beyond individual workplaces, and indeed, industry sectors. As a result, ecological competence generally cannot be developed, assessed and certified in isolation at an enterprise level. Hence, there is a need for a more holistic and inclusive approach to both the identification of skill requirements and competency

standards for TVET curricula, and the assessment and certification of a learner's ecological competence. Consideration should be given to adopting the French system of *alternance* to rotate trainees between two or more workplaces in order to increase their exposure to different modes of production and their environmental consequences. Input into curriculum development and assessment processes from a broader range of stakeholders, including industry leaders in the field, environmental agencies, educators and the wider community, would also help to ensure that accredited courses and qualifications incorporate the requisite knowledge and skills, and acknowledge all legitimate stakeholder interests.

The current practice of delivering national competencies and qualifications for domestic industries should be reviewed against the need for global and regional approaches to ecologically sustainable development. As economic markets become increasingly regionalized and internationalized, many companies are utilizing offshore networks of production, marketing and distribution and are sourcing raw materials (and often workers) from other countries. As a result, the environmental impact of their operations extends beyond the national borders of their host countries, as do the adverse effects of their resources extraction, waste and pollution. The resulting environmental limitations of developing national TVET programmes and qualifications need to be recognized. TVET providers, particularly in developed countries, also have a regional role and responsibility to assist neighbouring countries to develop in ecologically sustainable ways; for example by participating in joint initiatives with international aid agencies and (re)designing and delivering environmentally sound programmes in collaboration with local providers, government agencies, non-government organizations and other bodies so as to ensure that they are relevant and responsive to local needs and conditions.

For the foreseeable future the incorporation of ecological principles and practices into technical and vocational learning will have to be negotiated within existing structures for programme design and delivery. Even if the aforementioned issues are addressed effectively, there is still no guarantee that ecologically sustainable development can be accommodated and fostered successfully within current frameworks for technical and vocational learning and assessment. The general tendency of CBT programmes to construct vocational learning as atomized, decontextualized and directly observable standards of workplace and job-task performance may prove to be a major obstacle to learning for ecologically sustainable development. As CBT is a product of and technology for reproducing productivism in TVET, it is debatable whether the inclusion of fragmented and standardized sustainable development competency standards would promote or undercut the formation of authentic ecological competence. Ecologically sustainable development may ultimately necessitate the creation of new structures and processes for technical/vocational learning and assessment.

Although they have been relatively short-lived, some attempts have been made to experiment with ecologically sound approaches to learning within a CBT framework. For instance, the former Renewable Energy Centre at Brisbane Institute of TAFE in Australia developed a holistic, contextualized, integrated, inter/multi-disciplinary and collaborative approach to reflect and promote ecological principles in engineering programmes (Berrill and Giffard, 2001). Such principles were also reflected in

the Centre's own energy-efficient design and operation, thus demonstrating that the principles and practices of ecologically sustainable development provide a basis for integrated approaches to organizational and curriculum change in TVET.

## *Training, Retraining and Supporting Staff*

Teachers and trainers will be the major catalyst for the transition from productivism to ecologism in TVET. Unless teachers/trainers are willing and able to incorporate the principles and practices of ecologically sustainable development into their programmes effectively, learners are unlikely to develop the required knowledge, skills and dispositions. Universities and other providers of TVET teacher and trainer training must therefore take immediate steps to ensure that their programmes equip trainees with the appropriate skills and techniques in programme design and delivery, and impart to them a critical understanding of their role as educators for ecologically sustainable development. If progress is to be achieved in the short to medium term, intensive retraining and professional development will be required for existing teachers and trainers.

Teachers and trainers will need access to appropriate curriculum resources and support materials relating to their industry and occupational areas. Such resources and materials should be developed not only by external experts, but also by the teachers and trainers themselves in the context of professional research and development activities. This would enhance the teachers' and trainers' awareness and abilities, and also encourage them to take greater ownership of, and responsibility for, the outcomes. Teachers and trainers would need adequate resources and time release from normal duties for such activities.

If the greening of TVET is to be an integrated and effective process of institutional change, non-teaching staff must also be involved in retraining and professional development activities. Managers of TVET providers will require training to develop their awareness and understanding of ecological principles and practices, in addition to enhancing their capacity to plan, co-ordinate and support effective organizational learning and change processes. This applies equally to policy-makers and planners at a systemic level. Provider staff involved in the provision of student services (including course and careers advice), learning support (including libraries and resource centres), facilities management, equipment and grounds maintenance and administrative services will all require specialized forms of training to ensure that they are able to understand and apply ecological principles in their daily work practices.

## *Forging New Coalitions of Interest*

As productivism is so deeply entrenched in the current decision-making structures, policies and practices of the TVET sector, new coalitions of stakeholders are required to facilitate the shift to ecologically sustainable development. The prevailing climate of market competition in TVET militates against co-operative

programme design and delivery among providers as they become less willing to pool information and resources (Anderson, 2006). A countervailing strategy could involve establishing collaborative learning networks, as they are 'closely aligned with the principles of learning for sustainability [and offer] opportunities for dialogue and partnership building, as well as sharing practical experiences' (Tilbury et al., 2005, pp. 11–12). In recognition of the complex nature of ecologically sustainable development, collaborative learning networks would be most effective if they were not only industry-specific, but also cross-industry, multidisciplinary and interdisciplinary in composition.

More generally, there is a need to develop strategic partnerships and collaborative networks among TVET actors (policy-makers, planners and providers), environmental protection and regional development agencies, government at all levels, community groups, aid agencies, non-government organizations and industry and enterprise leaders in sustainability. Such partnerships and networks will help to increase the level of recognition, resources and support and generate new ideas and strategies for ecologically sustainable development in TVET. The global scale of the ecological crisis also indicates the need for transnational partnerships between TVET systems and providers in geographically proximate and economically interdependent countries, both developed and developing.

## *Researching and Evaluating Change*

The processes of critiquing productivism in TVET, envisioning alternative futures and strategizing change need to be underpinned and informed by research and evaluation. As noted earlier, information and knowledge resources for promoting ecologically sustainable development in TVET are sparse. There are few published statistics about environmental education provision and training provision and participation and learning outcomes in TVET systems and providers. In the absence of any baseline data, it will remain difficult to plan for and evaluate change. Little is known about the factors, both external and internal to TVET, that may assist or impede the process of change. Nor is there a clear picture of needs and priorities for ecological sustainability in TVET, or of the extent to which existing programmes and delivery strategies are effective from learner, industry and community perspectives. More generally, as suggested earlier, the meanings and implications of ecologically sustainable development for TVET must be explored in greater depth.

Consequently there is a strong warrant for fundamental research to problematise productivism in TVET and reframe its rationale, purposes and goals in post-productivist terms. National and provider inventories of environmental programmes (specialist and generalist) are needed, together with information about participation and learning outcomes (knowledge/skills/competencies in the TVET sector, an assessment of the needs and priorities of students, industry (on a sectoral basis) and the wider community, a critical analysis of barriers to and drivers of change at a systemic and provider level and an evaluation of the impact and efficacy of existing policies programmes and pedagogies. TVET practitioners require access to research from which they can derive models and strategies for use in classrooms and

workshops, and also opportunities to undertake their own action research projects to promote ecologically sustainable development in programme design, curriculum content, teaching/learning and assessment strategies and resources development. From the outset, an integrated framework for evaluating and reviewing the impact and efficacy of change projects is required at a systemic and provider level.

### *Committing Resources*

The raft of proposals outlined in the preceding discussion has major, long-term resource implications. The reform of policy and planning systems, the redesign of programmes, curriculum and assessment and the development of teachers/trainers, educational resources and research and evaluation programmes will require considerable amounts of time and money. Substantial investment will be required during the start-up and developmental phase, although the ongoing need to maintain, review, update and improve all such elements will not come cheap. It may also be necessary to expand the scope and lengthen the duration of existing programmes if the desired learning is to be effective, and in order to mitigate the problem of curricular overload. All this will have significant implications for TVET funding, particularly in developing countries. How such initiatives are financed is a question for public debate, but could involve the introduction of sustainable industry training levies, perhaps linked in some way to carbon credit trading schemes or the like.

## Conclusion

This chapter has argued that TVET providers must not only engage in a critical examination of productivism and its negative environmental effects, but also initiate debates and strategies to facilitate the transition to ecologically sustainable development and a new ethos of ecologism. The transition to ecologically sustainable development and ecologism in TVET is likely to be resisted by powerful vested interests, but there is also potential for developing new coalitions of interest and collaborative learning networks to promote ecologically sustainable development. TVET policy-makers, managers and practitioners share responsibility for critiquing productivism, stimulating dialogue, raising learner and public awareness about the challenges we confront and articulating a vision and strategy for redressing the ecological blind-spot in current constructions of TVET. A number of issues have been identified in this chapter and various steps for overcoming existing barriers to ecologically sustainable development in TVET have been proposed. In the end, however, it is only through the individual commitment and collective effort of the whole TVET community along such lines that progress towards an ecologically sustainable future will be achieved.

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## References

Anderson, D. (1998) Students as clients: refocussing training market reform, in Robinson, C. and Kenyon, R. (eds) T*he Market for Vocational Education and Training*, pp. 307–22. National Centre for Vocational Education Research: Adelaide.

Anderson, D. (2002) Productivism, ecological sustainability and vocational education and training, in Searle, J. and Roebuck, R. (eds) *Envisioning Practice – Implementing Change, Proceedings of the 10th Annual International Conference on Post-compulsory Education and Training*, vol. 1, pp. 61–8. Australian Academic Press: Brisbane.

Anderson, D. (2003a) Productivism, VET and ecological sustainability, Paper presented to the changing face of VET, 6th Annual Conference of the Australian VET research association. Australian Technology Park Conference Centre, Sydney, 9–11 April. http://www.avetra.org.au/Conference_Archives/2003/documents/PA066Anderson.pdf

Anderson, D. (2003b) VET and ecologism: charting the terrain, in Searle, J. Yashin-Shaw, I. and Roebuck, D. (eds) *Enriching Learning Cultures, Proceedings of the 11th Annual International Conference on Post-compulsory Education and Training*, vol. 1, pp. 16–23. Australian Academic Press: Brisbane.

Anderson, D. (2003c) From productivism to ecologism: dilemmas, issues and strategies for VET. *Australian Vocational Education Review*, 10(1): 1–14.

Anderson, D. (2006) *Trading Places: The Impact and Outcomes of Market Reform in Vocational Education and Training*. National Centre for Vocational Education Research: Adelaide.

Anderson, D., Brown, M. and Rushbrook, P. (2004) Vocational education and training, in Foley, G. (ed.) *Dimensions of Adult Learning: Adult Education and Training in a Global Era*, pp. 234–50. Allen & Unwin with Open University Press: Crows Nest, NSW.

Baines, J., Cohen, J. and Martin, S. (2005) United Kingdom: skills development for the twenty-first century. *Prospects*, 35(3): 355–65.

Baxter, B. (1999) *Ecologism: An Introduction*. Edinburgh University Press: Edinburgh.

Beck, U. (1992) *Risk Society: Towards a New Modernity*. Sage: London.

Bennell, P., Bandera, S., Kanyenze, G., Kimambo, E., Kiwia, S., Mbiriyakura, T., Mukyanuzi, F., Munetsi, N., Muzulu, J., Parsalaw, W. and Temu, J. (1999) Vocational education and training in Tanzania and Zimbabwe in the context of economic reform. Education Research Paper No. 28, Department for International Development: London. http://www.dfid.gov.uk/pubs/files/vocedtanzimedpaper28.pdf. Accessed 29 March 2007.

Berrill, T. and Giffard, S. (2001) Training designers and installers of stand-alone power systems – a holistic approach for a sustainable future, Paper presented to women leaders on the uptake of renewable energy seminar, Perth, June. http://acre.murdoch.edu.au/unep/ papers/Berrill.pdf. Accessed 19 November 2002.

Bruan, R. (1992) Environmental education and training in Brazil, Training Discussion Paper No. 84, Training Policies Branch, International Labour Office: Geneva. http://eric.ed.gov/ERICDocs/data/ericdocs2/content_storage_01/0000000b/80/22/43/5e.pdf. Accessed 20 January 2007.

Chinien, C. (2003) Skills to last: broadly transferable sustainable development skills for the Canadian workforce, A technical research report for Human Resources Development Canada, Human Resources Partnerships, National Centre for Workforce Development. http://www.unevoc.unesco.org/sustainable/docweb/SkillsToLast.pdf. Accessed 15 November 2006.

Dippo, D. (1998) An ethic of sustainability for work education. *Journal of Vocational Education Research*, 23(4): 325–38.

Disinger, J.F. et al. (1988) Recent developments in college level environmental studies courses and programs. ERIC/SMEAC Environmental Education Digest, No. 2. http://www.ericdigests.org/pre-9215/recent.htm. Accessed 25 January 2007.

Dobson, A. (1995) *Green Political Thought*. Routledge: London.

Ferrier, F. (2001) Can VET meet the skill needs of new industries? Case studies of two 'green' industries, in Beven, F., Kanes, C. and Roebuck, D. (eds) *Knowledge Demands for the New*

*Economy, Proceedings of the 9th Annual International Conference on Post-compulsory Education and Training*, vo1. 1, pp. 223–30. Australian Academic Press: Brisbane.

Fien, J. (1993) *Education for the Environment: Critical Curriculum Theorising and Environmental Education*. Deakin University Press: Geelong.

Fien, J. and Wilson, D. (2005) Promoting sustainable development in TVET: the Bonn Declaration. *Prospects*, 35(3): 273–88.

Gagliardi, R. and Alfthan, T. (1993) Environment training: policy and practice for sustainable development, ILO: Geneva. http://eric.ed.gov/ERICDocs/data/ericdocs2/content_storage_01/0000000b/80/23/6d/10.pdf. Accessed 20 December 2006.

Giddens, A. (1994) *Beyond Left and Right: The Future of Radical Politics*. Polity Press in association with Blackwell: Cambridge.

Gill, I.S., Fluitman, F. and Dar, A. (2000) *Vocational Education and Training Reform: Matching Skills to Markets and Budgets*. World Bank/Oxford University Press: Washington, DC.

Guthrie, H. and Cesnich, J. (1995) *Training for a Better Environment: An Evaluation of the Environmental Education and Training Needs in South Australia*. National Centre for Vocational Education Research: Adelaide.

Hardy, P. and Salasoo, T. (1987) The role of TAFE in environmental education, in Department of Arts, Heritage and Environment, *Environmental Education – Past, Present and Future. Proceedings of a Seminar and Workshops*, AGPS: Canberra.

Huckle, J. (1991) Education for sustainability: assessing pathways to the future. *Australian Journal of Environmental Education*, 7: 43–62.

International Labour Office (2002) *Learning and Training for Work in the Knowledge Society, Report IV* (1). International Labour Conference, 91st Session, ILO: Geneva. http://www.ilo.org/public/english/standards/relm/ilc/ilc91/pdf/rep-iv-2.pdf. Accessed 25 November 2006.

Loos, R., Schlogl, P., Kress, O., Gutschik, R., Ripatti, V., Kutt, K., Papatheodossiou, T., Martins, A. and Axelsson, H. (2000) Vocational training and innovative practices in the environmental sector: a comparison of ten EU member states, with specimen cases: synthesis report in the context of the 'Observing innovations in vocational training' project. Office for Official Publications of the European Communities: Luxembourg. http://eric.ed.gov/ERICDocs/data/ericdocs2/content_storage_01/0000000b/80/24/8c/c3.pdf. Accessed 8 January 2007.

Marginson, S. (1993) *Education and Public Policy in Australia*. Cambridge University Press: Melbourne.

National Centre for Sustainability (2005) *Guideline Standards for Sustainability*, Swinburne University Melbourne. http://www.swinburne.edu.au/ncs/researchprojects/knowledge/Guideline_Standards_for_Sustainability.pdf. Accessed 16 March 2007.

National Centre for Sustainability (n.d.) *Sustainability Related Competencies*, Swinburne University Melbourne. http://www.ncsustainability.com.au/files/Sustainability%20competency%20report.pdf. Accessed 18 March 2007.

Organization for Economic Cooperation and Development, OECD (1996) *Lifelong Learning for All*. Paris: OECD.

Potter, J.F. (1981) The environment and technical education in the United Kingdom. *The Environmentalist*, 1(4): 275–81.

Potter, J.F. (1986) Courses for environmental technicians, in Barrass, R. et al. (eds) *Environmental Science — Teaching and Practice*, Emjoc Press: Northallerton.

Potter, J.F. (1992) An environmental ethos for educators and trainers. *The Environmentalist*, 12(2): 81–3.

Potter, J.F. (1993) New guidelines for environmental education. *The Environmentalist*, 13(2): 81–2.

Russell, D. (2003) Environmental content in vocational education and training: project report and professional support materials, unpublished. Division Environment Group: TAFE NSW.

Stevenson, J. (1994) Interests in post-compulsory education and training: vested or community-based. *Australian and New Zealand Journal of Vocational Education Research*, 2(1): 102–20.

Tilbury, D., Keogh, A., Leighton, A. and Kent, J. (2005) *A National Review of Environmental Education and its Contribution to Sustainability in Australia: Further and Higher Education*. Australian Government Department of the Environment and Heritage and Australian Research Institute in Education for Sustainability (ARIES): Canberra.

UNESCO (1997) *Hamburg Declaration on Adult Learning*. http://www.unesco.org/education/uie/confintea/declaeng.htm. Accessed 19 July 2001.

Walters, A.H., Ghannoum, M., Abu Lisan, M. and Moore, K.E. (1981) Environmental technological education in a developing country – Libya. *The Environmentalist*, 1(2): 133–43.

World Bank (1991) Vocational and technical education and training. A World Bank policy paper. World Bank: Washington DC.

World Commission on Environment and Development (1987) *Our Common Future (Brundtland Report)*. Oxford University Press: Oxford.

# Chapter 12
# Basic Education for Sustainable Livelihoods: The Right Question?

**John E.S. Lawrence and Sean Tate**

*Outsiders who come with ready-made solutions are worse than useless. First, help us to ask the right questions. Next, help us to articulate these questions better. And then, help us to find the right answers.*

*Tilakaratha, an African king*

*There is no complete escape from the way outsiders project their ideologies and values into analysis and prescription, but at least we have identified two antidotes: first, repeatedly to enquire and reflect upon what poor people themselves want; and second to return again and again to examples of the unacceptable, and to analyse these rather than theoretical abstractions. A continuous enterprise of seeking to learn from the rural poor and of exercising imagination in seeing what to do is one way of setting directions and correcting course.*

*Chambers, 1993*

## Introduction: Basic Educational Context for Livelihoods

The Jomtien Conference in 1990 reoriented the attention of international organizations concerned with education towards meeting basic learning needs as a global goal. Advanced knowledge development and technical/scientific education and training are no less important to the development of human resources in these swiftly changing times. But to continue to neglect the fundamental task of education for all, and to fail to provide educational opportunity, at least through primary school, for every child worldwide, was to shortchange development at its base. Jomtien reminded the education community of several important principles: to look beyond mere enrolment as a measure of educational success to assess what is actually learned; to focus not only on learning substance, but also on developing continuing capacities to learn and to place basic education higher on national agendas.

Now, following the Amman and Dakar meetings and with the adoption of the Millennium Development Goals, the record is still mixed. Two broad conclusions

J.E.S. Lawrence
Columbia University, New York, USA
e-mail: john.lawrence@undp.org

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at two ends of the education continuum seem to be emerging from recent evaluative reports. Firstly, evidence is steadily accruing for the importance of nutritional, cognitive and social development, as well as early diagnostics for less visible but potentially critical learning disabilities in the early years (aged one to three) for successful maturation. Thus human development strategies, especially those addressing poverty, are paying more policy attention to this issue. Secondly, the basic learning needs of adults remain largely unmet in less developed countries. Rapid changes are occurring in working environments. Basic literacy and numeracy have been transcended as basic requirements for obtaining formal sector employment, and much of traditional basic education curricula lack relevance to the actual livelihood strategies of those living in poverty. Furthermore, lifelong access to educational opportunity seems more and more a necessity for survival in all societies.

If the two ends of the continuum exhibit shortcomings, the middle (public formal and non-formal education at basic levels) is weak too. Dropout rates remain unacceptably high (as high as 45 per cent in Pakistan) (UNESCO, 1997a). The phenomenon of 'pushout' is referred to (e.g. in Botswana) as a result of the reduction in secondary schooling from three to two years, forcing downward pressure on those already enrolled. Teachers are often not present, and when they are present are sporadically paid, and often under qualified.

In an EFA meeting in Islamabad of the nine countries with the largest population, among the key future challenges noted for Indian education were sustaining community interest, motivation and participation, community ownership, strengthening decentralization and nurturing community-based innovations (UNESCO, 1997b). The emphasis is on tapping the creative energies of each community into the basic education effort. This takes the deep involvement of people, and, above all, the close relevance of the basic educational experience to peoples' lives and livelihoods. 'Livelihood' is a timeless term, but it has been brought into new prominence in development strategies by UNCED and Agenda 21, and most recently by the Social Summit Declaration at Copenhagen in 1995, where it was explicitly linked with employment in Commitment 3. This chapter explores the human resource development aspects of livelihood strategies, and in particular its relationship with basic education. It frames the search through examining knowledge streams and posing questions. It begins by a preliminary review of relevant literature/research and concludes by suggesting new lines of inquiry as to what needs to be done to make basic education more livelihood-friendly.

## Perspectives on Livelihood

Before reviewing the knowledge streams which intersect on the relationship between education and livelihood, it is perhaps useful to state what a livelihood is and is not. Robert Chambers (1993, 1997) who brought forward the idea of livelihoods for new and intensified discussion in the development community, was candid in his concern about the use of the word. 'To stress livelihood', said Chambers, 'can, then, only be a working hypothesis to be confirmed and refuted case by case. If the word is used broadly, it means the antithesis of what many rural people and outsiders will agree

in saying no to' (Chambers, 1993). He acknowledges 'livelihood' in the evolution of ideas about rural development, but cautions that it may mean 'desirable change in rural areas' and that what is considered desirable differs by country, region, and person and it also differs over time.

Is livelihood enough? According to Chambers, it is definitely not. It is important to note here what livelihood does not include and the importance of these exclusions. Livelihood

> . . . can include food, health, a strong family, wealth and income. It can be described as a level of wealth and of stocks and flows of food and cash which provide for physical and social well-being and security against impoverishment. To this may be added access to basic goods and services, but while these are important, for the poorest they may only come second to subsistence and security . . . Nor are livelihoods and basic needs everything. There is also the quality of living and experience . . . the value people set on the familiar, on being needed, on a purpose and role in life, on love, on religious observations, on dancing and song, festivals and ceremonies, on things in their seasons, and bringing in the harvest. Perhaps the most one can say is that for the full enjoyment of these, secure and decent livelihoods may be necessary but not sufficient on their own. (Chambers, 1997)

Livelihoods, however, are necessary, and if 'the poor' are to be put first, then the growing interest in sustainable livelihoods is an important step in the right direction. It is at this point a working hypothesis to be confirmed or refuted case by case, but the cases are accumulating in favour of using this concept. Chambers moves to a sharper definition of livelihoods in relation to jobs and employment (1997). The concept of 'job' has emerged as a central element in human resources strategies and policy. Education systems are expected to be able to prepare people for jobs, individuals to make job choices, media (and in many cases public and private labour exchanges) to publish job opportunities and statistical systems to count jobs (usually rather imperfectly). Currently, job creation is high on the priority list of governments worldwide in both the North and the South.

Yet fundamental questions should be raised regarding this traditional, uni-linear person–job relationship that forms the foundation of so many of our human resources development approaches. Is it already outmoded even for the modern sector applications for which it has always been the unit of any occupational statistics or analysis? Furthermore, is it (and perhaps has it in the past been) irrelevant to the majority of 'workers' who live in poverty, make up the world's 'workforce', and for whom the concept of 'a (single) job' has been, at best, a distant goal? Paradoxically, even modern sector employment is no guarantee of an adequate livelihood for a single wage-earner supporting a family.

Livelihoods systems and strategies (coping and adaptive) are suggested by Chambers as a more useful concept than employment per se for those living in poverty. Livelihoods have been defined by UNDP in terms of a development goal (subsuming but not limited to employment), as 'the activities, means and entitlements by which individuals make a living' and

> . . . sustainable livelihoods are derived from people's capacities to exercise choice, and to access opportunities and resources, and use them for their livelihoods in ways that do not foreclose options for others (including future generations) to make their living, either now, or in the future. (Lawrence, 1997, p. 6)

Livelihood systems are the 'sets of economic, social and physical elements and inter-relationships which form the basis of livelihood decisions' (Lawrence, 1997). Furthermore, a livelihoods approach represents a different way of looking at development, with a focus more on the socio-economic relationships surrounding each individual and the decisions they take (Lawrence and Singh 1997).

## *Lessons from Livelihoods: The Knowledge Streams*

Learning about livelihoods is best done by talking to and observing the people who own those livelihoods. The lessons learned, however, depend into which knowledge streams one dips one's toes. Outsiders who talk to the owners of livelihoods or think about the meanings of livelihood, do so from a variety of perspectives. One way of trying to understand these various approaches is to review the literature from relevant areas. We have taken some first steps in this search. The initial findings are useful in guiding future policy and programmatic directions. The fields and disciplines that are the subject of this exploration are purposefully broad since both livelihood and education are both broad subjects in themselves. Key words for this review included livelihoods, sustainability, development, sustainability, environment, work, employment, economy, learning, schooling and participation. The 'Northern' or 'Western' bias is readily acknowledged, however, the aim is to identify, briefly, key concepts which link learning, schooling and education in relation to sustainable livelihoods, rather than pursue an in-depth review.

## *Economics, Livelihoods and Sustainable Development*

Livelihood has long had an economic connotation and it is from within the fields of economics and economic anthropology, as well as from development philosophers, that the real backlash has come up against thinking of livelihoods as having a purely market-oriented connection. Economic anthropologists such as Gudeman have argued that economies and economic theories are 'social constructions' and that the central processes of making a livelihood are culturally modelled (Gudeman, 1986, vi). In this view, the activities of livelihood are taken from a symbolic scheme drawn from features of the social world, while Western models of livelihood have used logical and mathematical schemes. Gudeman's point is not that one model is more valid than the other. The Western model is derivational, in that explanation consists of showing how one set of data can be derived from another, according to a set of rules. This model works very well for certain uses but when used cross-culturally, understanding becomes subsumed as part of a derivational explanation. Using Western premises to rearrange local models often eliminates the true meaning of what is happening in a local economic system. The differentiation that Gudeman describes has important implications for the bases of development, particularly in the connections to participatory development and learning.

In 1944 the economist Karl Polyani proposed the concept of an economy as a 'material-means-provisioning process' for society (Polyani, 1977). Polanyi defined a substantive economy as having a physical base. . .nature. . .and a social, institutional organization. An economy is therefore 'a process through which humans in society interact with nature. . .to supply the material means of livelihood' (Halperin and Dow, 1977, p. 2), which means that an economy is not a single institution but instead is constituted by many different institutional arrangements (kinship, political, magical, religious) as well as the market. Economies, therefore, cannot be understood in isolation from societies. In addition, work can be organized in different societies in a myriad ways. Work may be organized for wages or, as pointed out by Halperin and Dow (1977), by non-market institutions (households, communities, kinship institutions) that do not use money at all or do so only minimally. Understanding how economies and livelihoods operate, and their participatory nature, is basic to the idea of sustainable livelihoods and to sustainable development.

Unfortunately, the term sustainable development has often been perverted over the years into 'sustainable growth'. This compulsion for growth, as Hoogendijk notes, is supported by many economists who believe that growth is generated in the 'real sphere: more people, more wishes, technological development, new markets determine economic activity' (Hoogendijk, 1995, p. 22). The financial sphere, according to this mode of thinking, simply follows or facilitates what is happening in the real sphere. Opschoor (1996) describes this type of process as 'a permanent rat race: it has to grow in order to ensure full employment and growth reduces employment. . .and the market mechanism reinforces this reductionary tendency' (Opschoor, 1996).

A British economist, James Robertson, proposes 'decoupling the work people can do from what employers can provide, and decoupling local economic activity from what the national economy can provide' (Robertson, 1995, p. 8). This, he says, will be a liberation of work. In practice, Robertson envisions this decoupling as leading to changes in perception and values (people will seek opportunities to work at what they care for and think important) and changes in government policies. One such change, he says, would be that the 'aim of education will be to enable people to manage their own lives, including their work lives, rather than preparing them to work for employers' (Robertson, 1995).

Since the 1970s one of the few economists to address the sustainability of the 'growth ethic' in economic systems has been Herman E. Daly. In his many books and articles Daly has insisted that growth does not necessarily mean 'betterment' and that what is really needed is a 'steady-state economy' in which the understanding of growth includes 'some concept of maturity or sufficiency, beyond which point physical accumulation gives way to physical maintenance' (Daly, 1973). Daly and Cobb (1989) liken this to a helicopter economy that can stand still or go backwards as necessary. Relevant to learning and education, Daly states that

> . . . an economy in sustainable development adapts and improves in knowledge, organization, technical efficiency and wisdom; and it does this without assimilating or accreting, beyond some point, an ever greater percentage of the matter-energy of the ecosystem into itself. (Daly, 1997, p. 123)

An aspect of the economic development equation receiving increasing attention is globalization. This, too, has important ramifications for learning, schooling and education. The question asked in an online discussion was 'which globalization?' David Korten, a provocative development thinker, initiated the discussion in part to define the theme of a world conference of the Society for International Development. There are a variety of faces of globalization, according to Korten:

> One face is a globalizing civil society. Another is an emerging global consciousness of our mutual dependence on the life support systems of a small planet. A third is the globalization of communications. A fourth is the globalization of the consumer culture. A fifth is economic globalization. . .the erasing of economic borders to allow the free flow of goods and money. (Korten, 1997, p. 56)

It is economic globalization that is causing the most controversy. Opponents of economic globalization see it as pressing people and communities

> . . . in a race to the bottom as they seek to outbid one another for corporate favor by offering lower wages, less restrictive environmental and workplace regulations, and larger tax breaks and subsidies for their neighbors. (Korten, 1997, p. 56)

Amartya Sen has long argued that the focus in the twenty-first century will not be the state versus the market but rather a hard versus a soft perspective on development. The hard view, Sen dubs 'BLAST', for the blood, sweat and tears required. According to BLAST, a period of sacrifice must be suffered today in order to achieve successful development in the future. BLAST overlooks

> . . . social obligations to the present generation in favor of its responsibility to future generations. Moreover, it ignores the relationship between quality of life today (health and education) and productivity tomorrow, and the growing body of evidence that social development facilitates rapid, participatory growth. (Funaro, 1997, p. 49)

The soft view of development, which Sen calls GALA (from the Beatles song 'getting by with a little help from my friends') redefines development from the growth of economic development to the expansion of human capabilities and freedom. The social aspects of development, it was concluded, have often been referred to as the soft issues, but they are really the hardest issues to confront.

## *Development and Livelihoods: A Stream of Consciousness-Raising*

Development thinkers have, in one way or another, been contemplating livelihoods and sustainability for many years. Denis Goulet did so in *The Cruel Choice* (1975) as did Dennis Rondinelli in 'Why development projects fail' (1976). James Kearns and Turid Sato looked at new practices for development professionals (Kearns and Sato, 1989, p. 111) and found an overabundance of the rationalistic tradition in development work and workers; a Cartesian world that operates like a machine. Specific problems are logically framed and issues to be addressed by a project are rationally defined. Facts are assembled. Terms of reference are prepared. Reports are written.

And the professionals are blind to the world that exists in social interactions and relationships. Kearns and Sato also make note of Winograd and Flores' explanation of 'the floppy-disc theory of learning', where people are thought to be like computers with floppy-discs for minds into which data is inserted for processing by a computer-like brain. This is how the West, state Winograd and Flores, believes people acquire the knowledge to take new actions. Learning, they say, takes place in social interaction and doing.

Jeremy Seabrook (1993, 1995) re-examined the lexicon of development and found it full of clichés and dishonesty but he also finds hope in a new worldview that is struggling to find expression. The new view, he says, has at least three major objectives: (a) to make visible all that has been suppressed or elided in the existing ideology, giving true value to the work of women and children in the world, to count the true costs of the industrializing of our humanity; (b) empowerment and (c) the maintenance of real living diversity at every level. Martin Khor, of the Third World Network based in Penang, Malaysia, chastised development for the 'filtering of wealth' from the rich to the poor at an estimated annual drain of $250 million in the form of debt repayments, terms of trade, brain drain and internal pricing mechanisms by transnational companies (Seabrook, 1995).

Hope for sustainable livelihoods rise, however, in *The Oxfam Handbook of Development and Relief* (Eade and Williams, 1995) in which capacity-building and education are seen as central to Oxfam's methodology. 'Sustainable livelihoods' is described as taking a systems approach in

> . . . looking for impacts on social and gender equity, patterns of resource use, and the creation of opportunities that do not involve cost-shifting and that make people's lives better without impoverishing others or the next generation.(Eade and Williams, 1995; Shaw-Gardner, 1996)

The stream of gender and development/women in development yields much concern about sustainable livelihoods. One example is the 1995 *Declarations from Global Human Security: Pre-Conferences on Sustainable Livelihoods and Gende*r (Society for International Development, 1995), which defined livelihood as 'a means of living or of supporting life and meeting individual and community needs'. The pre-conference also defined a set of principles of sustainable livelihoods, including the principle of secure access to opportunity and meaningful activity in community life. The principles are seen as a

> . . . holistic set of values that are non-exploitative, promote participation in decision-making, emphasize the quality and creative nature of work, place needs over wants and foster healthy, mutually beneficial relationships between people and their environment especially domesticated animals (Society for International Development, 1995).

One of the very best explanations of the economic differences between the exchange value and use value of production, fundamental to understanding sustainable livelihoods, comes from Lourdes Beneria. The production of exchange values is viewed as an economic activity; production of use values does not. Use value production takes place outside market exchange both in the household and in the subsistence sector. It generates 'social relations between people' and therefore forms part of the

'categories of economics.' Because it does, states Beneria, use value production, often the labour of women, should be a part of the definition of 'active labour' (Beneria, 1985).

Paulo Freire taught that we should listen for *palabras generadoras*, or charged words that generate our worlds and how we imagine improving them. This short review has many such words – a stream of consciousness-raising. Some of the linkages with learning and education have already been implied; the next step is to explore these relationships more closely.

## Learning, Education and Sustainable Livelihoods

'Learning', 'schooling' and 'education' are charged words. The anthropologist Mary Catherine Bateson (1994) has mused on their meaning and found herself drifting into 'the insidious equation of learning with education and, more narrowly still, with schooling':

> Trying to understand learning by studying schooling is rather like trying to understand sexuality by studying bordellos. Certainly schooling is part of the spectrum of learning in human lives, but it is not the model for all learning, only one of the byways. Learning and teaching are both fundamental for human adaptation, but not all societies segregate them from the flow of life into institutional boxes.

It is interesting that the differentiation among learning, schooling, and education is so similar to the clarity now being sought among livelihoods, jobs and employment. Sustainable livelihoods would seem to have closer kinship to learning (sustainable learning/lifelong learning). Bateson (1994) notes that

> . . . preoccupied with schooling, most research on human learning is focused on learning that depends on teaching or is completed in a specified context rather than on learning that takes place spontaneously because it fits directly into life.

Schooling and education are, however, part of the byways of learning and cannot be ignored, but paying greater attention to the myriad learnings that occur outside of institutional contexts fits nicely with the concept of sustainable livelihood.

One early attempt to look at the relationship between development and learning/education is by Ralph Miller, who notes, 'it might seem strange if we said our objective was not development, but life. Yet, surely, this is the issue' (Miller, 1972).

More generally, a broader approach to development will be 'uneconomic' in that it will not aim primarily at economy and efficiency. It will not be deliberately wasteful, but it will take as its objective the welfare of human beings and will recognize that human welfare does not depend upon increased cash flow or greater success in international markets (Miller, 1972).

Miller perceived four educational implications of a broader conception of development:

- Education must become less formal;
- Education must be freed from system restrictions and developed through a variety of specific projects on a smaller scale;

- Education projects must be recognized as experimental and must be monitored so that we may find out what works in specific situations;
- Education must become more of a service within a complex of development efforts and less of an instructional programme for the sake of instruction.

From these implications it is a large leap forward in time to 1995 and the feisty thinking of Neil Postman in his book, *The End of Education*. For Postman, the 'god of economic utility' makes a covenant with the young which basically states:

> . . . if you pay attention in school, and do your homework, and score well on tests, and behave yourself, you will be rewarded with a well-paying job when you are done. (Postman, 1995)

It follows, says Postman, that any school activity not designed to further this end is seen as a frill. He also observes that 'there is little evidence (that is to say, none) that the productivity of a nation's economy is related to the quality of its schooling' (Postman, 1995, p. 31) concluding:

> . . . specialized competence can come only through a more generalized competence, which is to say that economic utility is a by-product of a good education. Any education that is mainly *about* economic utility is far too limited to be useful, and, in any case, so diminishes the world that it mocks one's humanity. At the very least, it diminishes the idea of what a good learner is. (Postman, 1995, p. 31)

Howard Gardner is another important American educator whose views can link to the concept of sustainable livelihoods. His pioneering research on multiple intelligences, outlined in his early book *Frames of Mind* (1983) provides one such linkage. He theorized that all human beings are capable of at least seven different ways of knowing the world (seven intelligences). These are language, logical–mathematical analysis, spatial representation, musical thinking, the use of the body to solve problems or to make things, an understanding of other individuals and an understanding of ourselves (Gardner, 1991, p. 12). Where individuals differ, states Gardner, is in the strength of these intelligences. These differences challenge an educational system that assumes everyone can learn in the same way, and that a uniform, universal measure is enough to test student learning. In his later work, *The Unschooled Mind* (1991) he believes that what is needed in education

> . . . is the creation of a climate in which students come naturally to link their intuitive ways of knowing with scholastic and disciplinary (knowing a discipline) forms of knowing. Needed as well is an educational milieu in which they use the resultant integrated knowledge to illuminate new problems and puzzles with which they have been presented. (Gardner, 1991, p. 258)

## The Right Questions? Implications and Conclusions

Mary Catherine Bateson provides a fitting conclusion to this short review of the literature on education and sustainable livelihoods:

> . . . it is a mistake to try to reform the educational system without revising our sense of ourselves as learning beings, following a path from birth to death that is longer and more unpredictable than ever before. Only when that is done will we be in a position to reconstruct educational systems where teachers model learning rather than authority, so that schooling will fit in and perform its limited task within the larger framework of learning before and after and alongside. (Bateson, 1994)

Implications for basic education systems must include reassessment of not only the needs, but also the strengths of those currently underserved and not served by such systems. Poverty eradication must become an explicit and priority concern for those involved in design and implementation of basic education programmes. That it has not been the case in the past, even in the world's poorest regions, is testimony to the systemic distortions that can perpetuate poverty by maintaining exclusionary attitudes and values:

> Poverty in the past has been treated as too economics-specific a problem for educational action except in an indirect way, and subsumed under the more general category of 'educational disadvantage'. The belief dies hard that education cannot have anything directly to do with a hard core, economic problem like poverty, and that it can, at best, only play a secondary or marginal role [requiring] the conscious pursuit of empowerment of the poor as an overt objective of all basic education programmes. (Ordonez et al., 1998)

In addition, the relationship between heightened levels of schooling and aspirations for better jobs must be re-examined. Educating for jobs (as an explicit goal for parents justifying educational investments in their children), while often controversial in the past, is today increasingly challenged by the need to build human capacity, not only for employability, but for broader lifelong learning as well as for adaptive and coping livelihood strategies in a fast-moving and complicated world.

The case for more integrated human resources development strategies, and several country examples of the application of the approach, were put forward in the 1995 Report of the Secretary-General on Human Resources Development. Human resource development supply systems in the poorest countries, particularly formal education at the basic levels, are still designed primarily to prepare people for further education and for modern sector jobs in contradiction to clear empirical evidence which shows that small fractions of the original primary school intake go on to secondary, and much smaller fractions still go on to higher education and/or employment in the formal sector. Few opportunities now exist for adults, especially those with low formal skills, to recycle through education institutions, even though their need may be great. A more effective linkage between education and sustainable livelihoods across a lifetime therefore has become a central issue in social development and poverty eradication strategies.

In conclusion, four questions raised by UNDP are particularly critical for basic education programmes in becoming more receptive to the livelihood system needs of poorer communities.

The first is, how can the current policy shift towards decentralization of educational systems management heighten relevance of educational programmes to the feasibility and diversity of livelihoods in their own unique settings? As Dube (1995) notes of pre-independence Zimbabwe in 1980, a home science teacher was

dismissed when she set up a traditional kitchen outside the classroom. She was tired of teaching girls who had often walked a long way to class how to make sponge cakes and macaroni cheese. The total pointlessness of these recipes for the rural homes and culture shocked her. So she broke away from the formal education system, and began to develop, through extensive participatory efforts, a whole new system of empowerment through access to information that became internationally known as the Organization of Rural Associations for Progress (ORAP). Such entrepreneurial educational efforts are increasingly needed at grassroots levels if formal education systems of the future continue to empower only relatively few people in poor communities. Accordingly, in India, *lokshala* (local community) efforts are being supported in meeting the basic learning needs of poor children and adults. Integrating other basic social services with education at the community level can contribute to improved health, nutrition, hygiene and sanitation. The awareness and knowledge bases of households can be substantively increased, potentially unifying parents, children and teachers around common problem-solving goals for community improvement.

A second question is, how can basic education enhance equitable, well-tailored access to information on peoples' rights, to participate in policy dialogue, to legal recourse, to the protection of their assets and entitlements and to access to basic social services? The human rights education effort has provided some experiential base on which to initiate these kinds of approaches, as well as pointing up some of the difficulties.

A third question is, how can basic education inform poor people more thoughtfully on the concept of vulnerability and risk management in relation to livelihood systems? There has been little consideration of the tenets of insurance as applied to livelihood strategies, except in advanced industrial economies. Exposure to experience in spreading liabilities, to anticipating shocks/stresses to livelihood and to ways of explicitly planning for eventualities on the basis of collective cultural experience is a potentially new field for educational agencies in poorer areas. One aspect of this is to provide substantive information on good practices regarding health, early childhood care and disability diagnostics, gender equity, family planning, farming and basic trade practices. Another is to offer information on the concept of risk and risk management as a matter of family livelihood improvement and sustainability.

Finally, how can the promise of new information technologies open new doors in bringing information to the most remote communities? The evidence continues to show that the number of people who regularly access the Internet through points other than their home, office, or school continues to increase. This growing phenomenon of alternative points of access such as libraries, museums and civic organizations illustrates the heightened need for access to this medium and suggests a burgeoning democratization of the Internet from personal to community life.

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## References


Bateson, M.C. (1994) *Peripheral Visions: Learning along the Way*. Harper Collins: New York.

Beneria, L. (1985) Accounting for women's work, in Beneria, L. (ed.) *Women and Development: The Sexual Division of Labor in Rural Societies*, pp. 127–29. Praeger: New York.

Chambers, R. (1993) *Rural Development: Putting the Last First*. Longman Scientific and Technical: Harlow.

Chambers, R. (1997) *Whose Reality Counts? Putting the First Last*. Intermediate Technology Publications: London.

Daly, H.E. (1973) *Toward a Steady-State Economy*. W.H. Freeman: San Francisco, CA.

Daly, H.E. (1997 [1990]) Sustainable growth: an impossibility theorem. *Development*, 40, 123.

Daly, H.E. and Cobb, J. (1989) *For the Common Good*. Beacon Press: Boston, MA.

Dube, L. (1995) Zenzele (do it yourself): the ORAP way, in Taylor, C., Desai, A. Knutsson, K.-E., O'Dea-Knutsson, P. and Taylor-Ide, D. (eds) *Partnerships for Social Development: A Casebook*. *The Independent Task Force on Community Action for Social Development*, pp. 5–10. Future Generations: Franklin, WV.

Eade, D. and Williams, S. (1995) *The Oxfam Handbook of Development and Relief*. Oxfam: Oxford.

Funaro, R. (1997) Balancing out the development equation. *Grassroots Development*, 21(1): 48–50.

Gardner, H. (1991) *The Unschooled Mind*. Basic Books: New York.

Goulet, D. (1975) *The Cruel Choice*. Atheneum: New York.

Gudeman, S. (1986) *Economics as Culture: Models and Metaphors of Livelihood*. Routledge and Kegan Paul: London.

Halperin, R. and Dow, J. (eds) (1997) *Peasant Livelihood: Studies in Economic Anthropology and Cultural Ecology*. St Martin's Press: New York.

Hoogendijk, W. (1995) Preparing for the revolt. *Development*, 3.

Kearns, J. and Sato, T (1989) New practices for development professionals. *Development*, 4.

Korten, D. (1997) Which globalization? *Development*, 40.

Lawrence, J.E.S. (1997) Adult education and jobs, or sustainable livelihoods? Paper presented at a UNESCO panel on Changes in the World of Work, Hamburg, 12 July 1997. http://www.cse.mrt.ac.lk/lecnotes/cs5171/texts/CONFINTE-PAP2000.pdf. Accessed 17 April 2007.

Lawrence, J.E.S. and Singh, N. (1997) Sustainable livelihoods and employment. *International Journal of Technical Cooperation*, 3(1): 92–109.

Miller, R. (1972) The meaning of development and its educational implications, in *Perspectives on Development*, pp. 5–10. Agricultural Development Council: New York.

Opschoor, H. (1996) Sustainable growth and employment. *Ecumenical Review*, July 48.

Ordonez, V., Kasaju, P.K. and Seshadri, C. (co-ordinators) (1998) *Basic Education for Empowerment of the Poor: Report of a Regional Study on Literacy as a Tool for Empowerment of the Poor*. UNESCO Asia and Pacific Programme of Education for All and UNDP: Bangkok.

Polyani, K. (1977) *The Livelihood of Man*. Pearson, H.W. (ed.) Academic Press: New York.

Postman, N. (1995) *The End of Education*. Random House: New York.

Robertson, J. (1995) People and places: beyond the dependency culture. *Development*, 3.

Rondinelli, R. (1976) Why development projects fail. *Project Management Quarterly*, 7, March, 10–15.

Seabrook, J. (1993) *Pioneers of Change: Experiments in Creating a Humane Society*. Zed Books: London.

Seabrook, J. (1995) Re-examining the lexicon of development, *Resurgence*, 61–62, September–October 13.

Shaw-Gardner, K. (1996) *The Oxfam Handbook of Development and Relief* (book review). *Grassroots Development*, 20.

Society for International Development (1995) Pre-conference workshop on Civil Society, Sustainable Livelihoods and Women in Development: Declarations from Global Human Security. *Journal of the Society for International Development*, 3(67): 64–8.

UNESCO (1997a) Second E-9 ministerial review meeting, Islamabad, Pakistan, 14–16 September 1997. http://unesdoc.unesco.org/images/0012/001246/124658e.pdf. Accessed 17 April 2007.

UNESCO (1997b) Second E-9 ministerial review meeting, Islamabad, Pakistan, 14–16 September 1997. The Indian Experience. Country Paper. UNESCO.

# Chapter 13
# Adult and Vocational Education for Social Sustainability: A New Concept for TVET for Sustainable Development

**Stephen McKenzie**

## Introduction

In April 2006 a group of researchers in vocational, adult and community education met in Adelaide, Australia, to discuss the potential contribution of their fields to the area of social sustainability. The abbreviation AVESS (adult and vocational education for social sustainability) was developed simply as a convenient short acronym describing the interests of the group. However, much attention during the meeting was directed at the concepts behind the acronym, to the point where it became an important generative concept in its own right. This chapter describes my own views on AVESS, focusing on the urgent need for particular kinds of thinking and research to ensure that TVET can truly become the master key to sustainable development.

## What Is AVESS?

How can vocational and adult education providers help to create and maintain open and democratic societies in the twenty-first century? And how can they adapt to meet new demands for flexibility and career diversity coming from both employers and employees? AVESS is a concept for exploring these questions so as to provide new tools to practitioners and policy advice to government bodies and non-governmental organizations, and lead the development of academic knowledge in an important developing area of research and activity.

It is now widely recognized that vocational education and training (VET) is one of the most important keys to sustainable development. Social cohesion and environmental protection will remain distant ideals for many people unless they can be linked with the everyday livelihood activities that people must pursue in order to achieve economic security (Cohen and James, 2002; see the foreword by Parkin and

S. McKenzie
Research Associate, Hawke Research Institute for Sustainable Societies, University of South Australia, Adelaide, Australia
e-mail: stephenmckenziester@gmail.com

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Howard). In order to forge these links, new types of knowledge will be required – including values and attitudes, as well as new skills.

This new kind of knowledge can be generally referred to as 'knowledge for social sustainability'. While it is recognized that sustainability contains environmental, social and economic factors, this chapter will focus specifically on the social element (McKenzie, 2004). This focus does not preclude the acknowledgement of factors in the other two areas in our analysis – it simply positions the social as the central and most important concern. I seek to explore models of education that position knowledge for sustainability alongside the more specific technical skills that are taught in vocational education settings. It is through the development of new types of knowledge in the workforce that are both vocationally relevant and contribute to a sustainable democracy that the distant ideal can become a reality.

Although this agenda is widely recognized as important, little cohesive research has been undertaken on how vocational education providers are beginning to develop these skills within the workforce and on how this aim might be furthered. We have no clear conceptual models of how the process can work, or case studies to inform the design of such a model. This picture is true of VET research worldwide, despite calls from bodies such as UNESCO-UNEVOC International Centre and elsewhere (such as Chinien, 2003, p. 8).

A literature review on 'education for sustainability' research material has concluded that the main focus of activity is in environmental awareness education from primary school through to tertiary education. Vocational and adult education are under-researched, as is the social element of sustainability, together with the role of activities like peace and citizenship education, or the teaching of critical thinking skills in building sustainable, democratic communities.

Moreover, adult education has also been marginalized from much recent 'VET for sustainability' discourse, whereas it should be central to the sustainability agenda. Not only is adult education a second-chance mechanism, it is a very adaptable vehicle for community development in areas where pre-compulsory education has been inadequate. Many VET providers who are unaware of adult education methodologies will struggle when dealing with retrenched adult workers looking to reskill, or indeed with adult learners in disadvantaged areas who have never received initial formal training. Finally, adult education (in Australia, at least) has traditionally concerned itself with precisely the kind of issues we are describing by the term 'knowledge for sustainability' – knowledge that is concerned with making a better society as a whole, not simply a better livelihood for the individual.

These imbalances urgently require redress. It is no longer enough to leave large global agendas like sustainability in the care of university-educated professionals, and nor is it enough to isolate the environment as the only concern of sustainability at the expense of research into what sustains our communities. The pairing of adult and vocational education together (as AVE) creates a concept that embraces both the technical aspect of training and the knowledge for a better society traditionally associated with adult education. By further combining AVE with the newly emerging field of social sustainability, we create 'AVESS', a powerful conceptual tool for furthering the education for sustainability agenda and correcting many

current imbalances in the way that agenda is addressed. A literature review on education for sustainability began the process of grouping the material into categories and made generalized statements about these categories. It made a distinction between education for sustainability and education for a sustainable workforce then using the different levels of education shown in Table 13.1. The table is a representation of these categories.

The first observation regarding the search findings is that the environmental dominates in conceptions of sustainability when it is linked with education. Environmental education programmes were common enough before the advent of sustainability discourse and what was formerly taught at high school or university as natural sciences may now form part of a course on education for sustainability. The natural sciences now have a long disciplinary history of being linked with sustainability studies, meaning that it can operate as an individual discipline within sustainability as well as making a valuable contribution to interdisciplinary work on sustainability.

The same is true of the discipline of economics. Although this area is in fact not very well represented in the literature on education for sustainability, the concept of sustaining a bottom line is understood most clearly within the discipline of economics. Indeed, the first bottom line was the economic – the other two are relative latecomers to that discourse (Elkington, 1999). Economics as a discipline has much to bring to interdisciplinary work on sustainability due to its solid interdisciplinary history. (The point must, however, be made that basic economic literacy, such as how the balance of trade works and how interest rates are liked to inflation, is not generally present in courses in VET settings and could make a considerable contribution to a sustainable society if it were.)

The same is not true of social sustainability, which has never been perceived as an entity independent of the social and economic spheres. In some ways this is a sensible approach – the whole point of triple bottom line (TBL) sustainability is that integrated solutions are required to problems that are too complex to be solved by single disciplines. However, it does mean that we are currently engaged in the task of trying to define what is in the overlapping area of this well-known TBL diagram, without actually having a clear view of what is in the society circle (see Fig. 13.1).

Social sustainability – not connected with the other two factors – is rarely discussed. I argue that social scientists engaged in sustainability studies must attempt to define and research the social independently (as much as this is possible) before returning to the multidisciplinary task of addressing the overlap between the three spheres. If this process does not occur, the social sciences are destined to a support role in sustainability studies, operating primarily as a means to generate and measure public acceptance and uptake of ideas and strategies generated in the other two main areas.

Unlike other recent researchers on sustainability, notably Hawkes (2001), the TBL referred to here does not add in cultural, religious, individual or spiritual as a fourth bottom line or ‘pillar.’ These factors (particularly the cultural and religious) could fit easily within the social. It is precisely because of the lack of a clear view of the social that other factors are emerging as though they were separate elements.

**Table 13.1** Social sustainability in the literature

| | Social | Economic | Environmental | Social | Economic |
|---|---|---|---|---|---|
| | Education for a sustainable workforce – (impact of education) | | Education for sustainability (values and attitudes) | | |
| Type of education | Social impact of education | Economic impact of education | Environmental awareness education | Social skills and values within education | Economic awareness and management |
| Pre-school Primary school | | | Major concentration of environmental sustainability in education research | | |
| Middle school High school and university | Major concentration of education for a sustainable workforce research | | | Major concentration of education for social sustainability research | |
| TAFE Adult education setting | Social and economic impact of AVE Getting a job with AVE | | | Education for social sustainability Ethics and values in AVE | |

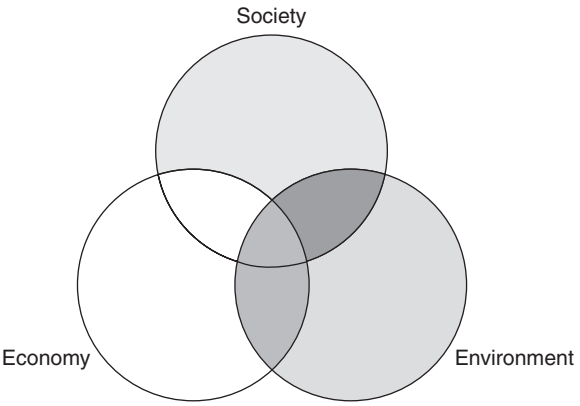


**Fig. 13.1** Triple bottom line sustainability

While the definition of social sustainability is at present a slippery and elusive one, even more nebulous is the distinction between social and cultural. Adding even more elements and more complexity to the already unstable concept of sustainable development will not improve our understanding of it. For this reason, the view of social sustainability used here includes both the cultural and the religious, and both of these elements can contribute to greater social sustainability and cohesion.

To elaborate, the following definition of social sustainability provides some idea about what it might look like in isolation from other elements of the TBL:

Social Sustainability Refers to a Positive and Long-Term Condition in Communities and a Process Within Communities for achieving and maintaining that condition.

The following features are indicators of the condition, and the steps towards their establishment and implementation are aspects of the process:

- Equity of access to key services (including health, education, transport, housing and recreation);
- Equity between generations, meaning that future generations will not be disadvantaged by the activities of the current generation;
- A system of cultural relations in which the positive aspects of disparate cultures are valued and protected and in which cultural integration is supported and promoted when it is desired by individuals and groups;
- Freedom of religious expression, and a sense within religious communities that their own religious expression contributes to greater social cohesion;
- The widespread political participation of citizens not only in electoral procedures but also in other areas of political activity, particularly at a local level;
- A sense of community ownership of the local environment as well as local services and amenities;
- Mechanisms for a community to fulfil its own needs, where possible, through community action;

- Mechanisms for political advocacy to meet needs that cannot be met by community action;
- Mechanisms for a community to collectively identify its strengths and needs;
- A system for transmitting awareness of social sustainability from one generation to the next;
- A sense of community responsibility for maintaining that system of transmission.

## Education for Sustainability

The lack of focus on the social as a separate entity can lead to some muddled thinking when it comes to applying sustainability to everyday practice. In the case of education, this means that there are many quite different types of activity which are spoken about under the general heading of education for sustainability, and that very little distinction is made between them in the literature.

In this chapter and in AVESS work generally, a distinction is made between 'education for sustainability' and 'education for a sustainable workforce'. These are the two main columns in the Table 13.1. The literature review has revealed that, as well as the confusion between these two fields of concern, both of them are not well studied in regard to work in AVE settings. The AVESS project seeks to find and study activity in AVE settings that bridges the gap between these two concerns. In other words, we are looking for activity that combines 'getting a job with AVE' and 'ethics and values in AVE'.

*Education for sustainability* (ethics and values in AVE) refers to the provision of knowledge for sustainability within education settings – both formal and informal. For example, primary school students may be taught about the need to value the environment, or college students may be encouraged to take a course on democratic citizenship. Both of these learning activities pass on values or skills associated with sustainability to future generations, or embed them in the current workforce. Research projects in this line of inquiry focus on the design and effectiveness of these educational programmes leading to new curricula, or the restructuring of existing educational programmes.

*Education for a sustainable workforce* (getting a job with AVE) treats education as a necessary component of a sustainable society/economy. It is obvious that poor education is a chief cause of unemployment, and also that unemployment is a key factor in social exclusion and economic instability. Research in this area normally focuses on the initial causes of labour market exclusion (poor education), and on mechanisms to decrease unemployment by increasing participation in education or by changing curricula to ensure students get optimal results (Clayton, 1999; Jarvis, 2004).

There is a significant problem with treating the second category, 'education for a sustainable workforce' uncritically, as though it made a general contribution to economic sustainability and was therefore unquestionably a good activity. While it is certainly true that increased vocational education can lead to increased employment

opportunities and therefore to a more economically stable society, we must continue to inquire about what kind of employment is being found by graduates. If the VET system is simply being used to increase the number of people participating in the workforce as it is currently structured, this will lead to a decrease in sustainability, for we know that much of the way that work is currently structured and undertaken is bad for both the society and the environment.

Projects or research that simply argue for an improvement in the functioning of the current VET system in a country or region cannot be said to contribute to a more sustainable society. The task at hand is to reorient the TVET system so that it takes sustainable development into account. This cannot be achieved by simply increasing the scope and effectiveness of the current system.

However, nor can we proceed simply by assuming that the provision of knowledge for sustainability in VET settings will automatically achieve our goal. The primary motivation of most VET students is to learn a trade and increase their financial prospects, and unless this motivation is kept in full view, any knowledge for sustainability that is imparted during a VET course will appear peripheral and irrelevant and is unlikely to have a lasting impact. The challenge, therefore is to find modes of instruction within VET (and ACE) settings that position knowledge for sustainability alongside traditional career skill development so as to effectively engage learners and help them to see their own skill development as part of a wider process of social transformation.

## Positives and Negative Aspects of Using Social Sustainability in Our Agenda

Sustainability is a large and complex concept and unless it are treated with care, ‘sustainable’ quickly becomes an umbrella term that means simply ‘good’, and any action with a positive outcome within society or the environment can then be labelled sustainable. This is particularly true of social sustainability, which cannot be quantified and regulated to the same extent as the other factors. In the AVESS meeting in April, the decision to use ‘social sustainability’ as a key term rather than ‘social justice’ or a ‘democratic society’ was deliberate, and it was based on the understanding that sustainability could still be a generative concept, provided that it is handled with due care. Some of the deliberations are outlined below.

When people ask for a definition of social sustainability, this is not in fact what they really want. Several pages of definitions of this term could be provided, however these will ultimately be unsatisfying to most academics, who ask the question not from a position of polite ignorance, but from a position of considerable caution and suspicion.

Many of the presenters at the symposium had come to discuss particular projects in adult or vocational education research or practice and part of their agenda was

to determine if and how this activity fitted it with the sustainability agenda. The real questions behind the question, in many cases, were: how does this new notion differ from previous conceptions of a good society? How are we supposed to work within this research agenda? How can we distinguish what we are doing from what is being done by others who also use sustainability as a uniting concept, but whose actions we disagree with? What difference will using this term make to our research?

Obviously, these questions are much more difficult to answer than a simple request for a definition. Sustainability is now a buzzword, it is true, but it is also a powerful concept that we cannot afford to ignore. It is also useful because it focuses attention onto the mid- to long-term future and asks us to consider how our ideas and actions in the present are going to contribute to the improvement of society, and how we are going to ensure that these improved conditions are maintained.

This second point is critical, and is also frequently absent from writing on social policy that simply identifies a current problem and designs mechanisms (or requests resources) to fix it. By adding sustainability into the equation, we are also forced to consider issues of resources, community acceptance and the transmission of our ideas to future generations. It is no longer enough to simply say, 'this project, if funded, will have a positive result'. We must begin to consider how the result may be sustained. Is the project itself sustainable?

While as a group our symposium fell short of designing a manifesto, and indeed this was never our intention, some key agreements were made about how we discuss the role of sustainability in adult and vocational education research. The main agreement was our acknowledgement of the negative side of sustainability discourse, meaning the tendency, when defined and developed to an extensive degree, to use it as overpowering concept to monitor and control rather than empower. Sustainability then becomes a factor by which communities, groups and individuals are held accountable, rather than a concept used to educate and empower those individuals. While some monitoring and control over companies and governments in environmental and economic arenas is valid and necessary, the same kind of thing cannot be employed when talking about society. Communities cannot and should not be monitored and controlled according to a concept of what a sustainable community should be.

Instead, social sustainability should be seen as leading towards progressive and empowering actions, rather than conservative and controlling ones. When we practice social sustainability, we imagine a sustainable future and work towards it. In doing so, we create no disjunction between the individual's personal ideal future and the ideal of the community. By acting to make our own economic futures more stable, we should also be acting to create community sustainability and harmony. Sustainability is not something which can or should be measured within the context of AVESS, nor is it a mechanism by which people can be held accountable. It should instead be a way of encouraging people to take responsibility for community sustainability by deliberately positioning it alongside their personal sustainability throughout the course of the education and training.

## What AVESS Looks Like: Some Theory and a Key Example

To summarize the previous sections, work in adult and vocational education that contributes to social sustainability can theoretically be characterized as work that:

- Actively contributes to the economic welfare of individuals by enhancing their career skills;
- Actively enhances the economic stability of the community by improving the skill pool;
- Actively enhances the social sustainability of the community by imparting knowledge and values associated with strong and open democratic societies;
- Is easily embedded in the fabric of the community and therefore is easily perpetuated;
- Contributes in some way to its own perpetuation into the future.

A major part of work in this area is to identify projects that meet these criteria so that we can begin to build a database of best practice examples. For the time being I will concentrate on main example of work that clearly fits much of our theoretical description of AVESS. This is the Wider Horizons programme run by the Ireland Institute of Pittsburgh (Wider Horizons, n.d.).

Wider Horizons is essentially an internship programme joined to a peace activism scheme for Northern Ireland. The project has been developed from within the community and is obviously well integrated. The scheme has been extremely successful and has so far taken over 1000 people from Northern Ireland through this dual process. While support comes from the International Fund for Ireland, much of the funding also comes from within the community, either through donations or in the form of housing support for interns, or through the offering of internships. The scheme assists groups of young Irish people, both Catholic and Protestant, to travel together to Pittsburgh to participate in an 8-week internship/conflict resolution programme.

The scheme not only provides participants with career skills but also with a chance to undertake reconciliation activities outside the conflict environment. The social and economic advancement this creates is both individual and societal. Participants are deliberately positioned so as to perceive that their own career growth is one aspect of the growth and healing of their society in general. It is this aspect which attracts attention and makes the scheme such a valuable model for our consideration in other areas.

## Summary

The AVESS project aims to explore the current and potential contribution of adult and vocational education to a sustainable society. We wish to discuss what education for social sustainability might be – peace studies, future studies, values education, relationship education, or other possibilities. How can this be included within AVE

curricula so that it becomes linked to career skills and thus professional practice, and does not remain an abstract set of qualities that have little impact in the workplace? How much of this is already occurring in AVE settings and what does that practice looks like?

While asking all these questions, we will need to keep our eye on what it is about what we are uncovering that will contribute to a society that is more sustainable, as well as more equitable. We also need to ask ourselves whether skills and qualities associated with sustainability can be transmitted to future generations. Can a community take responsibility for its own sustainability through adult and vocation education?

## References

Chinien, C. (ed.) (2003) *Skills to Last. Broadly Transferable Sustainable Development Skills for the Canadian Workforce. A Technical Research Report for Human Resources Development Canada*. Human Resources Partnerships, National Centre for Workforce Development.

Clayton, P. (ed.) (1999) *Access to Vocational Guidance for People at Risk of Social Exclusion*. Department of Adult and Continuing Education, University of Glasgow: Glasgow.

Cohen, J and James, S. (eds.) (2002) *Learning to Last: Skills, Sustainability and Strategy*. Learning and Skills Development Agency: London.

Elkington, J. (1999) Triple bottom line revolution: reporting for the third millennium. *Australian CPA*, 69.

Hawkes, J. (2001) *The Fourth Pillar of Sustainability: Culture's Essential Role in Public Planning*. Common Ground Australia: Melbourne.

Jarvis, P. (2004) Lifelong learning and active citizenship in a global society: an analysis of European Union lifelong learning policy. *JACE* 10 (1).

McKenzie, S. (2004) Social sustainability: towards some definitions. Hawke Research Institute Working Paper Series, 27. http://www.unisa.edu.au/hawkeinstitute/publi-cations/ workingpaper.asp#27. Accessed 17 April 2007.

Wider Horizons (n.d.) http://www.iiofpitt.org/index.cfm/area/information/page/ widerHorizons. Accessed 8 April 2007.

# Chapter 14
# Intercultural Education: Promoting Sustainability in Education and Training

**Johanna Lasonen**

## Introduction

Education for sustainable development (ESD) is a dynamic concept that encompasses a new vision of education seeking to empower people of all ages to assume responsibility for creating and enjoying a sustainable future. Today the notion of sustainable development includes ecological, economic, social and cultural sustainability. Cultural diversity and intercultural education contribute to the social and cultural aspects of sustainability. Responding to the challenge of ESD entails that the education policy is based on the participation of the whole population: all individuals should be aware of their own responsibility for creating a sustainable future in terms of ecology, economy, social relations and culture. The objectives for each education and training system stem from each country's culture, economic and environmental context. Nevertheless, the global dimension of sustainable development must be taken into consideration in each country.

Education, as a mean for sustainable development, covers formal and non-formal education, local civil society, the media and the workplace. Each country's capacity to move towards sustainable human development depends on the existence of skilled human resources in the scientific, technical and professional fields that are needed for addressing complex environmental, resource and development issues. In an international global marketplace, large numbers of both temporary and permanent migrants can result in a highly diverse workforce. This diversity gives rise to intercultural competence and thus poses the question to educators and TVET, in particular: is intercultural education a separate subject of curriculum or should it be seen as an essential component of overall education?

Internationalization, regionalization and localization, as trends within globalization, have provided new kinds of requirements and opportunities for intercultural dialogue and learning. However, in some countries the focus has been on promoting the mobility of the workforce and unifying qualifications across the region, rather

J. Lasonen
Institute for Educational Research, University of Jyväskylä, Finland
e-mail: johanna.lasonen@ktl.jyu.fi

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than on understanding diversity in schools and working teams and at work. The goals of intercultural education and of gaining intercultural competences may be missing from academic, vocational education and teacher training.

The chapter discusses the role of intercultural education in the context of globalization and multiculturalism and argues that the goal of intercultural education and learning is to attain sustainable development. In an internationalized world, intercultural competence should be considered an internal element of every type of education and training.

The chapter also explores the current challenges related to multiculturalism and intercultural education. The challenges are linked to discussions of intercultural competences. Sustainable development in terms of parity of esteem, equity and intercultural education has been demonstrated in previous research (Lasonen, 1998, 2003, 2004, 2005; Lasonen and Bhalalusesa, 2006; Lasonen and Manning, 2000).

## Is Interculturality Included in ESD?

Interculturality, being a manifold phenomenon in communities, connects people to multicultural societies. Mall (2000) indicated that interculturality functions as a construct and is used for world trade, following socio-economic interests. The UN Johannesburg World Summit on Sustainable Development in 2002 adopted the objective of a human, equal and caring global society, where everyone's right to life with human dignity is recognized. The documents in the UN's Decade of Education for Sustainable Development provide the foundations to reform and mobilize education at all levels, from elementary schools to universities and from pre-vocational classes to high-tech expertise, in support of sustainable development (UNESCO, 2005; UNESCO–UNEVOC, 2005).

It is in this context that Finland's Strategy and Policy on Education for Sustainable Development have been analysed (UNECE, n.d.) as well as the Baltic 21E programme (Ministry of Labour, 2006). A vision for the Finnish education system consists of people committed to a sustainable lifestyle, whose motivation, skills and knowledge are fostered by ESD as an integral part of all education and training. Such people take lifelong responsibility for the development of new sustainable practices and working environments and are able to weigh the ecological, economic, social and cultural effects of their decisions in practical situations. The Finnish society aims at fostering, locally and globally, people's physical, mental, social, cultural, and economic wellbeing without overloading nature and reducing its diversity. Each educational sector has a distinct role in society and consequently also has characteristic models of working, responsibilities and administrative steering systems.

Education for sustainable development has been incorporated into school and college activities in Finland, for example, in the vocational upper secondary level, vocational higher education and research. The National Board of Education has provided the guidelines for environmental quality criteria and sustainable development auditing instructions for these educational institutions (Hyytiäinen et al., 1999;

National Board of Education, 2003). Rajakorpi and Rajakorpi (2001) evaluated the extent to which ESD was implemented in Finnish curricula, teaching and everyday activities among elementary, secondary and adult education schools including vocational colleges. They interviewed some 430 teachers, students, rectors and other personnel. Parameters that measured the principles of sustainable development, mainly concerning the environment, were developed in the study. The results of the evaluation revealed that sustainable development was implemented both in curricula, teaching and everyday activities and was assessed fairly well by personnel groups. Vocational schools were found to be far ahead both in teaching curricula and in their practical actions compared with the other Finnish schools and colleges at the end of 1990s. The focus of ESD was on its ecological aspects, as government policy emphasizes economic sustainability.

Internationalization and intercultural education can be complementary concepts, although the former supports the globalization of the economy and the latter explains intercultural communication and mutual learning at the local level. Internationalization is part of the objectives of official education and training. Regional and national educational programmes are intended to promote international co-operation, and mobility has considerably expanded the volume of student and teacher exchanges and substantially increased the number of multinational co-operative projects between educational establishments. At the same time, international migration and its causes and experiences to education and training in multicultural societies are hardly ever discussed. ESD refers to a vision and a dynamic process, rather than to a precisely defined concept. The aim of sustainable development is a world where all people can choose for themselves what kind of life they wish to live. Making such choices will become possible when the essential prerequisites for life are available to everyone. These essentials include good health, the opportunity for education and free access to information, an adequate standard of living and the possibilities of maintaining it, a healthy environment, security and freedom, the possibility to participate in and influence the life of the community, and general acceptance, regardless of one's ethnic background, gender, age and religion. However, disparities and inequalities exist between men and women and between different ethnic groups.

## Poverty Hits Women

Throughout the world more than one billion people are living in unbearable poverty. Most of the poor live in developing countries and a majority of them are women:

- About 1.3 billion people live in poverty
- Nearly 70 per cent of these are women
- Women globally do two-thirds of the hours of work
- Women earn 10 per cent of the global income
- Only one per cent of women own property

- Globally, women constitute 46.7 per cent of the registered labour force and in developing countries this figure is 31 per cent
- Women work, on average, many more hours per week than men do everywhere
- In many countries women do twice as much unpaid work as men do
- In rural areas women:
  - Produce more than half of the food in the world, in some regions up to 80 per cent
  - Cultivate a considerable part of land in developing countries
  - Own only 2 per cent of the land
  - Receive only 1 per cent of the agricultural income, and
  - Receive only 5 per cent of agricultural investments.

> Besides such economic reasons, female poverty stems from rigid gender roles and women's limited share of power in society. Women are an example of a group whose access to the basic prerequisites of life is denied in a male-dominated world. Discrimination can also target various minority groups on the basis of wealth, ethnic background, age, religion, language, social class and health. Getting rid of poverty and achieving sustainable development is nonetheless a common cause to men and women alike. Multiculturalism, as a set value, which emphasizes justice, and the significance of and respect for every individual and group, is a prerequisite for sustainable development. (Women Watch, 2006)

Education and training systems and the use to which they are put are shaped by the historical, economic, cultural and social characteristics and contexts of each country, by special national features of occupational structures and by the development of the division of labour. Technical and vocational education and training have the task of developing the national work culture, citizenship skills and individual lifelong learning skills, and of promoting national economic growth and competitiveness in the context of regional and global markets. Structural and cultural inequity might be hidden in a country's educational system. For example, a 2006 survey of Ethiopian and Tanzanian girls' educational opportunities conducted by Lasonen and Bhalalusesa (2006) found that there was no direct discrimination against girls and women or denial of their access to educational opportunities at the policy level. However, there certainly are prejudice and gender role stereotypes resulting from the structural, social, economic and cultural setup of local communities which continue to put girls and women at a disadvantage. The analysis centred around educational participation, focusing on the educational policy background and the institutional, socio-psychological, social and socio-economic factors affecting participation. Briefly, four things are needed: upgrading girls and women's participation and survival in public and private education and training, more financial support for the education of girls, documentation of the experiences of high achievers and successful women and guidance and counselling services for fostering girls' self-esteem and confidence (Lasonen, 2004).

By contrast, it has been shown through a European system that equality and justice, can be promoted through and within education and training and are determinants of sustainable development (Azizi and Lasonen, 2006). Different types of educational system provide different starting points for promoting social equality through education and training. Looking at the history of Europe and the development

of European educational systems, it is clear that some countries have been more advanced than the others in terms of a rate of inclusiveness. For instance, education systems in Nordic countries are inclusive and nurturing, reserving student places for all at the primary and secondary levels and for a large number of an age cohort at the tertiary level of education. Evaluation and assessment strategies and methods are educational and supportive, rather than selective and exclusive. Drop-out rates are lower in such an inclusive education and training systems than in less inclusive systems (Lasonen, 1998).

Yet ESD requires many challenges. One of them is to take ideas from systemic thinking into practical contexts and vice versa. According to Fullan (2005), 'sustainability is the capacity of a system to engage in the complexities of continuous improvement consistent with deep values of human purpose' (p. iv). Fullan defines some of the elements of sustainability that bring ideas into practice, such as public service with a moral commitment to changes at relevant contexts, deep learning, and a commitment to short-term and long-term results, as well as reflective leadership.

Cultural diversity is a challenge in educational institutions as well as at workplaces. Table 14.1 shows some issues of sustainable development related to TVET and cultural diversity.

Most countries comprise a rich diversity of ethnic groups which speak many different languages. Each of us belongs to an ethnic group. Modern communities are formed of different groups and communities that coexists side by side, within each other and one upon another, having multiple and flexible identities. Some 200 countries of our world include about 5,000 ethnic groups, many of whom move frequently from one place to another. Two-thirds of all countries contain more than one ethnic or religious group that make up at least 10 per cent of the population (UNDP, 2004).

**Table 14.1** Sustainable development and interculturality in TVET

| TVET for sustainable development | Policies | Strategies for practice |
|---|---|---|
| Economic perspective | Global and regional economy, world market, changing work, consumerism, poverty reduction, gender equity, health care | Education and training for all, education system variables, peace education, conflict resolution, health education, global education |
| Ecological perspective | Ecological balance, biodiversity, sustainable futures | Environmental education, mutual respect and thrust, eco-pedagogy |
| Socio-cultural perspective | Cultural diversity, identity issues, multilingual education, citizenship, free mobility, parity of esteem, equality | Inter-cultural education and inter-religious dialogue, human rights education, anti-racism |

## Multicultural Societies

Migration is growing across the globe. According to a UN estimate (UN, 2006), in 2005 there were 195 million immigrants in the world, comprising 3 per cent of the world's total population. Due to the rapid population growth worldwide, the number of immigrants has increased rapidly. Less than 10 per cent (19.2 million) of these 195 million immigrants are refugees (9.2 million are refugees, 839,200 asylum seekers, 1.5 million returned refugees, 5.6 million internally displaced and 2 million others of concern) (UNHCR, 2005). The numbers of refugees are not expected to grow in the future.

After World War II there was a substantial flow of migrant workers to central and northern Europe, but this did not extend to Finland. In Finland the domestic labour force was able to satisfy the needs of the gradually expanding industrial and service sectors. Finland's capacity to meet its needs was partly due to women's relatively high participation rate in the workforce. Finnish women are traditionally highly educated, and owing to advanced government family policies female labour was efficient and available. In addition, high social mobility has provided the workforce with experts from different social strata. One reason for low immigration rates in Finland is that, unlike many other European countries, Finland has no colonial history. However, Finland is gradually becoming more multicultural than before. According to the population statistics, at the end of 2004 Finland had a population of approximately 5.5 million, of whom 108,346 were citizens of foreign countries. The mother tongue of 133,183 people was neither Finnish, Swedish or Sami (Lappish). Approximately 3 per cent of the population (166,361 people) were born in another country (Statistics of Finland, 2005). Foreign citizens in Finland account for about 2.3 per cent of the total population, while the percentage of those born outside Finland is about 3 per cent. These figures do not include foreigners working in Finland on a temporary basis, ranging from approximately 4,000–12,000, depending on the season (Ministry of Labour, 2006). These figures are the smallest within the EU when accounting also for the unregistered foreign population in the EU countries.

Human rights are an essential principle in immigration policy. From the human rights point of view, central issues include non-discrimination, women's rights, the principle of child benefit and social rights in people's working life. The obligations of international agreements relative to immigration policy essentially concern the treatment and legal protection of people. The aim is that immigrants' legal position is as close as possible to that of the original population. Finland's human rights policy emphasizes especially the rights of women, children, minorities and indigenous peoples. However, legal protection does not hinder racist attitudes and stereotypes of immigrants who come from far away lands.

## *Towards Work-Based Immigration*

The ageing of the population and the decrease in the supply of workforce will, in the next few years, have a considerable impact on the quantity of workforce and on the

structures of labour market. According to a UNDP estimate (2004) for Europe, the proportion of over 60-year-olds will rise from its present 23 per cent to 33 per cent by the year 2020. In Europe the population is ageing faster than in other parts of the world, and in Finland this change in the age structure is taking place sooner than in many other European countries. Already by 2004 and 2005, the workforce was diminishing, as more people retired from the labour market than entered it. Finland's population is ageing at such a rate that it is estimated that in 2030 there will be over 600,000 more people over 65 than at present. At the same time the number of those of work age will decrease by more than 300,000, and the number of children under 15 will fall by 70,000. In addition, there will be increasing regional differences in Finland in terms of the age structure (Ministry of Labour, 2006). These statistics makes the implementation of a sustainable educational development system even more urgent for Finland.

Although population growth is slowing down in industrialized countries, it is estimated that the global population will increase by 50 per cent during the next 50 years. The population is still growing fast, especially in Asia and in Latin America. The ILO has estimated that the volume of labour force in the world will increase by 500 million people during the coming decades (ILO, 2005).

In all industrial countries with low birth rates there is an increasing interest in work-based immigration. It is thought that an immigrant workforce could partly alleviate problems that might arise from an otherwise diminishing workforce. Immigration alone cannot, however, solve the anticipated structural problems in the labour market. Although the number of foreign permanent residents in Finland has increased, this has not yet raised the number of employed workforce very much. Unemployment among foreign permanent residents has remained high (in 2004 it was about 28 per cent) and their employment rate was about 43 per cent in 2004. Unemployment has remained at least three times more frequent among the immigrants than among native Finns. Longer stay immigrants' employment prospects get better, however. There are probably many reasons for these groups' low participation in the labour market. The reasons for immigration to Finland during two last decades have been primarily other than work related, most typically family ties. A significant proportion of the foreign permanent residents living in Finland are mothers taking care of their children at home, in spite of a good day-care system, or they are not of work age. Often their professional competence, language skills and other qualifications have been either insufficient or have not matched the needs of the labour market. There has also been some prejudice in the labour market against employing foreigners.

## *Cultural Diversity in Cities*

Labour migrants often prefer to live in large cities (Rogers and Tillie, 2001). Residents of foreign origin coming from outside Europe constitute between a tenth to a third of the population in so-called old immigration cities in northern Europe, while southern Europe's new immigration cities, whose migrants have arrived since the

1980s, have labour migrant population of around 5 per cent. These numbers do not include illegal migrants, whose numbers, if known, might greatly increase the total foreign population.

Migrant settlement creates local challenges for authorities. In the past, an effective national migrant policy hardly existed. A literature survey of municipal immigration policies in some 25 European cities conducted by Alexander (2001) indicated a scheme of staged policy alternatives. Local host–stranger relations were defined as the local authority's attitudes and assumptions regarding the presence of labour migrants and their otherness. He suggested that there were five general phases of policy reactions, each expressing the local authorities' different attitudes and assumptions toward the migrants:

- In the *transient phase*, the local authority regards labour migrants as a passing phenomenon, assuming they will soon move elsewhere or return home. The municipality thus does not try to establish any particular immigration policy.
- The *guest-worker attitude* represents a phase in which the local authority realizes it has a migrant presence but considers the presence as temporary and requiring limited, short-term solutions. The countries in which these cities are found have national policies to host guest workers. The migrants are assumed to be young, single and male with minimal needs such as lodging and basic healthcare.
- The *assimilation phase* marks a fundamental shift in municipal attitudes as migrants are considered to be a permanent phenomenon. According to the assimilation assumption, the migrants will remain but their otherness will gradually disappear. Assimilation policies encourage a one-sided process of integration into the local host society, while discouraging public manifestations of ethnic and religious difference.
- The *pluralist attitude* assumes the permanence of the migrant presence and also accepts their otherness. Pluralist policies (e.g. projects promoting ethnic entrepreneurship) aim at turning ethnicity into a positive factor for migrant integration and for the city as a whole.
- The *intercultural phase* appeared in the 1990s. The vision of intercultural integration emphasizes the need for a common ground of a multicultural city. The dangers of sectarianism and the importance of interaction between different communities and individuals is recognized, as well as differences within ethnic groups and the constraints that the ethnic community may place on individual members (Alexander, 2001).

Intercultural policies aim at giving each individual the freedom to choose among multiple identities. Immigrants can contribute to the economy and social life of host countries to a greater extent if they are treated respectfully and nurtured properly. The realities of ethnic and cultural diversity and mobility among people cannot be ignored in any society. If different cultures exist side by side without interacting in multicultural communities, discrimination, marginalization and exploitation may appear. To avoid this, interculturality can refer to interaction on the basis of aspiration and efforts for mutual respect and appreciation.

A model to develop intercultural sensitivity describes changes in individuals' behaviour, knowledge or feelings through the learners' experience of gradually learning to understand cultural diversity and at the same time construct their view of the world. According to Bennett and Bennett (2004), experiencing cultural differences goes through six stages. Each stage involves new kind of experience. The first three stages (denial, defensiveness and depreciation) reduce ethnocentricity, i.e. the belief that one's own group is absolutely unique. The other culture is seen negatively and with great reservation, but this stance can also be reversed. An ethnocentric orientation tends to polarize cultural differences, which leads to the avoidance or depreciation of other cultures. A reversed worldview is also possible with regard to cultural differences, so that other cultures are considered superior and one's own culture is depreciated.

The next three stages in the development (acceptance, adaptation and integration) help people see their own group as one of the many. A tolerant approach typically works towards minimizing the significance of cultural differences. A tolerant person puts emphasis on solidarity and universal values and minimizes the significance of cultural differences. Ethno-relativistic thinking recognizes and accepts cultural differences. Cultural sensitivity also strengthens one's own cultural identity. Although this kind of stage-based model involve the risk of making individual learning appear unnecessarily rigid, it also provide as framework for the progress of intercultural understanding.

## Intercultural Education and Intercultural Competence

The terms, 'multicultural education' and 'intercultural education', have been sometimes used synonymously. However, a society or community may include several ethnic groups who do not interact and hardly communicate at all with each other. In other words, the community is multicultural but not intercultural. Intercultural education aims at transforming the structures and contents of education in multicultural societies on equal basis. Multicultural education aims to arrange and to improve the education of immigrant youngsters and other minority groups. The term 'intercultural' is used when referring to education and training, and the term 'multicultural' when referring to culturally diverse society (Batelaan and Gundara, 1991, p. 10). A multicultural education permits and promotes different cultures and languages. Intercultural education goes further, as it refers to personal learning experiences through interpersonal communication. Education and training systems are challenged to consider interculturalism as part of their goals and strategies. According to Kymlicka:

> An intercultural citizen is someone who not only supports the principles of a multicultural state but also exhibits a range of more positive personal attitudes towards diversity. In particular, it is someone who is curious rather than fearful about other peoples and cultures; someone who is open to learning about other ways of life, and willing to consider how issues look from other people's point of view. (2003, p. 157)

The differences between the concepts of multicultural and intercultural education are understood here from the learning and teaching contexts. The following distinction was made between these terms (Lasonen, 2005):

- *Multicultural education* is often used in the context of adjusting immigrant groups to their new home countries by preparing them to live and work on a daily basis in multicultural communities and societies.
- *Intercultural education* prepares learners to act as interpreters and mediators between different cultures on mutual bases. This concept is often used in the context of international and intercultural co-operation promoting intercultural understanding.

TVET with the aim of promoting intercultural dialogue and understanding has the objective of training people to act, adopting a co-operative and team-working approach as mediators, interpreters and active agents between different cultures.

Education and training usually has stated aims and objectives that reflect the good and desirable things sought. The purpose of education is to provide the learners with the capabilities by means of which they can attain a good life for themselves. Therefore education and training are essentially ethical activities, where certain values are inherently present. What is a good life is a key question for human beings. In the same fashion, in the field of education we can ask what is a good education and development. Positive values can be regarded as aims for a good life. Values that promote the common good are desirable.

A value is an abstraction, a kind of standard that influences our choice of intentions and goals. Values direct individuals' and groups' choices and are manifested in words and deeds. UNESCO emphasizes values that relate to cultural solidarity, tolerance, multiculturalism and democracy to enhance sustainable development. An education system demonstrates its commitment to cultural diversity through teaching and curriculum implementation. The *UNESCO Guidelines on Intercultural Education* are based on three principles. Intercultural education

- Respects the cultural identity of the learner through the provision of culturally appropriate and responsive quality education for all;
- Provides every learner with the cultural knowledge, attitudes and skills necessary to achieve active and full participation in society; and
- Provides all learners with cultural knowledge, attitudes and skills that enable them to contribute to respect, understanding and solidarity among individuals, and ethnic and religious groups and nations. (UNESCO, 2006, p. 32)

## *Intercultural Competence*

A discussion of the nature of intercultural competence raises the question of whether it is a separate field of expertise or whether it should be seen as an essential component of competence and expertise. Jokikokko (2005, p. 68) has indicated that intercultural competence in educational contexts forms three qualitatively different

categories: (a) an ethical orientation consisting of values, interpersonal characteristics and one's basic orientation towards other people and the world; (b) an efficiency orientation, including one's organizational skills and ability to act in various roles and situations and (c) a pedagogical orientation and competence. She studied student teachers' and young teachers' conceptions of their intercultural know-how.

Lasonen has studied vocational teachers becoming intercultural experts in the field of music. Her case study shows intercultural competence to be an integral part of vocational teachers' domain specific expertise (see Lasonen, 2003). Music, as a vocational field, plays an important social role in various cultures around the world: it generates an atmosphere, creates order in various rituals, brings people together, creates groups, calms and serves as a source of joy. The case study investigated the role of intercultural competence in music and particularly as a part of the expertise of music teachers, the field representing one vocational area in Finland. Two of the music teachers immigrated to Finland some 10 years ago.

The following research question guided the study: (a) how do the music teachers define their own expertise? (b) what role does intercultural competence play in their work and (c) how were their intercultural competence developed? The analysis was based on narrative-biographical materials collected through in-depth interviewing of four individuals. The informants taught in prominent institutions of a polytechnic and a teacher education college. Besides holding teaching positions they have given solo concerts in several countries. One of the informants has composed music for instruments and ensembles, different chamber music orchestras and symphony orchestras. They have served more than 10 years as judges of the prestigious international solo instrument competitions and taught international master classes. The motifs of some of the compositions derive from places in another country as concrete images born there are turned into metaphors.

In the case study, expertise seemed to be determined by the individual's identity and profession, of which multiculturalism and interculturality are integral and essential elements. In music, multicultural motifs and intercultural working contexts are inbuilt elements of the field: composers of music pieces come from different cultural and historical backgrounds; when one interprets compositions one must find out about their historical and geographical codes and signs; when one produces a work of art one must understand the diversity of one's audiences and work in different countries. In the teachers' descriptions of their professional activities, intercultural competence was manifested as gaining recognition for their work and as the mission of cultural work that has been transmitted to their students.

The language of music has been understood through the symbols, signs, culture-bound styles and emotions aroused by the melody. Feelings called forth by events that are a part of general human experience in particular can, when awakened by music, be universal. It is musicians' and music teachers' intercultural expertise that made possible the realization of this potential universality, arousing, before a great variety of audiences, feelings and ideas of interpretations that transcend any particular place and time. As a conclusion, the social aspect of music is a complex phenomenon. Musicians play a very important role within their communities.

While the article was limited to a consideration of experiences of interculturalism in the context of teaching Western classical music, we know that there are in various parts of the globe older traditions of sophisticated classical music (e.g. classical Hindu and Vietnamese music). A more general question that emerges in the context of intercultural competence is, who is competent and who is not and who are those who decide one way or the other? The case study assumed and concluded that competence of this kind was what may be called an added value linked with high-level professional competence, a natural aspect that has been one of the objects of the experts' lifelong learning. Assessing intercultural competence has been left to the experts themselves, as they have operated in various and complex social situations. A social assessment of the characteristics that can be classified as being a part of intercultural competence, such as the ability to communicate and interpret ones' own competence in ways that work in the given contexts, flexible adjustment and fluent communication, takes place when groups have accepted the experts as members.

As a conclusion, intercultural competence seemed to become an internal element of music and teaching expertise. Intercultural experiences stimulated and motivated musical performance. Intercultural competence appeared to be a broadly understood competence that covers personal characteristics, professional competence and skills, and the whole affective domain. Intercultural competence is an inbuilt element of a professional domain and its activities. Learning interculturality is a complex social and personal learning process through reflecting on and becoming aware of the global and national politics and events and of personal behaviour in changing situations involving social human beings. These are the skills that TVET needs to teach and incorporate into the curriculum.

This discussion of intercultural education has not raised the issue of societal awareness of inequities in multicultural societies, nor the role of the professional competence among other occupations. A pedagogical approach can contribute to becoming aware of societal, political and power structures and their functions.

## *A Pedagogical Approach for Raising Awareness*

Education is an essential way to foster critical thinking and to improve people's capability to deal with local and global developmental issues and to find solutions for the problems of sustainable development. Mutual respect and responsibility between generations is fundamental in sustainable development. The enhancement of instructional modes for intercultural teaching and learning arrangements is an emerging issue in TVET. In addition to recruiting students from minority groups to TVET, teaching international students and studying with them is challenging the pedagogy of vocational education, and teaching and learning.

The key concepts of critical pedagogy are politics, culture and the economy. Politics covers cultural, social and communal activity where identities are constructed, ways of life maintained and reproduced and meanings created. Accordingly, the term, 'culture politics' is often used when talking about the way in which

schools and other public spaces produce and reproduce certain values, ways of life and conceptions of reality. Critical pedagogues such as Henry Giroux and Peter McLaren stress the role of the economic domain in this process. They argue that we need a new ethics that will transform a market-based economic policy oriented towards the maximization of profit into an economic policy of the common good. Representatives of critical pedagogy look at education institutions from a social theory perspective and emphasize that pedagogical activity is bound up with the world outside school, such as the position of various social groups, different genders and ethnic groups, and with the media and popular culture. They have described various tensions present in the world of school and in popular culture and the ways in which education, race, class and the gender system operate to differentiate people socially.

Critical pedagogy has been inspired by several intellectual traditions, such as the tradition of American progressivism and pragmatism, post-colonial criticism, the critical thinking of the Frankfurt School, deconstructionists and especially Freire's educational philosophy. According to McLaren (1998, 2000), critical pedagogy has a dialectical conception of theory. A critical theory of education is engaged and participatory; it provides conceptual tools for understanding and changing practices and enters into responsive interaction with critical practices.

Dominant cultures and subcultures are engaged in cultural struggles. In these struggles, certain discourses and practices emerge as dominant or hegemonic. Ideology refers to the production and maintenance of the ideas, values and beliefs that people employ in their daily life and that enable them to increase their cultural capital. The concept of discourse refers to those modes of speech and practices that enable people to make sense of life and whose analysis makes it possible to examine the most varied knowledge and power relations, cultural struggles and ideologies. Justifying knowledge, deciding what is right and true knowledge, is determined largely on a class basis: the economic elite defines what, in a certain social situation, is considered valid knowledge and determines the orders of knowledge, the content of the concept of giftedness and the directions of educational tracks (Giroux, 1996, 2000).

Critical pedagogues reject the idea that the economic basis is the inescapable determinant of society and decline to reduce the world of signs, symbols and representations to the economic domain. Instead of looking at a situation shaped by complex cultural, ethnic and gender considerations from a perspective of strict economic determinism, they stress the relative independence from the economic elite enjoyed by teachers and cultural workers. Despite their marketization, schools are capable of operating as public spaces for potential cultural, social and economic changes. Considered as discursive praxis, social practices are socially and symbolically saturated and serve as means and ways of justifying different social orders and hegemonizing a certain view of the good life that has also an economic aspect.

Knowledge is always the knowledge of a particular person or group that has been produced on the basis of some particular point of view, and it is mediated and socially maintained. Critical pedagogy examines the social links and social

formation of knowledge, the functions that knowledge has, and the ways in which it is justified in particular pedagogical practices. These are not limited to formal education but include all public spaces and places where people come together to create, construct and stitch together their shared social reality.

## Conclusions and Implications

Communities become more diverse and dynamic as people move from one place to another, whether it be to migrate, to work, for tourism, for international education or to change their identity. Migration brings with it various cultural practices and commodities that gradually accustom us to different tastes and living styles. The comparison and interpretation of cultural differences may also shape schooling and education.

The aim of multicultural education is to give people some frame of reference for acting in intercultural settings as well as for facing and serving different people and colleagues. All citizens, newcomers and first inhabitants should have a chance to contribute to the cultural and economic development of the nation. It is the duty and right of governments and institutions to provide conditions that enable all citizens to use and further develop their skills, talent and identity, and thus contribute to the national development and economy as well.

The task of intercultural education is to provide an optimal environment for intercultural learning by means of an intercultural dialogue aiming at intercultural competences. The purpose of intercultural education is to prepare students to adapt to, live and work in multicultural work communities and in multicultural societies. Intercultural education and training can be implemented at all levels of formal education, in the contexts of non-formal education and in working places. The preparation for participation in a society requires an awareness of the basic values on which a democratic and multicultural society is built.

Intercultural education involves questions linked to and reflections on conceptions of the human being and knowledge, curricula, teaching, learning, administration and learning environments. An education that sees diversity in a positive light shapes the experiences, lifestyles and identities of individuals and groups towards an acceptance and respect of a multicultural world.

From the perspective of professional education, broadly understood, competence covers personal characteristics and core competence as well as skills such as language skills, knowledge of and understanding cultures and civilizations and their history. Intercultural competence refers to the attitudes, knowledge, skills, ethics and social and cultural awareness needed when operating in intercultural situations. Intercultural competence accumulates and changes through studying, learning, working and living with others. Training for expertise in diverse contexts involves not only an awareness of the values linked to attitudes towards multiculturalism but also a global perspective on teaching and research. Training the right kind and number of scientists, experts, technicians and educational personnel will be needed to fill the impending gap as the population ages. This can be achieved in a

globalized world only if the standard of education meets the challenge and provides the means for innovation and for surviving in a changing world on a sustainable basis.

## References

Alexander, M. (2001) Tel Aviv: migrants: city copes with a different type of migrant, in Rogers, A. and Tillie, J. (eds) *Multicultural Policies and Modes of Citizenship in European Cities*, pp. 199–223. Ashgate: Aldershot.

Azizi, N. and Lasonen, J. (2006) *Education, Training and the Economy: Preparing Young People for a Changing Labour Market*. Institute for Educational Research, University of Jyväskylä: Jyväskylä.

Batelaan, P. and Gundara, J. (1991) Intercultural education: selected bibliography. *Bulletin of the International Bureau of Education*, 65(260): 7–86.

Bennett, J.M. and Bennett, M.J. (2004) Developing intercultural sensitivity: an integrative approach to global and domestic diversity, in Landis, D., Bennett, J.M. and Bennett, M.J. (eds) *Handbook of Intercultural Training*, pp. 147–184. 3rd edn. Sage: Thousand Oaks, CA.

Fullan, M. (2005) *Leadership and Sustainability: System Thinkers in Action*. Corwin Press: Thousand Oaks, CA.

Giroux, H. (1996) *Fugitive Cultures*. Routledge: New York and London.

Giroux, H. (2000) *Impure Acts: The Practical Politics of Cultural Studies*. Routledge: New York and London.

Hyytiäinen, J., Hämeenoja, E., Hänninen, T., Leinonen, E. and Tenhunen, R. (1999) *Kestävä kehitys oppilaitoksissa. – Ekoauditoinnin opas* [Sustainable development in educational institutions – Eco auditing instructions]. Opetushallitus: Helsinki.

ILO (2005) *Key Indicators of the Labour Market*. 4th edn. [CD-Rom]. ILO: Geneva.

Jokikokko, K. (2005) Interculturally trained Finnish teachers' conceptions of diversity and intercultural competence. *Intercultural Education*, 16(1): 69–83.

Kymlicka, W. (2003) Multicultural states and intercultural citizens. *Theory and Research in Education*, 1(2): 147–169.

Lasonen, J. (1998) Finding new strategies for post-16 education to promote parity of esteem between vocational and general education, in Dietzen, A. and Kuhn, M. (eds) *Building a European Co-operative Research Tradition in Vocational Education and Training*, pp. 85–95. BIBB, Bundesinstitut für Berufsbildung: Berlin.

Lasonen, J. (2003) Interculturalization through music teaching. *Line Lifelong Learning in Europe*, 8(2): 10–16.

Lasonen, J. (2004) Poverty and powerlessness in Ethiopia: shaping gender equity through technical, vocational education and training, in Lakes, R. D. and Carter, P.A. (eds) *Globalizing Education for Work: Comparative Perspectives on Gender and the New Economy*, pp. 97–110. Lawrence Erlbaum Associates: Hillsdale, NJ.

Lasonen, J. (2005) Reflections on interculturality in relation to education and work. *Journal of Higher Education Policy*, 18(4): 397–407.

Lasonen, J. and Bhalalusesa, E. (2006) Girls' educational participation in Ethiopia and Tanzania, in Sempruch, J., Willems, K. and Shook, L. (eds) *Multiple Marginalities: An Intercultural Dialogue on Gender in Education*. Helmer Verlag: Korbach.

Lasonen, J. and Manning, S. (2000) Transnational comparisons of parity of esteem between vocational and general education. *International Journal of Vocational Education and Training*, 8 (1–2): 7–21.

McLaren, P. (1998) *Life in Schools: An Introduction to Critical Pedagogy in the Foundations of Education*. Longman: New York.

McLaren, P. (2000) *Che Guevara, Paolo Freire and the Pedagogy of Revolution*. Rowman and Littlefield: Lanham, MD.

Mall, R.A. (2000) *Intercultural Philosophy*. Rowman and Littlefield Publishers: Oxford.

Ministry of Education (2006) *Sustainable Development in Education; Implementation of Baltic 21E Programme and Finnish Strategy for the Decade of Education for Sustainable Development (2005–2014)*. Helsinki University Press: Helsinki. http://www.nachhaltigkeit.at/monthly/2006-12/pdf/tr07.pdf. Accessed 17 April 2007.

Ministry of Labour (2006) *Työryhmän ehdotus maahanmuuttopoliittiseksi ohjelmaksi* [Proposal for immigration policy]. Ministry of Labour: Helsinki.

National Board of Education (2003) *Koulujen ja oppilaitosten ympäristökriteerit* [The criteria of sustainable development for schools and colleges]. Edita Prima Oy: Helsinki.

Rajakorpi, A. and Rajakorpi, H. (eds) (2001) *Sustainable Development in Schools and Educational Institutions: Evaluations 7/2001*. National Board of Education: Helsinki.

Rogers, A. and Tillie, J. (eds) (2001) *Multicultural Policies and Modes of Citizenship in European Cities*. Ashgate: Aldershot.

Statistics of Finland (2005) *Population Statistics*. Government of Finland: Helsinki.

UN (2006) *Trend in Total Migrant Stock: The 2005 Revision. (POP/DB/MIG/Rev. 20005)* UN Population Division: New York.

UNDP (2004) *Human Development Report 2004: Cultural Liberty in Today's Diverse World*. UNDP: New York.

UNECE (n.d.) Home page. www.unece.org. Accessed 17 April 2007.

UNESCO (2005) *United Nations Decade of Education for Sustainable Development 2005–2014*. Draft International Implementation Scheme. http://www.unesco. org/education/desd. Accessed 17 April 2007.

UNESCO (2006) *UNESCO Guidelines on Intercultural Education*. Division for the Promotion of Quality Education, UNESCO Section of Education for Peace and Human Rights: Paris.

UNESCO–UNEVOC International Centre (2005) *Orienting Technical and Vocational Education and Training (TVET) for Sustainable Development: A Discussion Paper*. UNESCO–UNEVOC: Bonn.

UNHCR (2005) *Refugees by Numbers*. Media Relations and Public Information Services: Geneva.

Women Watch (2006) *Women and Poverty*. Directory of UN Resources on Gender and Women's Issues. http://www.un.org/womenwatch/[Retrieved 17 April 2007].

# Chapter 16
# Sustainable Development Through a Skilled, Knowledge-Based Workforce

**Man-Gon Park, Shyamal Majumdar and Suresh K. Dhameja**

## Introduction

Sustainable development is an elusive term that many people misunderstand to mean solely environmental protection or economic development. Sustainable development is more than this. It is about maintaining and improving people's quality of life without compromising the ability of future generations to meet their own needs. It is not limited to a concern for the natural environment or focused exclusively on economic development. Rather sustainable development is a concept based on integrating socio-cultural, environmental and economic considerations. Therefore, technical and vocational education and training (TVET) systems require a deep understanding of the theory and practices of sustainable development. The changing nature of the world of work, especially due to globalization and technological changes, affects the way these changes impact upon the quality of local social, economic and environmental conditions. Unfortunately, TVET in many countries remains locked in the role of being a mere supplier of skilled labour to industry and is therefore unable to respond effectively to the needs of sustainable development strategies. TVET professionals thus face the dual challenge of reorienting technology and conserving natural resources, reducing energy consumption and improving the quality of human life. As a result, they need to be aware of the challenges of applying the concept of sustainable development in the workplace.

The situation becomes more critical with the emergence of the knowledge-based economy. With the drastic transition from the industrial age to the information age and then to the knowledge age, workplace complexity is steadily increasing. There is also considerable evidence to show that certain knowledge-based technologies are transforming the development process all over the world. These technologies are information technologies, advanced material technologies, biotechnologies and new energy technologies. These technologies are not narrow technologies but groups of technologies that are underpinned by a variety of related disciplines. A common

M.-G. Park
College of Engineering PuKyong National University, Republic of Korea
e- mail: mpark@pknu.ac.kr

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feature of them all is that they tend to change fast. The half-life of these technologies is only a few years. Technical knowledge and skills tend to become obsolete very quickly unless explicit strategies are adopted to build and maintain the skill base of the people involved. These technologies also tend to be highly dependent on research and development, especially in new technologies where the connection between basic science and technology is much deeper.

Emerging workplaces demand a skilled, knowledge-based workforce for sustaining employability. In addition to job-specific technical competencies, a set of life skills generic to a cluster of occupations is required in order to perform competently as a knowledge worker. Specific occupational skills are augmented by growing cognitive skills. These skills are essential for to participate effectively in the emerging patterns of work and work organizations. In this chapter the authors list the independent generic skills embedded in the concept of economic, environmental and social sustainability for an emerging knowledge economy and promote the idea of producing a knowledge-based, skilled workforce at an accelerated pace. Factors affecting entrepreneurship and the achievement of a knowledge-based entrepreneurial motivation model are also put forward to stimulate entrepreneurial development as part of this skill base. TVET is currently faced with challenges posed by the displacement of the strong traditional focus on manual work in favour of mental work, or at least, the changing mixture of competencies nowadays required in the workplace.

## Impact of New Technologies on Occupational Patterns

In today's knowledge-driven global economy, the foremost wealth of a firm is its human capital or knowledge assets. These human knowledge assets should be trained to operate in entrepreneurial ways as if they were conducting their own businesses, but still remaining aware of the broader definition of sustainable development. Workforces in all nations need to exhibit a high degree of dynamism and entrepreneurial spirit. OCED estimates that already more than half the wealth of advanced industrial societies is derived from knowledge capital.

This is not the case in the developing nations. Poor countries generally face great obstacles in co-ordinating four elements of progress: labour, capital, resources and innovations (Mayer, 1992). Experience shows that difficulties reinforce each other in a vicious cycle of poverty as shown in Fig. 16.1.

Figure 16.1 illustrates the way that one hurdle raises yet another hurdle. Low income leads to low saving; low saving retards the growth of capital formation; inadequate capital prevents the introduction of new machinery and a rapid growth in productivity and low productivity leads to low wages and salaries. Other elements of poverty, as shown in Fig. 16.2, are also self-reinforcing. Poverty is accompanied by low levels of education, literacy and skill. These in turn prevent the adoption of new and improved technologies and lead to rapid population growth, which neutralizes the benefits of improvements in infrastructure, output and food production (Moy, 1999).

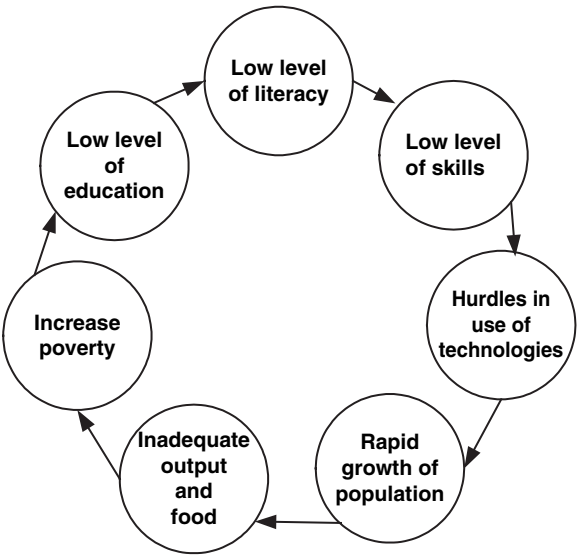


**Fig. 16.1** The vicious cycle of poverty

A multi-pronged strategy is needed to give a big push forward to the economy of poverty-stricken nations. Promotion of entrepreneurship in the education system in general and TVET sector in particular is one of the measures for breaking the vicious cycle of poverty.

The knowledge-based economy recognizes the key role of information-based technologies in providing a foundation for the generation, management and

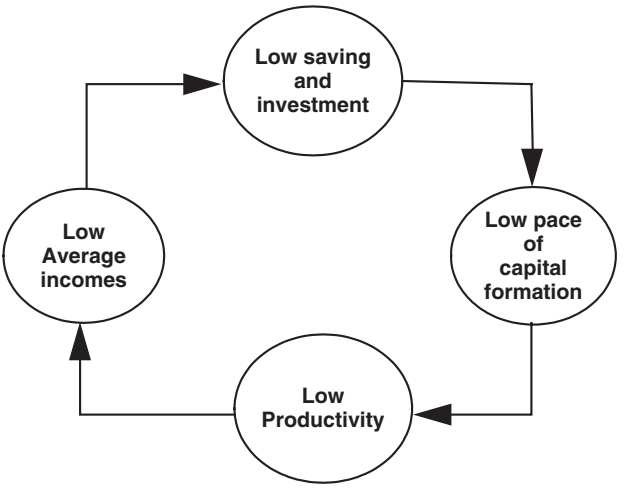


**Fig. 16.2** The vicious cycle of poverty, illiteracy, low technologies and rapid population growth

utilization of knowledge as never before, and for the emergence of knowledge-based industries. The employment pattern is shifting from manual and clerical workers to knowledge workers (Drucker, 1998). Nonaka (1998) believes that one sure source of any lasting competitive advantage of a business organization will be knowledge. Successful companies will be those that consistently create new knowledge, disseminate it widely throughout the organization and embody it in the new product and services.

The common features of the knowledge-based industries are interdisciplinary, oriented towards research and development, information intensive and dynamic and they require human capital with high reasoning and cognitive skills. Organizations are becoming flatter, leaner and more flexible in response to change. Strategic alliances among organizations have become commonplace, giving rise to a new phenomenon – the boundary-less organization. Ashkenas et al. (1995) explained that the boundary-less or virtual organization is a fluid continuum, not a fixed state. It is capable of evolving and growing so that the location of the boundaries may shift. The levels of the organizational hierarchy may decrease, functions may merge and partnership with suppliers and customers may evolve, thus shifting boundaries from 'who does what' to 'who knows what' and 'who is connected to whom'.

Unlike in the past, many occupations are going to be short-lived, emerging for while and then being replaced by some other occupation. Blue-collar jobs are generally shrinking and are being replaced by white-collar jobs, which require skills of planning, monitoring, co-ordination, supervision and dealing with people. As a consequence of these changes, the role of TVET must undergo a change. Greater focus is needed on the development of higher order generic transferable skills and less on the development of specific skills. Some of these skills that will enable workers to respond more quickly and more intelligently to changes in their industry are entrepreneurial.

Economists the world over depict the parameters of growth and development as education, health, a high per capita income, employment and infrastructural facilities such as transport and a pollution-free environment. Employability is listed as one of the factors of growth. But we know that the jobs for the large numbers of educated youth graduating from educational institutions are dwindling. Education as a whole has to be skill-oriented, vocational and entrepreneurial (self-employment oriented). Since the number of jobs, both in the government and private corporate sector, will keep on reducing due to automation and improved technology, there is a need to think of the alternative mode of employability. One such mode is entrepreneurship and self-employment. We have to motivate students in educational institutions to opt for self-employment and entrepreneurship rather than preparing and orienting them for wage employment.

There is a tremendous reservoir of latent entrepreneurial talent in most countries which, if properly harnessed, could help in solving many of the serious problems being faced by these countries, primarily on account of youth unemployment. The myth that entrepreneurs are born and not created has faded. Carefully designed and systematically imparted entrepreneurship inputs strengthen the hypotheses that entrepreneurs can be created too. The quality and quantity of entrepreneurship

inputs are crucial in the process of entrepreneurship development. Currently, the absence of organized effort in integrating entrepreneurship education and training is resulting in restricted the supply of enterprising people in the business arena. A low level of entrepreneurship in any country is characteristically linked to slow economic growth and widespread unemployment and underemployment.

The subject of entrepreneurship has thus become important and necessary for the education sector, which is directly responsible for the development of a country's economy. The TVET sub-sector is specifically responsible for providing skilled and technical manpower to large, medium and small scale enterprises and industries. In this context, imparting entrepreneurship education and training to our youth, especially those in TVET, is of paramount importance for sustainable development.

Educators and employers are beginning to realize that the flexibility of the individual, rather than mere acquisition of knowledge and skill in a particular area, is emerging as a key requirement. Workers need to be able to demonstrate the ability and the flexibility to quickly adapt to a changing working environment and changes in technologies. Since the present strategy of continuing education and training is expected to reach a plateau before too long, it is recognized that the individual's capacity for autonomous learning, without the formal support of external, formally organized programmes of continuing education and training, will be crucial in the future. Surveys of leading employers in many parts of the world support this view. Employers are increasingly looking not only for skills specific to technologies currently in use, but for higher order generic transferable skills, such as skills of conceptualization, analysis, problem-solving, creativity, communication and interpersonnel skills as well as learning to learn skills.

## Emerging Generic Skills for Knowledge Workers

A number of studies have been undertaken on key generic skills, such as the Mayer Committee (1992) set up by the Australian Education Council and Ministers of Vocational Education, Employment and Training in Australia (1991) and the Secretary's Commission (1991) in the USA (1992) and the British National Skills Task Force. This allows a comparison of generic competencies (Moy, 1999) identified in countries like Australia, the UK, the USA and New Zealand (Table 16.1)

Mayer's work on key competencies attempted to provide a definition for each of the seven key competencies, which can be helpful in understanding generic skills *vis-à-vis* job-specific skills (see Table 16.2 for key competency definitions).

Generic skills, such as those identified in Table 16.1, can be structured into a developmental framework. Kearns (2001) offers a model for clustering generic skills into the following groups; cognitive, interpersonal, enterprise, innovation and creativity and work readiness and work habits clusters. Figure 16.3 presents the details of the four clusters of key generic skills required by the twenty-first century organization.

**Table 16.1** Comparison of generic competencies

| Australia<br>Key competencies | UK<br>Core skills | USA<br>Workplace know-how | New Zealand<br>Essential skills |
|---|---|---|---|
| Collecting, analysing and organizing information | Communication | Information foundation skills: basic skills | Information skills |
| Communicating ideas and information | Communicating personal skills: improving own learning and performance | Resources foundation skills: basic skills | Communication skills |
| Planning and organizing activities | Personal skills: Improving own learning and performance | Resources foundation skills: personal qualities | Self-management skills, work and study skills |
| Working with others and in teams | Personal skills: working with others | Interpersonal skills | Social skills, work and study skills |
| Using mathematical ideas and techniques | Numeric: application of numbers | Foundation skills: basic skills | Numeric skills |
| Solving problems | Problem-solving | Foundation skills: thinking | Problem-solving and decision-making skills |
| Using technology | Information technology | Technology systems | Information skills communication skills |

**Table 16.2** Key competency definitions

| Key competency | Definition |
|---|---|
| Collecting, analysing and organizing information | The capacity to locate, sift and sort information in order to select what is required and present it in a useful way; and to evaluate both the information itself and the sources and methods used to obtain it |
| Communicating ideas and information | The capacity to communicate effectively with others, using the range of spoken, written, graphic and other non-verbal means of expression |
| Planning and organizing activities | The capacity to plan and organize one's own work activities, including making good use of time and resources, sorting out priorities and monitoring one's own performance |
| Working with others and in teams | The capacity to interact effectively with other people, both on a one-to-one basis and in groups, including understanding and responding to the needs of a client and working as a member of a team to achieve a shared goal |
| Using mathematical ideas and techniques | The capacity to use mathematical ideas, such as numbers and space, and techniques such as estimation and approximation, for practical purposes |

(continued)

**Table 16.2** (continued)

| Key competency | Definition |
|---|---|
| Collecting, analysing and organizing information | The capacity to locate, sift and sort information in order to select what is required and present it in a useful way; and to evaluate both the information itself and the sources and methods used to obtain it |
| Solving problems | The capacity to apply problem-solving strategies in purposeful ways, both in situations where the problem and the desired solution are clearly evident and in situations requiring critical thinking and a creative approach to achieve an outcome. |
| Using technology | The capacity to apply technology, combining the physical and sensory skills needed to operate equipment with an understanding of scientific and technological principles needed to explore and adapt systems |

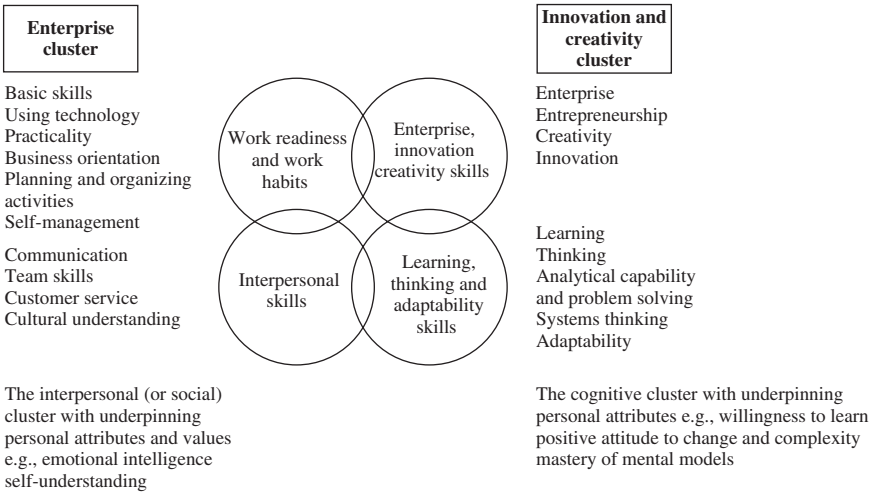


**Fig. 16.3** Clusters of generic skills

## Proposed Generic Skills

Careful analysis of the above reports and working in the TVET system for more than two decades has led the authors to suggest that, in addition to domain-independent core generic skills, knowledge workers are required to acquire a basic concept of economic, environmental and social sustainability in all discipline and trades. In the following paragraph we discuss key domain-independent generic skills and then sustainable development life skills.

## *Domain-Independent Generic Skills*

- *Critical thinking and problem-solving skills*. Knowledge workers need to develop critical thinking skills to define problems in complex, overlapping, ill-defined domains; use available tools and expertise for searching, formulating the problem, analysing, interpreting, categorizing ideas and finding alternatives, and choosing the best solution.
- *Creative thinking skills*. Knowledge workers need to develop creative thinking to generate new ideas for solving problems, discover new principles and new processes and products. Diagnostic and design skills will play an important role in this.
- *Information handling skills*. Knowledge workers need to develop the capacity to acquire, locate, search and find information for effective decision-making. They need to evaluate the information and know-how to use and communicate it.
- *Communicating skills*. Knowledge workers need to develop communication skills in a variety of media for diverse audiences, using variety of modern tools, particularly the Internet.
- *Teamwork skills*. Knowledge workers need to be able to work in a team to solve complex problems, create complex tools, services and products. Collaboration, co-ordination and teamwork will be the key for success.
- *Technology application skills*. The capacity to apply technology, particularly computing technology, with physical and sensory skills is essential in the knowledge age. Knowledge workers need to operate equipment with an understanding of the scientific and technological principles needed to explore, acquire, adapt and operate systems.
- *Autonomous learning skills*. Rapid technological changes require an ability to diagnose and prescribe one's own training needs. Knowledge workers will have to manage their own career paths and their own continuous learning of new skills. Learning to learn and lifelong learning will be the key parameter of survival in this era.
- *Cross-cultural understanding skills*. In the era of globalization, knowledge workers will have to work in multicultural society. They need to have the cross-cultural understanding for effective teamwork.

## *Sustainable Development Life Skills*

- *Economic sustenance*. Economic sustainability requires knowledge workers to develop a broader general education for economic literacy (National Council for Economic Education, 2002), sustainable production and consumption and entrepreneurial skills using the sustainable ethos of 'reduce, rethink, renew, recycle and reuse' principles.
- *Environmental sustenance*. Environmental sustainability requires a change from the 'business-as-usual approach' to development to a sustainable production ethos. This involves the responsible use of raw materials, energy, and water, and applying concepts related to environmental sustainability to the workplace.

- *Social sustenance*. Social sustainability involves ensuring that the basic needs of all people are satisfied and that all, regardless of gender, ethnicity or geography, they have an opportunity to develop and utilize their talents in ways that enable them to live happy, healthy and fulfilling lives. The concepts of social sustenance embrace existing concepts of work and employment but widen to include multiple forms of economic and non-economic activities.

A knowledge-based economy means an ever-increasing demand for a well-educated, knowledge-based skilled workforce in all parts of the economy. All aspects of the way we live and work, produce and consume are in the midst of a profound transformation as a result of the revolution in information and communications technologies and the rise of the global knowledge-based economy. Products, firms and industries that were unheard of a decade ago are now significant sources of wealth. This is true in both the developed world and the developing world. The skills required for many conventional occupations are changing rapidly and many skills are quickly becoming outdated as new jobs, new technologies and new industries emerge. The use of emerging technology is transforming the way we work and do business in all sectors and in every place. Shorter product cycles, a fast expanding knowledge base and the rapid obsolescence of existing knowledge are all putting tremendous pressure on nations to develop knowledge-based skill workers at an accelerated speed.

Many countries have begun to undertake important reforms in all aspects of technical and vocational education to produce large number of knowledge workers to meet the challenges of the twenty-first century. New emerging generic skills embedded with sustainable life skills need to be developed to cope with fast-changing technologies. Many new industries and employment opportunities are also being developed, such as in eco-tourism, environmental monitoring, sustainable community development, eco-design, recycling, land rehabilitation, pollution control, waste water treatment and reuse. All require knowledge-based skilled workers who have the knowledge of and commitment to sustainability as well as requisite technical knowledge.

These changes are creating new roles and courses in TVET. While there could be a difference in the nature and details of generic skills that need to be included in the curriculum, among nations, in the context of the development stages, policies and priorities, there can be no disagreements about integrating higher order generic skills embedded with the sustainable development concept.

While learning through facts, drill and practices, rules and procedures was more adaptive in the past, learning through projects and problems, inquiry and design, discovery and invention, creativity and diversity, action and reflection is more fitting in the present to develop a knowledge-based skilled workforce at an accelerated speed for sustainable employment in the knowledge economy.

In the future many knowledge workers will work from home in small businesses and will generate their own work. Because of this, entrepreneurial skills need to be added to the generic skill set outlined above.

## Factors Influencing Entrepreneurship

There is a vast reservoir of latent entrepreneurial talent in most countries which, if properly harnessed, could help in solving many of the serious problems being faced by these countries. Unfortunately, the absence of organized efforts to integrate entrepreneurship into education and training is restricting the supply of enterprising people for business and industry. Low levels of entrepreneurship in any country are characteristically linked with slow economic growth and widespread unemployment and underemployment. The myth that entrepreneurs are born and not created has faded away with carefully designed training in entrepreneurial skills. The TVET sector is specifically responsible for providing skilled labour and, it is in this context that entrepreneurship education and training for youth is of paramount importance for sustainable development.

This section outlines the importance of entrepreneurship to an economy. In order to achieve the aim of promoting entrepreneurship, there is a need to identify important factors which interact amongst themselves and influence entrepreneurship. These factors are:

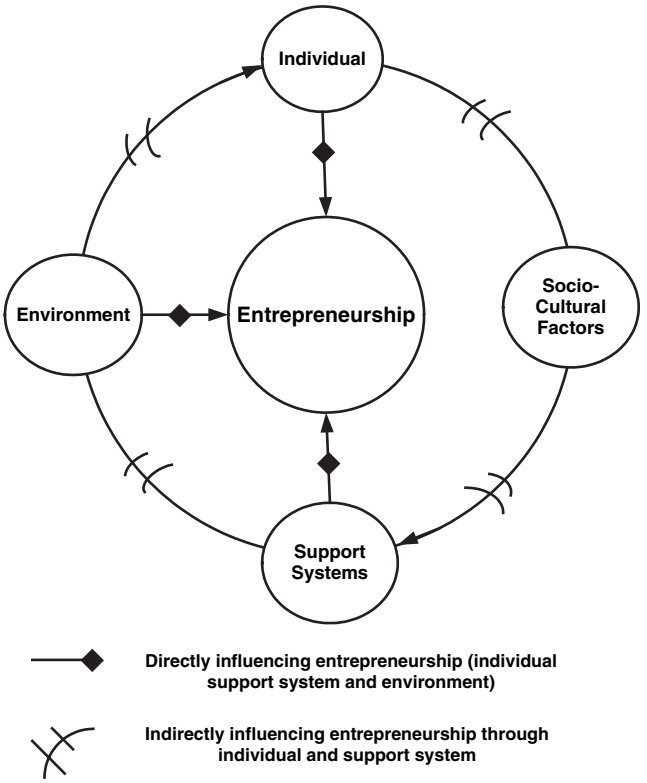


**Fig. 16.4** Factors interacting with and influencing entrepreneurship

- Individual initiatives in setting up an enterprise;
- The social, political and economic policy of the government and financial institutions and the opportunities that are available in the society;
- Support systems like financial, commercial, research, training and consultancy service assistance.

Figure 16.4 shows the individual, environment and support system factors interacting with and influencing entrepreneurship development. The fourth factor is the socio-cultural tradition emanating from the family and the society in general (Ashkenas et al., 1995).

## Knowledge-based Entrepreneurship through STEP

Analyses of the leading companies worldwide reveal that most founders of new technology-based firms are highly qualified professionals with a sound academic background. The growth and development of Silicon Valley around Stanford University is the finest example of this new trend. This clearly indicates that TVET institutions could nucleate the generation of entrepreneurs and with the help of the industries can play a vital role in shaping today's students into tomorrow's entrepreneurs (Kearns, 2001). But this is not the case of many entrepreneurs in the developing world who set up businesses because they have no other source of income.

In the developed world, science parks and similar initiatives like research parks and innovation centres are the latest in the evolutionary line of effective institute – industry interface mechanisms. A science park in defined as an industrial complex close to a place of higher learning, providing high quality environment and accommodation to the tenant companies on a rental basis. A research park differs from the science park in the sense that it prohibits all manufacture except for prototypes. A technology park is usually a development to accommodate companies engaged in the commercial application of high technology with very little or no institute linkage. Innovation centres are developments intended for providing incubator space for new technology-based firms and production-linked services, often operating on science parks principles. They can be seen the world over, including in some initiatives in Asian countries, and science parks and related mechanisms have proved to be quite successful.

Developing such a Science, Technology and Entrepreneurship Programme (STEP) signifies a systems approach to creativity, innovation and entrepreneurship. In this way, a STEP can be an effective mechanism for enhancing industry – institute linkages with services and facilities offered and functions to be performed, as depicted in Fig. 16.5. STEPs can therefore be established in and around TVET institutions. Successful examples of science parks and related mechanisms have shown that there is no single model to be replicated; it has suit and be specific to local conditions. Any STEP has to work in close liaison with the neighbouring or supporting TVET institution to get maximum advantage of the facilities and expertise available there. Only those facilities which are not available in the institute are created in the STEP.

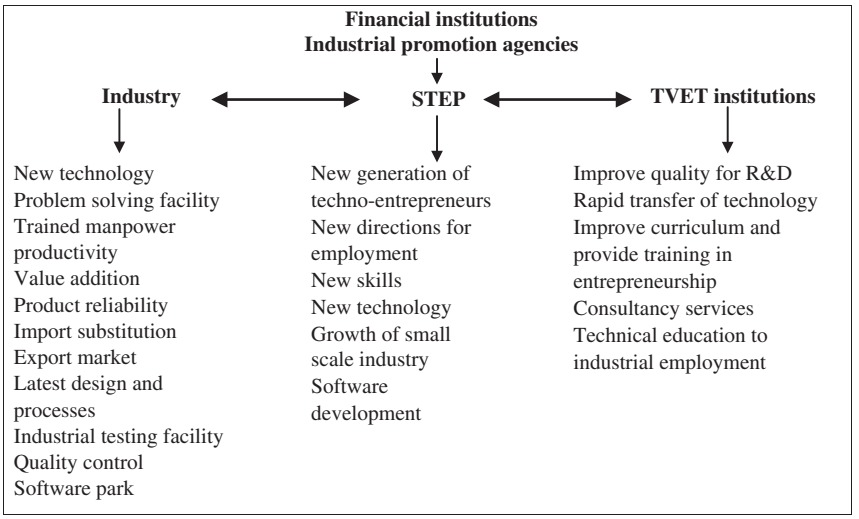


**Fig. 16.5** STEP mechanisms for industry and TVET institute linkages

## Conclusion

The rise of knowledge-based economies means an ever-increasing demand for a well-educated and skilled knowledge-based workforce. The disappearance of manual jobs and their replacement with jobs that require the high order skills of planning, monitoring, co-ordination, supervision and dealing with people, require a change in the preparation of people for the workforce. Workers need to be able respond more quickly and more intelligently to changes in their industry, irrespective of whether it is their business or not. Not only has the nature of work changed but the role of the worker in the workplace has also changed. Workers are required to participate more actively in the business itself. This new skill base is more compatible with a skill base of an entrepreneur than a wage earner. As a consequence of these changes, the role of TVET must undergo a change. Greater focus has to be placed on the development of higher order generic transferable skills and less on the development of specific skills. These changes need to occur within a framework of sustainable development.

The current inadequacy of country-wide approaches to entrepreneurship is one of the factors inhibiting the process of industrialization and economic development. Our TVET systems have not given adequate consideration to training potential entrepreneurs or encouraging higher order skills. Inputs for self-employment and entrepreneurial development have either not yet been provided or are provided in an unstructured fashion. There is therefore an urgent need to make a sincere effort in this direction for sustainable development. Students in our TVET system need to learn entrepreneurial skills and competencies. This will go a long way in fulfilling the needs of the modern workplace as well as the aspirations of those who have the desire and potential for setting up their independent ventures, but are unable to do so.

Higher order skills and entrepreneurship need not simply be confined to industry, trade and commerce. In fact, the pace of development would be far greater when people in general in all walks of life and in all work situations start demonstrating entrepreneurial behaviour. Developing economies need greater numbers of people possessing entrepreneurial qualities who are capable of taking decisions under uncertain conditions. It is this class of human resources which has the potential of transforming underdeveloped economies into developed ones.

## References

Ashkenas, R. et al. (1995) *The Boundaryless Organization*. Jossey-Bass: San Francisco, CA.

Drucker, P. (1998) *The Coming of the New Organization: Knowledge Management*. Harvard Business School Press: Cambridge, MA.

Kearns, P. (2001) *Generic Skills for the New Economy*. National Centre for Vocational Education Research: Adelaide.

Mayer E. (1992) *Putting General Education to Work: The Key Competencies Report*. Australian Education Council and Ministers for Vocational Education and Training: Melbourne.

Moy, J. (1999) *The Impact of Generic Competencies on Workplace Performance*. National Centre for Vocational Education Research: Adelaide.

National Council for Economic Education (2002) Campaign for Economic Literacy: Challenge and Response. http://www.ncee.net.cel.

Nonaka, I. (1998) *The Knowledge-creating Organization: Knowledge Management*. Harvard Business School Press: Cambridge, MA.

Secretary's Commission (1991) *What Work Requires of Schools* (ED 332 054). US Department of Labor: Washington, DC.

# Chapter 17
# The TVET Response to the Challenges of Sustainable Development: Towards a Synthesis

**Veronica Volkoff**

In the chapters exploring responses within TVET to the challenges of sustainable developed explored in Part I, the authors of Part II have outlined key opportunities and challenges within the context of a highly complex, rapidly changing, technologically based and uncertain world. Indeed, complexity and uncertainty emerge as key themes in these chapters. Two key sets of complexities are prominent: the enigmatic and complex nature of sustainable development as a concept; and the complex multiple roles and purposes of TVET that shape its response to the demands of addressing sustainable development.

The authors have emphasized the changes and uncertainties of life and livelihoods that confront people in both developed and developing countries in the twenty-first century, including uncertainties in economic, socio-cultural, political and environmental circumstances. Striking a balance between these dynamic systems is embodied in the concept of sustainability (see Part 1). As Dhameja et al. remind us, sustainable development is an elusive term but an inclusive concept, embracing economic, environmental and socio-cultural concerns.

For TVET to successfully address the challenges of sustainable development in the twenty-first century requires providers, in all their forms across nations, cultures and societal contexts, to review their orientation, priorities and obligations, pedagogies, curriculum and processes of curriculum development, as well as their commitment to and strategies for professional development of their staff. It also demands that TVET providers rethink their relationships with the broader community and connections with other education providers.

Globalization and technological developments have led to the transformation of the nature of work and careers, as well as shifts in opportunities for employment, with a rapid reduction of jobs using unskilled labour. In analysing the notion of sustainability and the more dynamic notion of sustainable development, Thomas stresses the importance of developing people's adaptability to changing environmental and socio-economic circumstances. Sustainable development should not

V. Volkoff
Centre for Post-compulsory Education and Training, University of Melbourne, Australia
e-mail: vvolkoff@unimelb.edu.au

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only promote sustainability but should also support people to learn, develop and adapt to the changing circumstances they encounter throughout their lives.

Pretzer sees the current technological revolution as one based on continuous change, new ways of thinking about work, careers, production and quality and taking place within a context of intensified environmental pressures and concerns. He proposes that technological proficiency needs to be accompanied by 'technological integrity', that is, the capacity to make decisions based on holistic considerations about the social and technological as well as natural environment. He argues that it is both desirable and possible to develop a technologically literate population that uses technology within an ethical and values framework focused on the achievement of a sustainable future.

Rapid and widespread technological developments have also ensured that literacy and numeracy are necessary but no longer sufficient outcomes of basic education. Competence in multiple literacies including ICTs is now of prime importance for all seeking sustainable livelihoods. Hughes calls for Education for All (EFA) to be conceptualized as 'a strategy and a process' aimed at poverty reduction and achievement of greater equity and social justice. He argues that through targeting women and girls, socio-economically disadvantaged people and those marginalized by their ethnicity, race or remote location, EFA can provide initial skills for employment in conjunction with basic education and lay the groundwork for further education and training across the lifetime, where possible. Central to achieving these outcomes are effective pathways from EFA to TVET and the integration of age and contextually relevant elements of TVET within EFA for people with limited or no prospective access to such pathways. Where TVET is limited in its availability, then EFA can play an important role in promoting sustainable development.

Seemann has developed the concept of 'technacy' as a special form of multiple literacies to depict:

> . . . the ability to understand, communicate and exploit the characteristics of technology with particular regard to how human technological praxis is necessarily a holistic engagement with the world that involves people, tools and the consumed environment, driven by purpose and contextual considerations.

This is a complex but important statement that is exemplified through two case study examples from remote Australian Aboriginal communities that illustrate the way in which values, culture and context are inescapably a part of all technologies and the use of them. Informed by these case studies, Seemann then develops a theoretical model for the collective prowess to exploit this holistic and universal approach to understanding technology, which he calls technacy education. In emphasizing the core contributions of education to sustainable development, Seemann argues that technacy must be considered as a third essential pillar for learning, alongside literacy and numeracy, and that is well placed to help address, for its part, the transition towards a sustainable future of humanity.

Stephen McKenzie argues that concerns about social cohesion and environmental sustainability will remain low in people's priorities unless they are clearly connected with their livelihood strategies. He explores the question of TVET's potential

contribution to social sustainability through a discussion of the Australian AVESS (adult and vocational education for social sustainability) project and argues that within the Australian context, the linking together of adult education and vocational training offers opportunities to conceptually include both the technical and vocational concerns of training with the second chance and community development focus of adult education. McKenzie suggests that linking the combined adult and vocational education to social sustainability creates a useful conceptual tool. He makes a distinction between education for sustainability and education for a sustainable workforce and raises potential positive and negative consequences of building social sustainability into the TVET agenda. He concludes that a key challenge is to design for teaching and learning, in both vocational and adult education provision, to integrate the development of knowledge for sustainability with skill development for employment, livelihood and career.

In reviewing the literature on education and sustainable livelihoods, Lawrence and Tate examine different perspectives on livelihoods. They propose that a 'livelihoods approach' focusing on the 'socio-economic relationships surrounding each individual and the decisions they take', provides a different and useful way of examining development. They also point out that traditional basic education curricula fail to address actual livelihood strategies for those in poverty and that lifelong access to opportunities for education and training is becoming a necessity for survival in all societies. They argue that central to achieving progress in social development and poverty eradication is the issue of a more effective connection between 'education and sustainable livelihoods across a lifetime'.

Mahmood argues for the integration of TVET with entrepreneurship and sustainable development as a mechanism for reducing poverty in rural populations. He argues that as well as entrepreneurship being positively connected with economic growth, teaching entrepreneurship to the disadvantaged rural population in the Asia-Pacific region can form an important part of poverty reduction policy. Entrepreneurship programmes designed for rural youth and women can help to develop skills for employment, create jobs and draw on the potential productivity of these groups to improve national growth and productivity while reducing poverty.

However, Dhameja et al. remind us that in many countries TVET focuses merely on the supply of skilled labour and does not address the needs of sustainable development nor promote sustainable development strategies. They identify the generic skills that are required for TVET to address sustainable development and to produce a workforce sufficiently knowledgeable, skilled and attitudinally oriented towards entrepreneurship in conjunction with sustainable development.

The ageing of the population, particularly in developed countries, has led to labour shortages that are increasingly met by migrant workers. As Lasonen points out, the ethnic diversity of communities and workplaces has increased in many countries, demanding not only multicultural education to support the adjustment of the immigrant groups to live and work in multicultural societies, but also intercultural education within whole communities to build respect and understanding among different ethnic, cultural and religious groups and secure the sustainability

of those communities. Lasonen argues that intercultural competence should be an integral part of all types of education and training in an internationalized world.

The diverse demands on TVET identified by the authors challenge the traditional orientation of TVET focused narrowly on the development of skilled labour for industry. For example, to meet the goals of intercultural education, that is, to ensure that TVET is both inclusive of diverse students and that it utilises appropriate pedagogies to provide intercultural education integrated with development of employment related knowledge and skills requires a critical rethink of TVET's roles and pedagogies and the professional re-development of its teachers and trainers.

Anderson questions the common premises about the main purposes of TVET and proposes that in a time of 'manufactured uncertainty and ecological risk', the common assumptions that the main purposes of TVET are to drive economic growth, increased productivity and profit and to build the individual economic output and employability of graduates, are no longer rational or meaningful. Anderson suggests that TVET now has a dual responsibility – to investigate and raise stakeholder and community awareness about the potential impact of perpetual economic growth and to promote and facilitate a transition to ecologically sustainable development. He argues that TVET is strategically positioned to take up the challenge of promoting the principles of ecologically sustainable development. However, to do so, TVET providers need to adopt a range of measures including rethinking their markets, reforming their organizations, policy and planning, professionally developing their staff for broader responsibilities, redesigning programmes and collaborating with broad networks to best promote ecologically sustainable development.

Gough observes that from the perspectives of different stakeholders within the community, TVET offers different potential returns and thus prompts them to 'invest' in TVET in quite different ways. These investments include the opportunity costs incurred by individual learners, TVET provider and societal costs for which each stakeholder expects future returns according to their perspective. While employers expect that TVET will deliver them a skilled workforce, and learners that they will achieve employment and an ongoing livelihood, from the perspective of broader society, environmental sustainability and social cohesion need to equally considered as desired outcomes in the 'business case'. Gough suggests that TVET providers borrow from the economists' 'real options' approach that incorporates an organizational learning model with a future orientation. Thus a TVET institution guided by real options thinking, would seek to position itself to be most adaptable and flexible to respond effectively to not only current challenges, but also to future developments, applying this approach to strategic planning, staffing practices, curriculum directions and resources management. Gough argues that the learning orientation to an uncertain future that sustainable development requires is the same as that embodied in a real options approach. When the future is unclear for learners, TVET conceptualized as 'sustainable investment' can integrate within training for vocational knowledge and skills opportunities to develop a broader range of capacities, such as adapting and learning new skills as required, understanding sustainability as related to their industry and occupation, and examining and making informed decisions that reflect their values and preferences.

## Challenges for TVET

The authors have outlined ways in which TVET's response can serve the diverse goals of sustainable development including economic, environmental and social sustainability. They have also raised a number of challenges that face TVET in attempting to serve these goals. Critical to TVET's capacity to respond to the challenges of sustainable development is the clarification of its focus and obligations. The TVET sector can remain a servant of industry or become an agent of change in the community by adopting sustainability principles However, the challenges cannot be met if TVET remains focused primarily on providing skilled labour for industry to build productivity and outputs for the economy with a secondary focus on skills for individual employment. To be an agent of change, TVET needs to become more adaptive, creative and relevant and to play a continuing role in people's lives. In the age of super-complexity, lifelong learning is crucial and new curriculum modes are required that establish a knowledge culture that embraces uncertainty but does not destroy existing cultures or diverse cultural contexts.

A new and broader vision for TVET is required with commitments to and strategies for:

- Transforming TVET culture to embrace sustainable development;
- Providing equitable access and support for learners from diverse socio-economic status, ethnic and religious groups to build sustainable livelihoods;
- Developing adaptable and flexible curriculum which is woven from not only relevant vocational knowledge and skills strands but also integrating strands that provide for the development of:
  - Respect and harmony among diverse populations;
  - Technological literacy without denying or diminishing existing cultural capital;
  - New skills while valuing and building on learners' existing knowledge and skills;
  - Entrepreneurship skills;
  - Learning to learn capabilities and a lifelong learning orientation;
  - Generic employability skills imbued with values to support exploration of options and ethical decision-making in the context of an uncertain future;
  - Understanding of the potential environmental impacts of work and the skills to make informed and value-based decisions to promote sustainable development;
  - A knowledge culture that acknowledges the changing nature of work and embraces uncertainty and change.
- Establishing and utilizing broader networks and cross-disciplinary sources of expertise to inform and support curriculum development;
- Devising appropriate pedagogies to promote the diversity of learning outcomes required for sustainable development;

- Establishing reliable and rigorous processes for identifying, anticipating and adapting to the needs of evolving communities, changing industry needs and increasing environmental concerns;
- Training and resourcing TVET staff to effectively meet the challenge.

There has been little mention in these chapters of the role or nature of TVET policies focused on education for sustainable development, or of how public policy can drive and support TVET's response to sustainable development. Without the development of coherent sectoral visions, legislation or incentives to drive TVET to embrace sustainable development as a key goal, the onus rests on providers to rethink and integrate their commitments. To be able to identify, anticipate and adapt to changing economic, social and environmental demands, that is, to be sustainable TVET organizations themselves, providers now need to view and respond to the needs of individual learners, communities, industry and the environment, not as competing demands but as equally valued and interconnected obligations within their education and training provision. This cannot be achieved in isolation and it requires TVET providers to foster and exploit the expertise of networks of community, industry and government bodies as well as other education and training providers. The processes through which enterprises can be recruited to engage in partnerships with providers to support the development of a new curriculum for TVET for sustainable development need further exploration. How TVET can model sustainable development practice and engage enterprises in partnerships that model ethical practice are questions that also remain to be answered.

# Part III
# Country Experiences in Integrating Sustainable Development into TVET

# Chapter 18
# UK: Developing the Strategy for Sustainable Development in TVET

**Stephen Martin, Maureen Martin and Judith Cohen**

## Introduction

This chapter describes the current status of sustainable development in the learning and skills sector of education and training in England.[1] The learning and skills sector covers further education colleges, work-based learning, adult and community learning and schools with sixth forms.

In England there are some 6 million learners participating in the learning and skills sector. Many of these learners are disadvantaged, with some providers drawing as many as 27 per cent of their students from some of the most disadvantaged areas of the country. Over 1200 providers deliver most of the learning. The bulk of the training is through 400 general further education colleges and some 100 sixth form colleges. The remainder is provided by over 500 private and voluntary-sector training providers and approximately 200 local authority and adult education institutions.

This diverse sector is funded to the tune of $7 billion per year by the Learning and Skills Council (LSC) and has long been the poor cousin of the educational system in the UK. Over the past 20 years it has also been the subject of repeated policy change, largely targeted at making the sector more responsive to national skills needs. This focus has recently been reinforced in three policy papers. The first, *21st Century Skills: Realising Our Potential* (Department for Education and Skills, [DfES] 2003a) sets out the government's aim of securing greater engagement with employers in the development of skills for future employees. The second, *14–19 Education and Skills* (DfES, 2005) sets out the government's aim to reform the secondary and post-secondary education and training aimed at 14–19 year olds to make it more responsive to basic educational needs (i.e. a good grounding in maths and English) and the skills needed for employment. The third paper, *Further Education: Raising Skills, Improving Life Chances* (DfES, 2006) focuses on a number of reforms aimed at raising the level of skills, with a greater emphasis on the economic mission of the sector and of individual providers. This includes expanding and

S. Martin
Open University, Milton Keynes, UK
e-mail: esm@esmartin.demon.co.uk

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enhancing the Centres of Vocational Excellence[2] (CoVE) programme. All this proposed change is set within the context of yet another government commitment to radically reform this sector. *Success for All – Reforming Further Education and Training* (DfES, 2002) sets out a series of significant policy goals focusing on widening choice to learners and enhancing the quality of leadership and teaching and learning.

Throughout this period of policy reform the Learning and Skills Development Agency (LSDA[3]) has doggedly attempted to raise the profile and create the opportunities for the learning and skills sector to embed sustainable development within college and training provider policies and practices. The initiative *Learning to Last* sought to stimulate greater awareness and debate in the sector and in its later stages to create activities which supported emerging best practice (Baines et al., 2005a; Martin et al., 2004). Our emphasis has been on 'embedding', by which we mean that sustainable development is delivered through other programmes and qualifications rather than as discrete provision. The strategy adopted has been to write Learning to Last initiatives into mainstream policy and programmes of development.

In 2003 the DfES published its *Sustainable Development Action Plan for Education and Skills*, (2003b) setting out a range of actions required of all education and training providers and national agencies such as the LSC. The LSC sector was asked to:

- Produce guidance on good practice and disseminate advice on green and sustainable development issues to LSC-supported FE [further education] and adult continuing learning estates;
- Pursue the highest standards of environmental management across all properties owned and managed by the Department and its associated bodies;
- Fund a design study on design standards (in buildings) in the further education sector to consider the impact on the learner experience, the proper balance between design standards and costs, and the sustainability and green requirements for briefing and designing new builds;
- Support the development of the role of the new Leadership College in driving the sustainable development agenda forward;
- Commission a further education estates management statistical study that will allow tracking of running costs including energy costs across the further education sector year on year and benchmark performance and identify good practice and exemplars.

In response to this action plan, in 2005 the LSC produced a strategy on sustainable development – *From Here to Sustainability* which sets out in more detail what the LSC sought to achieve in terms of taking this agenda forward in three target areas:

- Embedding sustainable development in the curriculum (curriculum)
- Developing more sustainable educational estates (campus)
- Contributing to more sustainable communities and businesses (community).

This chapter describes the results of a six-month survey that assessed how sustainable development is being embedded in the sector, focusing on leadership and

management, buildings and estates, teaching and learning and community and business. The survey provides a snapshot of activity and, in a raw sense, provides a benchmark from which it will be possible to assess development when the exercise is conducted again in a few years' time. The findings are largely the result of voluntary activity and enthusiasm on the part of individual staff and students since the last round of targeted funding (very small amounts) occurred in 2002–2003 (Learning and Skills Network homepage, n.d.).

## Methodology

The survey questionnaire was sent to 1244 providers and 151 were returned. In addition, 10 organizations were selected for follow-up visits. The institutional visits were largely in proportion to the responses received by category of provider and aimed to achieve a geographic spread. The selection process entailed analysing the returned questionnaires, using key words to indicate a range of emerging good practice. The visits fell into the following categories: five general FE colleges, two work-based learning providers, one specialist college (land-based education and training), one sixth form college and one adult and continuing education provider.

During these visits elements of good or emerging good practice in sustainable development were explored in a number of broad areas:

- Institutional policy, practice and governance
- Building and estates, design and management
- Staff development
- Curriculum development
- Health
- Procurement
- Engagement with employers
- Engagement with local community groups and initiatives.

The visits explored innovative practices that can contribute to reducing greenhouse gas emissions from the operations of the organization (e.g. energy conservation, building design, travel plans and local procurement). It also explored the integration of sustainable development principles and practice into courses and course materials. Some examples of emerging good practice in CoVE were identified in the LSDA research reports (Baines et al., 2005b; Martin et al., 2004).

## Survey Results

### *Distribution of Responses*

The overall response rate to the survey was just over 12 per cent. The response rate of the major categories of provider is represented in Fig. 18.1.

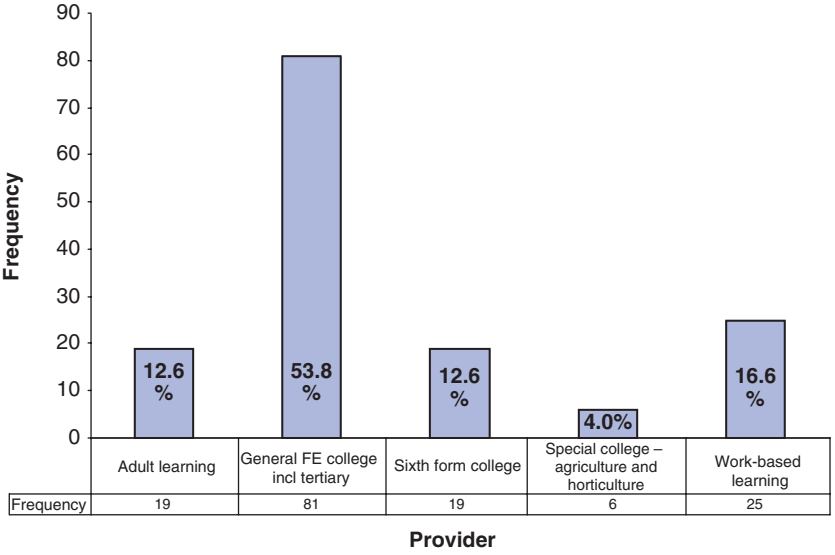


**Fig. 18.1** Response by provider type (%)

Specialist colleges (e.g. land-based and art and design colleges) fall within the general FE category and in some instances, through mergersm some general FE colleges provide both specialist provision as well as sixth form college provision. Hence, the categories in a few instances overlap.

## *Leadership and Management*

Overall 52 per cent of providers in this area have an sustainable development policy and, while 69 per cent have undertaken audits of resource use, only 30 per cent report on performance. Of the 48 per cent who do not have an sustainable development policy, 61 per cent have undertaken audits of resource use. Where there is evidence of good or emerging good practice it is firmly underpinned by strong and, in some instances, visionary leadership at executive level and within the governance of the organization. Most policy documents emphasise the environmental aspects of sustainability, placing less emphasis on an integrated approach to the environmental, social and economic dimensions of sustainable development. Few providers report on their overall performance in putting sustainable development into practice. For example, there was little emphasis on sustainable development in self-assessment reports on institutional quality. For most providers there is a significant and understandably pragmatic emphasis on cost. Hence, any new build or refurbishment is rigorously scrutinized for both environmental and occasionally sustainable development performance, but in all cases the cost imperative wins. There is now a wide recognition of ‘investing to save’, particularly in energy resource use, but current

funding constraints and regimes do not permit some of the investment identified. All new build and refurbishment meet legislative requirements – building regulations, health and safety and disability discrimination legislation.

In a few instances the strong support of individual governors has led to a significant reinforcement of the organization's progress in implementing sustainable development, in one case supporting a partnership with a national company seeking to implement a biomass energy system and in another in seeking support from the local council in securing more effective recycling and waste management opportunities.

In nearly all organizations there is a growing recognition that they need to measure consumption of non-renewable as well as renewable resources. Energy, water and waste are now being monitored regularly and, in some instances, in some detail. In one case energy costs 2 per cent of total budget costs and is growing. However, because base lines have not been defined and are, in many instances, difficult to define because of the huge changes taking place in the sector, their current use as a management tool is relatively limited. Nevertheless, most providers visited have an energy and resource use committee with wide-ranging representation (in one case 27 representatives) which takes an active role in mitigating the impact of waste and water use and seeks to reduce energy use through positive awareness-raising campaigns and signage.

Communication has a key role to play in making sustainable development accessible. It is clear from this survey that informed, motivated and committed people can progress their sustainability goals more effectively. Communications need to reflect content, timing, the medium, style and the messenger conveying the message. Messages should be inspiring and make sustainability fashionable and even 'cool'.

Some institutions use newsletters to report on energy and resource use and savings, another uses 'green' e-mail alerts, another uses the college intranet to foster dialogue and feedback. This reinforces the message that conservation is a shared responsibility and highlights what staff and students can do individually.

Few of the organizations studied have adopted a formal environmental management system. Indeed, there is some reluctance to adopt ISO 14001 because it has no clear targets, milestones or endpoints. Some informal systems of environmental management are beginning to emerge. In some cases building management systems have been installed, but these are still in their infancy in terms of monitoring, evaluation, target setting and improving performance as an integrated management approach. In a few instances the executive leaders are taking external university programmes in sustainable development as part of their own staff development, but most supported the idea of a national programme that incorporated the principles of sustainable development, along with examples of integrated management approaches. One-third of all respondents have sustainable development champions.

Sustainable development champions have been recruited or appointed in a number of cases. One college currently has 32, two from each division or service, who act as advocates and activists and are undertaking an accredited staff development

programme offered by a local university to assist them in this role. In some cases the role of champion is in the senior management team and a number are in the estates team. In one college the union questioned the role of champions and wanted to ensure that additional resources would accompany additional responsibilities.

## *Buildings, Estates and Procurement*

Overall, at least 45 per cent of all respondents are addressing aspects of sustainable development in this area. Of the 48 per cent of respondents who do not have an sustainable development policy, there is evidence that some aspects of the agenda are gaining prominence. For example, 43 per cent of these have travel plans and 56 per cent of these support local markets and/or fair trade.

Most colleges are seeking to incorporate more environmentally sustainable features into new building and refurbishment. In several CoVEs a range of new technical and general teaching facilities have been built in the last few years. These buildings have been built to exacting and high-energy efficiency standards and hence comply with current building regulations. The orientation of buildings has been considered to maximize natural lighting; under-floor heating and natural ventilation is incorporated into some new builds. However, in large part, due to cost, few of these new builds have been more innovative in applying new technology in the form of alternative energy systems. A number are considering biomass energy converters, but few have considered wind generators or solar alternatives. Rainwater harvesting has been installed in some new building programmes. Many providers have a legacy of older buildings and many are taking the opportunity through grant aid and loans to refurbish these buildings to a higher standard and to ensure accessibility for those with disabilities, thus enabling improved social inclusion from their wider community. In some instances double-glazing has been installed for energy saving; in some motion sensors instead of switches control lighting. In one college energy use in a particular building was being monitored in an attempt to see if reductions could be made through a revision in timetabling (for example, to see whether all evening classes could be conducted on one or two floors instead of over three, as at present). Another college is seeking ways to accommodate those wishing to use its buildings over the weekend into one building, rather than opening and heating a range of buildings.

Reducing the environmental impact of buildings and estates has been done in the following ways:

- Using water-based paints in all refurbished and redecoration programmes;
- Managing up to 24 waste streams and recycling many;
- Purchasing energy from green sources;
- Integrating energy management into the management structure and clearly delegating responsibility for energy use;
- Opening formal and informal channels of communication between energy management and staff at all levels.

Nearly all providers are taking a proactive and in some cases a creative approach to procurement of a wide range of materials and equipment. Innovative practice in one college using online bidding, resulted in the purchase of high spec IT equipment valued at £50, 000 for £250 (plus shipping). Some colleges are also working with a global company in catering to encourage the purchase of local food produce. Some providers are using or seeking to use the Office of Government Commerce for energy purchases and at least one is a member of the Crescent Purchasing Consortium organized by the Environmental Association of Universities and Colleges (EAUC, n.d.). One college outlined the policy for acquiring flat screen monitors (TFT) for computers, as new purchase or replacement, as these use 30 per cent less energy than the traditional cathode ray tube monitors and their environmental impact is much less as the lead component consists of a few grams of solder and not up to the 1 kg of lead contained in some CRTs. Another college is investigating the purchase of non-directional carpet tiles that can be moved around to distribute wear and thus extend their life. The carpet tiles are made from recycled materials and 100 per cent green energy, and are sourced from a company with a significant reputation in the sustainable development field.

For most providers, paper recycling is a dominant activity. Bottles and cans are also routinely recycled. There is little emphasis in most on other waste streams such as batteries, food waste and plastics. There is an overall concern to reduce waste going to landfill. Innovative practice in one college with a refurbishment and new build programme was to retain construction waste on site, hire a stone crusher and use the resulting aggregate in the new build, thus saving £40, 000. In respect of the disposal of its IT equipment, one college contracts with a local company which collects and refurbishes the equipment for further use; another donates its IT equipment to local schools.

Most organizations have or are beginning to develop and implement travel plans; many actively support car sharing by providing car-parking incentives. One college links its daily timetable to the local train timetable. Others are working in wider local authority transport initiatives to reduce car use and promote either cycling or the use of public transport. Many of these initiatives are still in their infancy and are subject to variations in pricing by the local authorities. One college has negotiated a bus service for their students over a wider area and as a result, this has provided transport for nearby villages which otherwise would not have a bus service.

Some car-sharing schemes are making use of sophisticated software packages linked to global information systems to identify potential sharers. Some schemes are district-wide and web based. The most effective green travel plans involve significant promotion through a range of channels, as well as holding promotional events such as ‘Try a bike’ day or ‘Leave the car at home today’ or ‘Ride for health’. The impact of one travel plan of one provider is set out in Table 18.1.

## *Courses and Curriculum*

Overall, 67 per cent of respondents report that they embed some sustainable development concepts or approaches into some of their courses and programmes. Of

**Table 18.1** Use of a particular mode of transport by employees (%)

| Mode | 1998 | 2001 | 2003 | 2005 |
|---|---|---|---|---|
| Car driver | 71.3 | 56.4 | 49.4 | 44 |
| Car share | 0.0 | 0.0 | 7.0 | 12 |
| Car passenger | 7.7 | 8.6 | 5.1 | 3 |
| Motorcycle | 0.6 | 0.4 | 0.6 | 0 |
| Bus | 5.5 | 10.2 | 9.4 | 11 |
| Train | 2.0 | 3.6 | 2.4 | 4 |
| Cycle | 2.1 | 3.2 | 3.9 | 4 |
| Walk | 10.8 | 16.9 | 20.6 | 18 |
| Work from home | 0.0 | 0.6 | 1.7 | 4 |

the 48 per cent of respondents who do not have an sustainable development policy, 62 per cent of these report that sustainable development concepts or approaches are embedded into some of their programmes and 67 per cent are implementing or considering a 'healthy college' programme.

A high proportion of respondents (nearly 70 per cent) said they were embedding concepts or approaches to sustainable development into existing courses and programmes. A rather more mixed picture emerged from the institutions visited. In a few instances, the process of integration is clearly underway. In some specialist land-based colleges the emphasis on environmental sustainability through countryside management courses, agriculture and horticulture programmes and some construction programmes is evident in course handbooks, learning materials and library resources more generally. However, even here the wider concept on which the sustainability agenda is based is less evident. There were generally fewer examples of taking a wider and more holistic approach to sustainable development in the organizations visited. Some colleges are addressing the agenda through citizenship programmes, group tutorial work, and personal and social development programmes. Staff at one college spoke of 'mining the curriculum' to identify opportunities to embed principles of sustainable development. One college had used the National Council for Further Education programme as a cross-college approach and had found these approaches useful, but as a level 1 award it is generally less applicable for high level provision. The absence of higher level generic provision is a barrier to the wider adoption of sustainable development in most institutions. In addition, the awarding bodies have been slow to change their accredited curricula and most providers viewed this as slowing progress in curriculum reform.

## *Employer Relations*

Overall 31 per cent of respondents actively seek to work with socially and environmentally responsible employers. Of the 48 per cent of respondents who do not have an sustainable development policy, 25 per cent of these actively seek to work with socially and environmentally responsible employers.

The survey revealed a generally limited response to the question of whether providers were actively seeking to work with environmentally or socially responsible employers. This was also confirmed during the visits. A few providers could identify some employers in this category with whom they had some engagement. However, in many instances there was a limited awareness of which employers in their area were taking a more proactive stance in response to environmental or social issues.

## *Community*

Overall 28 per cent of respondents have developed networks to promote sustainable development. Many more (75 per cent) share facilities with local community and 77 per cent of students undertake volunteering activities. Of the 48 per cent of respondents who do not have an sustainable development policy, 71 per cent share facilities and 76 per cent have student volunteering activities.

Many respondents to the survey said that they shared facilities with local organizations. Some of these were organizations responsible for local nature reserves or local environmental groups and hence the provider was able to contribute to the debate about local and regional conservation issues. Some colleges visited were members of the EAUC and most were positive about the benefits of belonging to a wider network that could offer mechanisms for sharing good practice. Nevertheless, there was some discussion about how the EAUC might help lead the sector in offering baseline energy consumption data and, more generally, benchmarking frameworks for different types of provider.

## *Conclusions*

This survey highlights some of the emerging good practice in implementing the sustainable development agenda in LSC funded organizations. However, there is still a significant gap between policy discourse, as exemplified in the government's action plan (DfES, 2003b), and the range and scale of good practice which is outlined in this survey. There are a number of new initiatives that could help strengthen the embedding of sustainable development in vocational programmes, for example, the development of regional skills strategies for emerging environmental technologies, such as microgeneration of energy, waste management, recycling and pollution control (Advantage West Midlands, 2002).

Most of the providers visited exhibit elements of good practice. However, all those visited stress that they are still at an early stage in their implementation of their respective strategies on sustainable development. Hence, this survey provides only a snapshot of a dynamic process. In most of those organizations in which progress is being made there are a number of defining characteristics:

- A strong emphasis on explicitly shared values and vision;
- A commitment to the process being inclusive, involving all stakeholders – staff, students and the wider community;

- Well-informed and visionary leadership who themselves are part of a learning process;
- Clear and inspiring communication, including sustainability champions;
- Strong emphasis on sustainable energy and resource management, including transport;
- Regular and rigorous appraisal of progress;
- An integrated and systemic approach across the whole organization.

The survey exercise has been useful. In itself it has not progressed the agenda but we now have information upon which to build. The areas outlined below are possible next steps and are suggested with the caveat that there is much to do in all aspects of provision.

*Leadership and management*: We have found exemplary leadership and management and can now devise strategies to transfer and develop practice. We have begun work with the Centre for Excellence in Leadership (n.d.) to explore the embedding of an sustainable development conceptual framework in existing leadership and management programmes. We have also identified principals who can develop the debate amongst their peers and champion sustainable development with the LSC, government and other stakeholders.

*Buildings and estates*: We are developing close links with the Environmental Association of Universities and Colleges as their project on sustainable procurement progresses. We are lobbying government to allow extra funding so that providers can choose alternative energy/sustainable construction options in their capital programmes. Given extra funding, we will develop learning opportunities from capital-build programmes so that construction students, for example, could benefit from observing or even being involved with live projects that incorporate sustainable development concepts.

*Curriculum*: Perhaps this is where the most work needs to be done. We need to work closely with awarding bodies, the Qualifications and Curriculum Authority, the Sector Skills Councils and providers and learners so as to embed issues of energy and waste in all vocational provision, as a first step. Initial teacher training programmes and competences are being reformed currently, and we hope to develop pilot work to train the trainers. Exploring links between enterprise and citizenship education would be beneficial. Both of these areas are developing separately from each other and from sustainable development.

*Community*: In this area, in particular, we need government to help us to join-up policy. The new Department for Community and Local Government that is responsible for developing the sustainable communities agenda has priorities to create learning laboratories in each region, as well as renew the professional qualifications of built environment specialists. The learning and skills sector is ideally placed, and experienced, to aid the delivery of this change, if sufficient preparation and policy links can be made.

There is every sign that the dogged work of sustainable development enthusiasts in the UK will be reciprocated in the next few years by government and its agencies. We will be able to use the baseline audit to measure our progress in a systematic way.

## Case Study: Somerset College of Arts and Technology

This college has adopted a values-led whole institution approach. It features strong leadership and management and its primary catalyst is the Genesis Project – a sustainable construction programme. The Somerset College of Arts and Technology (n.d.) has developed a wide-ranging and innovative strategy for sustainable development. The principles of the strategy are clearly articulated in the college environmental policy and its strategy for sustainable development education:

> The college recognises that its business activities result in both direct and indirect environmental impacts and that our responsibilities extend beyond the education and training of learners and include responsible environmental management. We are therefore committed to . . . reducing our direct and indirect environmental impacts. The college also has a key influencing role in promoting sustainable development through the education process.

Its policy statement includes:

- Applying sustainability criteria to subcontractors and suppliers
- Minimizing waste
- Complying with environmental legislations
- Working with key stakeholders inside and outside the institution to manage environmental impacts
- Learning from and sharing good practice
- Reporting annually on progress.

These objectives are also reinforced through the college's statement of values that are given prominence throughout the campus on notice-boards and in their prospectus and website.

These strategies are promoted and led by a team of 32 self-selected sustainability champions, two for each department or service. The champions have been divided into two categories: communicators (aptly named 'Tree Frogs') and activists ('Friends of Genesis'). The communicators act as primary disseminators of information to help raise awareness of how the institution is progressing the sustainable development agenda. They participate in discussion groups and act as role models of sustainable behaviour. Activists support wider college sustainable development activities, including active support for community events in the Genesis Centre. They make a personal commitment to become more aware of sustainable development issues through reading and discussion group activities and help other staff to make changes, as well as advising others.

All the champions participate in two 160-hour continuing professional development modules in sustainable development education (level 1 and 3) offered by the University of Plymouth. The learner outcomes of the modules include:

- The ability to demonstrate an understanding of the concepts of sustainability and sustainable development;
- The ability to demonstrate knowledge and understanding of sustainable natural, social and economic systems and their interdependence;

- The evaluation of current notions of economic growth, standards of living, equity, justice and quality of life;
- Developing their pedagogy, curriculum and assessment in a sustainability framework.

Central to the college's strategy is a major new initiative, the Genesis Project. This project features an innovative resource centre that demonstrates the use of sustainable construction materials and methods (see also Martin et al., 2004). The Genesis Centre (n.d.) is a recognized CoVE in sustainable construction with separate pavilions built from environmentally friendly materials such as straw bales, timber, earth and clay, traditional cob and using recycled denim for insulation. The Centre draws its energy from solar panels and a biomass boiler.

The Centre provides a one-stop venue for all aspects of sustainable construction education and training and product demonstration and advice. The Genesis Project has stimulated a wide range of curriculum activity, both with the college and in partnership with local schools and a joint foundation degree in sustainable construction with Plymouth University.

Local schools visit the centre to learn more about sustainable construction and the use of alternative materials. Pupils have the opportunity to try their hand at building, using mini straw bales and cob blocks. Such opportunities provide new and challenging ways of raising awareness of the current contribution that construction makes to waste (about 25 per cent of total waste in the UK) and to greenhouse gases through energy use (buildings account for a full 50 per cent of total energy consumption). In nursery education, children participate in activities such as digging in their garden and growing different vegetables. They talk about saving energy in their playroom and recycle used paper. They also visit the Genesis Centre and learn about sustainable construction materials, which helps develop their environmental awareness and enhance their language skills.

## Case Study: Working Herts Ltd

The key features of this approach were its focus on entry to employment, employer engagement and home energy use.

Working Herts is a small training provider based in Borehamwood, Herts and in Luton. It is a social enterprise model operated under charitable status with a board of trustees from the local community.

The organization was established in 1997 as a means of providing training opportunities in this part of Hertfordshire for low-achieving young people who are disengaged and some who are homeless. Its mission is twofold:

- To be the best hands-on training provider in the East of England
- To make Hertfordshire (and South Bedfordshire) the warmest place in England.

These twin objectives are met by providing up to 40 trainees at any one time, with a 22-week basic skills programme integrated with an Open College Network work-based programme in loft insulation. In addition, the trainees are given driving

lessons and obtain an accredited first aid certificate. On completion of their training, they are supported into employment.

The varied backgrounds of these young people is a major challenge to the programme organizers, but they have met this challenge with an innovative and highly stimulating work-based programme which raises the awareness and understanding of the trainees of a wide variety of sustainable development issues and their resolution. The focus on home insulation provides the trainees with an understanding of energy use and efficiency and its impact on climate change. By supplying loft insulation to poorer households with the help of grant aid the programme helps to alleviate fuel poverty.

The trainees work in teams of six with a trained and experienced supervisor and can carry out two to three installations per day. Overall, they insulate about 1500 houses each year. They carry out assessments of each household to determine the requirements for insulation materials, as well as health and safety risk assessments, including checking for the presence of pests (such as wasps, woodworm and mice). They work in collaboration with British Gas, which provides grant aid on a sliding scale, depending on the type of house and status of householder. Hence, the provision is supported by LSC funding as well as funding from the business sector. This training programme is being adopted as a model in Birmingham as part of a new venture called Birmingham Social Enterprise Energy Network. It aims to add value to energy efficiency programmes through local procurement and spend, to take energy efficiency to the 'hard-to-reach', and to create sustainable job opportunities in disadvantaged communities.

In addition to loft insulation, the trainees carry out household water consumption surveys. This entails visiting householders and collecting information on a range of questions, from number of residents and taps, to water use, range and types of appliances, etc. These surveys are commissioned by a local multi-national utility company to support their strategy for water conservation.

Working Herts provides an excellent example of taking young trainees with limited interest in environmental issues, raising their awareness and practical skills as well as generic social skills, including team-working and communication skills, to give them a broader platform for them to enter the workforce, better qualified and more able to develop a successful career in a range of occupations. Many will undoubtedly carry with them many of the social and environmental skills they have acquired and apply them in their chosen career.

## Notes

1. The chapter is based on a survey of the Learning and Skills sector carried out in 2005–2006 and published as *Sustainable Development in the Learning and Skills Sector – National Baseline Survey* (2006).
2. CoVEs aim to develop the skills and careers of those already in work and to enhance both the employability of new entrants to the labour market and the employment prospects of those seeking work (including self employment).

3. LSDA was a strategic national agency set up to carry out action research to improve the quality of post-16 education and training in England, Wales and Northern Ireland. The LSDA has been succeeded by the creation of the Learning and Skills Network (LSN).

## References

Advantage West Midlands (2002) *Cluster Mapping and Analysis in the Environmental Industries of the West Midlands*. http://www.advantagewm.co.uk/environmental-mapping-report.doc. Accessed 27 May 2007.

Association of Universities and Colleges (n.d.) Home page. http:// www.eauc.org.uk

Baines, J., Cohen, J. and Martin, S. (2005a) United Kingdom: skills development for the 21st century. *Prospects*, 35(3): 355–365.

Baines, J., Cohen, J., Brannigan, J. and Strachan, G. (2005b) *CoVEs Focus on Future Skills: Sustainable Development in Construction, Agriculture and Food Technology: Final Report*. Learning and Skills Development Agency: London.

Centre for Excellence in Leadership (n.d.) Home page. www.centreforexcellence.co.uk

DfES (2002) *Success for All: Reforming Further Education and Training*. http://www.dfes.gov.uk

DfES (2003a) *21st Century Skills: Realising Our Potential*. http://www.dfes.gov.uk

DfES (2003b) *Sustainable Development Action Plan for Education and Skills*. http://www.dfes.gov.uk/sd/action.shtml

DfES (2005) *14–19 Education and Skills*. http://www.dfes.gov.uk

DfES (2006) *Further Education: Raising Skills, Improving Life Chances*. http://www.dfes.gov.uk

Genesis Centre (n.d.) *Somerset College of Arts and Technology*. http://www.somerset.webhoster.co.uk/genesis05/

Learning and Skills Network (n.d.) http://www.lsneducation.org.uk/sustainable

LSC (2005) *From Here to Sustainability*. http://www.lsc.gov.uk

Martin, S., Martin, M., Cohen, J. and Aitken, L. (2004). *Contributing to Sustainable Development: Centres of Vocational Excellence*. Learning and Skills Network.

Martin, S., Martin, M., Cohen, J. and Correo, R. (2006) *Sustainable Development in the Learning and Skills Sector: National Baseline Survey*. Learning and Skills Development Agency: London.http://www.lsneducation.org.uk/user/order.aspx?code=062427&src=XOWEB&cookie_test=true

Somerset College of Arts and Technology (n.d.) Home page. http://www.somerset.webhoster.co.uk/index.html

Working Herts (n.d.) Home page. http://www.hertsdirect.org/comdirectory/comvol/employ2y/emplyservice3/534025

# Chapter 19
# Germany: Policy-making Strategies and Project Experiences

**Michael Haertel**

This chapter aims to help concretize the debate on how to achieve the objectives associated with the principle of sustainability, and to describe how vocational education and training can contribute to this process. A case-study approach to the topic has been chosen deliberately, so that concrete experiences and examples are used to illustrate ways of operationalizing the formulated policy objectives and achieving process-based implementation.

Hence, the examples of technical and vocational education (TVET) for sustainable development described below are also intended to document the fact that sustainable development can be understood only as a process; whilst it is possible to make qualitative progress towards its objectives, it is probably impossible to accomplish them completely in all their complexity. Science and research are always opening up new options for reconfiguring the economic, ecological and social spheres and adapting them dynamically to constantly changing conditions. The debate on sustainable development is aligned with the endeavour to shape societal and economic development in such a way as to enable (environmentally) liveable conditions for the majority of the population. Yet while that continues to remain a very distant reality, the alarming outlook for the future indicates an immediate need for action. Options for a gradual reorientation of vocational education towards sustainability criteria are set out against the backdrop of current pilot projects, with the aim of documenting the scope for action and reform in this central area of education policy, stimulating debate on the issues, and initiating relevant co-operation projects.

A further aim of this chapter is therefore to make the documented findings from concrete joint action in TVET for sustainable development available to other educational planners and responsible parties. Such knowledge sharing is organized in co-operation with UNESCO–UNEVOC International Centre for Technical and Vocational Education and Training and those responsible for the United Nations Decade of Education for Sustainable Development.

M. Haertel
Federal Institute for Vocational Education and Training, Bonn, Germany
e-mail: haertel@bibb.de

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Taking into account the whole debate about sustainable development, the German government has committed itself to systematically integrating the underlying principles of sustainable development into its policies (Federal Ministry of Education and Research, 2002). Referring to this background and its essential significance for the implementation of action, the chapter addresses the importance of focusing on ways of securing sustainable development through initial and continuing vocational education and training.

High priority is being attached in this context to providing orientation for vocational education and training for the move towards a quality approach which integrates the principles of sustainable development. The long-term sustainability of benign work and production structures can be ensured only by gaining the informed and active involvement of suitably skilled staff-from skilled workers to the management level. Therefore, the next sections describe

- Policy-making as one fundamental prerequisite for the implementation of vocational education and training for sustainable development;
- The example of a pilot scheme for the development of necessary qualifications in the field of bioenergy as one means of initiating sustainable rural development;
- The significance of qualified training staff and the need for training content;
- The potential of information and communication technology (ICT) for global knowledge sharing.

## National Political Initiatives to Foster Vocational Education and Training for Sustainable Development

The German government's strategy for realizing concrete action in pursuit of the goal of sustainable development is a process-oriented approach (Fig. 19.1 and Fig. 19.2). As one means among many others, it commissions a wide variety of highly professionalized experts to undertake frequent reports and studies analyzing the importance of vocational education and training for sustainable development. They advise decision-makers to fund research and development (R&D) projects that play a direct or indirect role in preparatory activities to shape vocational education and training for sustainable development:

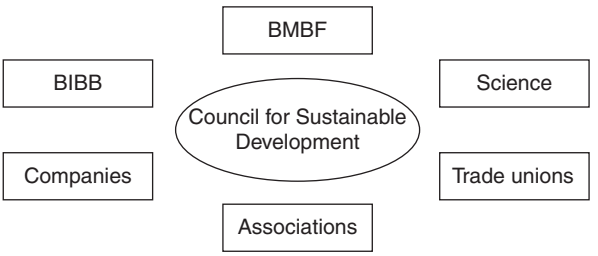


**Fig. 19.1** Designing national strategies – partners of excellence
Source: BiBB

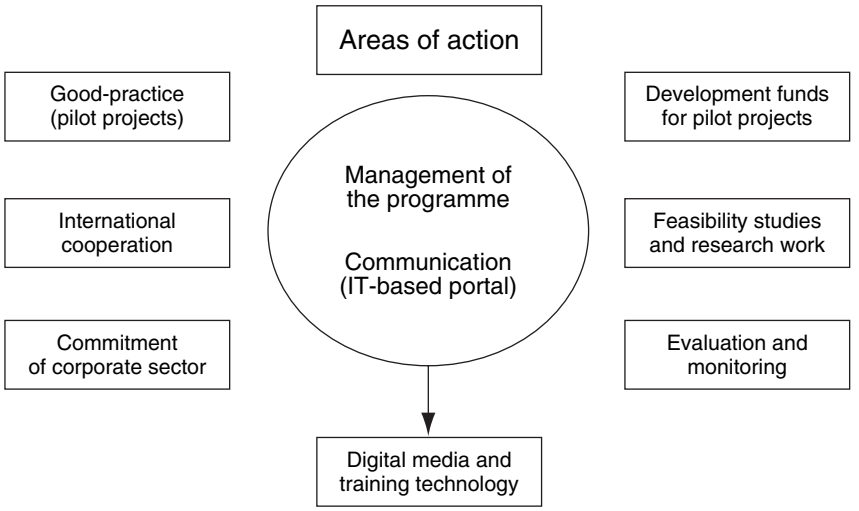


**Fig. 19.2** Overview: coordinated action
Source: BiBB

> R&D is used not only to tap new knowledge but also for developing innovative methods, concepts, processes and strategies for giving the concept of sustainability a more concrete form and subsequently implementing it. The German government is therefore extremely interested in increasing the amount of research and development findings that are put into actual practice in society (transfer of knowledge). (Federal Ministry of Education and Research, 2002, p. 24).

Taking into account the specific needs and demands of the world of work, the so-called sustainability triangle, integrating environmental, economic and social aspects, needs to be given a more appropriate definition for this field of action. Every occupational activity, be it manufacturing, maintenance or a service, uses materials and objects which contain environmental resources in natural or in processed forms. There are no occupations which do not have either direct or indirect links with the environment. Occupational activities therefore pose inherent risks to sustainable development, but also have the potential to alleviate the pressures which militate against it.

Environmental assets such as clean water, clean air, uncontaminated soil and a stable climate are the bases not only of the very existence and future of all forms of life, but also of agricultural, industrial and artisanal production. As well as strengthening the domestic market, sustainable development expertise and know-how can develop into a sought-after export line. Implementing a policy of efficient management for sustainability and corresponding training for all members of the workforce has the direct effect of creating business advantages, such as avoiding corporate costs by reducing energy, water and resource consumption, by sorting and recycling waste and by reusing packaging.

Economic management that complies with the principle of sustainability can be determined on the basis of three fundamental management criteria, against which the sustainability of products, production processes and modes of conduct can be measured:

- *Regeneration*. Renewable natural resources such as timber or fish stocks must be exploited in the long term only within the limits of their capacity for regeneration, lest they be lost to future generations.
- *Substitution*. Non-renewable natural resources, such as minerals or fossil fuels must be exploited in the long term only to the extent that their functions cannot be substituted by other materials or sources of energy.
- *Adaptability*. The release of substances or energy must not be greater in the long term than the adaptability of ecosystems, e.g., the climate, forests and oceans.

A modern, far-sighted policy which intends to shift towards (a strategy of) sustainable development therefore attaches particular importance to companies and their workforces implementing sustainable development measures on their own initiative. This enables education policy-makers to find a more practice-oriented understanding of sustainable development and its demands to inform their discussions with representatives of the world of work.

Continuous optimization and reform of production structures are essential procedures for ecology-minded corporate processes. Corresponding training provision for all members of the workforce, from skilled workers to management, is a key factor in making this continuous improvement process possible.

Seen within this context, knowledge and skills relating to sustainable development – both during training and in the working life proper – become quality factors which are in high demand for any workforce that is both aware of and competent in its actions. Training personnel play a major role in developing sound training programmes that follow the philosophy of sustainable development, and must therefore be equipped with the relevant competences themselves.

Despite much effort and recognition of the necessity for more sustainable, benign production procedures, there is still further ground to cover in integrating education for sustainable development into vocational education and training and institutionalizing it in corporate practice.

All important documents, resolutions and recommendations over the past 10 years have stressed again and again the significance of vocational education and training for the realization of sustainability goals. However, there is still insufficient awareness, acceptance and a concrete definition of conceivable fields of action.

Based on these findings, the German government decided to launch a target-oriented action programme on vocational education and training for sustainable development. It commissioned the Federal Institute for Vocational Education and Training (BIBB) with:

- The management of the preparatory phase of this programme
- All activities related to its implementation

- Monitoring and evaluation
- Knowledge transfer into the vocational education and training community.

The aim of the preparatory phase was to create an appropriate foundation for making decisions about the realization of an action programme. It was announced by the Federal Ministry for Education and Research in 2003. The duration of the programme was scheduled for up to five years from its launch in 2004.

Within the first phase of the action programme, five pilot schemes in specific occupational fields were realized:

- Renewable resources and rural development (bioenergy)
- Training for sustainable development in skilled trades
- The automotive components industry
- Building and facility management for sports facilities
- Process automation in the industrial sector.

Concrete results of these pilot schemes are expected soon. Initial impressions indicate that a high amount of authentic content-related training material has been generated, especially for trainers. Of the pilot schemes listed above, the one dealing with renewable resources (bioenergy) will serve as an example to illustrate the expected outcomes (Fig. 19.3).

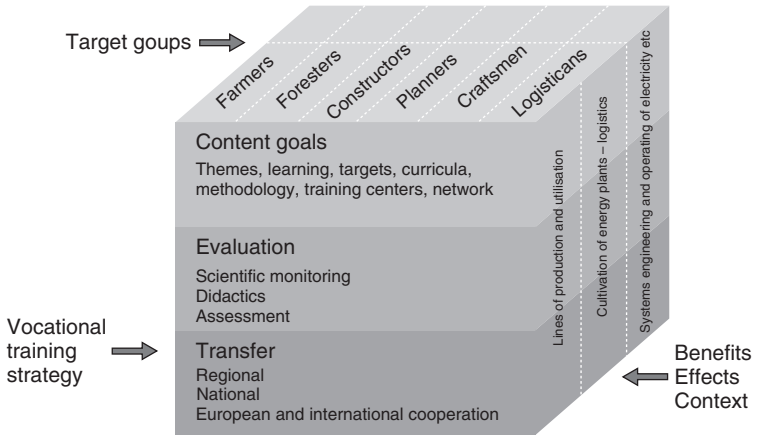


**Fig. 19.3** Pilot scheme: skills and qualifications in using bioenergy in rural areas

## Renewables and Rural Development

German agricultural policy is based on the Common Agricultural Policy (CAP) of the EU. A central element of the CAP is an integrated, sustainable policy for agriculture and for rural regions, paying increasing tribute to environmental interests

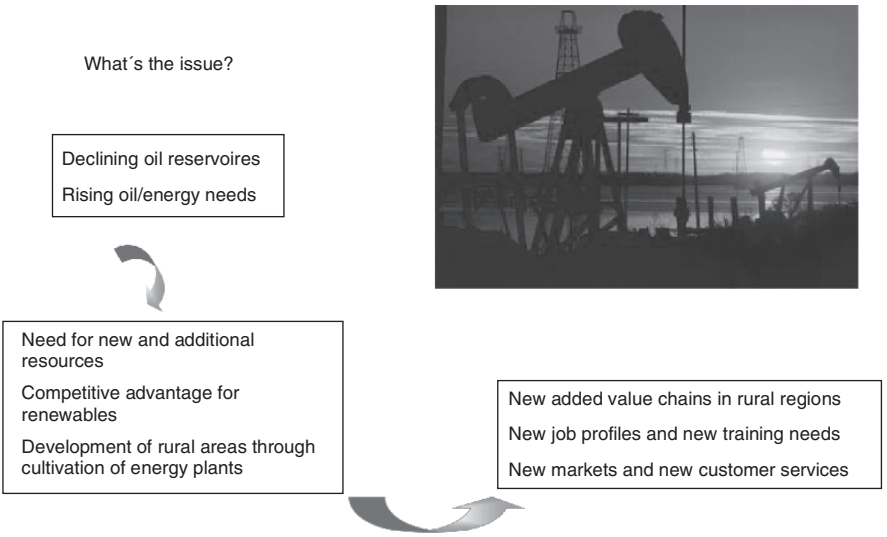


**Fig. 19.4** New perspectives for rural areas
Source: BiBB

(Fig. 19.4). Ongoing WTO negotiations and the recently expanded EU with its new central and eastern European members will also have a considerable influence on the sustainability of German agriculture. Moreover, the Kyoto Protocol, which is intended to minimize the $CO_2$ problem of raw fossil materials and fossil fuels for the sake of mitigating climate change cannot be left out of the equation. In this context, agriculture will face a substantial modernization process that will also extend to its preliminary and its downstream purviews.

Interest in making use of domestic biological materials as a source of energy and raw material will grow significantly, mainly driven by the demand of small and medium-sized industries. Both sectors will be part of the sustainable development of rural regions. Apart from these very different ways of using agricultural products, however, both traditional agriculture (food) and the so-called 'new agriculture' (non-food) will ultimately face the same problems with respect to recycling and disposal.

Renewable primary products fit perfectly into the frame of sustainability. For agriculture and forestry, however, they represent innovative products, processes and services. In producing biogas from liquid manure, for example, agriculture will benefit from multiple sustainable effects: the combined generation of power and heat/cooling, the environmentally friendly treatment of liquid manure, reduction of emissions and, finally, better availability of nutrients for crops.

Rapid future growth is expected in this market and likewise in the demand for information and education on how various natural resources in agriculture and forestry can be used, either as energy carriers or as a source of raw materials. At

the same time, social changes and society's changing expectations will accelerate this process. Therefore there is an increasing need for specialized, professionally qualified personnel and consultants in rural areas with expertise all along the production, processing and recycling chains involving these materials.

In the process of disseminating bio materials in the market and attracting consumers to renewable energies and materials, information can be regarded as a key to success. This demands a rethink in vocational education and training. Thus, the opportunities for vocational education and training in supporting the current process of market development for renewable primary products are tremendous. The main actors confronted by these new opportunities come from the following sectors; public services and governmental institutions, agriculture and forestry, manufacturing industry, retail sales, consumers, waste management/energy industry and education and training.

What a new interdisciplinary concept of education in renewable primary products needs – in addition to an overall strategic approach geared towards sustainability (economy, ecology, society) – is a sound analysis of how to develop new energy and material products and recovery lines. Furthermore, it will be necessary to investigate regional possibilities for creating additional value for agriculture and forestry as well as for local industry in the form of modern, sustainable recycling management. Additional aspects to be taken into account are how educational goals and qualification needs can be incorporated into educational practice.

The educational initiatives of the EU should be also kept in mind, especially with regard to the national economies of the new EU member states in central and eastern Europe, which are highly dependent on the agricultural sector. It is already evident that these countries are confronted with an urgent need for concepts for sustainable (rural) regional development, the know-how to implement them and corresponding quality management systems.

Many developing countries face the same problems, particularly the need to find ways of halting or minimizing migration from rural areas to urban areas. A powerful strategy to modernize rural development, focusing on renewable energy, could make a decisive impact in addressing the challenge of migration. Qualification strategies, additional forms of employment, income-generating opportunities and regional development would symbolize this new and sustainable value chain for rural development.

With respect to the first results of the pilot scheme, a new set of qualification needs emerges. In agriculture, new possibilities arise to develop continuing education programmes for the profile of an 'energy and raw material farmer'. To accommodate this development, the necessary educational thrust should involve such topics as recycling management, regional planning, marketing, technology transfer and waste management. Sound knowledge and qualifications are necessary in relation to sustainability, renewable primary products for energy and material recovery, ecologically sound integrated product systems and modern processing and fabrication technologies. When biological waste treatment enters the new markets successfully, the picture will be complete.

Farmers need to be skilled at thinking not only in their own, farm-related dimensions but also in regional dimensions in order to open up and enter new supply markets, to provide themselves with energy, heat and biofuel or to feed their locally produced energy into public grids either for electricity, heat or gas. This requires knowledge about biogas plants, biomass cogeneration plants, esterification plants and so on.

## A Didactic Approach to Teaching and Training

The principle of sustainable development calls for an integrated approach to ecological, cultural, social, economic and global considerations. The prospect of full integration here cannot be guaranteed in the long term by the instruments of science, technology, economics and law alone. If the principle of sustainable development is to be implemented successfully, there is also a need for education, training and the development of competence in all fields.

Teachers and trainers frequently face the problem of how to integrate the issue of sustainability into the instruction they provide at college or the workplace. They play a decisive role in developing an understanding and awareness of sustainable development in initial and continuing vocational education and training. From personal experience they know how difficult it can be to put across the message that sustainable development starts with one's routine activities in the workplace. Indeed, working effectively alongside the triangle of sustainability is more than just a matter of applying technical expertise and complying with regulations and standards. In many instances there is a lack of teaching and training materials which are applicable to operations in the workplace and which motivate students and trainees to ensure that their conduct is in line with the principle of sustainability.

In the light of this situation, BIBB has developed an interdisciplinary concept to support teachers and trainers in their efforts to integrate the demands of sustainable development into the practices of vocational education and training in a systematic and practical manner. The concept was developed in co-operation with teachers and trainers working in vocational education and training in the new (eastern) federal states of Germany; where it was tested in companies, in vocational training centres and in vocational colleges. It is now being used in the form of manuals on education and training for sustainable development relating to the following industrial sectors: industrial metalworking, sanitation, heating and air conditioning engineering, construction, motor vehicle, chemical and commercial occupations (Fig. 19.5).[1]

The education and training concept can be used to support the development of occupation-related skills based on the principles of relevance and practical action. It contains everything required to prepare and deliver the relevant training and instruction. The contents, goals and methodologies have been carefully co-ordinated to facilitate a holistic form of learning.

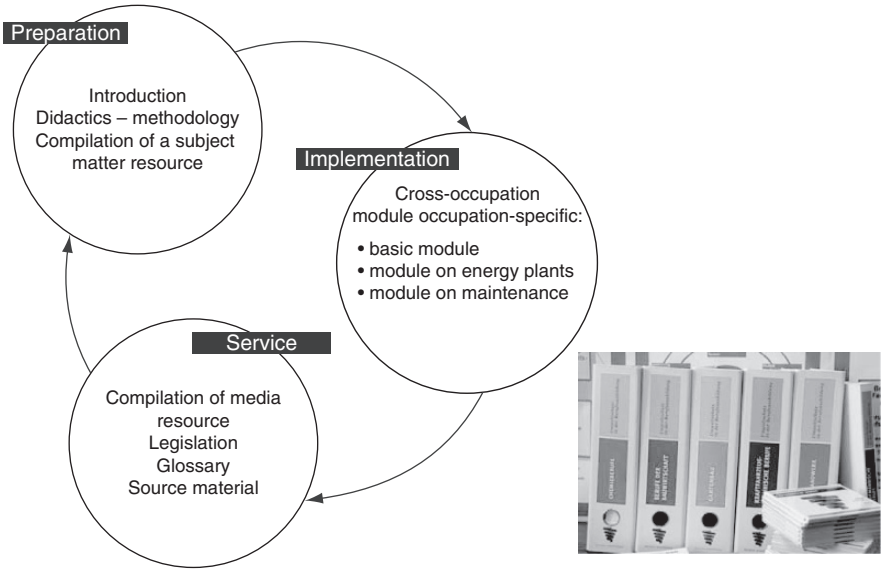


**Fig. 19.5** Manual for teachers and trainers
Source: BiBB, 2008

Defining concrete learning goals is the first step in integrating environmentally relevant knowledge, skills and abilities into vocational training. The immediate goal of this integrative approach is to remove the barrier between occupation-specific skills, on the one hand, and skills relating to environmental protection on the other, so that the latter are seen and treated as a fundamental element of all activities in the workplace.

The ultimate goal of all environmental training measures is to acquire thorough proficiency in dealing with any aspects of sustainable development with a bearing on one's occupational activity. This proficiency can be described as follows:

- Accepting responsibility for sustainable development and being qualified to take action to protect it;
- Having the ability to apply subject-related expertise and to share this with others;
- Mastering the skills required for the proper handling of materials and processes which pose a hazard in terms of sustainable development;
- Demonstrating sound conduct based on the principles of sustainability in the workplace and in one's own private life, including in situations involving conflicting interests.

In this context professional competence also presupposes that all parties concerned display a readiness to change their behaviour accordingly.

Having measures of sustainability implemented by suitably skilled workers is an aim which promises benefits to every company in two respects. On the one hand,

it averts hazards to people and their natural living environment. On the other, low energy consumption, the use of environmentally friendly materials and environmentally clean and sustainable processes, intelligent transport and logistics procedures and waste management concepts geared towards waste avoidance can reduce costs and, in the long term, enhance corporate competitiveness.

Each manual follows a standardized three-part structure:

- Introductory guidance on preparing the training and instruction;
- Cross-occupation and occupation-specific training content, e.g. on maintenance and recycling in industrial metalworking occupations, on timber protection and sorting and reducing waste on building sites in construction occupations;
- Systematized information on topic-related legislation and information sources, with a glossary.

This common basic structure attaches particular value to the advantages of repeat recognition in occupation-related education and training for sustainable development (Fig. 19.6). The structure also allows for the planning and subsequent implementation of practically relevant training and instruction units on sustainability in the workplace, for example units on eco-audits, recycling and maintenance. The manuals not only describe various teaching and training methodologies, they also provide practical hints and tips on their use. Each methodology gives the learner access to general problem-solving strategies.

The content has been systematically prepared and is presented in book form: the manual. Each individual manual leaves sufficient leeway for developing a personal approach to designing the learning process. All the teaching and learning materials have been designed to dovetail with each other and also leave scope for expansion. Thus, the learner is familiarized with the way in which proper maintenance practices

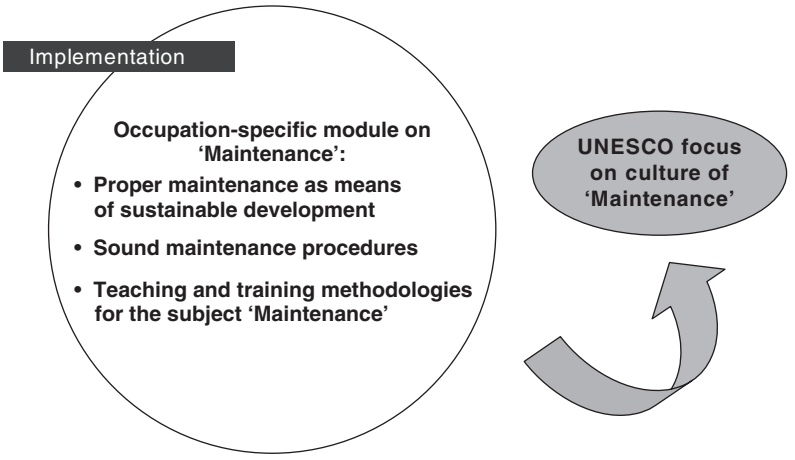


**Fig. 19.6** Occupation-specific module on 'Maintenance'
Source: BiBB

make an important contribution towards a cleaner environment and simultaneously give a concrete action-oriented profile to the process-based approach of TVET for sustainable development, protecting the environment:

- By means of proper maintenance (using products and devices for a longer time than previously);
- During maintenance operations and by means of alternative maintenance procedures (such as mitigating their environmental impact);
- By means of modernization (such as replacing outdated components).

The basic notions relating to maintenance work are explained in a concise and precise manner. Also provided are specially prepared examples and numerous photocopiable worksheets which are suitable for use by teaching and training personnel in demonstrating the environmental importance of proper maintenance at various steps in the training (e.g. maintenance analysis: the evacuation of air from a hydraulic system).

Again, following this training philosophy, the path to sustainable development can gain its own distinctive profile in the world of work. These measures can, for example, increase the running time of plant and machinery-enhanced use of resources, recognize frequently occurring faults and environmentally harmful production modes and allow for corresponding measures – preferably preventive measures – to be initiated.

It becomes clear at this point, if not before, just how important access to up-to-date information is. Putting TVET for sustainable development into practice can be seen as a particularly pertinent symbol for the plethora of sometimes contradictory information and a rapid decline in the half-life of knowledge valid at any particular point in time. More importantly, it demonstrates that certain steps in developing environment-minded training content do not need to be repeated time and again.

It has to be conceded, however, that the demands to be met by such education and training for sustainable development extend beyond the capacities of initial vocational education and training. It is essential to follow this up with subsequent advanced and continuing training measures which are specifically geared to an individual company and workplace.

## Global Knowledge Sharing – Using the Potential of Information and Communication Technology (ICT)

The information society offers great potential in promoting sustainable development, democracy, transparency, accountability and good governance. Full exploitation of the new opportunities provided by information and communication technology (ICT) and of their combination with traditional media, as well as an adequate response to the challenge of the digital divide, should be important parts in any strategy, national or international, aimed at achieving the development goals

set by the Millennium Declaration (UN, 2002–2006). There is also a need for a people-centred approach that emphasizes social, cultural, economic and governance goals.

ICT so far has created the means and possibilities for the globalization of economics and labour, and national economies that cannot take part in this development will be at a serious competitive disadvantage. On a global scale, national economies need to keep competitive options open and to provide their populations with prospects of safeguarding their livelihoods in their own countries. To achieve this, it is necessary to build up and maintain access to network competence on all required levels.

ICT offer a fundamental opportunity to allow access to education and knowledge anywhere on our planet, without place and time restrictions. The Internet will develop into a global library with an overpowering influence as an information and knowledge database for all fields.

Access to this database, i.e. in the provision of technological prerequisites, the availability of the necessary infrastructure and the training of personnel qualified to implement and control specific knowledge management systems will become strategic resources or, in other words, factors contributing to added value in all national economies. New software products, increasingly complex hardware, modern means of (mobile) communication and an ever-expanding supply of information demand the continuing adaptation of work practices and processes. Purchasing, production organization, marketing and sales, in short, the whole of business logistics, is changing visibly and at shorter and shorter intervals. ICT is the motor of these transformations and has in the meantime become an almost natural part of (modern) economic and production processes.

The integration of technology brings together educational methods, content, services, new media, the Internet and globally accessible information networks. The globalization of economies and labour markets implies the full utilization of international knowledge as well as its delivery on a global scale. Making use of globally available knowledge, in the interests not only of initial and continuing training but also of sustainable development, is bringing about changes that are being felt by all strata of society.

The technological platform for globally available information already exists: the world wide web (WWW), which is increasingly also being used as a platform for delivering knowledge worldwide. The development process can only be speeded up if the expertise and continuing training opportunities are available when they are needed and, of course, where they are needed. The WWW is thus becoming the basis for the globalization of knowledge, a universal, globally accessible library. This has its advantages, but it also raises two major problems: firstly, the problem of the authenticity of the knowledge made available, a problem which is manifested mainly in attributing the authorship or authority of that knowledge and secondly, the problem of relating available knowledge to a continuing training need, to a problem in the workplace, which is manifested mainly as a search problem with lost-in-hyperspace effects.

The challenges for vocational training associated with rapid technological development thus move more and more into the field of vision of national educational policy efforts. Despite many residual problems, the use of modern educational technology is proving to be the central shaping factor for forward-looking vocational training.

## *Take Off: Thinking About an UNEVOC-Based Community of Practice*

One consequence of this emerging ICT-based technical and social mega-trend could be to launch a UNEVOC-moderated information technology (IT)-based 'community of practice'[2] which could be fully integrated into the infrastructure of the UNEVOC website (n.d.). The drivers of TVET-systems could make full use of all available technologies from e-mail to video conferencing and application sharing. More importantly it would allow for co-operation and collaboration among learning groups located across the world, with a view to sharing and continually updating educational expertise and experience, co-operative learning and projects and what the practical application of this expertise and experience entails in the workplace. It would allow access to national and international or global (information and knowledge) resources and ultimately, it would allow international participation in educational know-how and form the basis of international standards for educational design.

> The Dot Force concluded that, when wisely applied, ICT offers enormous opportunities to narrow social and economic inequalities and support sustainable local wealth creation, and thus help to achieve the broader development goals that the international community has set. ICT cannot of course act as a panacea for all development problems, but by dramatically improving communication and exchange of information, they can create powerful social and economic networks, which in turn provide the basis for major advances in development. (Dot Force, 2001, p. 3)

In addition to technological and organizational questions, other issues which come to the fore in this connection are questions concerning the effective promotion of learning, didactic and methodological standards for learning software and network-supported learning provision, as well as the corresponding learning architecture. Education policy, especially, faces a number of further challenges. Here are just some of the many critical aspects which need to be clarified:

- How can we make use of the possibilities of the knowledge/information society for the benefit of everybody, of society and of the economy?
- What can we do to reduce the gap between those who use ICT for learning and training and those who have to manage without the use of ICT?
- Do we need new forms of quality management and new criteria for quality standards?

- What consequences does the use of ICT have for education and training systems?
- Where (in which sectors) and how should the state (the public sector) take on an active role?
- What are the new responsibilities and roles for the stakeholders in guaranteeing the use of ICT in education and training?
- What role should the international community play in promoting improved training policies and their governance?

In spite of all the advantages which ICT offer to educational systems and the global economy as a whole, some very critical aspects of IT-based learning environments are still unresolved and build a barrier between the so-called 'on-liners' and 'off-liners'. They include:

- The lack of a learning model to define the role of IT-based learning in the mix of education and training delivery;
- The absence of a sustainable business model for IT-based learning environments;
- The lack of a well-tested and relevant delivery technology and learning management system;
- The availability of Internet connectivity and the high costs of online Internet delivery (telecommunication infrastructure, fixed lines);
- Internet bandwidth;
- The availability of learning material and the high design and development costs of IT-based learning material;
- Learner support and the facilitation of learning, also linked to the absence of a tried and tested learning model;
- The maturity of learners and their willingness to migrate to IT-based learning;
- The acceptance of this medium by current educational representatives, like teachers and tutors;
- Accessibility;
- Web didactic approaches.[3]

The need for continuing training in the environmental field is expanding and the demand for manpower with ecological competence is growing, while the demand for 'unskilled' workers is declining. The requirement placed on companies and thus on their workforces for flexibility in adjusting to the need for sustainability in their operations will become even more pressing in future. The problem facing SMEs is that they do not run their own training divisions: they have to outsource environmental expertise and training from the market.

Continuing training thus becomes an operation involving space and time constraints and the dependence on trainers to which the company has to adapt itself. Continuing training is oriented towards subject coverage and training personnel; it is geared to the average standard of competence required in the market and the average worker. The laws of the market play a more important role here than environmental education as such. The focus is on the rapid (and costly) meeting of needs and on calculating the cost of courses rather than on determining actual knowledge

requirements; so that what is received in return is global knowledge, rather than answers to one's own specific questions.

*Scenario one*. The customer wants an environmentally sound product. The supplier needs continuing training to provide that product and books a seminar with an external training provider. The seminar is held three months later. The supplier then submits a quotation for the enquiry and discovers that the customer has long since bought from a competitor or has in the meantime acquired the expertise himself/herself. This leads to a loss of image and the erosion of customer loyalty.

In a global information and knowledge society, the conventional seminar format undoubtedly has nothing to contribute today to developing the necessary environmental awareness and thus, equally, to promoting the necessary environmentally sensitive conduct, as is shown by the scenario already described. The development process can be speeded up only if the expertise and continuing training opportunities are available when they are needed and, of course, where they are needed. This should be done by a community of practice and its services, as mentioned above.

*Scenario two*. The customer wants an environmentally sound product. The supplier makes enquiries at the national information centre for environmental education in vocational training – either immediately from the workplace or at home that evening via the Internet. He/she obtains information on the subject of the enquiry, on relevant regulations, standards, cost calculation models, profitability accounting and, if he/she so desires, a course on the subject which will be delivered via the learning method of his choice. He/she uses the information, submits a quotation and gets the job order.

Once such an information and continuing training opportunity exists, the intrinsic motivation of employers and their workforces will be optimally primed, precisely because that opportunity is there when they need it – on demand and just in time, because the content can be configured to suit the problems which the company is facing, and because the knowledge will be consolidated by being put to practical use (learning by doing).

All the continuing training measures are backed up by a hotline operated from 06:00 to 00:00 daily. The hotline can provide tutorial support online, make proposals for company-specific support provision and provide learning aids for self-managed learning which make use of the motivation driven by the problem at hand.

Alongside this online tutoring facility, an UNEVOC-hosted hypermedia community of practice could provide further possibilities for communication and co-operation. In this respect it could make full use of all available technologies from e-mail to video conferencing and application sharing. In a full run-time environment it could manage co-operation among learning groups located across the world with a view to sharing and continually updating expertise and experience on TVET for sustainable development and what the practical application of this expertise and experience entails in the workplace.

## Just in Time and on Demand

BIBB has attempted to address the consequences associated with IT-based information and knowledge management processes in terms of the organization of work and training. The introduction and use of e-learning in vocational education and training is one of the most popular tools in IT-based information and learning environments. It changes the activity and job profiles of training staff and sets new standards for the qualification of personnel. This has also prompted BIBB to draw up new forms of employee qualifications and develop alternatives to traditional qualifications provision by integrating modern ICT technologies. This has led to the creation of the training staff qualifications portal, www.ausbilderfoerderung.de (BIBB, n.d.a.) In addition, the complementary tool www.foraus.de (BIBB, n.d.b.) is a portal providing current information relating to initial and continuing vocational education and training. Collectively, subject to comparison, discussion and analysis alongside success stories of IT-based information and knowledge management tools in other UNESCO member states, both portals could serve as examples for the design, test and evaluation of a UNEVOC-hosted community of practice.

In spite of all positive impacts there is still a general lack of the coherent concepts required to translate these new (network-supported) approaches to information and work into a didactic framework and thus facilitate the process of conversion to work-integrated learning applications. Content providers have also signed up to this aim, and the sector is introducing its own initiatives and business models in an attempt to establish a marketplace for digital media. The intention is to create broad-based and cross-sector content provision for e-learning that can be used interchangeably and in endlessly varying new combinations. In the long term, this has the potential to pave the way for the lower-cost production of digital media.

Against the background of these developments, BIBB is looking into the fundamentals of enabling the integration of electronic information into a methodological and didactic concept, with the aim of using this as a basis from which to investigate the learning potential involved. Debate is ongoing as to whether such electronic information can serve as learning modules for the purpose of (mobile) process-related qualifications. The course of developments in media and technology-based training is opening up opportunities to deploy digital media in the shape of (mobile) configured information, teaching and learning infrastructure, particularly with respect to in-company qualifications and service processes and in the sales sector, with its wide variety of service-related aspects.

The challenge here is to provide information systems offering ease of navigation and use, allowing content to be accessed easily and featuring learning elements that also contain qualifications components. The searchable information, moreover, needs to be presented in the form of the smallest viable learning units possible (granular units). In the interests of achieving the highest level of flexibility possible in terms of the reuse of content, it is vital to think in terms of sub-categorization into small learning modules that can be dynamically combined to form learning pages or exercises. The granular format and the structured clarity of learning content provision represent some of the key prerequisites for the convenient preparation

of content for the purposes of media-based training that allows use in a variety of work-process related target formats and application scenarios.

The ever-increasing pace of technological change in production processes could ultimately lead to the decentralization of training, bringing with it new demands with regard to individual learning process support activities, both for the trainers and skilled employees providing training. Within this specific context, the promotion of self-directed qualification by means of information and knowledge management represents a further strategic challenge for trainees. Handling these opportunities and having access to them will remain one of the most challenging tasks for the international community in order to close the so-called 'digital gap'. Delivering the great stock of experience, content and practice-oriented didactic approaches for TVET for sustainable development, just in time and on demand, would describe the main service task of a UNEVOC-hosted community of practice. Such access to existing information and knowledge would be a first and urgent step to support and improve education for sustainable development initiatives in many cases. It could strengthen and motivate decision-makers in this field to plan and realize individual national strategies, taking into account existing models, success stories and experiences.

## Notes

1. BIBB Research Project 3.3003, *Umweltgerechte Berufsausbildung in den neuen Bundesländern – Maßnahmen zur Förderung der Qualität beruflicher Umweltbildung* (Environmentally sustainable initial vocational education and training in the new federal states of Germany – measures to promote the quality of vocational environmental education). In the course of the project, a total of seven manuals for trainers, teachers and trainees were developed, tested and made available to the vocational education community (Federal Institute for Vocational Education and Training, 1999a, b, c, d, e, 2000a, b). A seminar guide on the use of the manuals in routine training completes this product range. A particular quality feature is the methodological–didactic approach developed for all the occupational sectors listed above, which creates a distinctive profile for initial vocational education and training in compliance with environmentally sustainable principles. Finally, reflection on this thematic area from a philosophy of education perspective was undertaken in Härtel et al. (2000).
2. The conceptual framework of a community of practice refers to the process of social learning that occurs when people who have a common interest in some subject or problem collaborate to share experiences, establish (common) solutions, and develop a culture of communication and joint action. Etienne Wenger did use this definition in relation to situated learning as part of an attempt to 'rethink learning' (Wenger, 2000, p. 7).
3. This list was discussed during the Pan European Regional Ministerial Conference in Preparation of the World Summit on the Information Society (Banciu and Haertel, 2002).

## References

Banciu, D. and Haertel, M. (2002) Conclusion of the thematic debate 'E Learning' Conference Report. Pan-European Regional Ministerial Conference in Preparation of the World Summit on the Information Society: Bucharest.

BiBB (n.d.a) (home page) *Ausbilderfoerderung*. http://www. ausbilderfoerderung.de. Accessed 28 September 2006.
BiBB (n.d.b) Forum for Ausbilder (home page). http://www.foraus.de. Accessed 28 September 2006.
Dot Force Report (2001) *Digital Opportunities for All: Meeting the Challenge*. http://www.dotforce.org.
Federal Institute for Vocational Education and Training (1999a) *Berufe der Bauwirtschaft* (construction occupations). BiBB, Berlin.
Federal Institute for Vocational Education and Training (1999b) *Kaufmännische Berufe* (commercial occupations). BiBB, Berlin.
Federal Institute for Vocational Education and Training (1999c) *Kraftfahrzeugtechnische Berufe* (motor vehicle occupations). BiBB, Berlin.
Federal Institute for Vocational Education and Training (1999d) *SHK-Handwerk* (sanitation, heating and air conditioning engineering occupations). BiBB, Berlin.
Federal Institute for Vocational Education and Training (1999e) *Umweltschutz in der Berufsausbildung – Industrielle Metallberufe* (industrial metalworking occupations). BiBB, Berlin.
Federal Institute for Vocational Education and Training (2000a) *Chemieberufe* (chemical occupations). BiBB, Bonn.
Federal Institute for Vocational Education and Training (2000b) *Gartenbau* (horticulture). BiBB, Bonn.
Federal Ministry of Education and Research (2002) *Report of the Federal Government on Education for a Sustainable Development*. BiBB, Bonn.
Härtel, M., Stockmann, R. and Gaus, H. (eds) (2000) *Berufliche Umweltbildung und Umweltberatung – Grundlagen, Konzepte und Wirkungsmessung* (Vocational environmental education and environmental consulting – principles, concepts and measurement of effectiveness). BIBB, W. Bertelsmann Verlag: Bielefeld.
UN (2002–2006) *UN Millennium Project*. http://www.unmillenniumproject.org. Accessed 29 September 2006.
UNEVOC (n.d.) (home page) http://www.unevoc.unesco.org. Accessed 18 September 2006.
Wenger, E. (2000) *Communities of Practice Learning, Meaning and Identity*. Cambridge University Press: Cambridge.

# Chapter 20
# Australia: The Role of Partnerships, Industry Skills Councils and Training Packages

**Linda Condon and Andrew Rickard**

## Introduction

Ongoing social and economic development is dependent on the health of ecosystems. With dependence on finite resources, providing quality and equitable lifestyles is a challenging prospect for present and future societies. This chapter presents results on the research, processes and outcomes that designed and implemented change across the national training sector. The environmental content of national training packages (TP) in Australia was researched using a set of indicators selected from the Global Reporting Initiative. In addition, audits were undertaken through TPs published on the National Training Information Service (NTIS) website. The results of the research highlighted the need to develop a set of guideline standards for Education for Environmental Sustainability (EfES) at the national training level. Partnerships were established by the National Centre for Sustainability with government agencies, Industry Skills Councils (ISCs) and registered training organizations to facilitate the development and implementation of the guideline standards. Work at the National Centre for Sustainability is continuing to integrate and enhance the newly endorsed units across industry with assistance from ISCs and government agencies. The following discussion outlines the move of the national training sector in Australia in reconnecting societies' industrial practices with ecological systems.

## The Issues

On the premise that 'social and economic development is not possible on a degraded planet' (UNESCO, 2004a, p. 8) there is a strong emphasis on using education for development towards sustainability. UNESCO (2004a) identifies the opportunities for vocational education and training (VET) to influence trainees by increasing their

L. Condon
National Centre for Sustainability, Swinburne University of Technology, Australia
e-mail: LCondon@groupwise.swin.edu.au

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exposure to sustainability concepts, practices and examples. It is argued that this approach will increase the likelihood of the desired workplace culture change for sustainability (UNESCO, 2004a, p. 10).

There exist significant national opportunities in the area of technical and vocational education and training (TVET) to build the knowledge and skill capacity of industries of the future. The importance of education as a strategy in skilling the future workforce for industries is vital, as industry training is inextricably linked to industry practices.

Work in Australia on TVET and sustainable development has been spearheaded by a few dedicated people in the various educational institutes, including research undertaken by ARIES (Keogh et al., 2004). Many in Australia have struggled to elevate environmental issues to a more strategic national level in order to have an impact across the entire training system.

The National Centre for Vocational Education Research (NCVER), which is unique in Australia's education system, has been involved in two projects that examine environmental issues from a TVET perspective. The NCVER is responsible for collecting, managing, analysing, evaluating and communicating research and statistics about VET. NCVER's vision is for policy and practice in vocational education and training to be based on sound evidence. Projects run by the NCVER which examine environmental issues include:

- TVET for sustainable development (commenced June 2006).
- Finding the common ground: is there a place for education for sustainability in VET policy and practice? (commenced July 2004). The outcomes of this work were released in 2007.

The National Centre for Sustainability (NCS) at Swinburne University of Technology (TAFE Division) has a dedicated focus on engaging the TVET sector, industry and community on issues relating to sustainability. The work undertaken by the NCS over the past three years has significantly shifted the national TVET sector towards addressing sustainable development in training.

## TVET in Australia

In Australia 1.6 million students were enrolled in the public TAFE system in 2004, with seven out of 10 students undertaking accredited training through the Australian qualifications framework (NCVER, 2005, p. 1). There are currently 75 training packages (TPs), with the most popular fields of study being management and commerce (329,000 enrolled students) followed by engineering and related technologies (257,800 enrolled students) (NCVER, 2005, p. 5).

The content and development of nationally accredited TPs is industry driven through industry bodies and associations. These bodies guide and advise the national accrediting body of skill requirements and emerging industry needs. TPs 'set out skills, knowledge, and attitudes a person requires to work effectively in a given

industry' (ANTA, 2003, p. 7). Since the completion of the research aspects of this chapter, the responsibilities and functions of the Australian National Training Authority (ANTA) have been transferred to the Department of Education, Science and Training (DEST, 2005).

TP development and maintenance in Australia is presently administered by ten ISCs. The development of ISCs was undertaken in 2003 to

> . . . develop national industry skills reports which give information about the scope and nature of the industry, the trends and directions of the industries, and the demand for skills and workforce development. (DEST, 2005)

The ten ISCs manage all but a few of the industry TP:

- AgriFood Industry Skills Council
- Community Services and Health Industry Skills Council
- Construction and Property Services Industry Skills Council
- ElectroComms and EnergyUtilities Industry Skills Council Ltd
- Government and Community Safety Industry Skills Council
- Innovation and Business Industry Skills Council
- Manufacturing Industry Skills Council
- Resources and Infrastructure Industry Skills Council
- Services Industry Skills Council
- Transport and Logistics Industry Skills Council (DEST, 2005)

Qualifications in the Australian VET sector range from Certificate 1 to Advanced Diploma level, which also includes links to higher education opportunities. All TPs consist of units of competency, which provide a framework for outcomes-based learning. Each unit of competency consists of elements, performance criteria, a range of variables and supporting evidence guides.

## The Need for Change: Our Research Findings

### *The Research Process*

To assess the content of EfES in industry TPs, an audit criteria based upon Global Reporting Initiative (GRI) indicators was developed. The GRI sustainability reporting guidelines are 'a framework for reporting on an organizations economic, environmental, and social performance' (Global Reporting Initiative, 2002, p. 8). The choice of adopting the GRI indicators was determined by their broad nature, their promotion of comparability and quality and their standing in the sustainable development community. As the GRI indicators do not at this time include a supplement for reporting on education, environmental sustainability indicators were selected and linked to a number of EfES search terms. These search terms provided the basis for whether or not the competencies and their elements in TPs were recognized as content addressing EfES. The GRI indicators and the additional 14 search criteria used throughout the research are indicated in Table 20.1.

**Table 20.1** GRI indicators and search terms

| GRI indicators | Additional search criteria | |
|---|---|---|
| Materials | Avoidance | Minimize |
| Energy | Reduce | Sustainability |
| Water | Reuse | Environment |
| Biodiversity | Recycle | Maintenance |
| Emissions, effluents and wastes | Treat | EMS |
| Suppliers | Recover | |
| Products and services | Contain | |
| Compliance | Dispose | |
| Transport | Efficiency | |

The process used to identify EfES content was undertaken using a word search through the NTIS website. The NTIS was a product previously administered by the Australian National Training Authority and consists of various databases that identify VET accredited courses, competency standards, TPs and training providers and text information on a range of complementary issues (NTIS, 2004).

Using the NTIS database, an assessment of the TPs was undertaken in 2004 by staff at the National Centre for Sustainability (NTIS, 2004). The results were documented using a matrix that recorded the TP, unit of competency, code and description of the identified competency element. The matrix format used to record results is illustrated in Table 20.2. Identified competencies were recorded using a binary process against the corresponding EfES criteria.

In total, 414 competencies in TPs returned results against the search criteria. This eventuated into a total of 724 hits against the selection criteria. TPs that did not record any affirmative finds were omitted from the results. The large number of hits is a result of competencies addressing two or more of the selected criteria. For example, the unit 'UTENES411A: Assess renewable energy apparatus and systems' in the Electrotechnology Industry TP received hits against both compliance and energy indicators, 'Assess renewable *energy* apparatus and systems to determine *compliance* with standards and for suitability for its application and prepare test/inspection documentation according to requirements'.

The composition of the total number of hits is illustrated in Fig. 20.1. The dominance of 'emissions and waste' as well as 'compliance' is evident, representing a total of 67 per cent of all hits. These results are supported by findings and conclusions by Russell (2003) and Condon and Young (2004).

**Table 20.2** Sustainable development issues examined

| The issues examined against each relevant unit of competency | |
|---|---|
| Materials | Suppliers |
| Energy | Products and services |
| Water | Compliance, legal and regulated |
| Biodiversity | Transport |
| Emissions, effluent and waste | |

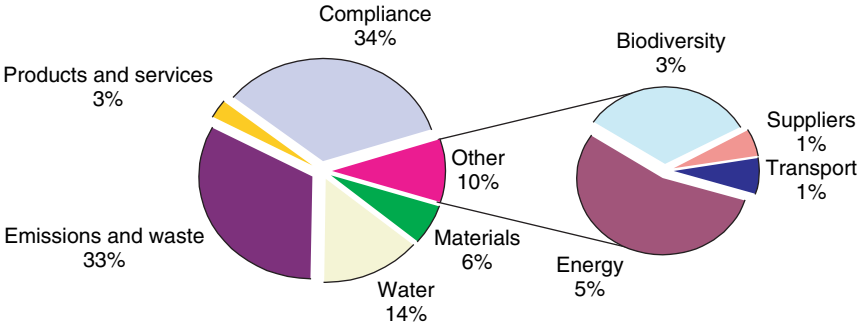


**Fig. 20.1** Total 'hits' of identified competencies against GRI indicators

The structure of the matrix allowed for further data analysis down to an individual TP level. The subsequent figures demonstrate the results for TPs under the administrative area of the Australian ISCs. Due to the varying number of TPs in each ISC and the diversity in TPs in general, the scales of the graphs are not consistent. It is also important to reiterate that these graphs have excluded those TPs in which no results were obtained through the NTIS search engine, or where data was inaccessible.

## *Findings*

The fact that competencies identified potentially meet more than one GRI criterion means that the aggregated results hide a number of relationships. Due to the large number of competencies that addressed 'compliance' and the significance of the regulatory environment for industry, these results were further analysed. The relationship of 'compliance' with the 'water', 'waste' and 'energy' criteria was explored. The results showed that:

- of the competencies identified as referring to waste, 80 per cent also addressed compliance;
- of the competencies identified as referring to energy, 74 per cent also addressed compliance;
- of the competencies identified as referring to water, 79 per cent also addressed compliance.

Of all of the results obtained, no one TP contained content that addressed all of the selected criteria. This is clearly evident in a review of Figs. 20.2 to 20.4. Figure 20.4 is of particular interest as it clearly displays the composition or 'competency mix' of EfES in TPs.

The agrifood industry and manufacturing industry have been selected as examples of the research findings to demonstrate the relatively poor integration of sustainable development in TPs. It would seem that most environmental content is

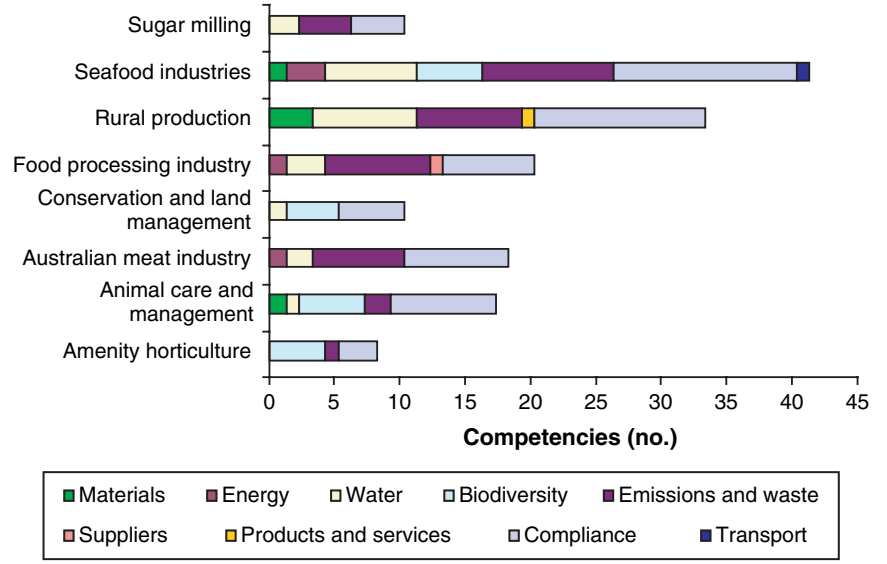


**Fig. 20.2** Findings: Agrifood ISC Training Packages

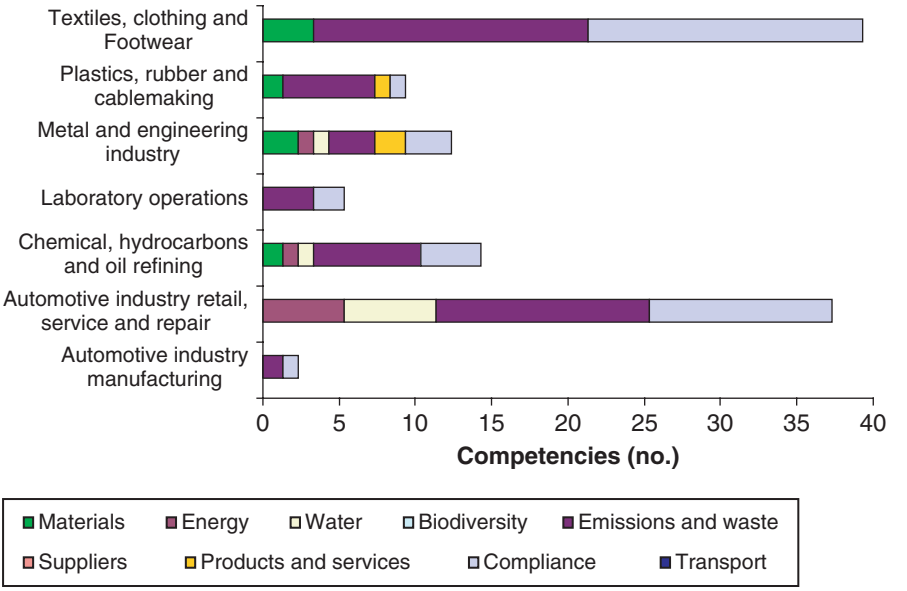


**Fig. 20.3** Findings: Manufacturing ISC Training Packages

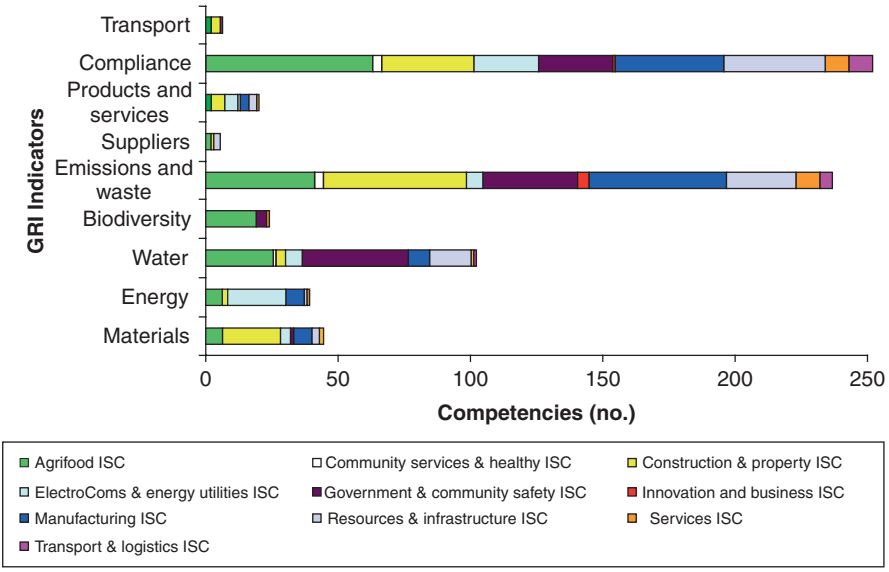


**Fig. 20.4** Training packages by GRI indicator

related to compliance, without true consideration for sustainable development (see Figs. 20.2 and 20.3).

The TPs reviewed in the Agrifood ISC show some diversity, with all of the GRI indicators present at an ISC administrative level. The competency mix is most diverse in the seafood TP, containing seven of the 10 indicators. Agrifood TPs represent over half of the competencies identified that address biodiversity. Considering the role and function of water in food production and processing, the higher presence of competencies addressing water with these TPs is not surprising. In total, for the Agrifood ISC, 12 additional compliance-driven and more generic competencies were identified that were not included in Fig. 20.2. These competencies were identified in sugar milling (2), seafood industries (1), rural production (2), food processing (4) and conservation and land management (3) TPs and relate to sustainable aquaculture, implementing procedures and managing environmental policies.

For the TPs reviewed in the manufacturing sector, ‘compliance’ and ‘emissions’ and ‘waste’ represent over half of all TPs reviewed with the exception of metal and engineering. Absent from all the TPs reviewed were the indicators for transport, suppliers and biodiversity. This is surprising, considering the role of transport in the distribution of goods in the sector. An equivalent statement can also be made for suppliers with the manufacturing sector, arguably one of the most dependent and complex in regards to supply chain management.

A number of competencies were identified in the plastics, rubber and cable making (2), laboratory operations (1) and chemical, hydrocarbons and oil refining (5) TPs that did not fit the assessment criteria but were perceived to address EfES

such as the competencies to develop site environmental policy, undertake process or project environmental impact assessment and monitor and correct activities having impact on the environment.

Each of these competencies is broadly written and as a result did not fit the exact criteria in the GRI matrix developed to assess TPs. However, these competencies are acknowledged throughout this research as addressing compliance while being directed more at the policy and planning levels. Figure 20.4 displays the composition or 'competency mix' of EfES in all the TPs examined.

Throughout this research a number of more generic and broadly written competencies were identified that addressed EfES. These competencies have been referred to several times in the explanation of the results. In total, 64 competencies were identified that were not included in the assessment matrix due to classification issues. Upon review of these units, they appear to specifically address policy, plans, monitoring and management aspects of the environment. It is assumed that the broad nature of these competencies allows for customization in the specific industry area.

## What Did We Learn?

The diversity of industry TPs, along with the diversity of the indicators selected, means that the results cannot be interpreted as 'more is better'. The results of this research do not indicate whether or not industry TPs address industry-specific environmental impacts. The research illustrates only the content and the element mix of EfES in TPs. Hence, comparisons cannot easily be made between TPs. For example, the Coal TP (Resources and Infrastructure ISC) and the Business Services TP (Innovation and Business Skills Australia) have strongly differing operational environments and subsequently different environmental impacts. Value from this research could significantly be enhanced with a comparative analysis of the EfES mix in TPs measured against industry impacts.

### *Indicator Selection and Data Integrity*

Environmental indicators from the GRI were selected above a number of other audit criteria, including the establishment of an original set of indicators. The rationale for the selection criteria is detailed above. However, further elaboration on the criteria provides an insight into the opportunities and limitations of the selection. The flexibility of the GRI indicators provided scope for easy customization, while the accompanying information in the industry sector supplements provided TP developers with access to resources containing further information. The accompanying information available through the GRI portal includes sector supplements, guidance documents and technical protocols for specific industry areas and is continually evolving (Global Reporting Initiative, 2002).

## *Current Drivers of TP Development*

The results of this research indicated that the regulatory environment is a principal driver for environmental competency development in TPs. The emphasis on regulation is not surprising and has been illustrated in other research conducted by Condon and Young (2004) and Russell (2003). Considering the expertise, knowledge and present understanding of the relationship between industry and the environment, arguments for not 'moving beyond compliance' are justifiable only in relation to the subsequent impacts on the economic bottom line.

At this time, the introduction of environmental sustainability into the curriculum is not adopted or imposed upon TP developers. The industry-led nature of TP development provides an explanation as to why TPs are not an accurate reflection of environmental impacts. Anderson (2003) argues that the 'perpetual growth paradigm' of industry is disconnected from environmental truths. This disconnection between industry and the environment is the true ecological risk (UNESCO, 2004b), hence, the hurdle to importing skills and knowledge in environmental sustainability into TPs. The operational and economic environment of industry, along with the complexity in creating value for environmental capital, appears to place this possibility out of reach for industry and government planners.

## *An Innovative Approach*

As 'social and economic development is not possible on a degraded planet', (UNESCO, 2004b, p. 8) the incorporation of EfES is vital if industry practices are to be reconnected and operate in the boundaries of ecological systems. From the results of this research, a number of opportunities emerged, highlighting the need for a strategic approach to reform the TVET sector.

In late 2004 the National Centre for Sustainability approached EcoRecycle (a Victorian government agency renamed Sustainability Victoria in 2005) and commenced dialogue on the most effective way to advance and facilitate change in the TVET sector. The normal strategy to effect change in the TVET sector in Australia would have been to approach ANTA or DEST and ask for funding through a national collaborative project to engage the relevant people and organizations to determine the need for change. This would then require collaboration with industry advisory bodies and other industry associations. A previous ANTA review had not seen the emergence of sustainable development as significant, although a national consultation had taken place where the issues were raised (ANTA, 2004). This review (ANTA, 2004) recognized that the following aspects of TPs needed to be addressed:

- Industry will need a highly skilled workforce to support strong performance in the global economy;
- Employers and individuals will be at the centre of vocational education and training;

- Communities and regions will be strengthened economically and socially through learning and employment;
- Indigenous Australians will have skills for viable jobs and their learning culture will be shared.

This was, in effect, a great advance from what had previously been a system entirely driven by industry, without regard for other aspects of society. However, environmental sustainable development was not thought to be worth addressing, as a result of this previous review.

## *A New Approach*

In discussions with EcoRecycle in late 2004 it was agreed that the development of a memorandum of understanding with ANTA would be explored, to further the uptake and integration of sustainability into TPs. For a review to take place effectively in the TVET environment, funding was required to maximize the consultative process outside the normal review cycle. EcoRecycle and the Department of Environment and Conservation in New South Wales were prepared to fund the work and as a result ANTA was able to provide expert advice to assist the process. A memorandum of understanding was signed between ANTA, EcoRecycle and the Department of Environment and Conservation in December 2004 to commence the work. The National Centre for Sustainability at Swinburne University of Technology was then able to commence the review and start national consultation on the development of guideline standards for sustainability.


**Fig. 20.5** Uptake of guideline standards

One of the main aims of EcoRecycle was to enhance industry participation in 'resource efficiency', thereby reducing its impacts on the environment. The focus of the work was driven in part by the needs of the government departments and agencies to address their own requirements to reduce the impact of industry on the environment. This was in synergy with the project aims of developing a reformed training sector addressing sustainable development. Therefore, the project's aim was to 'build the capacity of the workforce that results in behaviour change towards more sustainable business systems, business practices and business thinking'.

Guideline competency standards, as opposed to units of competency, were first developed to accommodate the need to introduce occupational health and safety into all TPs. When it was realized that the development of guideline standards could be used to inform TPs at a national level, additional standards were developed for customer service, first aid and innovation to try to standardise the training system. When this project began it was recognized that the development of guideline standards in sustainability would be the most effective way to ensure the uptake of sustainability. The process of the uptake of guideline competency standards is outlined in Fig. 20.5.

## *The Process of Consultation*

A large number of organizations and individuals were engaged throughout the development of the guideline competency standards. In total, 345 individuals were contacted from a broad range of organizations. Registered training organizations represented the largest stakeholder base (36 per cent), with State Industry Training Advisory Boards (21 per cent) and government (14 per cent) also being well represented. Although ISCs and industry representation appear low, the total number of contacts in ISCs is limited as there are only 10 councils, of which nine participated in the process on a regular basis. The total industry category therefore should be considered to be 8 per cent of total stakeholder representation.

The geographical representation of stakeholders was largely dominated by Victoria (44 per cent) and New South Wales (17 per cent). It is believed that the lower representation from the other states and territories is reflected in the lower number of institutes and VET sector participants in those parts of Australia (Fig. 20.6).

As part of the consultation process, a steering group was established to guide the process. The steering group consisted of individuals from the New South Wales Department of Environment and Conservation, EcoRecycle Victoria, the National Centre for Sustainability, the New South Wales Department of Energy, Utilities and Sustainability and Melbourne Water, working with ANTA. In addition, a reference group, established to assist in the development of the draft guideline competency standards, met regularly to monitor the consultation process. Key individuals from ISCs and industry, including union representation, were engaged to ensure inclusive consultation in the reference group.

The consultation process was undertaken in an open and collaborative style in alignment with the principles of education for sustainability. National Centre for

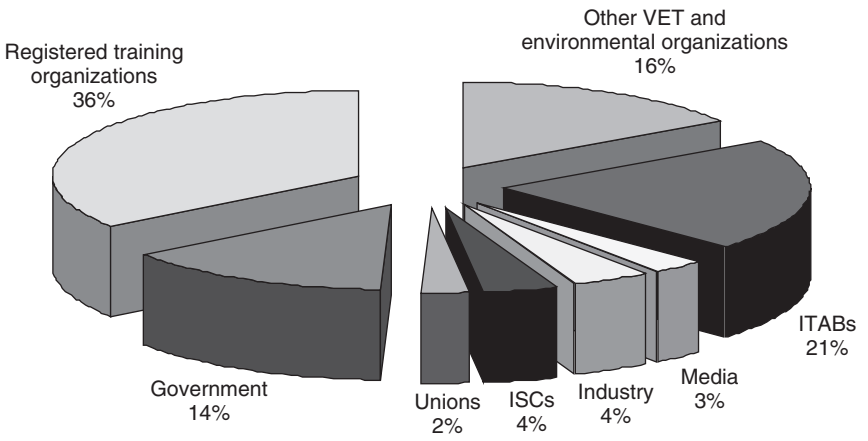


**Fig. 20.6** Stakeholders who are developing guideline competency standards

Sustainability employees travelled nationally, conducting workshop sessions and offering participants the opportunity to assist in the design and content of the guideline competency standards. The resulting guideline competency standards are outlined in Table 20.3.

These guideline competency standards have been developed in line with units of competency with elements, performance criteria, range statements and evidence guides and are available for viewing at the NCS website (NCS, 2006).

**Table 20.3** Guideline competency standards for sustainability

| | |
|---|---|
| **GCSSUS01** | Participate in environmentally sustainable work practices |
| **GCSSUS02** | Implement and monitor environmentally sustainable work practices |
| **GCSSUS03** | Develop workplace policy and procedures for sustainability |

## *The Outcomes*

The project outcomes included the official 'noting' of the designed guideline competency standards role of sustainability and resource efficiency in industry TPs, with commencement of uptake of the guideline competency standards and significant relationship building. The overall aim in developing these guideline standards was to:

- Contribute to an increased awareness and understanding of sustainability in business systems, practices and thinking at all levels of government, industry and community
- Encourage behaviour change and systems implementation throughout industry, government and community in the area sustainable production and consumption.

The development and implementation of the standards has received broad support and input from the ISC (especially those representing the seafood, construction, manufacturing, business, innovation and transport industries), as well as from training providers, education agencies and environmental organizations.

The standards have been designed to assist industry in rethinking resource use and to improve environmental performance. They include concepts such as life-cycle thinking, eco-efficiency and design, purchasing strategies, product stewardship and ecological foot-printing as potential tools to achieve positive environmental outcomes.

The three units of competency developed are aimed at varying levels in the national training framework. The standards are currently being endorsed and imported into TPs by the ISCs and delivery by training organizations commences in 2007. The standards are flexible in design so that they can be customized to meet the needs of particular industries.

The introduction of the standards is a critical step in establishing a framework to assist training at the vocational level. The implementation of the guideline competency standards and practice in industry is an important contribution in building knowledge and skills for a sustainable Australia.

### *Where to Next?*

Through this work in 2004–2005, the guideline standards have now been available for uptake and integration by ISCs for the past year. TP developers across the nation and the NCS has been working with four ISCs including Manufacturing Skills Australia, Innovation in Business Skills Australia, Construction and Property Services Industry Skills Council and the seafood industry to endorse and customize the guideline competency standards. Once the units are endorsed, any ISC can integrate the units in their TPs. This process usually occurs when TPs are up for review, which is now part of a continual improvement cycle.

The NCS has put forward a recommendation to roll out a series of training programmes on an action research basis to determine the effectiveness of the new customized and endorsed units of competency. It is anticipated that this will be undertaken in 2007. This action research approach will survey and measure the effectiveness of training in the workplace using the endorsed and customized units of competencies. A report on the outcome of this work will be available in 2008. Action research principles will be adhered to, with regular evaluation of the process with aspects of reflection and critical thinking applied.

## Conclusion

Industry associations and organizations that influence the development of industry TPs must revalorize the ecological environment. This is the solution to addressing criticisms noted by Anderson (2003). Opportunities in this area include

the adoption of underpinning statements or guidelines that influence TP development. The *Bonn Declaration for Technical and Vocational Education and Training* (UNESCO, 2004b), the *National Strategy for Ecologically Sustainable Development* (DEH, 1992), *Environmental Education for a Sustainable Future: National Action Plan* (DEH, 2001) and the recently developed *Guideline Competency Standards for Sustainability* (NTIS, 2005) all provide potential examples. This concept is not new and is argued for by authors such as Hardy and Salasoo (1987), Stronell (1997), Sterling (2001) and Keogh et al. (2004). Such content needs to be specifically detailed in the *TP Developer's Handbook* (Russell, 2003) published by the Department of Education, Science and Training.

The concept of guideline standards for sustainability was initiated by discussions between the then Ecorecycle Victoria, the New South Wales Department of Conservation and Environment and the ANTA. These organizations worked in partnership with the National Centre for Sustainability at Swinburne University to manage the consultation and development process. Ultimately, the project outcomes have seen the emergence of guideline competency standards and an increased awareness of the importance of sustainability and resource efficiency in the training sector.

It is hoped that through this initiative, the national training system will now have a significant impact on industry training with a focus on sustainability. This will in turn see industry become more resource efficient with greater accountability to the environment.

## References

Anderson, D. (2003) *Productivism, VET and Ecological Sustainability, The Changing Face of VET*. 6th Annual Conference of the Australian VET Research Association, Australia Technology Park Conference Centre: Sydney.

ANTA (2003) *Annual National Report of the Australian Vocational Education and Training System*. Australian National Training Authority: Brisbane.

ANTA (2004) *High Level Review of Training Packages Phase 3*. http://www.dest.gov.au/NR/ rdonlyres /952CBE57–5FD3–4E37-A97A-D8DB0AFD9B3D/11073/consult_paper.pdf. Accessed 12 November 2006.

Condon, L. and Young, A. (2004) *Sustainability Related Competency Report*. Swinburne University of Technology: Melbourne. Available online from http://www.swin.edu.au/ncs. Accessed September 2004.

DEH (1992) *National Strategy for Ecologically Sustainable Development*. Commonwealth of Australia: Canberra.

DEH (2001) *Environmental Education for a Sustainable Future: National Action Plan*. Commonwealth of Australia: Canberra.

DEST (2005) *Advice from Industry*. Available online from http://www.dest.gov.au/sectors/ training_skills/policy_issues_reviews/key_issues/nts/vet/advisory.htm. Accessed 9 September 2005.

Global Reporting Initiative. (2002) *Sustainability Reporting Guidelines*. Global Reporting Initiative: Boston, MA.

Hardy, P. and Salasoo, T. (1987) The role of TAFE in environmental education. Environmental education – past, present and future. *Proceedings of the Third National Environmental Education Seminar and Workshops*. URSULA College, ANU, Australian Government Publishing Services: Canberra.

Keogh, A., Tilbury, D., Leighton, A. and Kent, J. (2004) *A National Review of Environmental Education and its Contribution to Sustainability in Australia: Further and Higher Education*. Australian Research Institute in Education for Sustainability (ARIES) for the Department of the Environment and Heritage, Australian Government: Sydney.

NCS (2006) Available online from http://www.swinburne.edu.au/ncs/researchprojects/knowledge.htm. Accessed September 2006.

NCVER (2005) *Australian Vocational Education and Training Statistics*. Australian Government, Adelaide, South Australia.

NCVER (2006) Available online from http://www.ncver.edu.au/vetcontext/publications/1718.html. Accessed 14 March 2008.

NTIS (2004) Available online from www.ntis.gov.au. Accessed 14 March 2008.

NTIS (2005) *Guideline Competency Standards for Sustainability*. Available online from http:// www.ntis.gov.au/cgi-bin/waxhtml/ ~ntis2/std.wxh?page=8&usedname=element&standard_name=sustain& standard_code=& submit=Search. Accessed 21 September 2005.

Russell, D. (2003) *Environmental Content in Vocational Education and Training: Project Report and Professional Support Materials*. Primary Industries and Natural Resources Division. TAFE: New South Wales.

Sterling, S. (2001) *Sustainable Education: Re-Visioning Learning and Change*. Green Books, Totnes.

Stronell, J. (1997) *The Eighth Key Competency*. Tutorial paper, Contexts of Education and Training, p. 6. University of Melbourne: Melbourne.

UNESCO (2004a) *Discussion Paper: Orienting TVET for Sustainable Development*. UNESCO–UNEVOC International Centre for Technical and Vocational Education and Training for the UNESCO International Experts Meeting on Learning for Work, Citizenship and Sustainability: Bonn.

UNESCO (2004b) *Bonn Declaration for Technical and Vocational Education and Training*. 25–28 October. Available online from http://portal.unesco.org/education/en/ev.php-URL_ID=26967&URL_DO=DO_TOPIC&URL_SECTION=201.html. Accessed 21 September 2005.

# Chapter 21
# Canada: Generic Sustainable Development Skills for the Workforce

**France Boutin and Chris Chinien**

## Introduction

There is a general consensus that the workforce must be prepared so that it can contribute to the goals of sustainable development. The implementation of workforce education and training for sustainable development presupposes that the sustainable development-related knowledge, skills and attitudes are known. However, an extensive review of literature indicated that this information is non-existent. The purpose of this study was therefore to identify the sustainable development-related knowledge, skills, and attitudes required by the workforce (Chinien et al., 2004).

This chapter describes research undertaken to develop the sustainable development competency profile (SDCP) for the workforce using integrative literature reviews and expert consultations. The SDCP generated by this study consists of six unifying themes: ethics and values, integrated decision-making, responsible use of resources, valuing diversity, safety and wellbeing and continual improvement. These six themes address the essential knowledge, skills and attitudes necessary for the workforce to apply the principles of sustainable development in their day-to-day activities, regardless of job function, sector of activity, and level of education and training. They are also broadly applicable to general education, adult education and technical and vocational education and training.

In the past development has been essentially linked to the economic paradigm, which is primarily focused on the production of goods and services (Kronner, 2005). However, Elim Salim, Chair of the World Summit on Sustainable Development has argued:

> There are serious shortcomings in the way development has taken place in the 20th century. Development has followed only the economic track and has left behind social and environmental stability, resulting in rising poverty, inequality in income and development and natural disasters through rising flood levels affected by sea rise due to global warming. Development as implemented in the 20th century was not sustainable. (2002, p. 16)

F. Boutin
Université du Québec à Montréal, Canada
e-mail: boutin.france@uqam.ca

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Although the right to education, work, health and wellbeing is entrenched in the Universal Declaration of Human Rights of 1948, millions of people today are still living in conditions of abject poverty that deny them the opportunity to exercise these fundamental rights. The UN Committee on Economic, Social and Cultural Rights defined poverty as 'a human condition characterized by the sustained or chronic deprivation of the resources, capabilities, choices, security and power necessary for the enjoyment of an adequate standard of living and other civil, cultural, economic, political and social rights'. Poor people live in crippling conditions without adequate food, clean water, sanitation, healthcare and education.

In the new economy the labour market has become sharply polarized by a simultaneous increase in high-skilled and low-skilled jobs. This polarization of the labour force has contributed to widening inequalities in income and disparities in employment prospects between the skilled and less skilled workers (Camdessus, 1997). Tuijnman noted:

> Alienation, social exclusion, unemployment and slow productivity growth are among the consequences of limited capacity of some countries to adapt and fully exploit the opportunities offered in the global knowledge economy. (1997, p. 4)

According to estimates, more than a billion workers are unemployed or underemployed, and half of the world's total workforce (1.4 billion) survives on an income which is below the US$2 a day poverty line (OECD, 2006). As many as 36 million unemployed workers are from the OECD countries.

According to the World Bank global poverty monitoring (2003) the distribution of poor people in various regions of the world was as follows: sub-Saharan Africa: 46 per cent; South Asia: 40 per cent; Latin America: 15.6 per cent; East Asia and China: 15.3 per cent; Eastern Europe and Central Asia: 5.1 per cent. The following statistics are useful for understanding the crippling effects of poverty on people in the developing world:

- 1.2 billion people live on less than US$1 dollar a day;
- Over half of the world's population – 3 billion people – live on less than US$2 per day;
- Every evening 800 million people go to bed hungry;
- Women account for 70 per cent of the world's poor;
- Every day poverty kills 50,000 people worldwide, including 30,000 children;
- Every year 6 million children die from malnutrition before their fifth birthday;
- Over 11 million children die each year from preventable causes.

The Millennium Development Goals (MDGs) have now given world leaders a common framework to contribute to the fight against poverty, illiteracy, mortality, discrimination against women and environmental degradation. One of the key priorities of the MDGs is to reduce by half the proportion of people living in extreme poverty by 2015 (Preece and Singh, 2003).

The Dakar Framework for Action (UNESCO, 2000) positions education as an important instrument for combating poverty. Education, starting with the care and

education of young children and continuing through lifelong learning, is central to individual empowerment, the elimination of poverty at the household and community level and broad social and economic development. At the same time, the reduction of poverty facilitates progress towards basic education goals. There are evident synergies between strategies for promoting education and those for reducing poverty. On the occasion of the launch of the UN Literacy Decade, former Secretary-General Kofi Annan said:

> . . . literacy is the key to unlocking the cage of human misery; the key to delivering the potential of every human being; the key to opening up a future of freedom and hope.

Although humankind has emerged as the dominant species capable of reshaping our planet and its ecosystems through both intention and accident (Schellnhuber et al., 2004), our ecological footprint suggests that we are not living up to this immense and unprecedented responsibility. The human economy already consumes around 50 per cent of the planet's natural production every year. If this trend is maintained we will soon need many more planets to support our needs, given the forecast for a dramatic increase in world population. Greenish (2004) noted that sustainability has became a key facet of development 'in face of the exponentially rising pace of development in Asia, crises of all sorts in Africa, destruction of the huge natural resource of the South American rain forests and the continuing pillage of natural resources in the western world' (2004, p. 1).

This unsustainable approach to development is causing major ecological disasters, contaminating the air that we breathe and the water that we drink and causing several other irreversible damage to the environment. It is not therefore surprising that 40 per cent of the world population is already short of fresh water and that one-third of the world's fish stocks is threatened with extinction. Severe weather conditions have dramatic impact on our economy and millions of people are affected by floods. We are not only compromising our livelihood and our quality of life, but we are also compromising the livelihood of future generations. Kofi Annan, challenged us to think of two competing visions of the world:

- Imagine a future of relentless storms and floods; islands and heavily inhabited coastal regions inundated by rising sea levels; fertile soils rendered barren by drought and the desert's advance; mass migrations of environmental refugees; and armed conflicts over water and other precious natural resources.
- Then, think again, for more hopeful picture, of green technologies; livable cities; energy-efficient homes, transport and industry, and rising standards of living for all the world's people, not just a fortunate minority. (2002)

Reversing environmental degradation has become a global priority and world leaders recognize that environmental protection cannot be achieved without due consideration to economic and social development. The concept of sustainable development emerged from this critical reflection regarding the interdependency and interconnectedness between environmental protection and economic and social development. Sustainable development is thus commonly defined as 'meeting the needs

of the present generation without compromising the ability of future generations to meet their own needs'.

In 1987 the World Commission on Environment and Development (1987) published *Our Common Future*, a groundbreaking report that brought the terms 'sustainable development' and 'sustainability' into widespread use and called on the global community to take steps towards that goal. At the UN Earth Summit in Rio de Janeiro in 1992

> . . . over 170 governments agreed that human development aspirations and the capacity of the environment to support them were on a collision course. Sustainable development became the overarching policy framework within which governments would seek to address the challenges of unsustainable development patterns. (Forum for the Future, 2004, p. 5)

The Rio Declaration states that human beings are entitled to a healthy and productive life in harmony with nature and that they should be at the forefront of sustainable development. One of the most prominent activities in this regard was the development of Agenda 21 as a part of the Rio Earth Summit (UN, 1992). Agenda 21 is a global action plan for achieving sustainable development and has provided a useful starting point for many government and industry-based projects. For instance, sustainability projects have been initiated at the national, regional and local government levels all over the world. However, as repeatedly noted at the UN World Summit on Sustainable Development, Johannesburg (2002), there is still much work to do. If the concept of sustainable development is ever to be put into widespread practice, its principles must be integrated into all disciplines at every level of society. This necessity was explicitly recognized by Agenda 21, which positioned education as a key element in the advancement and implementation of sustainable development. Even in countries with strong education systems there is a need to reorient education and training to increase understanding and support for sustainable development. In particular, members of the workforce require new ways of thinking and new attitudes and skills to be able to implement the principles of sustainable development.

The UN Decade of Education for Sustainable Development was launched to promote concrete actions on sustainable development. The overall goal of the Decade is to

> . . . integrate the principles, values, and practices of sustainable development into all aspects of education and learning. This education effort will encourage change in behaviour that will create a more sustainable future in terms of environmental integrity, economic viability, and a just society for present and future generations. (UNESCO, 2005)

According to UNESCO, education for sustainable development should focus on 10 key themes, namely: overcoming poverty, gender equality, health promotion, environmental conservation and protection, rural transformation, human rights and citizenship, intercultural understanding of peace, sustainable production and consumption, cultural diversity and information and communication technologies. Therefore, the roles of education for sustainable development should be to:

- Inspire the belief that each of us has both the power and the responsibility to effect positive change on a global scale;

- Act as a primary agent of transformation towards sustainable development, increasing people's capacities to transform their vision for society into reality;
- Foster the values, behaviour and lifestyles required for a sustainable future;
- Help citizens to make decisions that consider the long-term future of the equity, economy and ecology of all communities;
- Build the capacity for future-oriented thinking.

Given that 'every human activity affects the environment, the entire population needs to be mobilized and trained to protect the environment' (Gagliardi and Alfthan, 1993). Sustainable literacy is therefore a basic skill that everyone should have. Sustainably literate people are expected to understand the need to change to a sustainable way of doing things, individually and collectively. They should have sufficient knowledge and skills to decide and act in a way that favours sustainable development and they should be able to recognize and reward other people's decisions and actions that favour sustainable development (Forum for the Future, 2004, p. 9).

Chapter 36 of Agenda 21 suggested that training is one of the most important tools for developing human resources and facilitating the transition to a more sustainable world. Agenda 21 also calls for vocational training programmes 'that meet the needs of environment and development with ensured access to training opportunities, regardless of social status, age, gender, race or religion' and the promotion of a 'flexible and adaptable workforce of various ages equipped to meet growing environment and development problems and changes arising from the transition to a sustainable society'.

Participants at the International Experts Meeting Learning for Work, Citizenship and Sustainability ratified the Bonn Declaration, which set the course for the contribution of TVET to education for sustainable development

> . . . since education is considered the key to effective development strategies, technical and vocational education and training (TVET) must be the master key that can alleviate poverty, promote peace, conserve the environment, improve the quality of life for all and help achieve sustainable development.

In order to meet these challenges, TVET must

> . . . reorient and redirect its curricula to imbue students and trainees with respect for the conservation and sustainable use of resources, social equity and appropriate development, plus with competencies to practice sustainable tasks at the workplace of today and tomorrow. (UNESCO–UNEVOC 2006, pp. 9–10)

TVET programmes are designed and developed using validated competencies or occupational standards. However, the failure to identify the sustainable development competencies required by the workforce represents a major barrier for integrating the concept of sustainable development in TVET. Educators are overwhelmed by the challenge of weaving an abstract concept like sustainable development in education and training.

## Conceptual Framework

The UNESCO framework for Decade of Education for Sustainable Development and the result of an analytical survey of the literature and research were used for developing a conceptual framework to provide the guiding theoretical orientation and the underpinning foundation to the study. This conceptual framework was used for the identification of the SDCP required by the workforce. This framework consisted of two main elements, sustainable development and human performance enablers.

The three main clusters encapsulated in the concept of sustainable development, environment, society and economy, were used as the foundation to the conceptual framework for this study. A brief description of each follows:

*Environment*. An environmentally sustainable system must maintain a stable resource base, avoiding over-exploitation of renewable resource systems, and depleting non-renewable resources only to the extent to which adequate substitutes can be developed. The concept includes maintenance of ecosystem functions such as biodiversity and atmospheric stability, thus addressing resources that are traditionally not considered as economic resources.

*Society*. A socially sustainable system must achieve distributional equity and the adequate provision of social services, including health, education and gender equity, as well as political accountability and participation to promote active citizenship. The overriding objective is quality of life (UNESCO–UNEVOC, 2004, p. 1).

*Economy*. An economically sustainable system must be able to produce goods and services on a continuing basis and to avoid sectoral imbalances between areas such as agricultural and industrial production. It should be a strong, stable and sustainable economy which provides prosperity and opportunities for all (Department for Education and Skills, 2004).

The human performance enablers incorporated two main domains of critical importance for the workforce, generic and broadly transferable competencies and occupationally specific competencies. The scope of this study was on generic and broadly transferable competencies. Our analysis of these competencies pointed toward three core dimensions of critical importance to support sustainable human performance. These dimensions were knowledge, skills and attitudes. An illustration of the conceptual framework is presented in Table 21.1.

**Table 21.1** Conceptual framework for sustainable development in TVET

| Sustainable Development | Sustainable human performance enablers | | |
|---|---|---|---|
| | Knowledge | Skills | Attitudes |
| Environmental | | | |
| Social | | | |
| Economic | | | |

Source: Adapted from Buckland, 2002

## Methodology

The study was conducted in two main phases. Phase 1 consisted of a general scan of the literature and research on environment, society and economy in order to identify key issues related to knowledge, attitude and skill needs for sustainable development. This was followed by an extensive review of the literature and research to identify specific sustainable development-related knowledge, skills, and attitudes (KSAs) that were of relevance to the workforce. These KSAs were then validated using a Focus Group methodology in Phase 2.

### *Phase 1*

The review of literature conducted in Phase 1 was focused on materials pertaining to sustainable development, education and workforce development. Particular effort was directed at how this information applies to government organizations involved in workforce development policies. Information was gathered through the review of a wide variety of documents obtained from local, national and international sources. The literature review was supplemented by limited consultation with relevant experts. These experts were contacted primarily through email and postings on listservs and electronic bulletin boards.

The conceptual framework developed for this study guided the information-gathering process. It also assisted the researchers in placing the knowledge, skills and attitudes or values identified in the appropriate cells related to the environment, society and the economy. Although this conceptual framework provided a very useful tool for identifying the KSAs, the limitation of classifying KSAs according to the clusters of environment, society and the economy separately was recognized. In many cases some KSAs had implications for more than one category. The decision to place a KSA element in a particular cell was based on an analysis of whether that particular element had more implications for the environment, society or the economy.

As shown in Table 21.2, a total of 588 KSAs were identified in the literature review and classified as pertaining mostly to the environment (161), society (258) or the economy (169). It is noteworthy that there were more KSAs related to the category, ‘society’.

**Table 21.2** Breakdown of KSAs identified before the validation process

| Sustainable development | Human performance enablers | | | |
|---|---|---|---|---|
| | Knowledge | Skills | Attitudes | Totals |
| Environment | 66 | 58 | 37 | 161 |
| Society | 78 | 101 | 79 | 258 |
| Economy | 67 | 63 | 39 | 169 |
| Totals | 211 | 222 | 155 | 588 |

## *Phase 2*

Given the methodology used for identifying the KSAs, it was determined that these KSAs had to be validated by a group of experts (N = 24) during phase 2. The focus group meeting was held to validate the knowledge, skills and attitudes inventory developed in phase 1. The expert participants were selected on the basis of their experience in sustainable development and/or workforce development. This focus group meeting had three objectives, to validate the relevance and importance of each KSAs, identify any gaps in the KSAs and assess the presentation format of the KSAs included in the competency profile.

A professional facilitator, specialized in sustainable development, co-ordinated the validation process. The experts were divided into three groups, balanced with regards to expertise in sustainable development, and workforce development. Each group was assigned the task of validating a profile related to the environment, society and the economy respectively. The small group validation was facilitated by project staff.

The experts were also asked to classify the KSAs according to four skill levels used by the Canadian Government in the *National Occupational Classification* handbook. Occupations usually require a university education (A), college education or apprenticeship training (B), secondary school and/or occupation-specific training (C) or on-the-job training only (D).

The breakdown of the inventory of KSAs after the validation process by the group of experts is shown in Table 21.3. The validation process confirmed that the experts were in total agreement with the literature regarding the critical KSAs that would enable the workforce to contribute to the goals of sustainable development. The total number of KSAs was reduced from 588 to 523. While a few KSAs were added in the area of society (5), 16 were eliminated from economy, and 44 from environment. Repetitive listing was the primary cause for eliminating KSAs.

The experts unanimously agreed that all 523 KSAs apply to all four skill levels (A, B, C and D) used by the Canadian Government in the *National Occupational Classification* handbook as described earlier. This result confirmed that these KSAs were broadly transferable across various levels of the workforce.

**Table 21.3** Breakdown of KSAs identified after the validation process

| Sustainable development | Human performance enablers | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Knowledge | | Skills | | Attitudes | | Totals | |
| Environment | 43 | (66) | 46 | (58) | 28 | (37) | 117 | (161) |
| Society | 66 | (78) | 109 | (101) | 78 | (79) | 253 | (258) |
| Economy | 57 | (67) | 59 | (63) | 37 | (39) | 153 | (169) |
| Totals | 166 | (211) | 214 | (222) | 143 | (155) | 523 | (588) |

Note: Numbers in bracket represent the KSAs before validation

## *Focus Group Debriefing*

A plenary debriefing session was held immediately following the validation sessions. The purpose was to get a general sense of the experts' reaction to the KSAs. They were asked to focus their discussions around five thematic questions rather than providing a detailed report of the validation. Key comments generated by these questions are summarized below.

*How can we consolidate knowledge, skills, and attitudes needed into a more manageable set?* It was suggested that themes could be developed to organize the information better. Skills could be grouped into generic categories and attitudes could be redefined as 'values'. The divisions between the environment, economy and society in each cluster could be eliminated and similar ideas and concepts could be consolidated.

*Is it appropriate to use these three clusters (economy, environment and society) to classify the knowledge, skills and attitudes?* The experts felt it was necessary to focus on the interdependencies between and within the groupings and that care was needed to avoid creating 'silos' or 'islands' where each cluster is looked at as being on its own.

*Are the organizing statements used to breakdown the three clusters appropriate?* It was thought that the categories seem passive and more concrete action statements were required. It was also suggested that it would be helpful to link the breakdown within the clusters.

*How adequately are the knowledge, skills, and attitudes in all three clusters covered?* The experts suggested that incentives to change are lacking. Messages need to be tailored to specific audiences/target groups and, furthermore, that valuing the role of science is an important attitude that had not been captured.

*What are some of the critical knowledge, skills, and attitudes that cut across all three areas?* The response listed: integration, innovation, responsibility, open-mindedness, creativity and interdependency.

The most important revision made was to move away from the three content organizers, namely, environment, society and the economy to avoid unnecessary repetition and to establish the interconnectedness and interdependency among these three elements. This was achieved by combining all the KSAs related to each of the clusters (environment, society and the economy) into three separately categories. The KSAs related to each of these new categories were then analysed for commonalities and differences. Six major skill clusters emerged from that analysis:

## *Revised KSAs Inventory*

1. *Ethics and values*: attitudes needed to behave and act ethically.
2. *Integrated decision-making*: knowledge and skills needed to process information effectively and efficiently.
3. *Responsible use of resources*: knowledge and skills needed to use resources responsibly.

4. *Valuing diversity*: knowledge and skills needed to contribute to, and support, diversity.
5. *Healthy lifestyle*: knowledge and skills needed to maintain workplace health and safety.
6. *Continual improvement*: knowledge, skills and attitudes needed to achieve sustainable competencies.

**Table 21.4** Generic sustainable development skills

| **1. Broadly transferable SDCP ethics and values: attitudes needed for ethical behaviour** | |
|---|---|
| Appreciate the diversity of environmental, social and economic systems | Accept trade-offs among conflicting goals |
| Demonstrate a commitment to stewardship | Use ethical principles in decision-making processes |
| Demonstrate leadership for sustainability | Consider multiple perspectives in the decision-making process |
| Respect human dignity | Respect privacy of information |
| Show concern for quality of life | Respect intellectual property rights |
| Embrace a learning culture | Adhere to legislation that protects the environment, promotes fair business practices and safeguards human rights |
| Support equity, inclusion, human rights, social justice and peace | Understand the need for political systems in a democratic society |
| Acknowledge constraints but adopt a 'can do' attitude | Learn from and work with others |
| Demonstrate integrity and trustworthiness | Deal with others fairly and with transparency |
| Demonstrate self-reliance in dealing with complex issues | Appreciate the dignity of work and fair pay |
| Embrace change with an open-mind and with confidence | Adopt the attitude that prevention is better than cure |
| Solve problems with persistence and perseverance | |
| Accommodate different values and competing interests | |
| **2. Integrated decision-making: knowledge and skills needed to process information effectively and efficiently** | |
| Demonstrate and maintain essential cognitive literacy skills | Evaluate impacts and consequences of actions taken |
| Demonstrate and maintain integrative skills | Use a system approach for thinking and analysis |
| Demonstrate and maintain essential skills | Make efficient, timely, accountable and cross-sectoral decisions |
| Demonstrate and maintain ICT literacy skills | Realize that today's decisions must be balanced with tomorrow's effects |
| Demonstrate and maintain technological and scientific literacy skills | Think imaginatively and creatively |
| Reflect critically about issues | Practice cross-functional and multi-criterial thinking |
| Work in collaborative workgroups | Consider multiple perspectives in the decision-making process |
| Learn to learn | Recognize the interdependence between environmental, economic and social systems |
| Apply interpersonal skills to resolve conflicts | |
| Recognize the importance of involving stakeholders in decision-making | |
| Think globally and act locally | |

Table 21.4 (continued)

**3. Reponsible use of resources: knowledge and skills needed to use resources responsibly**

- Acknowledge the limits of an area's carrying capacity
- Understand shared responsibility for using resources efficiently
- Recognize the need to use renewable resources
- Demonstrate basic economic literacy and accountability
- Minimize waste and view waste as a potential resource
- Understand factors that contribute to degradation of resources and the need for restoration
- Act as caretaker to environmental, social and economic systems for present and future generations, from a local, national and global perspective
- Apply precautionary principles
- Anticipate and prevent problems
- Use a proactive and strategic approach toward the use of resources
- Understand the need for the equitable distribution of resources and making provision for social services
- Understand that economic growth and development are compatible with the responsible use of resources
- Recognize the values associated with natural, human, social and produced capitals and understand the relationship among them
- Recognize the key contributions of small and medium enterprises and entrepreneurs in economic development

**4. Valuing diversity: knowledge and skills needed to contribute and support diversity**

- Understand the importance of biodiversity to humankind and the environment
- Understand that economic diversity is a competitive advantage in a global economy
- Understand and respect the need to maintain cultural and linguistic diversity for strengthening the social fabric
- Recognize the contribution of the cultural heritage and traditional knowledge of Aboriginal people for sustainable development
- Understand that the social fabric is strengthened when the workforce reflects
  the diversity of a population
- Encourage and facilitate diversity in the workforce
- Adapt to cultural diversity

**5. Safety and wellbeing: knowledge and skills needed to maintain workplace health and safety**

- Understand that a healthy ecosystem benefits human health now and in the future
- Recognize the effects of environmental degradation to health and safety
- Select environmentally friendly materials, products and processes
- Handle hazardous materials safely
- Practice a healthy lifestyle: healthy diet and regular exercise
- Recognize the consequences of alcohol and substance abuse
- Recognize the economic impact of accidents and unhealthy lifestyles
- Practice accident prevention
- Think and act safely

Table 21.4 (continued)

| **6. Continual improvement: knowledge and skills needed to improve quality of life** | |
|---|---|
| Contribute to research and innovation to further economic growth, environmental welfare, human health and social wellbeing | Understand the need for using more efficient means for distributing environmental resources and economic growth |
| Recognize the importance of sustainable development indicators for assessing growth and development | Adapt to changing requirements |
| Understand that maintaining the status quo is not an option | Recognize the need for checking and correction action |
| Understand the principles of continual improvement | Upgrade skills to cope with socio economic and socio-technical changes and environmental sustainability |

These six skill clusters were used to reclassify all the KSAs. The classification was performed by the research team according to an experts' consensus process. This exercise resulted in the sustainable developement competency profile (SDCP) (Table 21.4).

## Conclusions

People around the world agree that current economic development trends are not sustainable and we must make changes in our lifestyle. According to UNESCO (2003) 'education is the primary agent for transformation towards sustainable development, increasing people's capacities to transform their visions for society into reality'. While there is a general consensus that education is essential to achieve sustainability, there is little agreement beyond that. As was said by the Secretary General of the UN, Kofi Annan, 'our biggest challenge in this new century is to take an idea that sounds abstract – sustainable development – and turn it into reality for all the world's people'. The SDCP provides educators with a tool for developing the capacities of individuals and societies to work for a sustainable future. This skill profile can be used by educators to develop education and training programmes to achieve UNESCO's goals of education for sustainable development, that is, to

> ... help people of all ages better understand the world in which they live, addressing the complexity and interconnectedness of problems such as poverty, wasteful consumption, environmental degradation, urban decay, population growth, health, conflict and the violation of human rights that threaten our future. This vision of education emphasized a holistic, interdisciplinary approach to developing the knowledge and skills needed for a sustainable future as well as changes in values, behaviour, and lifestyles. (UNESCO, 2003, p. 4)

The SDCP provides a list of the broadly transferable, sustainable development-related skills required by the workforce in order to apply the principles of sustainable development in their day-to-day activities, regardless of job function, sector of activity and level of education and training. The SDCP is also broadly applicable to general education, adult education and technical and vocational education and training.

This study is the first systematic attempt made to identify the essential, broadly transferable sustainable development KSAs needed by the workforce. These KSAs must be woven into workforce development through a transformative learning process to enable workers to contribute to the goal of sustainable development. The KSAs provide the underlying foundation to support reflective practice in the workplace and in personal life.

The SDCP generated by this study has multiple applications. It can be used for developing performance indicators, score cards, curriculums, training programmes, self-assessment tool, needs assessment instruments, performance evaluation and feedback mechanisms, just to name a few. It is noteworthy that there are two distinct sets of sustainable development-related KSAs, generic or broadly transferable skills and occupationally specific skills. The focus of this study was on the generic skills. It is equally important to identify the occupationally specific sustainable development related skills for each trade and profession. The overall conclusions of this study are listed in Table 21.4.

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## References

Camdessus, M. (1997) *Making Globalization Work for Workers*. Address to the 24th Congress of the World Confederation of Labour, ILO: Bangkok, 2 December.

Chinien, C., Boutin, F., McDonald, C. and Searcy, C. (2004) S*kills to Last. Broadly Transferable Sustainable Development Literacy for the Canadian Workforce*. Human Resources Development Canada: Ottawa.

Department for Education and Skills (2004) *What is Sustainable Development*? http://www.dfes.gov.uk/aboutus/sd/whatis.shtml

Forum of the Future (2004) *Learning and Skills for Sustainable Development*. Forum for the Future: London.

Gagliardi, R. and Alfthan, T. (1993) *Environmental Training: Policy and Practice for Sustainable Development*. Final report of the ILO Project, Environmental Education in Vocational Training. ILO: Geneva.

Greenish, P. (2004) Sustainable development is an all engineering affair: the role of the Royal Academy of Engineering. Keynote speech presented at the Sustainability Competencies for Engineers Workshop 17 February, UK.

Kofi, A. (2002) Beyond the horizon. *Time*, 18 August. http://www.time.com/time/2002/greencentury/enannan.html. Accessed 3 September 2005.

Kronner, H. (2005) The contribution of technical and vocational education and training to sustainable development. Paper presented at the International Workshop on Workforce Development for the Knowledge Economy, 7–13 September: Seoul.

OECD (2006) *Creating Good Jobs and Prosperity – The Role of the OECD*. TUAC statement to the OECD ministerial council May 2006. OECD: Paris.

Preece, J. and Singh, M. (2003) *Adult Learning and Poverty Reduction*. Report on the workshop held at CONFINTEA Mid-Term Review Conference, September: Bangkok.

Salim, E. (2002) *The Journey of Hope: From Rio to Johannesburg. Words into Action*. For the UN World Summit on Sustainable Development, Johannesburg, 26 August. 4 September 2002. International Institute for Environment and Development: London.

Schellnhuber, H.J., Crutzen, P.J. et al. (2004) Science and global sustainability, in Crutzen, H.J., Clark, W.C., Claussen M. and Held H. (eds) *Earth System Analysis for Sustainability*, pp. 1–28. MIT Press: Cambridge, MA.

Tuijnman, A. (1997) Results and highlights from an international perspective IALS in relation to economies and labour markets. A symposium on literacy, economy and society. Presentation materials: Canada.

UN (1992) Agenda 21. Report of the United Nations Conference on Environment and Development, Rio de Janeiro Earth Summit, June 3–14. http://www.un.org/documents/ga/conf151/aconf15126–1annex1.htm. Accessed 20 May 2004.

UN (2002) World Summit on Sustainable Development Johannesburg, 26 August to 4 September. http://www.un.org/events/wssd/. Accessed 26 April 2007.

UNESCO (2003) United Nations Decade of Education for Sustainable Development (January 2005–December 2014). Framework for a draft international implementation scheme. UNESCO: Paris.

UNESCO (2000) *Dakar Framework for Action. Education For All: Meeting Our Collective Commitments*. World Education Forum, Dakar, Senegal, 26–28 April. Institute for Education. http://www.unesco.org/education/efa/ed_for_all/dakfram_eng.shtml. Accessed 5 June 2005.

UNESCO (2005) Report by the Director-General on the UN decade of education for sustainable development: international implementation scheme and UNESCO's contribution to the implementation of the decade. Draft international implementation scheme for the UN decade of education for sustainable development (2005–2014). Executive Board, 172nd session, Paris. http://unesdoc.unesco.org/images/0014/001403/140372e.pdf. Accessed 12 June 2007.

UNESCO–UNEVOC (2004) Orienting technical and vocational education and training (TVET) for sustainable development. Stolte, H. 'TVET for sustainable development: how to come from idealistic vision to a holistic approach?' InWEnt/Capacity Building International, Magdeburg, Germany, Head of Division Modern media and curricula development in VET, Backgrounds and frame conditions for the sustainable development approach. http://www.unescobkk.org/fileadmin/user_upload/apeid/Conference/papers/3B2_paper_Stolte.doc. Accessed 12 June 2007.

UNESCO–UNEVOC (2006) Orienting Technical and Vocational Education and Training for Sustainable Development, Discussion paper series 1. UNESCO-UNEVOC International Centre for technical and Vocational Education and training, Hermann-Ehlers-Str. 10, Bonn, Germany. http://unesdoc.unesco.org/images/0014/001480/148012e.pdf. Accessed 12 June 2007.

World Bank (2003) *Global Poverty Monitoring Homepage*. http://www.worldbank.org/research/povmonitor. Accessed 6 June 2005.

World Commission on Environment and Development (1987) *Our Common Future. The Brundtland Report*. Oxford University Press: Oxford, New York.

# Chapter 22
# South Africa: Applied Competence as the Guiding Framework for Environmental and Sustainability Education

**Heila Lotz-Sisitka and Glenda Raven**

## Introduction

Following the demise of apartheid rule in South Africa in 1994, the new government adopted the South African Qualifications Act (RSA, 1995a) which established the South African Qualifications Authority (SAQA). The SAQA was tasked with the responsibility for developing and implementing a national qualifications framework (NQF) based on principles of quality, equity and redress. A primary objective of the NQF was to establish a portable and responsive model for lifelong learning and one which could recognize prior learning according to an outcomes-based education and training framework. In addition to this mandate and amongst other responsibilities, SAQA has had a responsibility to design and develop qualifications that respond to the environmental rights and sustainable development clauses of the Constitution and associated national policies. Through this, environment and sustainability education was placed on the national education and training agenda (see Lotz-Sisitka and Olvitt in this volume). The 1995 White Paper on Education and Training, which announced the establishment of SAQA and the NQF, also indicated in its guiding principles that

> . . . environmental education, involving an interdisciplinary, integrated and active approach to learning, must be a vital element of all levels and programmes of the education and training system, in order to create environmentally literate and active citizens and ensure that all South Africans, present and future, enjoy a decent quality of life through the sustainable use of natural resources. (RSA, 1995b, p. 18)

Of significance to the development of the NQF has been the challenge to integrate education and training, as education and training were previously seen as two separate fields with little in common. Integration of education and training in South Africa's educational transformation process was given life through the notion of applied competence. Applied competence involves the integration of practical, foundation and reflexive competence and is used to guide qualifications, the design of

H. Lotz-Sisitka
Environmental Education and Sustainability Unit, Rhodes University, South Africa
e-mail: H.Lotz@ru.ac.za

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learning programmes and the assessment of learning. This competence framework has been of great interest to environmental and sustainability educators in southern Africa as the notion of reflexivity holds numerous promises for social change and transformation (see for example, Archer, 2003; Beck, 1992, 1999; Giddens, 1994). Social change theorists such as Beck, Giddens and Archer all argue that reflexivity is an enabling factor in agency and is therefore a key element of social change processes. We were therefore interested in its appearance within the competence framework that was to guide the NQF and were curious to examine its potential for enabling change through learning in the workplace. This chapter considers the notion of applied competence and its strengths and limitations, as conceptualized in the South African NQF for guiding environment and sustainability education in the workplace.

## Introducing a Competence-based Model in South Africa

Following the unbanning of the African National Congress, South Africa's re-entry into the global market necessitated a significant restructuring of education and training. In response to the economic and capacity development needs of the labour market, the National Training Strategy Initiative, later reconstituted as the National Training Board, put forward a proposal for integrating education and training and thinking about learning as a lifelong learning process (Kraak, 1999). The need to broaden thinking in the vocational sector beyond narrow models of 'skills development' and 'training' was introduced through the release of the 1995 White Paper on Education and Training. This policy paper was released by two ministries, the Ministry of Education and the Ministry of Labour, and firmly placed the notion of integrated education and training on the education transformation agenda. The same White Paper also introduced an outcomes-based education and training system, effectively inscribing a competence-based model as the means of achieving educational transformation in South Africa. This was in line with the changing landscape of adult learning (Edwards, 1997) and local and international critiques of 'training' discourses (Kraak, 1999; Stock, 1996), and with the emergence of outcomes-based models to guide vocational education and training in countries such as Australia, New Zealand, Canada, the UK and others (Barnett, 1994; Edwards and Usher, 1994).

Trends in the 1980s and 1990s in adult education reflect an emergent economic rationalism as the driver for an upsurge in demand for the provision of adult education programmes, particularly in more industrialized countries where greater emphasis was placed on workforce competences and skills to respond to more complex forms of technology, production and organization (Stock, 1996; Tuijnman, 1996). These economic, cultural and social transformations led to the need for educational models and approaches that enable learning to understand and effect change within an expanding global capitalist market economy (Edwards and Usher, 1994). With the rapid expansion of the global capitalist market economy emerged a rapid expansion of competence-based systems of education and training to address this

need for continuous lifelong learning, adaptation and change through skills and knowledge.

Competence-based systems have not, however, been without critique. Some, for example Edwards and Usher (1994, p. 1), question whether competence is an adequate conceptualization of human activity, and therefore an adequate means of assessment. Others argue that the notion of competence in competence-based systems has been too narrowly conceived (Kraak, 1999; McKernan, 1993) and that such narrow competence models do not adequately reflect the significant relationship between thought and action (Barnett, 1994). It has also been said that competence models tend to 'marginalize knowledge and understanding unrelated to workplace performance' (Edwards and Usher, 1994, p. 105). Some have also questioned the governmentality inscribed in competence-based models, where competence introduces a 'normalizing gaze' that seeks to encourage self-governance in relation to a set of pre-defined norms, thereby imposing power and control over individuals in ongoing attempts to sediment state and market power (Edwards and Usher, 1994; Popkewitz, 1999).

It is against this background that South Africa approached the development of a competence framework to guide implementation of the NQF. Kraak (1999), a South African educator, suggested extending the range of competences generally defined to include a wider resource of knowledge than that which is normally defined as underpinning work-related performance. Edwards and Usher (1994, p. 106) describe this as 'resistant and oppositional knowledge and understanding engendered through alternative discourses'. Unlike in contexts such as the UK and Canada, where competence models were primarily motivated by the needs of the changing global economy, the restructuring of the education and training system in South Africa was argued from an economic development perspective as well as from a social perspective to address inequalities perpetuated through traditional educational policies and practices (Sedunary, 1996). The emergence, development and implementation of the NQF was therefore underpinned by two major social objectives:

- Developing skills/competence for economic growth and development in a globalizing and increasingly competitive world;
- Addressing issues of human rights and social justice involving redress, equity and access to quality education and training that had previously been denied to most South Africans.

These two social objectives created a challenging context for the development of the NQF and for conceptualizing an appropriate framework for competence development through education and training. The country's commitments to sustainable development following its entry into the international community and ratification of Agenda 21 soon after Independence in 1994 added further challenges. The country's new Constitution enshrined the right to a healthy environment in its Bill of Rights (RSA, 1996) and established a framework for equitable and just utilization of resources within a sustainable development framework. The South African NQF at the time appeared to be geared to addressing some of the shortcomings of

national qualifications frameworks in other countries; specifically a too narrow focus on competence determined by capitalist market forces and the associated economic rationalism that was influencing the way these frameworks were being articulated in the international arena (National Training Board, 1998). Thus, the South African NQF placed a greater emphasis on the idea of reflexivity than had been observed elsewhere, in an attempt to create an integrated model of education and training, and to move education and training beyond mere skills training, so as to encourage lifelong learning competence that allowed learners to engage critically with processes of social change.

## Applied Competence

In conceptualizing what an integrated education and training framework would look like, the National Training Board, in 1997 developed the notion of applied competence, which they described as 'the demonstrated ability to perform a set of tasks with understanding and reflexivity' (p. 109). As indicated in the introduction above, applied competence involves three interconnected types of competence, namely, practical, foundational and reflexive competence. Practical competence is described as the ability to review a range of possible actions in an authentic context (e.g. identify sources of effluent), to decide on an appropriate action to follow (e.g. implement a mitigation measure to stop the effluent) and to perform the chosen action (Department of Education, 2000, p. 10). The chosen action is grounded in foundational competence, which is the demonstrated ability to understand the knowledge and thinking that underpins the action (e.g., the worker would have an understanding of different causes and mitigation measures to deal with the effluent problem). In the South African context, a further dimension of competence is required to achieve applied competence, namely the integration of the two types of competence through reflexive competence, in which learners show their ability to connect their performance and decision-making to the underlying understanding and adapt to change or unforeseen circumstances, and be able to explain these adaptations. In our example, the worker would, through reflexive competence, be able to predict future issues of a similar nature and attempt to put in place measures to avoid similar problems in future.

In this framework reflexive competence is defined as a particular kind of competence to be considered in the development of national standards, qualifications, learning programmes and assessments. Harley and Parker (1999) noted that reflexive competence is a distinguishing feature of the South African NQF and that it is linked to critical and ethical dimensions, to the values and dispositions that are linked to lifelong learning and to citizenship. Deacon and Parker (1999), however, emphasize that competence statements in themselves are empty: what gives them meaning are their link to practice and assessment in a specific context, They indicate that it is in their translation into learning programmes that their transformative potential can be realized.

## Reflexivity and Applied Competence in Environmental and Sustainability Education

### *Exploring the Transformative Potential of Reflexive Competence*

We were interested in probing the transformative potential of reflexive competence, in the context of applied competence in environmental and sustainability education (see Raven, 2005). This interest was further motivated by an emerging body of research in environmental and sustainability education in southern Africa that sought to conceptualize the dimensions of environmental and sustainability education as processes of social transformation in which the themes of risk and reflexivity have recurred (Janse van Rensburg, 1995; Lotz, 1995; Raven, 2005). In the recent *African Environment Outlook* report (UNEP, 2006, p. 34), it has been reported that 'the lack of skills and opportunity to manage environmental resources undermines the potential for sustainable development, consequently strengthening institutions and empowering people are important strategies' needed for social change towards sustainability. Recent research in southern Africa reveals a context of high risk and vulnerability, which requires reflexive learning processes that are proactive in mitigating risk and are responsive to risk and its associated impacts (Lotz-Sisitka, in press). Ulrich Beck's (1992, 1999) work on a world risk society has been a source of insight in our work to conceptualize appropriate responses in environment and sustainability education. He draws attention to the fact that risk is about knowledge (what we know), but also about unawareness (what we do not know, or do not even know we do not know, and why we know or do not know), which requires an open-process orientation to education, allowing for engaging with the unknown in ways that are not predetermined or predefined. In our research, we identified this as a central tension in the formulation of reflexive and applied competence in the NQF (Raven, 2005).

### *Tensions and Limitations Associated with Articulations of Reflexive Competence*

In examining the way in which reflexive competence was being articulated in the development of qualifications and courses (see Raven, 2005), we identified a range of tensions in the manner in which reflexive competence is conceptualized. These have implications for the depth and nature of possible social change and empowerment processes. This allowed us to develop a more refined concept of reflexive competence and to identify the implications for course design in vocational education and training contexts. We noted that tensions begin to arise around potential interpretations of reflexive and applied competence and how these translate in learning and assessment processes in education and training contexts. In this research we identified two potentially limiting interpretations of reflexive competence that could

constrain, rather than open up the exploration of responses to environmental and sustainability issues (Raven, 2005).

The first involves an interpretation of reflexive and applied competence that focuses mainly on adaptations to change or keeping pace with change as economic and social systems evolve, initiated through dominant, often economically driven forces in society. Framing reflexive and applied competence in this way has the potential to narrow learning and assessment opportunities to a means to a predefined end. Responses to environmental and sustainability issues are more likely then to be framed within technical rational solutions explored within the parameters of the very knowledge frameworks or 'rules of reason' that construct social actions, interactions and practices of daily life out of which these very issues emerge (Popkewitz, 2000). In our pollution control example above, an educator and learner working within this framing of reflexive competence would be satisfied with making an evaluative, adaptive change to the pollution problem within the existing status quo and would not, for example question why such pollution exists or is created in the first place.

Reflexive and applied competence can also be framed in the context of social critique that similarly presents the potential limitations in learning and assessment processes. Though at first glance appearing to be progressive in seeking a critique of existing and dominant ways of thinking and doing, this potential framing does little to encourage learning beyond predefined norms and knowledge parameters, thus allowing little room for exploring unawareness (including what we do not know and the reasons for not knowing), as suggested above. Our educator and learner dealing with the pollution control problem would, in this case, question the existence of the pollution problem and its origins and would no doubt become more critical of the structural factors that lead to and create such pollution. But this learner may not be able to do much about the underlying causes of the problem, even if he/she were empowered' to unpack the causal factors contributing to the problem. Within this framing of reflexive and applied competence, knowledge – and consequent power relations – is seen as a commodity that can be reallocated from one social group to another, to address imbalances and reconstitute social relations. The educators and learners would therefore blame the structure of society, management or consumers (or someone else) for the pollution problem (in our example). Learning and assessment processes associated with this framing of reflexive and applied competence do little to encourage the exploration of different ways of thinking about and acting in the context of environmental and sustainability issues and responses are likely to get caught up and recycled within predefined knowledge frameworks.

## *New Possibilities Embedded in an Alternative Framing of Reflexive and Applied Competence*

We offer a third framing of reflexive and applied competence that attempts to move environmental and sustainable education beyond dominant and existing knowledge frameworks that allows for not only engaging with what is known about issues and risks, but also includes what is not known and why we know and do not know (our

unawareness). This interpretation of reflexive and applied competence allows for a conceptualization of learning and assessment that disturbs that which appears normal and opens up possibilities for different ways of learning and thinking about and acting in relation to issues and risks. Influenced by Popkewitz (1999, 2000) and Popkewitz and Brennan's (1998) theory of a social epistemology, this framing of reflexive and applied competence encourages a critical engagement with knowledge frameworks and our consequent thinking and social actions and interactions. This framing encourages a critical exploration of the socio-historical contexts within which what we do and do not know about environmental and sustainability issues has been constructed. To return to our pollution control example above, the educator and learner in this framing of reflexive competence would seek to uncover the historical roots of knowledge construction processes that led to the pollution problem, and would also seek creative and innovative alternatives or try to think differently about solutions. They would also be aware that their knowledge is fallible, as we do not know all possible solutions, and this would create possibilities for a more open-ended exploration of possibilities and solutions to pollution prevention.

In many ways this conceptualization of reflexive competence builds on the second approach to reflexive competence outlined above, but also allows for a re-imagining process which does not end in structural critique and the identification of power relations. It allows for further destabilization of dominant and existing knowledge frameworks – and power relations – and opens the horizon for exploring new and different ways of thinking about and acting in relation to these issues and risks. Framed in this way, learning and assessment opportunities are opened up to what Beck (1999, p. 26) calls 'outside knowledge, the outsider perspective' and allows for epistemological possibilities to challenge, disrupt and change the social systems, structures, processes and relational dynamics within which the origin of many socio-ecological issues and risks lie. In this framing, a careful analysis of the historical roots of knowledge production systems and context is vital so as to avoid dislocated fantasies or visioning processes that do not take adequate account of structural constraints which are real, but have the potential to transform (Archer, 2003).

## Mapping a Way Forward for Vocational Education and Training Course Design

Through this research we were able to identify a number of insights that can shape an improved course and programme design in the vocational education and training sector (see Fig. 22.1). These have material and epistemological consequences and have potential to strengthen efforts to enable social and environmental change through an integrated approach to education and training. These include:

- The need to recognize that processes of change are ongoing and are often complex. Vocational education and training courses can be only a small part of a more comprehensive process of lifelong learning in which individuals

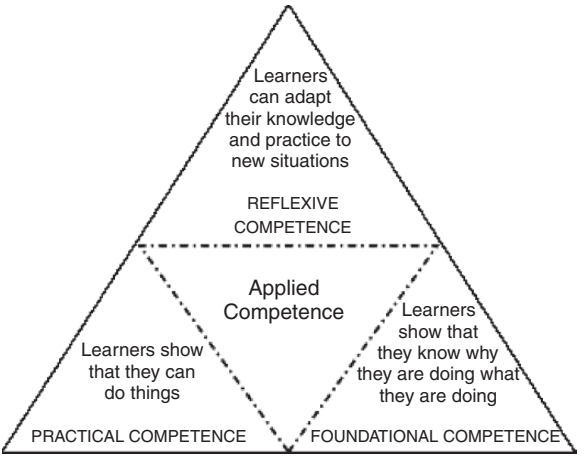


**Fig. 22.1** The interaction of competencies that combine in applied competence
Source: Mackay, Modisi and Lotz, 2000

gradually develop a capacity for understanding, participating in and challenging the processes of change. Education and training programmes therefore need to be systemically located and conceptualized within a broader notion of change in the workplace.

- Reflexive competence is closely connected with an engagement in reflexive processes of change in the workplace, which involves ongoing social actions and interactions in social systems, structures and epistemologies. Reflexive competence cannot be seen as a set of discrete capabilities to be developed in a single learning experience, course or programme. Instead, it appears to have a more complex, long-term character. Courses therefore need to be embedded in workplace systems and activities and should aim at enhancing ongoing reflexive engagement with everyday challenges in the workplace. This reflexive engagement, as outlined above, requires encounters with new ways of thinking and doing that might not be readily available in the workplace, and thus requires course designers to expose learners to broader ways of thinking and to critical, creative possibilities.
- Approaching the development of applied competence with a broader notion of reflexive competence implies an integrated approach to competence development that allows for open-ended learning processes, reflexivity, critique and creative problem-solving. It allows for alternative ways of knowing and thinking that reach beyond the status quo. It also requires a different, more open-ended and learning centred approach to assessment. Instrumental and reductionist assessment procedures that focus on discrete skills or knowledge acquisition are not appropriate for assessing applied competence. Unfortunately, outcomes-based models of vocational education and training tend to be characterized by such approaches to assessment and they are structured according to technically managed unit standard frameworks. Courses that seek to enhance applied

competence need to rethink assessment practice and should be based on contextual and integrated approaches to assessment.

We found that no single course process on its own enables reflexive and applied competence, but a collective of course processes (e.g. working with theory in relation to practice, workplace-based assignments, problem-solving tasks, critical reflection activities and participatory processes of assessment) over a period of time best facilitate the emergence of reflexivity (Raven, 2005). We found, too, that these course processes need to be underpinned by a particular philosophy of change that allows for critically reflexive, open learning processes (see Raven, 2005). Course designs that take account of the socially constructed nature of knowledge, history and context, applied and critical tasks, creative and critical thinking processes; and which adopt a learning-centred approach to assessment are most likely to strengthen and enable transformative applied competence that responds to environmental and sustainability issues and risks in meaningful ways. As indicated by the *African Environmental Outlook* report (UNEP, 2006), African citizens, managers and workers need to enhance their capacity to manage environmental resources to enable sustainable development. Our research argues that this needs to be done in ways that have material and epistemological outcomes that can contribute to both individual empowerment, and social and environmental change. This involves processes that allow learners to question the forms of reasoning and associated practice that lead to environment and sustainability issues and risks in the first place. As can be seen from this analysis, we have found that this required a critical appraisal of the model of competence being proposed by the NQF in South Africa, to ensure that the potential for transformation is not lost through shallow or inadequate interpretations of the competence framework.

## References

Archer, M. (2003) *Structure, Agency and the Internal Conversation*. Cambridge University Press: Cambridge.

Barnett, R. (1994) *The Limits of Competence: Knowledge, Higher Education and Society*. Open University Press: Buckingham.

Beck, U. (1992) *Risk Society. Towards a New Modernity*. Sage: London.

Beck, U. (1999) *World Risk Society*. Blackwell: Oxford.

Deacon, R. and Parker, B. (1999) Positively mystical: an interpretation of South Africa's outcomes-based national qualifications framework, in Jansen, J and Christie, P. (eds) *Changing Curriculum: Studies of Outcomes Based Education in South Africa*. Juta: Cape Town.

Department of Education (RSA) (2000) *Norms and Standards for Educators*. Department of Education: Pretoria.

Edwards, R. (1997) *Changing Places? Flexibility, Lifelong Learning and a Learning Society*. Routledge: London.

Edwards, R. and Usher, R. (1994). Disciplining the subject: the power of competence. *Studies in the Education of Adults*, 26(1): 1–14.

Giddens, A. (1994) Living in a post traditional society, in Beck, U., Giddens, A. and Lash, S. *Reflexive Modernisation: Politics, Tradition and Aesthetics in the Modern Social Order*. Polity Press: Cambridge.

Harley, K. and Parker, B. (1999) Integrating differences: implications for an outcomes-based national qualifications framework for the roles and competencies of teachers, in Jansen, J. and Christie, P. (eds) *Changing Curriculum: Studies of Outcomes Based Education in South Africa*. Juta: Cape Town.

Janse van Rensburg, E. (1995). Environmental education research in southern Africa: a landscape of shifting priorities. Unpublished Ph.D. thesis, Department of Education, Rhodes University, Grahamstown, South Africa.

Kraak, A. (1999) Competing education and training policy discourses: a 'systemic' versus 'unit standards' framework, in Jansen, J. and Christie, P. (eds) *Changing Curriculum: Studies of Outcomes Based Education in South Africa*. Juta: Cape Town.

Lotz, H.B. (1995) The development of environmental education resource materials for junior primary education through teacher participation: the case of the we care primary project. Unpublished D.Ed. thesis, University of Stellenbosch: Stellenbosch.

Lotz-Sisitka, H.B. (in press) *Education for Sustainable Development in a Context of Risk and Vulnerability*. SADC REEP: Howick.

McKay, I, Mosidi, S. and Lotz, H. (2000). Enabling Environmental Education Processes in Teacher Education: A resource to support teacher educators to interpret policy and change curricula. Share-Net/UNESCO/Department of Environmental Affairs and Tourism. Howick/Pretoria. 46 pgs.

McKernan, J. (1993) Perspectives and imperatives: some limitations of outcomes-based education. *Journal of Curriculum and Supervision*, 8(4): 343–353.

National Training Board (1997) *Access Document: Setting Standards for Education, Training and Development Practices in South Africa*. National Training Board: Pretoria.

National Training Board (1998) *Education, Training and Development Practices Project: An Indigenous Model for Progression Paths, Qualifications and Standards within the National Qualifications Framework, Final Report*. National Training Board: Pretoria.

Popkewitz, T. (1999) A social epistemology of education research, in Popkewitz, T. and Fendler, L. (eds) *Critical Theories in Education: Changing Terrains of Knowledge and Politics*. Routledge: New York.

Popkewitz, T. (2000) Globalization/regionalization, knowledge and educational practices: some notes on comparative strategies for educational research, in Popkewitz, T. (ed.) *Educational Knowledge: Changing Relationships Between the State, Civil Society and the Educational Community*. State University of New York Press: New York.

Popkewitz, T. and Brennan, M. (1998) Restructuring of social and political theory in education: Foucault and a social epistemology of school practices, in Popkewitz, T. and Brennan, M. (eds) *Foucault's Challenge: Discourse, Knowledge and Power in Education*. Teachers College Press: New York.

Raven, G. (2005). Enabling reflexivity and the development of reflexive competence within course processes: a case study of an environmental education professional development course. Unpublished PhD study, Faculty of Education, Rhodes University: Grahamstown.

RSA (1995a) *South African Qualifications Act*. Government Printers: Pretoria.

RSA (1995b) *White Paper on Education and Training*. Government Printers: Pretoria.

RSA (1996) *South African Constitution*. Government Printers: Pretoria.

Sedunary, E. (1996) Neither new nor alien to progressive thinking: interpreting the convergence of radical education and new vocationalism in Australia. *Journal of Curriculum Studies*, 28(4): 369–396.

Stock, A. (1996) Lifelong learning: thirty years of educational change, in Raggart, P., Edwards, R. and Small, N. (eds) *The Learning Society: Challenges and Trends*. Routledge: London.

Tuijnman, A. (1996) The expansion of adult education and training in Europe, in Raggart, P., Edwards, R. and Small, N. (eds) *The Learning Society: Challenges and Trends*. Routledge: London.

UNEP (2006) *African Environmental Outlook 2: Our Environment, Our Wealth*. UNEP: Nairobi.

# Chapter 23
# South Africa: Strengthening Responses to Sustainable Development Policy and Legislation

**Heila Lotz-Sisitka and Lausanne Olvitt**

## Introduction

A key objective of the newly established South African national qualifications framework (NQF) is to enable the transformation of society, following the demise of apartheid in 1994. Through the South African Constitution, which enshrines the right to a healthy environment for all citizens, and the sustainable utilization of resources for current and future generations (RSA, 1996), South African society adopted a development path that is oriented towards sustainable development. The development and implementation of the NQF (established by the South African Qualifications Authority Act in 1995) has involved various initiatives to design and develop qualifications that respond to the environmental rights and sustainable development clauses of the Constitution and associated national policy.

The past 10 years have been an active period for reconceptualizing education and training in South Africa, particularly in the previously neglected[1] area of workplace-based learning. New structures were put in place to develop and approve flexible and portable qualifications in unit-standard format, new service delivery structures and mechanisms have been established which allow for flexible forms of programme delivery and new learning programmes have been designed to respond to the outcomes-based, flexible format of the NQF. The NQF has created new opportunities for lifelong learning and new possibilities for those formerly disadvantaged by apartheid exclusionary policies and systems to gain access to education and training, and recognition for their skills and competencies. It has also created the space for new innovative programmes to emerge that respond to emerging issues in society, such as increased environmental degradation, increased health risks and new social and economic challenges.

Through 10 years of participation in the structures developing and approving qualifications, establishment of new service delivery mechanisms and learning programmes, we have supported, through various activities and networks, the emergence of an environmental and sustainability education focus within the NQF.

H. Lotz-Sisitka
Environmental Education and Sustainability Unit, Rhodes University, South Africa
e-mail: H.Lotz@ru.ac.za

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Initially our work focused on the establishment of structures and qualifications. More recently, our work has focused on the design and development of learning programmes for sustainability education and training, and flexible and responsive modes of course delivery. In this process, we have been guided by, and have critically reviewed the NQF competence framework, which combines practical, foundational and reflexive competence in seeking to enhance applied competence in the workplace (see Lotz-Sisitka, 2004; Lotz-Sisitka and Raven in this book).

## The Problem of an Inadequate Response to Sustainable Development Policy in the Vocational Education and Training Sector

This chapter reports on a recent research project undertaken on behalf of the Department of Environmental Affairs and Tourism to influence the national skills development strategy (NSDS) and the sector skill planning (SSP) process, to enable a more proactive orientation to the design an development of environment and sustainability qualifications and learning programmes. This research was commissioned by the Department of Environmental Affairs and Tourism in response to earlier research by Griffin (2003), who found that the NQF was not creating adequate opportunities for environmental and sustainability learning, as few qualifications were being designed and qualifications design was also being driven mainly by industry's immediate needs for skills development, rather than the requirements of the new national policy guiding sustainable development. While this research was being undertaken, the country experienced a major development crisis around its capacity to implement environmental impact assessment regulations, providing empirical evidence that the education and training system were not adequately preparing people to implement sustainable development legislative requirements. We traced this problem to the NSDS put in place by the Minister of Labour to guide the development, funding and implementation of new vocational training programmes, and the sector skills plans that were being used to develop the NSDS. We found that the sector skills plans and the NSDS had not adequately interpreted the country's sustainable development policies and was therefore not responding proactively to them.

## Examining the NSDS, Sector Skills Planning Frameworks and Sustainable Development Policy

The South African NQF has an implementation structure that locates the design and development of qualifications with nationally appointed standards generating bodies (who are mostly volunteer professionals). Quality assurance and accreditation of service providers and learning programmes is located with 27 sector education and training authorities (SETA). The SETAs are also beginning to support standards and qualifications generation, as the voluntary standards generating bodies are developing them too slowly and the demand for accredited training is

outstripping the availability of qualifications, accredited service providers and good quality learning programmes for workplace-based learning.

The SETAs are closely related to professional fields, for example, there is a tourism and hospitality SETA called THETA, a manufacturing industries SETA called MERSETA and a primary agriculture SETA called PAETA. They define priorities for education and training from an analysis of the workplace skills planning that takes place in various workplaces. Through the implementation of a skills development levy, companies and employing organizations are all required to allocate 1 per cent of their salary budget to the SETA system. If they send their workers on NQF-accredited training, which is approved and accredited by the SETAs, they can claim 80 per cent of this funding back. This financial mechanism has therefore created a huge demand for accredited training and the SETA system in South Africa has been struggling to respond adequately to the needs and demands of companies and employers (expressed through the workplace skills planning process) and the demands of national policy and legislation. They have been unable to establish a proactive approach to qualifications and training programme development, which has led to various skills and capacity crises as the government aims to implement its newly established policies with inadequate skills and capacity. This situation has affected sustainable development objectives (e.g. municipal service delivery, environmental impact assessments, sustainable development planning and risk mitigation) and environment and sustainability education and training in South Africa.

To explore this issue in more depth we undertook two related studies on behalf of the Department of Environment and Tourism, who are the lead agents for implementing the National Environmental Management Act, NEMA (RSA, 1998a), which is the framework legislation for all other environment and sustainability related legislation. The first study aimed to identify the status of environmental and sustainability education in the SSPs of the various SETAs (Lotz-Sisitka et al., 2004). This was a critical study to establish the situation of environmental and sustainability education in the vocational education and training sector, as the SSPs are the mechanism through which SETAs set priorities and allocate resources and funding to support and develop training programmes.

The second study aimed to examine further the relationship between sustainable development policy and legislation and associated education and training needs (Olvitt et al., 2004). This study was based on the findings of the first study and provided us with further insights on how the vocational education and training sector could become more responsive to enabling environment and sustainability education and training to address the capacity gaps that were emerging in implementing newly established sustainable development policies.

## *Findings from Study 1: Inadequate Attention to Education for Sustainable Development in SSPs*

This study involved a desktop review of five SSPs. The sampling was based on an assessment of five SETAs that were most likely to have incorporated environment and sustainability issues into their qualifications mix and thus, in their SSPs. A

selection of national sustainable development policy and legislation was reviewed through a keyword strategy to establish the implied needs for skills development. The analysis of the legislative implications for skills development and the SSPs of the five SETAs was developed in such a way that it could provide a platform for dialogue to inform the review of SSPs. Key findings from the study included the following:

- Some attention is being given to environment and sustainability issues in the five SSPs reviewed, but this appears to be inadequate to address the implied skills requirements in legislation and policy that the SSPs were aiming to respond to.
- The interpretations of environment and sustainability issues in the SSPs were not consistent with those in the NEMA (RSA, 1998a).
- The SSPs were being developed without adequate attention to the skills requirements associated with the sustainable development policy and legislation relevant to the sector.
- Environmental and sustainability training programmes were not adequately contextualized to the particular needs of the sectors.
- Skills frameworks and qualifications in the SETAs focused primarily on the technical dimensions of environmental management and sustainable development, and neglected the social dimensions of environmental management and sustainable development.
- Market-driven approaches to conservation, environmental management and sustainable development were dominating the perspectives in the SSPs.
- The SSPs appeared to be neglecting the relationship between rural development and skills development, particularly as these relate to environmental management and sustainable livelihoods amongst the poor.
- Factors that are likely to affect the future of the sector appeared to be neglected.
- The SSPs reflected a narrow view of education for sustainable development (ESD), which was limited to awareness-raising only, with little emphasis placed on action competence or applied competence (see Lotz-Sisitka and Raven, this volume).
- The contribution of ESD to development of the sectors had not been considered in the SSPs.
- No attention was being given to the training of ESD practitioners who would be able to offer education and training programmes to enhance ESD in the different sectors.
- Employment and skills needs related to environment and sustainability issues were not being considered in the light of broader social needs, but were rather narrowly interpreted in relation to the immediate needs of the sector itself.
- No mechanism was in place for inter-SETA dialogue on generic aspects of environment and sustainability education, which were relevant to more than one sector (e.g. environmental ethics and social justice training, generic environmental management skills).

The study recommended multi-sectoral (cross SETA) deliberations on environment and sustainability issues and dialogue on how these should be addressed through

qualifications, standards and training provision across the 27 SETAs. The findings of the study indicated that policy and legislative frameworks have implied needs for skills development and that, in order to proactively manage environment and sustainable development concerns, these implied skills ought to be considered alongside existing workplace skills development needs of industry. The study noted that failure to do so may cast the NSDS into a reactive mode, in the service of industry's immediate needs only. The research also indicated that needs for the country's environment and sustainable development needs are both technical (scientific) and social (sociological, educational) in nature. The research indicated that environment and sustainability issues in South Africa require a multidisciplinary and multi-sectoral response, and that the NSDS needed to consider sustainable development policy and legislation with a more proactive stance.

The study, due to its somewhat limited scope, was not able to provide a definitive analysis of the skills development requirements implied in the legislation reviewed, but it was able to raise key issues and questions and it established a methodology that could be expanded upon through further research and dialogue, a process which was taken forward in the second study.

## *Findings from Study 2: A Competence Framework to Guide ESD in the Vocational Education and Training Sector*

The second study was commissioned as a follow-up study to the first and was based on its recommendations to seek further depth in the analysis presented in the first study. The second study involved a more in-depth review of South Africa's sustainable development policy and legislation, and interviews with key stakeholders concerned with sustainable development policy implementation. The legislation reviewed included the NEMA (RSA, 1998a), the Environmental Impact Assessment Regulations (RSA, 1998b), the Marine Living Resources Act (RSA, 1998c), the Air Quality Bill (RSA, 2003a), the White Paper on Integrated Pollution and Waste Management (RSA, 2000), the Protected Areas Act (RSA, 2003b), the Biodiversity Act (RSA, 2004) and the World Heritage Convention Act (RSA, 1999). Interviews were conducted with those responsible for implementing policy and legislation relating to air quality, chemical and hazardous waste, environmental impact assessments, state of environment reporting and protected area management. Through a process of analysis, the following categories of competence were identified as being relevant to all the above-mentioned legislation and constituted a generic framework for competence development for environmental management within a sustainable development framework. These categories of competence include the following:

- *Environmental competence*. Legislation currently calls for practice that is strongly grounded in the principles and practices of ecological sustainability. For example practitioners in local authorities are required to: identify causes and effects of air pollution on the environment; plan or oversee development in ecologically

sustainable ways; identify and manage the impacts of water wastage and pollution by humans on ecosystems (amongst others).

- *Management/planning and administrative competence*. All areas of environmental management (educational, communicative, legislative, etc.) require basic levels of management and administrative competence. The skills required here include the ability to contribute to integrated environmental management plans and strategic plans. Skills associated with formalized agreements with stakeholders and the co-ordination of various projects and programmes are also relevant in this competence category.
- *Legislative competence*. Environmental management practitioners and local authorities are required to know and implement a wide range of applicable legislation, policy and regulations at national, provincial, municipal and area-specific levels. Some examples include implementing the precautionary principle of national environment management, harmonizing policies, legislation and actions and enforcing legislation that governs environmental impact assessments.
- *Communications competence*. Environmental management practitioners working with environmental management issues are required to ensure that interdepartmental communications are strengthened and that communications with the public are conducted in participatory ways. All environmental and sustainable development legislation calls for activities that require liaison, facilitation, consultation and negotiation. Examples of competencies required in this category include promoting the participation of interested and affected parties; negotiatiating land claims and land use priorities and following a process of public participation.
- *Social justice/ethical competence*. Competencies associated with this category reflect the broader South African constitutional commitment to human resource development, equity, human rights, redress and community empowerment. Examples of social justice/ethical competence that need to be applied practically include planning or overseeing development in socially and culturally sustainable ways; implementing community-based natural resource management programmes and ensuring that negotiations are conducted on an equal footing.
- *Education and training competence*. Most environmental management legislation include a need to transmit knowledge, raise awareness and build capacity for participation in environmental management. This presents a weak framework for environmental education and training, as knowledge transmission and awareness raising have long been proven to be ineffective in broadening participation. More in-depth, participatory approaches to education and training are required. Public participation is a key concern in environmental legislation and this overlaps with education and training competence. Practitioners therefore need to understand the challenges and opportunities of working in participatory ways with local communities.
- *Monitoring, evaluation and research competence*. This category of competence is required to ensure capability of applying the findings of relevant monitoring, research and evaluation activities to short-, medium- and long-term planning.

This area of competence is the key to effectiveness in other areas of competence outlined above.

A second process of analysis considered legislative requirements within the above-mentioned competence categories in relation to the education and training framework of the NQF. In this process the notion of applied competence was used to structure further analysis. Legislative requirements that related to these competence categories were analysed in terms of practical, foundational and reflexive competence[2] (see Lotz-Sistka and Raven in this volume). This analysis provided further insight into the types of knowledge, skills and values that might guide qualifications, skills development programmes and learning programmes. It provided a framework for the development of environmental management qualifications, skills development programmes and learnerships that would contribute to sustainable development in a social transformation process (see Table 23.1).

## The Way Forward: ESD Qualifications Development in the Vocational Education and Training Sector

Through this research we were able to conceptualize a framework to guide qualifications development that could respond to the cross-sectoral and multi-sectoral nature of ESD and environmental management for sustainable development (see Table 23.2). We were able to propose a way forward for SETAs to respond to the issues identified in our first study in which we identified various limitations in the way that ESD was being conceptualized and incorporated into SSPs across a number of SETAs.

Table 23.2 proposes a generic framework that can be used by standards generating bodies working with various SETAs, the SETAs themselves, the Department of Environmental Affairs and Tourism, and other service providers and course developers to guide the development of environmental management qualifications, skills development programmes and learnerships for sustainable development. It is important to note that this framework is not a learning programme template, although it can form the basis of future learning programme development if it is made available to providers, particularly further education and training colleges and higher education and training institutions.

With attention to progression and scope of application, this framework can also form the basis for making a career-path through qualifications and national skills development, as envisaged by the NSDS and NQF more broadly. This framework provides a platform for dialogue across SETAs[3] as well as guidance for interpretation at various levels of the NQF. At NQF levels 2–4 there is a stronger focus on practical and foundational competencies; work is conducted with guidance and support, and reflexivity is limited to locally situated practice. At levels 5–7 the scale of operation is broader (international, national or provincial), with more managerial responsibility and more reflexive skills at a broader level are required (see Lotz-Sisitka and Raven, this volume).

**Table 23.1** Categories and types of competence for applied competence for sustainable development

| Categories of competence | Examples of practical competence | Examples of foundational competence | Examples of reflexive competence |
|---|---|---|---|
| Environmental competence | Taking action to reduce pollution | Understanding why pollution is a problem | Evaluating the action taken to reduce pollution and implementing improvements to the initial strategy if needed |
| Management/planning and administrative competence | Implementing an EMS | Understanding that there are different ways of approaching environmental management, and there are different choices of EMS | Recognizing problems in the EMS implementation, making decisions and changing practice accordingly |
| Legislative competence | Ensuring air quality regulations are complied with | Understanding why air pollution is a global problem (i.e. Understanding global warming issues etc) | If problems are experienced with air quality control, being able to source appropriate help, evaluate the available capacity and implement changes |
| Communications competence | Running a public participation meeting | Understanding the dynamics of different interest groups in the public forum | Being able to assess possibilities for conflict and successfully using strategies to address conflict as it arises in a public participation process |
| Social justice/ethical competence | Selecting a new provider for a waste management contract to support local economic empowerment | Being able to justify why a particular choice was made | If the provider is not able to meet the required service levels, implementing a support strategy to address capacity constraints |
| Monitoring/evaluation and research competence | Using a particular monitoring tool for a particular purpose (e.g. Water quality monitoring) | Knowing why a particular monitoring strategy was used | Critically assessing the effectiveness of the monitoring process, and adjusting procedures accordingly |

**Table 23.2** Framework for developing environmental management qualifications, skills and learnerships for susfainable development

| Categories of competence levels | Practical competence | Foundational competence | Reflexive competence |
|---|---|---|---|
| Environmental competence | | | |
| Education and training competence | | | |
| Management/planning and administrative competence | | | |
| Legislative competence | | | |
| Communications competence | | | |
| Social justice and ethical competence | | | |
| Monitoring/evaluation and research competence | | | |

It was further recommended that when specific qualifications or programmes are being developed, it will be important to apply these categories of competence to the specific environmental management/sustainable development workplace contexts. For example, the management of World Heritage sites, protected areas, waste and pollution, local government environmental management and sustainable development activities such as water and sanitation management, all have specialized education and training needs. This will require context-specific examples and applications in education and training programmes. We undertook research in our local government context to test this framework in the local government context (Hamaamba, 2004; Olvitt and Hamaamba, 2006; Lotz-Sisitka et al., 2005) and found that it provided a useful generic framework that could be adapted for context-specific design and development of ESD programmes. We have also investigated how the framework can be used to guide the development of a learnership (a one-year workplace-based learning programme), or to guide specific skills development programmes for different learner groups. This formed the basis of an environmental education and training strategy for our local municipality to achieve their sustainable development objectives (Lotz-Sisitka et al., 2005) and is informing course and learning programme design in various vocational education and training programmes.

## Conclusion

This research, together with other emerging research projects to take this work further, has been undertaken with the intention of strengthening existing environmental management practices for sustainable development in South Africa by supporting the translation of environmental legislation from policy into practice. In the broadest sense this research aims to contribute to the empowerment and transformation of South African society towards a more sustainable future. As discussed in this chapter, our studies have argued that there is a need to conceptualize ESD proactively in the vocational education and training sector in response to sustainable

development policy and legislation, so as not to fall victim to reactive, narrow and default approaches to ESD that are driven by immediate and short-term industry needs only.

## Notes

1. Workplace-based learning was neglected in the apartheid era and very little concern was shown for the professional development or career-path options of workers, particularly black workers.
2. Applied competence involves the integration of practical, foundational and reflexive competence. Practical competence is a demonstrated ability to perform a set of tasks. Foundational competence is a demonstrated understanding of what a person is doing and why. Reflexive competence is a demonstrated ability to connect with is known with what is done, so that practitioners can learn from their actions and adapt (see Lotz-Sisitka and Raven, this book).
3. This dialogue has not yet taken place, due mainly to a lack of strategic leadership in ESD in the vocational education and training sector in South Africa, and due to a lack of an appropriate forum for SETAs to discuss issues relating to ESD.

## References

Griffin, C. (2003) Environmental outcomes in the South African learnership system. *Southern African Journal of Environmental Education*, 20: 53–62.

Hamaamba, T. 2004. Training needs for municipal employees: a case study of Makana municipality. Unpublished M.Ed. thesis. Rhodes University: Grahamstown.

Lotz-Sisitka, H. (2004) Environmental education and training in industry: an introductory overview of some developments in South Africa, in Loubser, C. (ed.) *Environmental Education: Some South African Perspectives*. Pretoria: Van Schaik.

Lotz-Sisitka, H., Malema, V. and Olvitt, L. (2004) Environmental and sustainability training in the sector skills plans: an initial review. Unpublished research report, Pretoria: Department of Environmental Affairs and Tourism.

Lotz-Sisitka, H., Hamaamba, T., Kachilonda, D., Zondane, P., Kula, T., Olvitt, L., Timmermans, I. (2005) Makana municipality local environmental action plan: environmental education and training strategy. Unpublished document, Makana Municipality: Grahamstown.

Olvitt, L. and Hamaamba, T. (2006) Identifying needs and opportunities for local government environmental education and training in South Africa. *Southern African Journal of Environmental Education*, 23: 122–37.

Olvitt, L., Malema, V. and Lotz-Sisitka, H. (2004) Analysis of the education and training needs implied in selected environmental legislation: an analytical study conducted for the Department of Environmental Affairs and Tourism. Unpublished research report, Department of Environmental Affairs and Tourism: Pretoria.

RSA (1996) *The Constitution of South Africa*. Government Printers: Pretoria.

RSA (1998a) *National Environmental Management Act*. Government Printers: Pretoria.

RSA (1998b) *Environmental Impact Assessment Regulations under Section 24(5) of the NEMA (Act no. 107 of 1998) as amended*. Government Printers: Pretoria.

RSA (1998c) *Marine Living Resources Act*. Government Printers: Pretoria.

RSA (1999) *World Heritage Convention Act*. Government Printers: Pretoria.

RSA (2000) *White Paper on Integrated Pollution and Waste Management for South Africa*. Government Printers: Pretoria.

RSA (2003a) *National Environment Management: Air Quality Bill*. Government Printers: Pretoria.

RSA (2003b) NEMA: *Protected Areas Act*. Government Printers: Pretoria.

RSA (2004) NEMA: *Biodiversity Act*. Government Printers: Pretoria.

# Chapter 24
# Azerbaijan: TVET and Sustainable Livelihoods in the Caucasus

**John E.S. Lawrence**

## Introduction

Globalization, as defined below, has blurred national boundaries, reshaped the work environment worldwide, and deeply challenged traditional approaches to human resources development (HRD). The 1990 Education for All (EFA) initiative and its metamorphosis into millennium development goals is sending ripple effects up through secondary and higher education levels as more children have access to basic education. Learning is now becoming widely recognized as a lifelong process. Livelihood sustainability for each individual is a complex process of balancing economic, socio-cultural and even environmental considerations in work, the family and the community. Formal education is increasingly acknowledging these new realities and less formal systems (virtual academies, online training centres) are emerging to accommodate to these pressures. Information and communication technologies (ICT) are opening up fresh vistas for self-paced, flexible and applied learning. Computer-based education offerings are proliferating worldwide at all levels.

Nowhere are these trends more evident than in young and emerging countries of the former Soviet Union. Unprecedented economic growth in an atmosphere of new independence have led to opportunities for cautious but promising educational entrepreneurship and initiative. A strong inherited educational legacy from earlier (Soviet) times, while it is constraining in some ways (e.g. by its emphasis on rote learning and authoritarian pedagogical styles), nevertheless ensures the high priority accorded to public education for its own sake as a cultural necessity. Furthermore, 'sustainability'[1] as a concept is being introduced into basic education texts, setting the stage for more comprehensive approaches in secondary and post-secondary curricula. In particular, several factors in both the supply of and demand for labour in the workforce are requiring more integrated HRD strategies, including different kinds of technical and vocational education and training (TVET), that focus more

J.E.S. Lawrence
United Nations Development Programme and School of International & Public Affairs, Columbia University, New York, USA
e-mail: john.lawrence@undp.org

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on job-creating (entrepreneurial) than on job-seeking skills and more adaptable to changing technologies.

This article explores these trends, with special reference to TVET in eastern Europe and western Asia, the Caucasus region and, most specifically, to the young nation of Azerbaijan that is developing at an unprecedented rate, with the fastest economic growth of any country in the world. The research on which the chapter is based is supported by several agencies (see acknowledgement section), whose assistance is gratefully acknowledged. The associated project work is still ongoing, meaning that the chapter itself is a work in progress. The conclusions, while tentative, are grounded in two initiatives. The first was the development of a National Employment Strategy (NES) for Azerbaijan, the product of a NES Commission chaired by the Minister of Labour, assisted by the work of a small team of international consultants of which the author was a member in 2004 (see UNDP, n.d.). Ultimately the NES was submitted to and approved by the Cabinet, and signed by the President in October 2005, setting the stage for the second initiative, the 'black gold to human gold' programme, on which the author worked as part of a team of advisers in 2006.

The purpose of this chapter is to identify key challenges for TVET as they reflect today's HRD priorities and to review ways in which these are being addressed today in Azerbaijan.

## Background

A combination of contemporary forces is shaping the context for HRD in eastern Europe and western Asia. Four of these are particularly critical: global competition and the education 'bulge'; the changing face and structure of work; the need for different kinds of HRD strategies and TVET and finally, the link to more sustainable concepts of livelihood.

One of the most interesting, and challenging aspects of 'globalization' – defined as the increasing internationalization of financial markets and of markets for goods and services (OECD, 2005), is the shift across national borders in the labour market demand for knowledge and skills. Industrialized nations in Europe and North America have lost some of their human resources edge, with their outsourcing of manufacturing and service jobs to countries in their own and other regions. A recent study of eight industrial sectors estimated that in 2003 1.5 million service jobs were outsourced abroad from more developed countries (McKinsey et al., 2005). By 2008 that number is projected to have risen to 4.1 million. These jobs have been going to several locations, among which India, Ireland and the Philippines have been the most important but which also include Russia and Eastern Europe.

A related phenomenon is the growing number of young people with access to secondary and post-secondary education, perhaps partly as a result of global emphasis on basic education initiatives such as Education for All,[2] especially in the younger and less industrialized countries. Overall, the adult literacy rate for the least developed countries rose by 10 per cent (from 44 per cent) between 1990 and

2003 (UNDP, 2005, Table 11, p. 254). Particularly striking, however, has been an upward pressure of markedly increased investment in secondary and tertiary education, and associated increases in net enrolment at secondary levels over the same period. As the World Bank has noted 'the global Education for All (EFA) effort provides added momentum for the growth in secondary education' (World Bank, 2006). While this is not universal (e.g., some countries, such as Australia, have reversed this investment trend), investments and enrolments have generally surged beyond the basic level, especially in some eastern European and Commonwealth of Independent States (CIS) countries for which data are available. For example, Hungary has expanded its proportion of public expenditure on secondary education over approximately the same period[3] from 24 per cent to 39 per cent and from 15.2 per cent to 23 per cent on tertiary education and the Ukraine doubled its expenditures at both levels (UNDP, 2005). Increases in secondary enrolment ratios (for the few countries in the region reporting these data) range from 7 per cent to 30 per cent and Azerbaijan reports a 46 per cent increase in secondary enrolments across this time span (State Statistical Committee, 2002, Table 1.2, p. 18).

Those entering this secondary educational bulge traditionally have two choices. One (much smaller) group is expected to survive through various academic barriers, often with considerable state or private support, to reach tertiary education and thus, they hope, a lucrative professional/technical career and relative occupational stability, predictability and security. The other (majority) is left to crest like a wave uncertainly on a rocky employment shore, either immediately, or via alternative, less secure TVET options through short-term institutional vocational/technical skills training, which, regrettably, is often out of step with the realities of the job market.

The work environment which today's young people are entering, and in which they are expected to survive and prosper, is in many ways radically different from the one in which their teachers have experience, and were trained to prepare them for Uncertainty, volatility and precariousness are characteristics all too often associated with employment opportunities. Factors such as outsourcing and layoffs in the face of fast-moving productivity technologies heighten the perception of worker insecurity. Self-employment, while it is relatively low and has actually been declining for some time in the USA and Canada (comprising less than 10 per cent of the workforce, defined in this case as non-farm, private-sector workers, in 2002) varies widely in the EU, with an EU-wide average of 14 per cent and in some countries (e.g. Greece) almost one-third of their workforce is self-employed (Chernyshev, 2005). Furthermore, it is impossible to ignore the fact that a wide swath of the working population may work outside the purview of formal labour markets in various kinds of self-employment, 'grey' economy work and insecure employment in a shadow sector.

The distinction between self-employment and informal sector activity is often unclear, especially in countries in early stages of labour market information system development. For example, the results of the first Azerbaijan labour force survey classifying 'place of main work' found that almost 20 per cent of actively employed persons are in 'private entrepreneurship activity' without contracts. More generally, 46 per cent of all economically active respondents were 'engaged in their own

business' or what are called 'own-account workers' (State Statistical Committee, 2004, p. 32).

The ILO recently defined two new, somewhat conflicting, concepts, firstly, 'decent work' as an organizing principle for ILO activities, and secondly, the 'informal economy'. Introduced in the ILO Director-General's report to the International Labour Conference in 1999, decent work was defined as 'opportunities for women and men to obtain decent and productive work in conditions of freedom, equity, security and human dignity', integrating all four of the agency's strategic objectives: employment, the promotion of rights at work, social protection and social dialogue (ILO, 1999). Indicators are identified which aid in defining, measuring and assessing work that is characterized as 'decent'. The goal is twofold: the promotion of acceptable job opportunities for all that meet widely acknowledged standards, for example, of access, remuneration, workplace safety and security and the rejection of unacceptable, dangerous, and/or exploitative work such as child labour. Yet these ideas remain elusive more than a decade after the 1995 World Social Summit in Copenhagen where world leaders committed to full employment as an international objective:

> Women are still excluded at all levels, with inequalities in education, training and recruitment underlying persistent gender wage gaps throughout the world. Over the last decade, unemployment among women increased by 13.2 million, reaching 77.9 million in 2004. ... Since 1995, an additional 34.4 million people have fallen into the category of the unemployed, particularly in the developing South ... and nearly half of all paid workers do not earn more than two dollars per day, while about one-fifth earn less than a dollar a day, according to ILO statistics. (Söderlindh, 2006)

The informal sector is usually seen by labour ministries as the antithesis of decent work. Associated often with conspicuous absence of crucial 'decent work' elements such as employment contracts, a living wage, a degree of longevity, security benefits and social protection, it is indeed at best a marginal bargain for workers forced to take its conditions. Nevertheless, it remains an inescapable reality for millions of people. Chernyshev (2005) notes differences between(less desirable) 'informal sector' employment as contrasted with (more desirable) employment in 'informal economy' enterprises, based on an emerging ILO consensus around the difficult issues of definition and measurement in this quasi-sector. Yet there still exists no clear definition.[4]

The term 'informal economy' triggers a lot of confusion and interpretations. People look at it in different ways. Economic and financial planners call it the unobserved economy. Labour advocates call it the unorganized sector. Social security officials label it the unprotected sector. Statistical authorities call them uncounted. Others say they are simply the poor and marginalized who are forced to create their own employment. There is a huge debate on what an informal economy is. There is, however, one common denominator in all these interpretations – all of them refer to some type of exclusion: from social security, from statistical coverage, from traditional trade unionism, from GDP estimates and from productive resources typically available to larger enterprises.

Nevertheless, the economic contribution of this kind of informal work, however defined and categorized, is considerable. Some estimates in recent EU studies suggest this may range from 7 per cent to 16 per cent of GDP (Daza, 2005) in member states. Estimates of informal economy share of GDP in less developed countries are much higher, averaging around 40 per cent by some counts (*The Economist*, 2004). Managing the various, complex (employment, health, skills requirements) aspects of informal economic activity thus becomes a matter of public policy. In particular, this is one more dimension in which education and training systems have to adapt to the realities of the global work environment.

The current need is for more integrated HRD strategies and different, leaner and more adaptable TVET, where education is seen not just as a one-time inoculation against unemployment and where skills acquisition and refinement become more of a lifelong, livelihood-supporting process. From the perspective of the international community, HRD is now seen as a facilitating factor in economic growth and a major focus of public policy in the developing world. Priorities have shifted from narrow and fragmented work-related training to much broader, mainstreamed and multisectoral approaches. The March 2006 Resolution on human resources development adopted by the UN General Assembly (UN, 2006) marks the most recent in a series of statements by the UN stressing the centrality of health and education at the core of human resource development and also

- Recognizing the importance of HRD in promoting sustainable development;
- Encouraging governments to integrate HRD policies in their national development strategies;
- Urging the adoption of cross-sectoral approaches to human resources development, which combine . . . factors such as economic growth, poverty eradication, the provision of basic social services, sustainable livelihoods, the empowerment of women, the involvement of young people, the needs of vulnerable groups of society and of local indigenous communities, political freedom, popular participation and respect for human rights, justice and equity, all of which are essential for enhancing human capacity in order to meet the challenge of development.

This kind of macro-framework for HRD has implications for TVET that go beyond traditional institutional and sectoral boundaries. A succession of global meetings has refined these ideas, from INCOTE in 1992 at Weimar, Hamburg's CONFINTEA V in 1997, through Seoul (1999) to Ho Chi Minh City, Vietnam in 2006. In particular, the Bonn Declaration and Action Plan (2004) articulates and reinforces a number of key principles. These include building on basic education as a human right and acknowledging upfront the millennium development goals as a fundamental platform for human development. A vision of TVET is introduced which incorporates learning for work, citizenship and sustainability by contributing to mutually beneficial individual and social development, improved comprehension and constructive use of science and technologies, and more sustainable approaches to the pursuit of livelihood.

So, after all, what is new about this vision? Almost a quarter century ago, Dale Parnell said the following about the US economy:

> It is absolutely imperative that high schools and colleges, particularly community, technical and junior colleges, become aggressive in examining, developing and sustaining quality educational programmes to serve that great host of Americans who will keep this country working, who will keep airplanes flying, and water flowing, our electricity charging, our hospitals operating, our trains tracking, our computers clicking, our cars running, our laws enforced, our goods and services sold, in a society saturated at every level with technology and information. (1985, p. 138)

Parnell's visionary prescription supported unparalleled economic and technological advance in the USA with an emphasis on a crucial development variable: the interstices between basic education (for the many) and advanced academics (for the few). He recognized the fact that most could fall between these two stools and that a successful HRD strategy (community colleges) should open up opportunities for this neglected majority. As a consequence, the community/junior college model is now being extended far beyond its original base in the USA as a strategic instrument in meeting the needs of swiftly advancing societies.

The Bonn Declaration took these keystone concepts of TVET and added three elements: global relevance, sustainability and bridging the digital divide as indispensable to international development. There is no question now of the global significance of failed states, even failed communities, which present unacceptable costs, not only to individuals and their own close socio-cultural groupings, but to national, regional and international order. Thus expanding opportunities for the development of human resources to their full potential becomes an urgent matter of public policy and a collective responsibility for everyone. Otherwise, huge untapped capacities (and the potential consequences) become a comprehensive liability to families, to each nation and, ultimately, to the global community itself.

Another major difference in the Bonn vision is the way it embraces sustainability. Although it is an elusive and complex proposition when tied to human development, nevertheless its acceptance marks a turning point in the evolution of HRD. Most challenging is its association with livelihoods and the idea that human existence and progress should ensure species survival, interpreted as healthful prosperity and longevity in a contemporary context, but with a view to future implications of present decisions, doing no harm to others nor threatening future generations. Human assets, characterized as both social and economic capital, are resources not for exploitation but for investment (Almas and Lawrence, 2003; Lawrence and Singh, 1997). Sustainable livelihoods thus constitute a goal not just for poorer communities, but increasingly for all societies, perhaps most importantly for countries at the head of the industrialized line.

Finally, the information explosion and the resultant rapidly metamorphosing communications technologies are transforming human learning and skills acquisition. Knowledge is much less hoarded by elites or those with privileged access to information. Skills are less confined to the specialized, or the 'expert', even 'master craftsman' (who today will increasingly be women). Patients may be almost as well informed as their doctors, and it is even not unknown for non-medically trained vendors of new life-saving machinery to be involved in actual operating room practice as medical teams learn their way through new techniques (Lawrence

and Braddy, 1988). Such horizontalization of information needed to achieve and maintain expertise requires education and training to be not only more frequent throughout a lifetime, but also to be flexible, current and more readily accessible. One way in which this adaptability is exhibited is through e-learning and online systems, which constitute new forms of parallel (virtual) HRD tracking approaches, as seen, for example in the proprietary certification of Internet work specialists by Cisco (n.d.).

## TVET for Sustainable Livelihoods in Azerbaijan

The Caucasus region is fast emerging from its recent Soviet history, with explosive economic expansion. Rich in natural resources, embraced, if carefully, by western partners (for example the EU Neighbourhood Policy, the Bologna Process), yet adamant in forging their own cultural and economic independence, these countries are potential bellwethers for unprecedented growth, prosperity and technological advance. Ahead of the others in its pace of change, Azerbaijan reported a GDP growth rate of almost 40 per cent between January and April 2006 (*Today AZ Business*, 2007) and a quadrupling of the state budget since 2004.

The opening in May 2006 of the Baku–Tbilisi–Ceyhan oil pipeline with a projected throughput of a million barrels daily, has significant strategic and economic implications for the region and for Azerbaijan. Passing from the Caspian Sea through the Georgia highlands to Turkey's Mediterranean coast, the almost 2000 km pipeline opens a major new and accessible source for tanker transport. Although the construction phases of this project have provided a spike in job opportunities, most of these are temporary. In fact, the oil sector, while contributing around 25 per cent of GDP, constitutes at best only around 1 per cent of the employment market (UNDP, 2003). However, should the economy generally become over-dependent on oil and natural gas production at the expense of the development of other revenue-generating sectors, the result can be the 'Dutch disease'[5] which every oil-producing nation (or any single-source economy) wishes to avoid. Azerbaijan's proven oil reserves are expected, according to current estimates (constantly being revised) to peak within a few years and then decline. There may be therefore a relatively short time for the productive economic base of the country to shift effectively and transparently to non-oil sectors. In addition, existing environmental problems from the earlier Soviet era, as well as attention spurred by ecological issues associated with the construction, operation and maintenance of the pipeline itself have increased the importance of sustainability in the public consciousness.

Oil revenues certainly have their advantages, and Azerbaijan has been producing oil for over a hundred years, and was the centre of the former Soviet empire for not only production, but also the education and training of extractive industry professionals, managers and para-professionals. There is also a very high standard of ongoing institutional private sector training, for example by BP in its facilities in Baku and elsewhere. The positive effects of that edge today are obvious, including dramatic national wealth generation in the short term, some highly paid,

if limited employment, and also technological advances which resonate throughout other sectors (e.g. in communications, transportation and services), leading to new skills requirements, particularly in the social sectors and the institutions of health and education. But there are several difficulties, including, at least initially, an inequitable distribution of the new wealth, in some quarters a sclerotic resistance to change and a lack of transparency in public policy and practice in education and training.

So, in face of these upsides and downsides of unparalleled, and unprecedented growth, three major challenges to HRD systems have emerged:

- Opening up education and training immediately at all levels to match the technological requirements (and new opportunities) offered by the burgeoning oil sector and its surrounding infrastructural and service environment;
- The broad extension of this momentum (investments, political and economic priorities and their educational implications) into all sectors across the longer term;
- Ensuring the quality of education and training programmes so as to reach and maintain international standards.

There are many elements of HRD strategies that underlie such an approach, among the most important of which is the TVET system. In Azerbaijan, vocational education is offered at two levels: one at general secondary schools and vocational lyceums and the other in specialized colleges and technicums. The first level is under the administration of the Department of Professional/Technical Education of the Education Ministry, and the second of the Department of Higher Education. This structure has been largely inherited from the former Soviet framework. It is acknowledged to be weak and in need of reform and consequently is being shaped by new constitutional and legislative processes.

One dimension of TVET reform is the development of a human resources scanning radar, which can give routinely updated labour market information to key HRD ministries (such as Economic Development, Labour and Education). This 'radar sensing' process is analogous to airport scanners constantly detecting signals, movements and patterns of interest to those making crucial decisions. Azerbaijan instituted its first labour force survey in 2004 and anticipates a biennial repeat of this process. Much effort is also put into maintaining inter-censal surveys of individuals and establishments, as well as keeping to international standards (definitions and methodology) so as to facilitate comparisons across time and national borders. Such surveys, if well designed and implemented,[6] assist in educational planning by identifying education levels and skills distributions as they change, by occupational grouping and industry. New occupations and skills requirements can also be identified, and specific issues (e.g. unemployment characteristics; intra-national disparities) can be prioritized, and if necessary, can become the subject of special, more in-depth studies.

With good demand-side statistics on skills distributions – buttressed by more anecdotal or direct qualitative support from the employers themselves – educational planners, theoretically at least, have stronger arguments with which to defend their budgets and make their case for necessary innovations. This need is particularly

critical in the CIS and Caucasus region, across which many countries and especially Azerbaijan have begun to experience substantial drops in vocational education secondary enrolments (UN Social and Economic Council, 2003). Reasons for this are unclear but underscore the need to examine the structure, strengths and shortcomings of the Azerbaijani TVET system.

Two studies have recently been completed of this education subsector. The first, conducted before the 2004 labour force survey, looks at the relationship between employment and technical and vocational training from the perspectives of small enterprise development, and social protection (Cummings, 2003). Mismatches between employers' needs and outputs from education and training institutions are documented. A lack of articulation is noted between these two HRD constituencies and recommendations offered for improving dialogue between employers and the line ministries. Local level initiatives are seen as pivotal in expanding district and municipal employment services, including targeted counselling for the unemployed, and 'tailored' skills programmes in areas of high need (infrastructure and construction, as well as management for small and informal businesses).

The second, more comprehensive, was completed by the European Training Foundation (2006) in support of European Neighbourhood Policy interests, and looks at HRD issues around the emergent European Neighbourhood Policy action plan for Azerbaijan. This study introduces the concept of sustainability both as an economic and management goal:

> Azerbaijan's hope for sustainable economic growth rests in large part with successful development of its vast oil and gas resources in the Caspian Sea . . . but not less important, with its capacity to effectively manage the resulting large revenue stream for the purpose of poverty reduction, economic diversification, and equitable development of human capital. (European Training Foundation et al., 2006, p. 6)

Several factors are identified as inhibiting these objectives, including unreliable and inconsistent data from the HRD supply-side institutions, lack of transparency in public and private sector transactions, and the low credibility of education and training certification. Standing out, however, from most data sources is one stark finding, namely, the vulnerabilities of a majority of young people (defined as 15–34 yrs) who have graduated from secondary general education. This group makes up almost three-quarters of the unemployed. Thus the study concludes (p. 89) that 'a flexible, open, and multiple level TVET system has a very large potential and a major role' to play in HRD for Azerbaijan.

Although some of its elements exist already, such a system has yet to be developed and is the subject now of considerable policy and practical concern. The challenge is to look beyond what this study calls the-day-to-day pulse, and begin to construct a pragmatic and adaptable approach to TVET that imparts more sustainable livelihood skills. Sustainability may an elusive target, but the term is used here both in terms of the process and the product.

In order for the TVET process to be sustainable it must find ways to stay current, maintain legitimacy and credibility with both employers and students and be fiscally manageable beyond mere dependency on revenues or the prime sponsorship

of just a single (extractive) sector. Major problems with existing TVET approaches can be seen in outdated facilities and equipment, as well as archaic pedagogical methods. There is also a preoccupation with traditional skills. If the aim of TVET approaches is for students to graduate with skills and attitudes for more sustainable livelihoods, then the teaching styles must be more participatory and engaging and the curricula more oriented to solving problems. Furthermore, graduates must possess entrepreneurial (job-creating rather than job-seeking) attitudes. Azerbaijan has been out front globally in addressing sustainability in school textbooks, though it has some distance to go yet in working these advances effectively into TVET. The text *Humans and Society*, centred on sustainable human development, is now compulsory and standard for all students (about 100 000 each year) in the ninth grade of the general secondary schools.[7] This is a visionary educational advance bringing to all schoolchildren, for the first time in the local language, previously inaccessible sustainability concepts of major national significance. The impulse to draw these ideas down into technical/vocational subjects is being pursued in two ways: through the institutionalization of lifelong learning patterns (e.g. expanded opportunities for adult education and in-service training programmes), and new openings (public and private) for virtual and on-line learning. In this regard, the Azerbaijan state programme on poverty reduction and economic development (SPPRED) incorporates several new education initiatives, including improving the material and technical base of education, introducing computer centres into secondary schools and capacity building in the Education Ministry itself (p. 135).

The way forward requires the following:

- Designing and implementing an integrated HRD strategy consistent with, but interpreting freely and innovatively, the pioneering Azerbaijan NES;
- Cultivating and channelling the brilliance of young, indigenous but all too often disillusioned Azerbaijanis into enterprising, productive livelihoods through direct counselling and broadened educational/training opportunities, including increasing offshore post-secondary options and better and more accessible HRD data systems on supply/demand characteristics;
- Incorporating new national ICT plans into more stringent e-governance practices, including regular job postings and interactive fora which can link job applicants and employers (Lawrence and Alakbarov, 2004), as well as permitting virtual twinning with educational institutions in other countries;
- Explicit, standardized follow up on the progress of students from all educational levels, but especially those from TVET programmes;
- 'Second chance' educational opportunities that permit educational equivalency and recovery for late developing or otherwise disadvantaged learners, as well as in-service retraining for both employed and unemployed persons;
- Focusing on occupational training and opportunities for employment generation related to more sustainable development for Azerbaijan, such as environmental clean up, tourism, improved agro-processing and pollution control.

## Conclusions

This chapter has outlined the global and regional context for TVET in Azerbaijan, a country experiencing very rapid economic growth, with an education system newly emerging from a Soviet heritage. Four factors are singled out as central to human resources development policies: the secondary education bulge; complicated and shifting work environments facing school leavers; the need for more integrated and comprehensive HRD strategies and the ultimate goal of livelihood sustainability. In light of the fresh prominence given both to TVET and to education for sustainable development, the world can learn much from how young, increasingly wealthy nations like Azerbaijan deal with these issues.

The major HRD challenges facing Azerbaijan lie in responding flexibly to immediate explosive growth, while looking also to the longer term, to economic diversification and forging a sustainable path to the not-so-distant future when oil and gas reserves die out. Recent studies of the national TVET system point up strengths and shortcomings, and make several recommendations, summarized below:

- Design and implement a broad, cross-sectoral and integrated HRD strategy and the necessary management reforms for its effective implementation;
- Obtain improved data on occupational skills supply and demand;
- Exploit new information technologies throughout the HRD approach;
- Expand post-secondary educational opportunities for second-chance and extend learning beyond high school for young people and adults in an accelerated skills development mode;
- Enhance the concept of sustainability both in schools, and in livelihoods.

Work has already begun on options for implementing new initiatives in line with these principles. Presidential commitment in Azerbaijan to the conversion of 'black gold to human gold' is now established in several formal statements.[8] An interesting dimensions to this approach is the further evidence of the multi-sectoral responsibility for public HRD policy through assigning the co-ordinating role neither to the Ministry of Education nor the Ministry of Labour (traditional HRD leaders in the public sector) but to the Ministry of Economic Development (MoED). On 20 October 2006 the President signed the decree authorizing the preparation by MoED and other appropriate ministries of a state programme for young Azerbaijanis to get education and training abroad. Meanwhile, the government was presented with a broad, inter-sectoral HRD framework outlined in a comprehensive final report draft (Hopkins et al., 2006). As part of this strategic approach, several additional recommendations have been offered to improve national investments in human capital. To enhance Azerbaijan's regional and international competitiveness by developing the non-oil sector, massive increases in human skills must be promoted through an accelerated skills development programme.

Four practical steps are suggested. Firstly, improved analytical tools must be made available to government, such as relevant modelling techniques and more systematic use of surveys to track movements in labour market conditions. Secondly,

the process of tuning TVET to peoples' needs must be receptive and agile, as labour markets shift and training needs change. Institutions, counsellors and individuals must have timely and reliable information on which to base their decisions. Useful precedents have been noted in US Occupational Information Coordinating Committees and the Canadian Job Futures programme. Thirdly, Azerbaijan is encouraged to network actively with other countries to engage in TVET fact-finding, especially with other oil-producing countries, and to share its own lessons learned.

Finally, the triple strengths of a community/junior college model are emphasized for possible regional pilot project in Azerbaijan as one means of dealing with the post-secondary bulge: (a) accessible, open-enrolment and skills-oriented programmes for high school equivalency through associate, sub-baccalaureate certification, (b) new opportunities for recycling employed persons seeking to upgrade, improve or update their work-related knowledge and skills and (c) articulated transfer programmes to national four-year universities. These affordable colleges, explicitly located in places where they can bring post-secondary education/training options closer to the people and their open enrolment policies have buttressed the US economy for almost half a century, and versions of them have mushroomed in Africa, the Middle East and Africa. It will be interesting to see whether the model can be usefully adapted for Azerbaijan in the search for more sustainable livelihoods for all.

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## Notes

1. 'Sustainability' is a complex array of propositions, referring to more than just environmental sensitivity, but including awareness and the thoughtful consideration of immediate and longer-term consequences of individual decisions and their implications for families and communities, now and in the future.
2. Originally a multilateral agency initiative spearheaded in 1990 by UNESCO, the World Bank, UNICEF and UNDP.
3. The reference period for these data is school years 1990/1–2002/3.
4. The ILO adopted a resolution on decent work and the informal economy at its 2002 International Labour Conference. For a good discussion of the evolution of the concepts, see Daza, 2005.
5. Traditionally defined as comprising three factors: macro-economic and factor-movement effects, spending effects and spillover and 'crowding-out' effects. For details, see Larsen, 2004.
6. Such surveys, to be effective, depend on sophisticated methodological design, instrumentation, interviewer training, management and quality control over data entry, analysis and dissemination.
7. Personal communication, Professor Urkhan Alakbarov, Principal Adviser, UNDP Human Development Report, Baku, Azerbaijan 2006.

8. See for example, the Speech of the President of Azerbaijan at the World Summit on the Information Society in Geneva, December 2003.

## References


Bonn Declaration (2004) on TVET and an Action Plan on TVET for Sustainable Development. Germany 28 October.

Chernyshev, I. (2005) Socio-economic security and decent work in Ukraine: a comparative view and statistical findings. Working Paper No. 76. Policy Integration Department Statistical Development and Analysis Group. ILO: Geneva. http://www.ilo.org/public/english/bureau/integration/download/publicat/4_3_412_wp-76.pdf. Accessed 27 April 2007.

Cisco Systems Inc. (n.d.) at http://www.cisco.com/web/learning/le3/le11/learning_all_certification_exams_list.html. Accessed 27 April 2007.

Cummings, I. (2003) Report on Employment Strategy for Azerbaijan. ILO: Baku.

Daza, J.L. (2005) *Social Dialogue, Labour Law and Labour*. Administration Department. ILO: Geneva.

European Training Foundation (2006) Labour market and VET challenges and perspectives in countries to engage in the European Neighbourhood Policy: Southern Caucasus. Draft 2. EECA.

Hopkins, M.J., Lawrence, J.E.S., Stephens, T., and Webster, A. (2006) Draft final report to Azerbaijan Ministry of Economic Development on 'black gold to human gold': using oil revenues to attain sustainable development. Baku.

ILO (1999) *Decent Work*. Report of the Director-General. ILC, 87th Session. ILO: Geneva.

Lawrence, J.E.S. and Alakbarov, U. (2004) Rapid progress of ICT in Azerbaijan: information technologies in the public service, in Gurstein M. and Tischenko V. (eds) *Community Informatics and Community Networking in the CIS: Practical and Policy Implications*. Editorial URSS: Moscow. http://www.rranet.net/book_eng.htm. Accessed 27 April 2007.

Lawrence, J.E.S. and Braddy, B. (1988) Need for laser and electro optic training programs assessed. *Laser Focus*, April, pp. 154–156.

Lawrence, J.E.S. and Singh, N. (1997) Sustainable livelihoods and employment. *International Journal of Technical Cooperation*, 3(1): 92–109.

McKinsey, et al. (2005) The emerging global labour market. http://www.mckinsey.com/mgi/publications/emerginggloballabormarket/index.asp

OECD (2005) Handbook on economic globalization indicators. http://www.oecd.org/document/44/0,2340,en_2649_33703_34957420_1_1_1_1,00.html

Parnell, D. (1985) *The Neglected Majority*. Community College Press: Washington, DC.

Söderlindh, L. (2006) Decent work still the exception to the rule. *International Press Service*, 16 May.

State Statistical Committee of Azerbaijan Republic (2002) *Education Statistics*. Government of Azerbaijan: Baku.

State Statistical Committee of Azerbaijan Republic (2004) *Survey of the Economic Activity of the Population of Azerbaijan. Methodology and Analysis of the Labour Market Situation*. Government of Azerbaijan: Baku.

*The Economist* (2004) In the shadows. Economics focus. *The Economist*, London. 17 June.

*Today AZ Business* (2007) Azerbaijan News Source http://www.today.az/news/business/26222.html. Accessed 27 April 2007.

UNDP (n.d.) UNDP helps the government to develop national employment strategy. http://www.un-az.org/UNDP/news/laborundpnew.php. Accessed 27 April 2007.

UN (2006) Resolution on human resources development (A/RES/60/211). http://daccessdds.un.org/doc/UNDOC/GEN/N05/500/26/PDF/N0550026.pdf?OpenElementAccessed27April2007.

UNDP (2003) *Azerbaijan Human Development Report*. UNDP: Baku.

UNDP (2005) *Human Development Report*. UNDP: New York. http://hdr.undp.org/reports/global/2005/. Accessed 27 April 2007.

UN Social and Economic Council (2003) Economic Commission for Europe. Coordinating Unit for Operational Activities. CIS forum on youth: 'Youth of the 21st century: realities and perspectives', Kiev, Ukraine, 24–26 September 2003.

World Bank (2006) Secondary education. http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTEDUCATION/0,,contentMDK:20521252~menuPK:738 179~pagePK:148956~piPK:216618~theSitePK:282386,00.html. Accessed 27 April 2007.

World Summit on the Information Society (2003) Speech of President Ilham Aliyev of Azerbaijan. Geneva, December 2003, in Almas, R. and Lawrence, G. (eds) *Globalization, Localization, and Sustainable Livelihoods*. Ashgate: Aldershot and Burlington, VT.

# Chapter 25
# India: Policy Perspectives and Challenges Ahead

**Jagmohan Singh Rajput**

> *The real difficulty is that people have no idea of what education truly is. We assess the value of education in the same manner as we assess the value of land or of shares in the stock-exchange market. We want to provide only such education as would enable the student to earn more. We hardly give any thought to the improvement of the character of the educated. The girls, we say, do not have to earn; so why should they be educated? As long as such ideas persist there is no hope of our ever knowing the true value of education.*
>
> *Mahatma Gandhi*

## Introduction

During the last six decades the Indian education system has grappled with practically all possible problems, issues and challenges that could be conceived anywhere. The socio-economic and cultural contexts posed enormous challenges in a multi-religious, yet secular set up. The population has increased threefold in the post-Independence period. The Constitution of India, which came into force in 1950, mandated universal elementary education to all children till they attained 14 years of age to be put in place within 10 years, i.e. by 1960. Sincere efforts and initiatives continued during all these years though the target remains elusive even now, 40 years later.

An objective understanding, appreciation and assessment of India's educational enterprise are not possible without referring to the pre-colonial era in education. Before the advent of the British India had a well-entrenched traditional system of training in the vocations and traditional skills and crafts with the predominant emphasis on working with hands. High-level technologies of contemporary context had been developed in textiles, metallurgy, housing, dam construction, dyeing and horticulture, to name just a few. The muslin of Dhaka and the still rust-free iron pillar near Qutub Minar in Delhi are the objects of great appreciation and curiosity, even now. A major part of new knowledge and skill transfer initially took place in the family and the community. There were master craftsmen well recognized

J.S. Rajput
National Council of Educational Research and Training, New Delhi, India
e-mail: jsrajput@hotmail.com

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and respected by the community to whom the young learners were entrusted for advanced instructions in skills and trades. The alien rulers coming with hard core expansionist designs followed the golden rule: 'to subjugate a people, obliterate and demean the indigenous culture'. This they did with full vigour and passion. All possible steps were taken to delink 'Indians' from their own culture and tradition. The muslin trade was destroyed and the craftsmen persecuted. Farmers were forced to grow indigo instead of native produce, leading to conditions of abject penury and poverty. Under these conditions, education suffered and India was reduced to a poor and illiterate country. Any discourse on education in Indian context remains incomplete without an understanding of these developments in the history of India and Indian education.

One can still find references to Thomas Babington Macaulay, whose famous Minutes of 1835 laid the foundation of the new education system in India and gave it a structure and content that would prepare educated Indians under the following prescription:

> We must at present do our best to form a class who may be interpreters between us and the millions we govern – a class of persons Indian in blood and colour, but English in tastes, in opinion, in morals and in intellect.

This system was not designed for all, but only for a few. It entrenched itself so well that its continuation has withstood all the post-Independence period efforts to replace it with one that would have its roots deep in the Indian soil. As in several other countries, in the public psyche education meant a white-collar job that brought prestige, power and pelf through a government job. Most importantly it gave 'freedom' from 'manual' work. Perceptions have changed considerably during the last two decades vis-à-vis the government job, but not with regard to working with hands.

This scenario is indeed interesting, as the traditional Indian system of teaching and learning was based upon the integral development of the individual learning. Boys were supposed to stay full time in *gurukuls* and learn not only the prescribed texts but perform all necessary chores and learn the needed skills. In spite of all the alien influences, the system survived and continued to play its role in creating, generalizing, disseminating and utilizing knowledge and wisdom. The issue of education drifting away from working with hands was examined and studied very thoroughly by Mahatma Gandhi. He conceptualized and put into practice a system of universal elementary education for both boys and girls that would be built on the basic premise, contained in the following words of Gandhi which he wrote in the newspaper, *Harijan*, in July 1938:

> By education I mean an all round drawing out of the best in child and man – body, mind and spirit.. . . I would therefore begin the child's education by teaching it a useful handicraft and enabling it to produce from the moment it begins its training. Thus every school can be made self-supporting, the condition being that the state takes over the manufacture of these schools.

Gandhi's perceptions were a synthesis of the relevant aspects of the traditional Indian education system, which was accessible to every one, and was the responsibility

of the society and, hence, got full support from the people. Work and skill acquisition were its essential core elements. He also had a very comprehensive and thorough understanding of India's social and cultural ethos, along with the economic crisis and poverty in which it was engulfed under an alien rule. His educational philosophy in implementation was popularly known as 'basic education'. It was built around the following matrix:

| | | |
|---|---|---|
| Head | Hand | Heart |
| Self | Society | Nature |
| Body | Mind | Spirit |

Each set of these three very clearly indicates the emphasis on preparing young pupils to grasp the mutuality of human beings and nature. It also indicates the path for achieving sympathy and harmony in the process of eternal human endeavour for a better and high quality of life. Gandhian concepts, now being read afresh globally, emphasized village republics, self-sufficiency and the essential importance of skill development and working with hands. In that concept of education, he perceived the respect for nature, employment and self-esteem for every one. The Gandhian formulation was basically an attempt to harmonize intellectual and manual work. This was a great step forward in making education directly relevant to the life of the people (Naik, 1997, p. 249).

The Indian system of education in its structure and numbers presents a unique scenario comprising all perceivable diversities. With over a million schools, it extends to around 320 universities, 102 deemed universities and nearly 17 625 colleges of higher education. It has over 3,000 teacher training institutions. In the federal set up education is included in the 'concurrent list' and major policies are formulated through the federal system involving both the centre and state (provincial) governments. School education lasts for 12 years; with an elementary stage of eight years, followed by two years of secondary and two years of senior secondary school. The participation of the relevant age group in higher education is only around 8 per cent, which is shockingly low.

The school structure, generally referred to as 10+2, is followed by 3-year courses at graduation level, leading to a first university degree in general colleges and courses of 4–5 years in duration in engineering, medical, management and other professional areas. The +2 stage has separate academic and vocational streams. Universities offer first-degree programmes in vocational education. Separately, there are industrial training institutions (ITIs) and polytechnics, which offer courses in technical education of varying duration and entry qualifications. Different ministries both at the central and provincial levels handle the programmes of TVET.

Enormous expansion of schools and classrooms has taken place in the past. This has to be continued into the future as well. Dropout rates are still a major hurdle in EFA as indicated in Table 25.1. School enrolment in the best case scenario has to increase by 75 million, which amounts to a 44 per cent enhancement.

**Table 25.1** Past and projected school enrolment and dropout rates in India, 1980–2020

| | 1980 actual (%) | 2000 estimated (%) | 2020 business-as-usual (%) | 2020 best case scenario (%) |
|---|---|---|---|---|
| Primary enrolment (1–5) | 80 | 89 | 100 | 100 |
| Elementary enrolment (1–8) | 77 | 79 | 85 | 100 |
| Secondary enrolment (9–12) | 30 | 58 | 75 | 100 |
| Drop-out rate (1–5) | 54 | 40 | 20 | 0 |
| Drop-out rate (1–8) | 73 | 54 | 35 | 0 |

Source: Garry Jacobs, in GOI (2004)

This in itself requires an increase in the total number of classroom by 65 per cent in 20 years. In addition, the Indian education system needs to embark upon much needed change in pedagogical methods, particularly a shift from the traditional academic curriculum to a work- and skill-oriented education right from the initial years in school. It further needs 'A shift from imparting information to imparting life values such as independent thinking, self-reliance and individual initiative that are essential for success in any field of endeavour' (GOI, 2004, p. 83).

While work education is an integral part of school curriculum, its emphasis becomes visible in schools only at the secondary stage. In several states children are offered one vocational trade. The graduates become more suited to polytechnics, which conduct courses ranging from 2 to 4 years. There are also privately managed ITIs. The graduates of ITIs generally get jobs, but they get no benefit in entry to higher technical education courses. The apprenticeship programme caters to different categories of graduates from ITIs, polytechnics and other professional institutions in providing them training in industry to give them enough actual field experiences. The Nursing Council of India and the Pharmacy Council of India cater to manpower requirements in areas related to health. The India Council of Agriculture Research looks after the education of graduates, postgraduates and research levels in agriculture. In all these cases, the training aspects need far greater emphasis than are available at present.

## Sustainable Development in Educational Policies

It is now very well realized that the people are living far beyond our collective means, thus seriously disturbing the harmony of humanity with nature. The quality of the future is being seriously compromised because of the levels of consumption, greed and (probably) the ignorance of a fraction of population of the present. No description of sustainable development could ever be comprehensive if it does not include the percept of sustainable consumption and the rationality of sharing common resources with everyone else. Planning, production, manufacture, distribution and each related step have to be made to restrain their unregulated exploitation of natural resources in the name of development, and unchecked consumption

is a certain remedy for catastrophe. The skewed distribution of the benefits of development creates greater diversities that are to be bridged at the current juncture of history. On the contrary, sustainable development has to incorporate the diverse conditions of poverty, deprivation and deficiencies on one side and those of affluence and wastage on the other. Some deserve to consume more and have a higher standard of living. Others could make do 'With more modest and carefully considered consumption' (UNESCO, 1997). The developmental processes must aim at harmonizing economic prosperity, environmental conservation and social wellbeing distributed on the widest possible scale. The meaning and import of sustainable development, thus, could be interpreted differently, but the goals to be achieved remain the same:

> Education and training for sustainable development is a process of learning how to make decisions that consider the long term future of economy, ecology and society in the workplace and the wider community. Building the competencies and commitments needed for such future oriented thinking is a key task of TVET for sustainable development. (Fien and Wilson, 2005)

All TVET initiatives need to focus on resource conservation, eco-efficiency and the total rejection of wasteful consumption. The changing nature of development, technologies and workplaces, along with the bulging expectations and aspirations of people, necessitate a global focus on sustainable development.

The policies in general education have paid attention to sustainability in several aspects, particularly in ecology, the environment conservation of natural resources and citizenship education to enable learners to contribute to creating a sustainable future. Policies must be reoriented to reshape TVET to address the emerging concerns of sustainability. Linking TVET to economic, environmental and social aspects of sustainability has to become the critical concern of policy-makers and curriculum developers, not only in TVET but also in the total canvas of general education. It is also now acknowledged that teacher education systems have to be geared to 'a trans-disciplinary, holistic approach which emphasizes the importance of and interrelatedness of the environment as a whole and the interdependence of parts' (Maclean, 2005).

The 1968 national policy on education (Naik, 1997, p. 249) made major recommendations regarding technical and vocational education. These included:

> In technical education, practical training in industry should form an integral part of such education. Technical education and research should be related closely to industry, encouraging the flow of personnel both ways and providing for continuous cooperation in the provision, design and periodical review of training programmes and facilities. (Naik, 1997, p. 252)

The 1964–1966 Education Commission Report entitled 'Education for National Development' (NCERT, 1971) recommended that education should be related to productivity so that a positive correlation would be established between expansion of education and economic growth.

The major policy formulations in education in 1968 and 1986 took into account the economic, environmental and social aspects of sustainable development factors

into consideration, keeping in view of the requirements of 'unity in diversity' on one hand, and poverty alleviation and the enhancement of quality of life, on the other. Good quality EFA is the foundation stone of an effective linkage of education to TVET. India continues to strive hard to achieve EFA and also to ensure that this EFA is linked to the acquisition of vocational and technical skills suitable to each age and stage of children. The educational initiatives in India have consistently conformed to UNESCO's perception on TVET in EFA and its role in sustainable development. This includes re-orienting education towards sustainable development, encouraging the necessary public awareness of sustainable development and promoting training towards sustainable development.

The economic, environmental and social aspects were emphasized in Chapter 36 of Agenda 21, which emerged in the UN conference on Environment and Development held in Rio de Janeiro in 1992, known generally as the Earth Summit. In this summit two major approaches were identified as leading to global catastrophe; poverty and the degradation of environment, both of own making – our materialistic and consumerist values and behaviour over egoistic lifestyles and our irresponsible patterns of production and consumption, causing the earth's finite resources to be exploited to satisfy the wants and whims of a few at the expense of the needs of the many. And in this context, there could hardly be any statement more comprehensive and pragmatic than what Gandhi said decades before the world became conscious of environmental degradation and poverty: 'Nature has sufficient to meet everybody's needs but not anybody's greed'. Could there be a greater justification for EFA and its synchronization with the skills needed to lead a good quality life, currently articulated in the terms of TVET?

A cursory glance through the curriculum frameworks for school education in India prepared in 1975, 1988 and 2000 (NCERT, 1975, 1988, 2000) would indeed reveal a considerable emphasis on and prioritization of EFA, work experience, vocational education, environmental education, a focus on activity-based learning and training and on recurrent training. Its relevance to teacher education was highlighted in the curriculum framework for quality teacher education in 1998 (NCTE, 1998). The significance of TVET would be seen in the policy frameworks on curriculum from primary to senior secondary and then on to university education. Apart from the formal education sector, the approach now stands accepted and for implementation in the open schooling system and non-formal/informal sector as well. Governments and the private sector have accepted responsibilities separately and in collaboration. Provisions also exist for those who would like to learn new skills or update the skills they have already learnt and used in the profession.

After 1986, provisions were also made to give opportunities to graduates of vocational courses for professional growth, career improvement and entry into other programmes with inputs of bridge courses wherever necessary. For the first time tertiary level courses in universities were also envisaged. The targets fixed were to cover 10 per cent of higher secondary students by 1995 and 25 per cent by 2000. These were, however, revised in 1992, and a 10 per cent coverage was fixed for 1995 and 25 per cent for 2000. There were other recommendations, like the formation of a Joint Council of Vocational Education at national level, the establishment of a

Bureau of Vocational Education in the Ministry of Human Resources Development, the establishment of a Central Institute of Vocational Education under the NCERT as the apex research and development institute at national level. A State Council of Vocational Education was also to be established. Most of these are in position now and are functional. The targets, however, have not yet been met. Coverage is currently just around 5 per cent in about 6000 schools. In 1998 a Parliamentary Standing Committee (1998) reviewed the position on vocational education. Some of its observations/recommendations were as follows:

- The centrally sponsored scheme has not been implemented as effectively as it should have been done. The Department should make a serious effort to give a meaningful thrust to the scheme.
- Community participation and a need and area-based approach should be adopted to accelerate the process of diverting students at the +2 level so as to achieve the target.
- District vocational surveys should be made compulsory and community participation in them should be encouraged so that the assessment of the manpower requirements of the area, the range of available occupations, the trend of emerging vocations and so on are properly recognized.
- Steps need to be taken to encourage a large number of girls to enrol in vocational education programme.
- Since skill is a major requirement for vocational education, the essential qualification for entry into vocational courses should be lowered from grade 10 to grade 12. Vocational certificates could be of two levels: a lower level for students who take up vocational education after class 7 or class 8 and a higher level certificate for those who take up vocational education after class 10.
- An effective monitoring mechanism should be evolved so as to ensure the effective implementation of the scheme.

## Key Areas in TVET

Technical education in India begins with a certificate level programme introduced in 1950 to train craftspeople under a craftsmen training scheme. The training is imparted in the ITIs and industrial training centres (ITCs). The duration could be one or two years. The next stage is the diploma level training of three years duration offered in polytechnics. Next come the engineering colleges, which generally offer graduate level programmes of 4-years' duration. These are followed by the provisions of post-doctoral and doctoral level programmes in selected institutions of technology. Certain institutions have acquired an international reputation and recognition and their graduates are valued far beyond India. These include Indian institutes of technology, Indian institutes of management, the National Institute of Industrial Management, schools of planning and architecture, Indian institutes of information technology and management and a few others. A couple of universities of technology have also been set up. As a step towards orienting education towards

vocations at the university level, computer applications and computer maintenance were introduced in a number of universities. Now several other options are also available. The All-India Council of Technical Education (AICTE) regulates the institutions of technology and management offering higher-level programmes in technical and management education. The state governments look after the others. The AICTE set up a national board of accreditation in 1994 for the institutions accredited by it. India today has one of the largest systems of technical education. With a population over one billion, this needs to expand further and that, too, should be done in the near future.

Apart from the formal system of schooling, special technical education programmes are also run to prepare requisite manpower through the system of ITIs. India's labour force was around 450 million in 2004 and continued to expand at the rate of 7.0–8.5 million per year. It is estimated that around 50 million people are without jobs and a large number is under employed. The unemployment rate among youth in some states is as high as 35 per cent. Training is offered through ITIs by both the public and the private sector. The state governments operate around 4600 ITIs with a total capacity of 67 800 training seats. Out of this, nearly 373 000 seats are established in some 1800 government ITIs and the remaining 305 000 are in some 2850 private TVET institutions. The number of vocational training institutes in India has shown a rapid increase over the years with the current growth, however, being driven mostly by private training providers. These training institutions, both public and private, receive general guidance from the Director-General, Employment and Training (DGET), Ministry of Labour, Government of India. DGET is the nodal department. It formulates policies, lays down standards and quantifies the technical requirement needed for training. The two major training schemes are known as apprenticeship training schemes and the craftsman training schemes. Both of these deliver nearly 70 recognized trades, more than 40 of which are in engineering. New trades are introduced every year. Under both these schemes training programmes are offered only to young students who have successfully reached a certain level of education: grade 8 or grade 10.

India is a predominantly rural, agriculture-based society. An overview of various programmes and courses in TVET would reveal the existing linkages to sustainable development. The major issues before planning EFA are soil conservation, livestock development, potable water, irrigation, food preservation, agricultural appliances, repairs, maintenance, health and hygiene, reduction of the exploitation of natural resources, environmental conservation and preservation, garbage and sewerage management and others. There are new areas emerging regularly and various sectors of TVET are conscious of these. The transport systems, urban, safety at workplaces, construction and housing for all, equipment repairs and pollution of various kinds can no longer be ignored.

One of the major challenges before Indian initiatives in TVET is to prepare and implement a rapid response to the imperatives of globalization and the fast-paced technological changes that would require highly skilled manpower in new areas in technology itself and also in enhancing productivity and services. One encouraging aspect is that many new advances in technology have the potential to transform our

very approach to education and training in new and upgraded skills. That India is responding, and has the requisite will and expertise, is already evident in the Silicon Valley enterprises, and the outsourcing tasks being undertaken in a couple of Indian cities. Information and communications technology (ICT) has been bought in a big way in institutions and industry in India and India is leading partner in connecting global knowledge networks.

Special care has been taken to ensure the greater participation of girls and women in TVET. There are polytechnics meant only for women, apart from the rest that admit both men and women. Stereotyping of courses has not been encouraged. In the polytechnic at Chandigarh, men are more interested in bakery and food preservation while women prefer courses in technology, including refrigeration, and others in repairs and maintenance. Skill training has helped in more girls enrolling in elementary education as their parents realize the productive and economic potentialities of education and its continuance. In this connection, it is relevant to recall the national policy on education, 1986–1992:

> The removal of women's illiteracy and obstacles inhibiting their access to, and retention in, elementary education will receive overriding priority, through provision of special support services, setting of time targets, and effective monitoring. Major emphasis will be laid on women's participation in vocational, technical and professional education at different levels. The policy of non-discrimination will be pursued vigorously to eliminate sex stereotyping in vocational and professional courses and to promote women's participation in non-traditional occupations, as well as in existing and emergent technologies. (GOI, 1992)

The policy further states:

> Appropriate formal and non-formal programmes of technical education will be devised for the benefit of women, the economically and socially weaker sections, and the physically handicapped.... Some polytechnics in the rural areas have started training weaker groups in the areas for productive occupations through a system of community polytechnics. The community polytechnic system will be appropriately strengthened to increase its quality and coverage.

These policy guidelines have been implemented within available resources during the intervening period.

ICT has to get into TVET in a big way. At this juncture, India has all the necessary expertise to bring in ICT in TVET. India's advantage in this arena is globally acknowledged and this is generating employment opportunities from abroad. This has created enthusiasm and motivation amongst students in emerging areas of TVET that link directly to ICT. Already, ICT is being put to many uses in TVET as well. It is particularly being used in teaching, learning, pedagogy, programme development, placement, career pathways and guidance as well as special needs learners and administrative purposes. The institutions of TVET have been provided with the necessary infrastructural inputs at each level. Faculty members have also been specially trained for this purpose. Their initial readiness is satisfactory but much more needs to be done by way of responding to training needs and software developments. Several ICT institutions are now equipped with facilities in computer-based learning, networking systems, database and databanks, computer-aided design and engineering systems.

## Value Inculcation Through TVET

Responsible and committed workers who knows their responsibilities towards sustainable development and its imperatives, have to be responsible and committed individuals who adhere to certain accepted values in the workplace and also in life. One of the critical roles in education and training is to foster amongst learners the attributes and values of responsible, capable, active, productive and creative members of the family and society as a whole (Rajput, 1999, 2001). TVET provides a very conducive environment for the acquisition of eternal human values. This aspect needs to be kept in consideration by curriculum developers, trainers and evaluators at each stage of teaching, training and learning. It may be reiterated that the tradition system of education maintained no distinction between education and work. This has remained an important part of the process of training and learning in all cultures. It is a fact that schools originated from the ancient Greek concept of education were established to cater for leisure-time needs, highlighting the distinction between the upper classes and masses. In an age of education for all, social justice, equality for opportunity and equity of human dignity, these attitudes and perceptions have changed dramatically. There is no relevance of an education that does not prepare every individual to play some part in the world of work. Gandhi considered work to be the core element of education. To him, manual work, well performed, is the surest means for developing the intellect. Experience and knowledge are inextricably woven together.

In a world that faces some 'sort of a moral crisis' (UNESCO, 1996) everywhere, TVET provides supportive avenues for inculcating values. A well-inculcated attitude towards work is necessarily accompanied by discipline and values. Discipline in the workplace requires a respect for rules, co-operation, teamwork, a regard for others, a concern for quality, the value of time and other values. The Indian education system has realized the need for value education and recommendations to this effect form an integral part of the policy and curricula of school education. This applies uniformly to the programmes, curricula and pedagogy of vocational education (NCERT, 2001, p. 91). The inculcation in values is not an external or additional subject of TVET. It is an organic and integral component of a good vocational education (Sheshadri, 2000, pp. 47–52.). Several of these aspects were comprehensively summarized in one of the keynote addresses delivered in the UNESCO international meeting in Bonn (Quisumbing, 2004, p. 13):

> The heart of education is the education of the heart. Values education is a necessary component of a holistic work education and citizenship education. By values education we do not mean merely teaching about values, but rather learning how to value, how to bring knowledge into the deeper level of understanding and insights; into the effective realm of our feelings and motions, our cherished choices and priorities into loving and appreciating, and how to internalize and translate these into our behaviour. Truly, value education is a holistic process and a total learning experience.

The role of the teacher or instructor in value inculcation is more of a facilitator than anything else. TVET has the potential to involve learners into accepting and performing 'work' the way it should be properly done. Performing a task with a

positive attitude, dexterity and devotion is in itself a real exercise in not only learning values but also living values. This aspect has to become an integral part of trainer and teacher preparation programmes and, in fact, the ethos of the workplace.

Teacher preparation programmes in India at present consists of a course of 2-years' duration after 12 years of schooling to prepare elementary school teachers and a programme of 1-year duration after a university degree to prepare secondary school teachers. There are a couple of experimental programmes of 2-years' duration for secondary teachers and also, at a couple of places, 4-year integrated programmes of teacher preparation. In the mid-1960s a 4-year programme preparing teachers of technology was initiated in four regional institutions of the NCERT. These were, however, discontinued after a couple of years. There are practically no programmes preparing teachers for the secondary school vocational stream. Graduates from polytechnics or engineering colleges are hired to teach at these, apart from those engaged on a part-time basis. A similar situation exists for the ITIs. Surprisingly, these do not come under the purview of the Ministry of Human Resources Development, which looks after education, but are with the Ministry of Labour.

The career paths of TVET teachers are uncertain and uninspiring. Public awareness of the potentialities of TVET is also very limited. This is primarily responsible for the poor enrolments in these courses, particularly from the better performing students. Teachers of TVET have to be prepared in institutions specially assigned for the task and new institutions have to be set up. The government has yet to step into this arena seriously. Only afterwards may private investment follow. Vocational streams in schools and ITIs will attract a much larger and more willing response once these are given their due place and importance in making education responsive to the needs of the individuals and the communities. Both students and their teachers would step in once they are clear about the existence of channels of upward mobility and career paths. Recruitment rules of TVET teachers have to be flexible and in tune with the demands of the fast-paced changes in skills and competencies. Provisions for upgrading qualifications through modular courses and supportive in-service education programmes will need to be built in. Special provisions of teacher incentives and other forms of motivation have to be devised and implemented. A new breed of workforce has to be created, motivated and expanded. Such people should be conscious of the fact that the lifecycle of the skills acquired could be short and they should be prepared to upgrade the skills they have already acquired, as well as to learn new skills, as an integral part of their work culture.

## Present Position

A basic background in technical and vocational education must be consolidated at school. Apart from including a general emphasis on work experience and socially useful productive work during first 10 years in school, the most significant of the innovations in TVET was the bifurcation of the higher secondary stage of education (10+2) into a academic and a vocational stream in 1977–1978. Centrally sponsored

vocational education has been in operation for all these years. In 1993–1994 a centrally sponsored scheme of pre-vocational education at lower secondary stage was also envisaged, with the aim of imparting training in simple marketable skills to students in grades 9 and 10. The inherent idea was to generate vocational interest and to help students to choose vocational areas at +2 stage. The recommended curriculum design generally consisted of three components with the weighting indicated in Table 25.2.

The three major components of the curriculum transaction were identified as education and basic skill training in schools, specialized skill training in collaborating institutions and on-the-job training in actual job situations. The students had the option to go directly to the job market or opt for apprenticeship training in industries and establishments.

Despite the targets laid down in the revised National Policy on Education (GOI, 1992), only around 11 per cent of students at the +2 stage have been covered so far. Nearly 19 000 vocational sections have been sanctioned in around 65 000 schools in which 935 000 students were covered. Over 150 courses have been introduced. One of the factors responsible for low preference for the vocational stream was the fact that it was conceived as a terminal stage. This distracted young people, as they were not in favour of giving up their hope for vertical mobility at that tender age.

India is now in an era of privatization and liberalization. Private investment in education sector is coming in a big way as the investors find the sector full of profit potential. Enterprising investors apart, one finds a large number of private institutions with small investments offering skill training in various trades in vocational and technical areas. These cater to specific local or regional needs with a focus on the trainees getting jobs in small factories and industries. Gaining entrance even to these organizations is not always within the reach of all the aspirants, primarily because of economic considerations, which contributes in further widening the gaps that already exist in society. Non-government organizations and voluntary agencies conduct short-term courses in skills and trades like cycles and motorcycle repairs, agro-based instruments and equipment, horticulture, dairy, poultry and so on. As a typical example, one voluntary agency provides non-formal skill training courses in air-conditioning and refrigeration, mechanical trade, welding and fabrication, radio and TV repairs, electric wiring and carpentry (NCERT, 2001). For girls, it runs programmes like watch and clock repairs, mushroom cultivation, tailoring, knitting and embroidery (NCERT, 2001, p. 91). All such efforts upgrade the acceptability and relevance of EFA in sustainable development and meet local requirements.

**Table 25.2** Curriculum design weightings recommended at the +2 stage

| Component | Weighting (%) |
|---|---|
| Language | 15 |
| General foundation course (environmental, rural development and entrepreneurship development) | 15 |
| Vocational theory and practical including on-the-job training | 70 |

However, the formal sector generally does not recognize such graduates for further training and upward mobility. Thus, these initiatives suffer from lack of motivational inputs from the formal sector, which continues to be valued by society.

At this stage, large-scale interventions from the government sector are called for, as only then will the EFA targets deliver the requisite benefits to individuals and the society. The key concepts of access, flexibility, utility, entrepreneurship and employability could then take concrete shape. The need for this is appreciated. The National Institute of Open Learning and the Indira Gandhi National Open University, at national level, and their counterparts at state level offer courses and programmes in TVET that are flexible, modular, on the Internet and available through correspondence and contact mode strategies. Apart from ICT and management areas, coverage extends to agriculture, horticulture, business and commerce, technical trades, health and paramedics, home science, teacher training and many others.

This is an anomalous situation in which, while there is unemployment and a search for more seats in such institutions, a recent study conducted by UNESCO, New Delhi, apprehends a decline in training enrolments and funding. The study indicates that this could be due to following reasons:

- A lack of student demand for training in the basic industrial trades;
- A rapidly diminishing demand from industry for training graduates as well as for formal apprentices;
- A shortage of government funding for public training provision;
- The over-provision of skills training due to uncontrolled growth of private TVET institutions;
- A problem of supply and demand imbalances at the state level.

This study was conducted in 100 private and government run centres in three states. From this there were enough indications that the internal efficiency of TVET systems is declining. The indicators were reduced enrolments, large proportions of dropouts and a low success rates in the final examinations. There was considerable under-utilization of the facilities created. Several of the trades offered are unpopular and attract no candidates. The additional inputs necessary to initiate new trades are not easily forthcoming. As a consequence of this, only around 25–30 per cent of graduates from government centres and around 42 per cent from private sector could get some form of waged employment and self-employment. The reorientation of TVET skills training programmes towards emerging areas in industry and outside industry is an urgent task. The requirement of the non-organized sector should not be ignored. Training has to be organically synchronized with apprenticeship programmes and the duration of training programmes needs to be reviewed together with the scrapping of unpopular trades.

In 1994, university level vocational courses were introduced. The scheme was introduced in 2000 colleges and more than 20 universities and their acceptability has been just marginal. Of all the children enrolled in Class 1, only around 10–12 per cent complete 10 years of schooling. The education system needs to respond not only to the successful, but also dropouts and those who fail in the annual year end examination and join the youth force of the unemployed and unskilled.

These young people are frustrated and dissatisfied. TVET initiatives could come in handy, even to those who are not interested in book learning and move out of the formal system. Their self-image and motivation could be restored once they acquire skills through the non-formal approach and become capable of earning a livelihood.

## Challenges Ahead

TVET in India needs to be comprehensively integrated with EFA initiatives. Apart from its policy orientation, it requires area-specific and region-specific strategies. Such synchronization is possible only when curriculum developers, experts in pedagogy and social scientists and those familiar with local technical and industrial potential sit down together and formulate curriculum, textual material and pedagogical inputs. In the past both the central and state governments have given due emphasis to TVET at the policy level. New management structures have also been created at the national, state and district levels. Institutions have also been established. The inherent deficiencies of these initiatives become prominent when it is observed that only a small percentage of students opt for vocational courses at higher secondary stage. Two factors that could make a big change are generally identified: the need to enhance financial inputs, on one hand, and preparation of competent and qualified teachers of TVET, on the other. While the resource crunch is being felt both at the level of the central and state government, a serious response is needed in view of the urgency of the matter. Special provisions have to be made to prepare teachers of vocational education. This may need to be initiated at the pre-service level and also through short-term modular training courses for existing teachers. Certain training institutions may have to be converted for the specialized preparation of teacher educators for TVET.

There may be a greater need for conducting a large number of occupational surveys and compiling a flexible compendium of trades and crafts. Such exercises have been conducted by state and national agencies in the past. Their coverage and frequency should be extended and expanded. If the appropriate use of new technologies is introduced, traditionally skilled manpower, which derives its skills from the family and tradition, could also be upgraded.

Large numbers of private TVET establishments have emerged and several of these have acquired credibility and acceptability. An independent accreditation authority could be conceptualized and established to help a large number of skilled young people to get certification and a sense of acceptability, which helps to motivate them and for them to acquire higher skills. The accreditation and certification of learner attainments in private sector enterprises is a major issue for policy-makers. Apart from private entrepreneurs, the open distance learning (ODL) system is now well established and can contribute in an area that requires fixing norms and levels of learning and then establishing equivalence. ODL systems can contribute in EFA initiatives for girls and marginalized groups that need affirmative inputs to bring them into the mainstream of the process of national development.

India now needs to establish an autonomous organization that could function as a national accreditation and evaluation authority in TVET at all the stages. The existing diversities and inadequacies of the structures available to the young aspirants in formal and informal sectors and the need to strengthen avenues to those wanting to upgrading their competencies necessitates such a step. Not only do desirable norms need to be specified in each area and trade, monitoring is needed to ensure that these are adhered to without dilution and further, that they are regularly revised and upgraded wherever necessary. Such an organization also must oversee the quality of teaching, training and learning materials. It could also help in coordinating the attempts made to prepare experts in curriculum development, material preparation, evaluation and the pedagogy of training. Issues like culture-specific pedagogy and inserting local elements into the curriculum could also be taken up by it.

The preparation of qualified, committed and competent trainers, teacher educators, teachers and material developers is now recognized to be the major bottleneck that requires early remedy. Several state governments in India are still reluctant to create regular positions for TVET teachers in schools. The traditional system of prescribed academic qualifications that persists for general education is also applied to TVET. These systems need an attitudinal change to bring in competent trainers in adequate numbers and instill in them the need for motivation and pace in the system. Even ODL initiatives are reluctant to utilize locally available experts as they are often not 'formally qualified enough' Existing system of preparing TVET teachers are either not available or are inadequate to match the requirements. Converting some of the existing general teacher training institutions into TVET-teacher training institutions could be a pragmatic alternative.

The systems responsible for implementing TVET need to target the entrepreneurship, self-employment and job opportunities in the unorganized sector. Inter-sectoral collaboration could bring together small-scale industries, rural banks, social workers and formal schools to plan and execute TVET initiatives. There are instances of voluntary agencies that have conducted surveys and made the results available to TVET planners and implementers (NCERT, 2001, pp. 91–95). Multi-dimensionality has to become the keyword in the extension, expansion and utilization of TVET.

A national curriculum meeting in 2003 in Bhopal, the city that suffered the infamous gas tragedy, examined the challenges before TVET and made several recommendations, including the following:

- Considerable flexibility needs to be built in the provision and organization of vocational courses, allowing local authorities and communities to take decisions about targets, institutions, courses and modalities for implementation.
- Widening the scope of activities of educational and training institutions and opening of their premises for part-time education and training the workforce (unorganized sector including school leavers) would be helpful.
- The coverage of national open school programmes to cater to the vocational needs of school leavers and to enhance the knowledge and productive skills of farmers, artisans and other community workers should be widened.

- Collaborative arrangements with employers in designing and implementing an effective programme of vocational education and training need to be established.
- In the context of the 73rd and 74th Constitutional Amendments, the specific roles of local body institutions such as the zila parishads (district councils) need to be identified. At the same time, there is a need to promote capacities for planning, administration and monitoring at district level.
- This group recommends a comprehensive district/block level action plan for vocational education, indicating targets and financial implications.
- At district and block level, a mechanism needs to be established to ensure that vocational education programmes are effectively implemented and the infrastructure and other facilities required are in place.

The other concerns identified included the networking of institutions, the mobilization of more resources and the continuous monitoring of the levels of skills and competence norms. The staff development activities are generally inadequate and ineffective, resulting in infrequent and unscientific revision of the curriculum. Consequently, quality is compromised. The need for greater societal involvement through voluntary agencies and public institutions entrusted with tasks like health, family welfare, environment, housing, potable drinking water, agriculture and others was also emphasized. India has embarked upon a reform agenda, along with consolidating the TVET system. Expanding it would include reorienting the TVET programme to meet emerging demands from industry, agriculture and non-industrial areas. Through proper studies and surveys, the mismatch between demand and supply can be corrected and institutional efficiency improved. Private training institutions and establishments require support in maintaining their levels of competency while they are training young people. A major challenge is to bring back school dropouts, workers in the unorganized sector and school graduates to skill training programmes and arrange for they to be appropriately certified.

The use of computers in TVET is becoming popular in every sector of activity but the human resources needed to train students is not available. Bold initiatives will have to be launched. A suggestion that has often emerged in various deliberations is that training can be organized through setting up computerized vocational education centres that could be run as private, self-employed business centres. These could deliver low cost, high quality training. A network of 50 000 such centres could train around 10 million workers every year. Such a bold initiative has to come from the government, in collaboration with the private sector and entrepreneurs. The governments could establish a corpus of skill development funds and the private sector could be persuaded to participate effectively in it.

## References

Fien, J. and Wilson, D. (2005) Promoting sustainable development in TVET: the Bonn Declaration. *Prospects*, 35(3): 274–277.

GOI (1992) *National Policy on Education* 1986/92. Government of India, Ministry of Human Resources Development: New Delhi.

GOI (2004) India: Vision 2020. *Report of the Committee on India Vision* 2020. Planning Commission, Government of India: New Delhi.

Maclean, R. (2005) Orienting TVET for sustainable development: introduction to open file. *Prospects*, 35(3): 249–380.

Naik, J.P. (1997) *The Education Commission and After*. APH Publishing Corporation: New Delhi.

NCERT (1971) *Education for National Development*. National Council for Educational Research and Training: New Delhi.

NCERT (1975) *Curriculum for Ten-Year School: A Framework*. National Council of Educational Research and Training: New Delhi.

NCERT (1988) *National Curriculum Framework for Elementary and Secondary Education*. National Council of Educational Research and Training: New Delhi.

NCERT (2000) *National Curriculum Framework for School Education*. National Council for Educational Research and Training: New Delhi.

NCERT (2001) *Vocationalization of Education at the School Stage*. Report of the Expert Group, National Council of Educational of Research and Training: New Delhi.

NCTE (1998) *Curriculum Framework for Quality Teacher Education*. National Council for Teacher Education: New Delhi.

Quisumbing, L.R. (2004) Education for the world of work and citizenship – towards sustainable future societies. Final report of the UNESCO International Experts Meeting, Bonn, 25–28 October 2004.

Rajput, J.S. (1999) School curriculum in India with focus on value education and work experience. *Journal of Indian Education*, 25(3): 1–13.

Rajput, J.S. (2001) *Symphony of Human Values in Education*. National Council for Educational Research and Training: New Delhi.

Sheshadri, C. (2000) *Conceptual Aspects of Value Education*. Report of the Seminar on Value Inculcation through Vocational Education, November 7–8, 2000, PSS Central Institute of Vocational Education: Bhopal.

UNESCO (1996) *Learning: The Treasure Within*. Report of the International Commission on Education for the Twenty-First Century, UNESCO: Paris.

UNESCO (1997) *Environment and Society: Education and Public Awareness for Sustainability*. UNESCO (UNESCO-EPD-97/CONf.401/CLD.2) Background Paper Prepared for UNESCO International Conference, Thessaloniki: Paris.

# Chapter 26
# China: Skills for Displaced People in the Three Gorges Reservoir Area of Chongqing

**Jiping Zhao, Yu Liu and Veronica Volkoff**

## Introduction

Chongqing is located in the upper reaches of the Yangtze River in south-west China. It is China's largest municipality, with an area of more than 8 million km$^2$ and a population of more than 30 million people (Chongqing, 2005). Chongqing comprises urban areas, including a highly developed city centre, and a vast rural area. The city centre, known as the hilly city, is sandwiched between huge rivers: the Yangtze and Jialing Rivers. The rural area includes the Three Gorges of the Yangtze River, mountainous areas and very fertile and productive agricultural land, as well as smaller cities, towns and villages. Uniting eastern China with its western provinces, Chongqing plays a very important strategic role in the economic development of western China. It has a wide range of industries including agriculture, business, automotive, building and construction, tourism and hospitality and electronics. Created as a municipality reporting directly to the People's Republic of China central government in 1997, it is charged with three great missions. It is expected to take the lead in developing the economy in the upper reaches of the Yangtze River and south-western China, to promote prosperity for rural areas as well as large cities and to manage the migration of people displaced in the Three Gorges area, while developing the local economy to ensure the implementation of the hydroelectric project (Chongqing, 2005).

The famous and picturesque Three Gorges, comprising the Qutan, Wu and Xiling Gorges, are located in the upper reaches of the Yangtze River, which is almost 2000 km long and is China's longest river (Chinese International Travel Agency in Chongqing, 2005). On 3 April 1992, the 5th conference meeting of the 7th session of the Chinese People's Congress passed a resolution, based on nearly 40 years of planning, scientific research and discussion, to commence the implementation of the Three Gorges Reservoir project, the biggest such project in Chinese history. It represents not only a huge and comprehensive hydroelectric project in China but

J. Zhao
Chongqing Industry Polytechnic College, Chongqing, China
e-mail: gzyannyl@163.com

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also an enormous challenge in addressing the associated population displacement and eco-environmental issues.

When the water rises to its expected height of 175 m, the surface of the body of water will expand to cover more than 10 $km^2$. The reservoir itself will be more than 6 $km^2$ in area and the total length of the river bank that is created will be almost 60 000 km (Yangtze Department Developing Company, 2002). More than 20 counties, towns and cities will be affected as a land area of up to 63 $km^2$ is submerged. As a result, the population of displaced people is expected to reach 1.13 million people by 2009.

Supporting the migration of more than a million people is considered to be one of the major challenges in the world. In order to solve the problems associated with this, the Chinese government has developed a migration policy in favour of development. This will give priority to environmental protection when reorganizing agriculture and industry and make sensible use of the local natural resources and labour resources. The migrants' knowledge of science and technology will be improved so as to improve their productivity and their lives in general, together with their capacities for self-development and wealth accumulation.

## The Importance of Vocational Skills Training for Migrants in the Three Gorges Area

This migration has provided valuable opportunities for restructuring local industries and a strong investment environment for reconstructing towns and cities and their shifts of function. Furthermore, these changes are expected to support agricultural development and promote the recovery of the eco-system. But with the water level expected to rise to 135 m after completion of the engineering project in the first phase, 72 per cent of industries in the flooded area will be either shut down or merged (Chongqing Government, 2004b). Before new industries are fully developed, there will be a scarcity of employment opportunities and a serious imbalance between the large population and the inadequate land available to support it. The government policy of returning farmland to forest or grassland, which has further reduced the environment's capacity to accommodate the resettlement of farmers in the reservoir area (Yangtze Department Developing Company, 2002) adds considerably to the challenge. Of the 15 major migration counties and towns, some have an unemployment rate of more than 8 per cent. This means that the lives of more than 200 000 people are affected (Chongqing Government, 2004b).

From 2004 the main task of the Chongqing Municipal Government has been to shift the focus from simply moving people out of the areas being inundated, to resettling and providing them with a sustainable livelihood (Chongquing Governmnent, 2002). Ongoing development and secure resettlement are two vital goals to foster the growth of new and environmentally sustainable industries, to develop an economy specific to this area and provide displaced farmers with relevant skills training to enable them to make a contribution to the economy and to maintain a quality livelihood (Chongqing Government, 2002).

**Table 26.1** Number of migrants to be trained 2004–2007

| Year | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|
| No. of trainees | 25 000 | 27 500 | 26 400 | 21 100 |

**Table 26.2** Types of training to be conducted, by industrial sector

| Learner | Agriculture | Manufacturing | Service and tourism |
|---|---|---|---|
| Migrants in rural areas | 28 200 | 500 | 16 700 |
| Migrants resident in towns | | 20 300 | 29 700 |

The training plan for the migrants in the Three Gorges Reservoir area, developed and implemented by the Chongqing municipal government, stipulates the principle that the training provided must be 'human-centred' and must combine the elevation of the workers' functional skills with skill training. Table 26.1 shows the numbers of migrants to be trained during the period 2004–2007 and Table 26.2 indicates the types of industrial training to be conducted (Chongqing Government, 2004b). Through the joint efforts of private training institutions, universities, vocational education and training (VET) schools, scientific research institutes and medium and large enterprises, it is anticipated that all the eligible migrants will be trained once by the end of 2007, so that each affected household will have at least one competent, skilled worker.

## Existing Barriers for Migrant Trainees in Learning Skills

The VET trainees include farmers, town folk, laid-off workers, university graduates and retired soldiers (Chongqing Government, 2004b). Table 26.3 shows the number of people involved in training programmes in Chongqing.

A questionnaire survey of trainees has revealed a variety of reasons for participation in the training. In the process of restructuring of industry in the Three Gorges Reservoir area, many products will be replaced and equipment updated. As a result, the managers and workers will need to acquire new skills and update their knowledge. Similarly, as a number of enterprises have been shut down for being environmental polluters, because they had financial problems or because their market no longer existed, workers in these enterprises who have been laid off need to improve and update their skills to be able to apply for new jobs.

The original function of cities and towns, after the process of urbanization and industrialization, is being renewed and residents in the towns and cities want to

**Table 26.3** Numbers of trainees in Chonging

| Migrants in rural areas | Migrants in market towns and towns | Laid-off workers and unemployed people | Total |
|---|---|---|---|
| 50 000 | 15 000 | 35 000 | 100 000 |

improve their quality of life. In the rural areas, as land utilization drops in the affected areas and as cultivation on the steep mountain slopes will result in serious soil erosion, farmers in the Reservoir area need to acquire new farming skills to adapt to the reconstruction of agriculture.

Large-scale construction projects need skilled workers. University graduates and retired soldiers need to acquire new skills to meet the demand from sectors such as telecommunications, transportation and constructing the cities. Migrant trainees will play their respective roles in all this and thus shoulder a variety of responsibilities in their families, workplaces and society. Their lack of time, money and basic knowledge for training is a common problem. In addition, insufficient focus on operational and practical skills, ineffective learning arrangements, their lack of confidence and the neglect of teamwork in learning, all influence their training outcomes. Therefore it is normal to find trainees who do not value learning, are afraid of changes and new methods, are afraid of losing face in public, have poor learning habits, are not young and have family responsibilities, have no confidence and consider themselves to be in a disadvantageous learning position.

Modern adult learning theory suggests that adult learning ability reaches its peak at about 30 years of age. From 30 to 50 years, adult learning ability tends to be stable. For people over 50, that ability begins to decrease. For adults, especially people over 40, learning efficiency in relation to the prescribed duration for a learning unit is likely to be less effective than for young people (Huang, 1999). However, if the adult learners are allowed to control the speed of their own learning, then it can be as effective as that of young people. Hence, different teaching and learning approaches are important to gain the desired training outcomes.

## Improving Migrant Skills Acquisition

Traditional Chinese VET provision teaches theory, but neglects the combination of theory with practice and practical skills training. It also fails to address the particular needs and different characteristics of trainees, as individuals and as a group. Traditional Chinese vocational education textbooks do not give much attention to recognizing the learners' previous knowledge or ability, or to occupational health and safety. Applying these old concepts and methods can never achieve expected outcomes in contemporary society.

Maslow (1971) indicated in his theory of needs levels that for adults, motivation is centred around meeting their social, psychological, safety, self-respect and self realization needs. Thus, adult training needs to follow these principles. For example, adult learners are likely to have very clear learning objectives in their minds and like to use objects and relevant materials as their learning aids and to learn in an informal environment. They are also adept at using their previous experience to help them learn new things. VET schools and other training institutions therefore need to reform traditional Chinese teaching and learning modes and methodologies to facilitate vocational training. Trainers need to use a variety of flexible teaching methods to help learners to solve such problems and improve the quality and efficiency of training.

## *Analysing Industrial and Learners' Needs*

The Chongqing Government's plan for restructuring industry and market demand has determined that agricultural training should focus on citrus growing, animal husbandry and aquaculture. In the manufacturing and service industries, training is required to meet the needs of structural readjustment and the 're-employment project' (Chongqing Government, 2004b). As the development of industries places higher demands on labourers' competence in various workplaces, learners' training needs should be analysed and the criteria for meeting these needs identified.

Meanwhile, vocational training programmes for migrants and an employment information system need to be provided at each of the four levels (city, county, town and village) so as to develop an effective labour output mechanism which accords with the training principles of market-orientation, government support, migrant willingness and contract management (Chongqing Government, 2004b).With the use of a questionnaire survey, we have identified the extent of migrant trainees' motivation and the level of their demand for learning. On the basis of this information, we have developed customized training to meet the demands of enterprises while matching the aspirations of migrants as well.

## *Developing Feasible Training Plans*

Analysis of the learners' demand for training has revealed the characteristics of the migrants themselves: scattered and mobile (Chongqing Government, 2002). These characteristics need to be given primary consideration in the development of feasible training programmes. Consideration also needs to be given to the competency standards relevant to each industrial job. In addition, improving the migrants' functional skills needs to be related to training that meets the criteria for qualifications. Feasible training plans need to be developed, including documenting competency standards, designing courses, setting training goals and expected outcomes, devising content teaching strategies and methods, providing learning and training resources (human, material and financial) and setting up assessment and evaluation standards, methods and strategies.

The training programmes are designed be 'industry-oriented, competence-focused and learner-centred' and traditional vocational education and training approaches will be reformed so as to realize the following four shifts from:

- Teacher-centred to learner-centred learning processes;
- Rigid teaching strategies and mechanisms to flexible ones;
- Teaching theory to enhancing learners' vocational and functional skills;
- Elite education to mass education.

Options provided will include introductory training for classified industries, vocational skills training and on-the-job training. Training courses at various levels will be developed for the migrants and farm workers to choose from, according to their own literacy levels, to guarantee the flexibility of the learning mechanism and active participation in the programmes.

## *Ensuring Relevant Learning Resources*

Learning resources, including human resources and facilities, are central to guaranteeing the quality of systematically implemented training programmes. Training institutions and vocational schools require qualified teachers with industry work experience to be involved in training delivery and assessment. For vocational schools that do not have sufficient qualified teaching staff, one option is to invite experienced and qualified technicians from enterprises to contribute to the training. Training and assessment activities require relevant facilities, equipment and materials to be designed, prepared and utilized. If these are insufficient, the training schedule must be readjusted and the learners can be placed in relevant workplaces where on-the-job training can satisfy the training and learning requirements of the curriculum.

An example of this strategy is to the casting worker training programme for rural migrant workers co-conducted by Chongqing Jieli Wheel Hub Manufacturer Ltd and Chongqing Industrial Polytechnic College. This uses industry resources in conjunction with training in VET schools. The basic theoretical knowledge is provided in Chongqing Industrial Polytechnic College for one month and practical skills training is conducted in Chongqing Jieli Wheel Hub Manufacture Ltd for two weeks. Table 26.4 outlines the collaborative training plan that was developed.

## *Implementing Flexible and Effective Learning Strategies*

Adult learners do have some learning advantages (Coates, 2003). They are likely to be:

- Highly motivated with clear and practical goals;
- Capable of self-adjustment and self-control in relation to the learning process;
- Filled with motivation, initiative, creativity and a sense of participation;
- Capable in terms of logical thinking and comprehension;
- Selective about the content of their learning.

Taking account of these advantages requires developing the following flexible and effective learning strategies:

*Flexible learning time*. The learners should be able to develop their own learning schedules according to their respective needs and requirements.

*Flexible learning plan*. Before the learners commence each unit of competency, trainers should help the learners to develop their own learning plan, according to the competency standards and based on their own needs and requirements. Learners should also be encouraged to apply for assessment, if they can demonstrate that they have already acquired the particular competence or if they can produce relevant documents or certificates confirming that they have successfully completed such training and can therefore ask to be exempted from scheduled training in order to avoid a waste of time and money.

**Table 26.4** Foundry worker training plan

| Programme | Content | Time (hours) | Train | Venue |
|---|---|---|---|---|
| **Basic theoretical knowledge** | | | | |
| Introduction | Laws and statute education<br>Occupational health and safety education<br>General knowledge of life in the city<br>Regulations and by laws in industry<br>Training management and assessment in CQIPC | 8 | Dean of practical training centre | |
| Basic knowledge of nonferrous smelting | Introduction to nonferrous metals<br>Common ways of smelting nonferrous metal<br>Crystallization regulation of nonferrous metals<br>Common equipment used for aluminium alloy smelting<br>Technological processes of aluminium alloy smelting<br>Hydrogen and dregs clearing in aluminium alloy smelting<br>Aluminium alloy smelting<br>Common quality problems in aluminium alloy smelting and how to prevent them | 112 | Metal materials teachers | Chongqing Industry Polytechnic College |
| Basic knowledge of nonferrous metals foundry | Introduction to nonferrous metals foundry<br>Casting formation and common defects of aluminium alloy smelting<br>Physical and mechanical functions of aluminium alloy casting<br>Analysing the technological process of aluminium alloy foundry<br>Aluminium alloy foundry gravity equipment<br>Gravity foundry die | 120 | Casting teachers | |
| **Operating training in the workplace** | Working process of smelting, casting, clearing dregs and servicing equipment | 120 | Foundry engineers and technicians | Chongqing Jieli Wheel Hub Manufacture Ltd |

*Variety of learning materials*. Video and audio teaching materials, prepared in media such as CDs, tapes and slides will need to be provided to trainees to allow them to learn whenever and wherever they wish.

The materials used for migrant training should follow the principles of sufficiency and application and focus on practical skills. Using textbooks in the traditional ways associated with academic theory teaching is not effective. Furthermore, the training materials need to be developed to match the competency standards required in the relevant industry and occupation.

In developing the training materials, attention should be given to the following key points:

- The training content, sequence and schedule should be determined according to the elements in each of the competency standards.
- The training content should incorporate relevant occupational health and safety and environmental issues.
- The quantity of the training content should be in line with the adequacy principle.
- Sequencing of teaching and learning should accord with the logical order in which each task is completed in the workplace, so as to align the training more closely to workplace requirements.
- Teaching time should be designated according to the time it takes to acquire the competency demanded for the job by the industry (Coates, 2003).

In addition, the training content should be human-centred and inclusive. When using pictures, icons, words and formatting in training activities, special attention should be paid to inclusive practices and to excluding any content with ethnic, religious or sexual discriminatory references or images. The training materials should also be appealing to the eye, with colourful pictures and cartoons, and be easy to read, understand and copy.

## *Teaching Activities Noticeable for Their Flexibility and Participation*

In the process of selecting, planning or implementing teaching activities, the traditional teacher-centred method should not be used. Instead, it is important to develop teaching plans based on the concepts of learner-centred teaching, to create a variety of learning and teaching activities that accommodate variations in learning styles, interests, requirements and experiences. A variety of approaches can be adopted involving the learners' senses of hearing, sight and touch in order to promote their engagement with the material. Through their participation in a variety of interactive teaching and learning activities, the learners can also develop their teamwork capabilities.

For example, the expert system of preventing plant diseases and insect pests, a programme available on the Internet, can be used to provide training materials for farming skills development. This 'learner–crops expert' interactive approach

can help to transform the learners from passive receivers of knowledge, as commonly experienced in traditional teaching classrooms, to the main subjects of the learning process, thus improving the learners' actual ability to solve complicated problems. For example, to address the problems faced by migrant workers at Shuanghe Street of Wangzhou in Chongqing Municipality, such as their lack of skills, their difficulties in finding employment and their poor quality of life, a skills training programme was conducted by the Chongqing Migrant Bureau from the end of 2005 to early in 2006. A total of 100 people (84 women and 16 men) signed up to undertake the training. Rural (farmer) migrants accounted for 54 of the participants and 46 were migrants from towns. The participants' ages varied from under 30-years old (42) aged between 30 and 35 (52) and older than 35 years (six). Their previous educational experience also varied. Three had completed studies at higher VET institutes and colleges. Eight had completed VET secondary school programmes, 27 were senior middle-school graduates and 62 were junior middle-school graduates. Among them, half trained in hospitality skills and the other half in marketing. (Chongqing Agricultural Bureau, 2004).

The training programme was conducted by Mintian Personnel Training in Wanzhou, which was helpful in promoting the trainees' subsequent employment. Mintian Personnel Training developed a very practical training plan to address the needs of the Shuanghe migrants and industries. The training plan allowed for 70 per cent of the training hours to be used in applied case studies and practical training. Focusing on the priority of developing job-related skills for employment, the case studies provided training in service industry communication skills and allocated time for both delivering theory and substantial practical training, supervised by practical teachers. Furthermore, additional job-related training was provided in the workplace with a particular focus on relevant statutes, laws, discipline and etiquette to improve the holistic attributes of all trainees. This meant that they were able to achieve the primary skill level required and lay a sound foundation for their employment in a minimum period of time (Chongqing Agricultural Bureau, 2004).

## *Implementing Assessment Aligned with Competency Standards*

Ways of collecting evidence of the learners' achievements and judging them in relation to the required standards of performance need to be developed (Coates, 2003). In developing effective assessment strategies, the traditional Chinese assessment requirements that taking 60 per cent as an acceptable score for competence must be amended. Instead, industry competency standards must be adopted and the trainees measured as being either competent or not yet competent.

The migrant trainees must be assessed in terms of their workplace performance, their ability to analyse and solve problems and their capacity to respond to unusual conditions and to apply theory to practice. First-hand information can be collected

through observing the learners displaying their skills and examining the quality of their products or other outcomes of their work. Indirect information can be collected through role play and other simulated activities. Complementary evidence can also be collected through questions in written or oral forms.

With systematic assessments, teachers and learners can gain a clear picture of their learning. As a result, teachers can revise their teaching strategies in an ongoing way and the learners can adjust their learning schedule. A conclusive assessment should be undertaken to examine all the elements required to achieve a competency standard, or to check the outcomes of training at the end of a training period. All assessment work must be completed by qualified teachers or industry personnel in order to guarantee the validity, reliability, flexibility and fairness of the assessment.

One example of such an approach is the training programme developed for migrants at Fengcheng Street Division, an area in which many migrants are still to be relocated. This Green Certificate programme focuses on the skills required for vegetable cultivation. It was adapted to the features of the local geography and it recognized that many farmers were already experienced in growing vegetables. Through focusing training on meeting local needs and conditions and building on learners' existing skills, the programme was conducted efficiently and improved vegetable cultivation skills (Chongqing Agricultural Bureau, 2004).

According to the Green Certificate delivery plan, 120 hours of theoretical training was provided, together with 180 hours of practical training. The content included a basic knowledge of vegetable cultivation, including a focus on environmentally sustainable practice, greenhouse horticulture, raising seedlings, cultivating different vegetable types such as eggplants, tomatoes, varieties of melons, varieties of legumes and green and root vegetables and technologies for preventing plant diseases and insect pests. At the same time, all migrant trainees were assessed against the competency requirements of the Green Certificate. In total, 10 migrant trainees successfully achieved the farmer technician certificates. They were the first batch of farmer technicians to be trained in the Three Gorges area (Chongqing Agricultural Bureau, 2004).

## Establish an Holistic Training Quality Evaluation System

In order to ensure the quality of curriculum development, every aspect of the curriculum development process must be monitored and evaluated. Students, teachers, enterprises, parents and the education department can all provide an input to evaluation during the curriculum design and implementation process. Evaluation of curriculum quality can be informed by a range of data: feedback from employers of learners' work in the workplace; learning outcomes; the adaptability of learners in their jobs and their capacity to meet the needs of technological development. During the evaluation process, the training content needs to be examined to determine whether it aligns with the competency standards developed by the relevant industry and whether the training outcomes match expectations.

## Sustainable Development Resulting from Implementation of TVET Training for Migrants in the Three Gorges Reservoir Area

Since 2004 when the Chongqing Government started implementing policies and plans aimed at addressing the quality of life, employment, productivity and income issues of displaced people, 21 urban migrant skills training bases have been established and an additional 100 training bases have been located in the counties of Chongqing. In addition, an advisory group of experts has been specially formed to guide skills training. The target groups participating in the training include poor migrants, middle-school graduate migrants who have recently entered the workforce, middle-aged migrants with some literacy who are capable of taking up work elsewhere and town migrants in need of assistance. More than 83 000 people have already received some training and more than 50 per cent of those trained have gained employment (Chongqing Daily, 2006), providing skilled human resources for many of the enterprises that are being established in the Three Gorges Reservoir area, in particular in four industries focused on the sustainable development of oranges, domestic animals, aquaculture and tourism.

Almost CNY37.2 billion has already been invested in projects to support migrants under the relevant municipal government policies. More than 940 000 migrants have been relocated, houses and public buildings reconstructed and the debris from submerged enterprises removed. Overall, the project is about 11 per cent ahead of schedule (*New Beijing Daily*, 2006). Project initiatives have also dramatically changed the lives of migrants in the Three Gorges Reservoir areas through increasing their income and improving productivity.

In particular, the value of production (GDP) of the Three Gorges local areas involved in these projects has more than quadrupled over the last 10 years, the per capita net income of farmer migrants has increased 2.45 times and bank savings are six times greater (Chongqing Daily, 2005). The migrants are transforming the Reservoir areas by their own hands. Numerous new buildings have been constructed, many bridges now cross the rivers, a network of roads connects different areas and a range of fruit growing zones has been established across different areas. Economic development is progressing in the Three Gorges Reservoir areas together with gradually improving environmental protection practice. In 2006, 97 000 more people remain to be relocated and re-established by the Chongqing Government by the end of 2007.

The Three Gorges Reservoir area training plan states that the core training plan and activities must focus on supporting migrants' production, increasing their income and improving their quality of life. Further, the training must focus on developing skilled personnel to improve the structure of the workforce and provide more stable human resources for the development of the Three Gorges Reservoir area. An important goal is to ensure that migrants who have been relocated are able to achieve sustainable incomes that match average local living standards.

## Conclusion

The training of migrants (displaced people) from the Three Gorges area of Chongqing commenced in 2004. That year was nominated the Migrants Training Year by the Chongqing Government. What have been the results? Chongqing Government statistics by the end of 2005 show the following outcomes of migrants' training:

- More than 83 000 migrants have completed their training;
- Almost 80 000 people have gained skills certificates at different levels;
- More than 33 000 people have received pre-employment training;
- Close to 2000 people have received cadres training;
- The focus has changed from migration/resettlement policies to provision of training for production skills and sustainable livelihoods.

In addition, with the majority of the labour force making the transition from agriculture to industry, the Chongqing Government has developed an employment policy to support small and medium-sized private enterprises, develop labour-intensive industry, widen the potential employment channels and provide multi-level skills training in various ways so as to improve the learners' capacity to gain employment.

Within this context, it is important that VET institutions and other training organizations make the best use of professional educational knowledge, develop human centred training courses and establish a flexible learner-centred learning system. Under the guidelines of fair treatment, sensible guidance, improved management and better service, migrants in the Three Gorges area are more likely to enjoy an equal opportunity for participating in vocational and skills training (Chongqing Government, 2004a).

There is an urgent need for a skilled labour force to assure the prosperity of the Three Gorges Reservoir area. However, it is only when the migrants have acquired relevant vocational skills that they can effectively contribute to the economic development of the area. Equipped with such skills, they can raise their productivity and thus improve their living standards and build sustainable livelihoods for their families.

## References

Chinese International Travel Agency in Chongqing (2005) Introduction to the Three Gorges in Yangtze. http://www.happycq.com. Accessed 1 April 2005.

Chongqing (2005) Map, in Introduction to Chongqing. http://www.cqmap.net. Accessed 1 April 2005.

Chongqing Agricultural Bureau (2004) Implementing Firmly Migrants Training, Advancing Migrants in the Three Gorges Area. Public Information Web, Chongqing Agricultural Bureau. http://www.cqagri.gov.cn. Accessed 2 April 2006.

*Chongqing Daily* (2005) Admirable spirit of migrants in the Three Gorges Reservoir area. Public Information Web, Chongqing Agricultural Bureau. http://www.cqagri.gov.cn. Accessed 1 October 2006.

*Chongqing Daily* (2006) The goal of the program: one family, one person participating in vocational skills training for migrants in the Three Gorges Reservoir area. Public Information Web, Chongqing Agricultural Bureau. http://www.cq.gov.cn. Accessed 1 October 2006.

Chongqing Government (2002) Migrants' engineering programme in the Three-Gorges: promoting sustainable development in the Three Gorges Reservoir area. Public Information Web, Chongqing Agricultural Bureau. http://www.cq.gov.cn. Accessed 2 April 2005.

Chongqing Government (2004a) Opening up employment channels to increase standards of living of migrants. Public Information Web, Chongqing Agricultural Bureau. http://www.cq.gov.cn. Accessed 2 April 2005.

Chongqing Government (2004b) Training programming of migrants in Three-Gorges Reservoir area. Issue No. 84. http://www.cq.gov.cn. Accessed 2 April 2005.

Coates, S. (2003) Training packages. Paper presented at the China–Australia VET Forum Conference, Chongqing.

Huang, F. (1999) Adult learning. http://www.lifelongedu.com.cn. Accessed 16 March 2005.

Maslow, A. (1971) *The Farther Researches of Human Nature*. Viking Press:New York.

*New Beijing Daily* (2006) Completing centralized shifting and allocating migrants in the Three Gorges Reservoir area by the end of next year by the Chongqing Municipal Government. Public Information Web, Chongqing Agricultural Bureau. http://www.cqagri.gov.cn. Accessed 1 October 2006.

Yangtze Department Developing Company (2002) China Three Gorges project. http://www.ctgpc.com. Accessed 10 March 2005.

# Chapter 27
# Country Experiences in Integrating Sustainable Development into TVET: Towards a Synthesis

**Alan Montague**

The chapters in Part III highlight the many initiatives in countries around the world to integrate issues of sustainable development in to TVET. These include examples of innovations in learning programmes as well as in the operations of college campuses (the UK and Germany), examples of research to identify sustainable development competencies that ought to be included in TVET programmes (Australia and Canada) and critiques of inappropriate competency-based approaches to the spirit of sustainable development (South Africa). The chapters in Part III also provide examples of the challenges facing all innovations in TVET, especially those, which like the principles underpinning sustainable development, question the dominant economic slant of traditional approaches to TVET (Azerbaijan, India, Australia and others). There are also inspiring stories such as those from China and Azerbaijan where major TVET reform programmes are underway to provide training for sustainable livelihoods.

This chapter is organized around the themes that were common to these experiences. These include the barriers to innovation faced by TVET policy-makers and practitioners due to the low status of TVET in many countries.

## The Status of TVET

A common challenge for TVET in almost all countries around the world is to announce proudly that it is directly relevant to most of the world's people as it has a crucial role to play in sustaining human development. However, Martin et al.'s account of how the Learning and Skills Development Agency (LSDA) in the UK is 'doggedly' attempting 'to raise the profile and create the opportunities for the learning and skills sector to embed sustainable development within college and training provider policies and practices' is typical of the pattern in many of the case studies in this section, including Australia, Germany, India and Canada. Unfortunately, these

A. Montague
RMIT University, Melbourne, Australia
e-mail: alan.montague@rmit.edu.au

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are very countries where the case studies show that innovative thinking and practice are underway.

However, the low status of TVET compared with other sectors of post-secondary education needs to be seen as an opportunity, not a barrier. This is where sustainable development issues can play a very significant role. As the authors of the chapters in this section indicate, while there may be much new thinking about development, as outlined in Part I, far too much development represents old-style thinking, and this has resulted in the myriad environmental problems outlined by Michael Haertel in his chapter and in significant human development challenges, as seen in the examples from South Africa, India, China and Azerbaijan. Appreciating the knowledge, skills and values that underpin sustainable development can do much to ensure that workers develop the skills for addressing these increasingly pressing challenges. Indeed, many governments' efforts to address climate change, for example, require workers trained in issues of sustainable development. The impact of the neglect of both TVET and sustainable development skills was seen in the UK in June 2007 when government plans to require that all houses being sold to have an energy efficiency report was delayed for at least a year due to the lack of skilled household energy auditors and tradespeople to retrofit houses for energy efficiency.

## Sustainable Development Competencies

In several countries researchers and policy-makers have tried provide guidance for TVET curriculum developers by identifying the competencies that TVET programmes can develop in order to address needs such as these. For example, Condon and Rickard's chapter describes research to identify guideline competency standards in sustainability and resource efficiency in industry for possible inclusion in training packages within the Australian qualifications framework. Developed by industry through national industry skills councils, training packages are sets of nationally endorsed standards and qualifications for recognizing and assessing people's skills in specific industries or industry sectors. Competencies related to life-cycle thinking, eco-efficiency and design, sustainable purchasing strategies, product stewardship and ecological foot-printing are identified.

The chapter by Boutin and Chinien about TVET in Canada also tried to identify sustainable development competencies for inclusion in TVET programmes. They did this through the development of a sustainable development competency profile (SDCP) for the workforce using literature reviews and expert consultations. The SDCP generated by this study consists of six thematic areas of competencies: ethics and values, integrated decision-making, responsible use of resources, valuing diversity, safety and wellbeing and continual improvement. These six address the essential knowledge, skills and attitudes necessary for the workforce to apply the principles of sustainable development in their day-to-day activities, regardless of job function, sector of activity, and level of education and training. They are also broadly applicable to general education, adult education and technical and vocational education and training.

Interestingly, the papers from South Africa bring the concept of competency into sharp relief. For example, following work by Edwards, Usher and others, Lotz-Sisitka and Raven question the way competency-based training narrows the curriculum by the narrow way it defines competence and assessment. This leads them to present an alternative view of competence based upon the process of reflexivity. This enables them to identify 'the integration of the two types of competence through reflexive competence, in which learners show their ability to connect their performance and decision-making to the underlying understanding and adapt to change or unforeseen circumstances, and be able to explain these adaptations. This, they argue, can lead education – and assessment – to focus not on technical performance *per se* but on being able to predict future issues of a similar nature to ones they have already experienced and to plan measures that may avoid similar problems in future.

Lawrence takes up the critique of competency-based training as well. Using examples of the development of a TVET system appropriate to Azerbaijan, a country rich in resources but also newly emerging from a form of economic and social stagnation, he identifies several key issues. The first is that many educators simply do not understand competency-based training and lack clear assessment models to show them how to avoid training and testing for the sake of training and testing, especially where the learner's skills are already evident. Thus, he argues strongly for the recognition of prior learning (RPL). He also offers equity reasons for this through his call for TVET to focus on the existing skills of those who have been marginalized from labour markets and training. This is especially important in Azerbaijan, where two-thirds of the population are working in the informal economy in their own small businesses and, therefore, are already highly competent in what they do.

## Pedagogy and Education for Sustainable Development

Reviewing the German experience, Haertel's chapter encourages action on the alarming environmental situation that the planet has reached. More significantly, however, Haertel expresses concern that many TVET teachers are challenged by the problem of how to integrate issues of sustainability into the instruction they provide at college or the workplace. This because teaching for sustainable development is more than just a matter of applying technical expertise and complying with regulations and standards. The reflexive competence described by Lotz-Sisitka and Raven is needed to deal with the ethical issues involved in balancing social, economic and environmental factors in many decisions. Thus, Haertel explains that learning in TVET requires students to undertake cross-disciplinary learning projects that link students to tangible, sustainable development problems in tangible industrial settings. Such projects enable all, including teachers, to develop the collective wisdom needed to think critically and creatively in relation to sustainable development. This is the same point made by Martin et al. who argue that this represents a change in education and training paradigms.

Such issues were highlighted in the case study from China which reported on the TVET needs of people who had been moved as a result of the building of the Three Gorges Dam. What sort of TVET is appropriate for rural workers moving to cities? How can they develop skills for the sustainable livelihoods of their families in an atmosphere of rapid change and where fear of change is all pervasive? The chapter by Zhao et al. discusses TVET as an ethical broker in developing and linking people to a new labour market and social circumstances.

## Conclusion

These three major themes – the status of TVET, competencies for sustainable development in the workplace and appropriate pedagogy – are not the only themes in the nine chapters in Part III. Others were taken up in individual chapters or appeared in several chapters. However, these three are part of the TVET response to the challenges of integrating sustainable development into education and training for the world of work.

# Part IV
# Enhancing and Supporting TVET for Sustainable Development

# Chapter 28
# Eight Principles for Promoting Sustainable Education

**William S. Pretzer**

## Some Barriers to Creating a Sustainable Education

Of all the challenges facing the sustainability movement, among the most intractable seems to be convincing the general population in industrialized societies that sustainability does not mean a vast expansion of governmental control, a constriction of individual liberty or a drastic reduction in the general quality of life. In the English language the word 'sustainable' sounds suspiciously similar to 'subsistence', with its connotations of bare survival rather than consumerism, growth and progress. This association is particularly resonant in the USA where we learn from school texts that our national story involves our transformation from subsistence farming during the colonial era into a technological giant in the nineteenth century and world power in the twentieth. For the elderly, any discussion of extending resources dredges up memories of World War II rationing with the enforced limitation on consumption of all kinds, recycling cans, nylon stockings and tyres, and cultivating a 'victory garden' (bringing to mind subsistence farming once again). If it does not need not a new language, then certainly the movement needs new images to go with the old words. In other words, the sustainability movement could use a good public relations campaign as well as an effective educational campaign. Indeed, it might even need a brand re-adjustment.

### *The Need for a New Public Image*

There are many sources and forms of resistance to the promotion of sustainability and we need to recognize them, if only to develop effective counter-arguments. Justifications to opposing sustainability can be found on ideological grounds, in theories of economic development, in beliefs in future innovations in natural resource development and in plain greed and the protection of privilege.

W.S. Pretzer
Central Michigan University, Mt. Pleasant, Michigan, USA
e-mail: bill.pretzer@cmich.edu

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Education for sustainability has been criticized in the USA as the product of an international cabal of Green political parties intent on using the public education system to socialize children towards a specific political perspective. Ostensibly, these groups do not question the goals of sustainability, but they resist what they perceive as a politically inspired curriculum, with resulting threats to free thought and individual autonomy. Another assertion is that sustainable development relies on dubious economic theories and definitions of natural resources. This position emphasizes the ability of humans to create resources or, at the very least, redefine the aspects of the natural world as resources. For some, environmentalism and governmental action strike at the heart of cherished traditions of individualism, theories of limited government and emphasis on local rule. For these ideologues, 'sustainable development' is code for anti-private property, anti-free enterprise and anti-personal freedom. Critics see it as government by an activist elite with an agenda antithetical to American constitutional traditions (Shaw, 2006; Swanson, 2005; Taylor, 2006).

In addition to a new public image, an effective educational plan also is required; one that can demonstrate the practicality of sustainability as well as illustrate its necessity. In addition to being practical and effective, this educational system also needs to be persistent but pliant, durable yet flexible. Indeed, it probably cannot be a system at all; it is more likely to be a set of overarching imperatives and values that find their local incarnations formed by local conditions, traditions and visions of the future (Quisumbing and de Leo, 2005). While TVET can integrate such perspectives into the curriculum, they should not stop at the TVET classroom door. The challenge is thus not confined to TVET, nor is it limited to creating curricular innovations or training programmes in formal educational settings. The wider educational sector must be encouraged to engage with these issues, perspectives and values. Indeed, reforms in TVET are most likely to take root where sustainability is integrated into other elements of the wider culture. On this issue, there is reason for hope.

My son's copy of *Sports Illustrated (SI)* arrived recently. For those who may be unfamiliar with it, *SI* is the 50+ year-old iconic American sports magazine with millions of readers worldwide and it is produced in international editions appearing in several countries including, most recently, China. The cover story headline for 12 March 2007 read: 'Sports and global warming: As the planet changes, so do the sports we play. Time to pay attention'. The article itself examines the potential for the global warming of impact on activities such as skiing and water sports, with illustrations showing the sustainable alternatives that are being considered in the design of golf courses and sports stadiums. I believe this represents a tipping point; the moment at which a social phenomenon leaps from being the concern of a small group to being broadly recognized as something that concerns a mass public (Gladwell, 2000).

Serious discussion of the conditions that concern are no longer relegated, on the one hand, to the letters pages of liberal newspapers, environmentalist journals appealing to eco-radicals and policy wonks and political journals appealing to progressive environmentalists or, on the other hand, to the manifestos of libertarian free

marketeers or the web blogs of radical individualists. It is now evidently time for the common man and woman to pay attention, and *SI* has given them reasons to do so with words and images that they understand and value.

As educational administrators our role here is similar: to use familiar language and experiences to press the advantage presented by this watershed moment into the arena of technical and vocational education and training. Promoting sustainability in TVET programmes requires truly innovative thinking and, while simple statements can mask complex realities, this chapter offers, not rigorous analysis or argumentation, but some simple suggestions as guides to communication and motivation.

Integrating sustainable development into TVET should be thought of as creating a new image of what it means to have technical skill and knowledge. Environmental efficiency and social responsibility can join the calculus of technical and economic efficiency as inherent goals (McDonough and Braungart, 1998). At specific times and places groups of engineers and technicians have gained enormous social prestige because they delivered on some widely held social vision. One example is Thomas Edison, Elihu Thomson and their associates who became the first generation of electrical engineers responsible for lighting city after city around the world. Another is the National Aeronautics and Space Administration scientists and engineers who put humans on the moon. Today we need a generation of engineers, designers and technicians who gain credibility and status by delivering on sustainable development.

The knee-jerk reaction that environmentalism is antithetical to economic growth or the profit margins is less and less persuasive, especially in the corridors of an increasing number of global corporations. We have moved from the slogan of the 1980s, 'greed is good', towards 'green is good' in the first decade of the twenty-first century. The result is that progressive educators and policy-makers are now freer than ever to think creatively about the relationship between technology, economic growth and TVET. This leads to the first of eight propositions offered to assist promoters of a sustainable education:

## *Principle 1: Learn from the Opposition, Collaborate with the Doubters and Preach to the Converted*

It may sound contrarian, but it is good to remember the importance of continually inspiring supporters and encouraging the doubtful. This is just as important as listening to and learning from critics, as well as convincingly answering their criticisms. The remainder of this chapter suggests seven additional principles useful in supporting the integration of sustainability into TVET. Principles 2, 3 and 4 emerge from an unslavish appreciation of history and a healthy respect for a usable past. Principles 5 to 8 are derived from a recognition of the enduring centrality of culturally specific local knowledge, traditional practice and spiritual values in the modern global economy.

## History

### *Principle 2: Seek Heroes and Role Models*

Find heroes of sustainability – past or present – in your own culture and use them as exemplars. To do so, you may need to reclaim or even reinterpret your nation's historical narrative. The study of heroes is largely out of fashion in the academic world, but heroes are useful nonetheless.

*Example 1:* George Washington Carver, the African–American ex-slave who became a renowned botanist and educator in the early twentieth century, is a hero to many. Known for his adaptation of the peanut to numerous uses, most people have forgotten the historical context and motivation for his peanut researches. Carver was intent on helping African–Americans develop a sustainable and economically independent agricultural system in the American South. He hoped peanuts, sweet potatoes and soybeans would be the source of their liberation.

Carver developed an agricultural extension programme for the state of Alabama and funded two horse-drawn wagons, 'moveable schools', that travelled along the state's back roads illustrating the benefits of crop rotation and other sustainable techniques. African–Americans, held in debt peonage in the post-reconstruction South, could reduce their dependence on soil- and soul-depleting tobacco or cotton monocultures and increase their self-reliance by growing and using peanuts for multiple purposes. Thus, they could extract themselves as much as possible from market relationships that were stacked against them (McMurry, 1982). By growing peanuts they could simultaneously replenish the soil with nutrients, encourage local entrepreneurialism and develop community relationships and political leverage. Carver's legacy is built on many pillars, not the least of which is his early advocacy of sustainable agriculture as a method of addressing social inequality.

*Example 2:* Far different but instructive nonetheless is the career of one of the most celebrated and yet ignored intellects of the twentieth century: R. Buckminster Fuller. Born into a prominent but poor New England family, Fuller failed at Harvard University and took a series of routine jobs. Employment that separated him from his wife, the tragic death of a young child and a failed business venture with his father-in-law drove Fuller to consider suicide at age 32. Walking along Chicago's Lake Michigan shoreline one night in 1927, Fuller experienced what can only be described as an epiphany: a realization, as he recalled it later, that he did not have the right to 'eliminate' himself because he 'belong[ed] to the Universe' (Sieden, 1989, p. 88; see also Pawley, 1990, for a broad assessment of Fuller's career). Fuller retreated into a two-year self-imposed silent exile. As he read and meditated, he developed several fundamental principles:

- Rely on your own experience, not what others tell you;
- Reform the environments in which people live and work; do not try to reform human nature directly;
- Have faith in technology and industrial practices;

- Humans are mobile and American society seems to especially value mobility ('trees have roots; humans have legs');
- Find the fundamental building blocks of nature for they will provide the most efficient ways of doing things. This he boiled down to 'ephemeralization' or 'doing more with less';
- Look to the big picture: plan details based on a wide and comprehensive view of the issue or situation. He called this way of working 'comprehensive anticipatory design science'.

These axioms provided the philosophical underpinnings for the rest of his career. His decidedly uneven record of success over the next 50 years can be attributed in some measure to the flaws in this philosophical perspective. His consummate faith in technology and his antipathy toward political and social organizations led him to ignore the processes by which his innovations could be widely adopted. His emphasis on efficiency failed to appreciate the sheer growth of resource utilization. His attempts to create universal solutions blinded him to human motivations rooted in the global diversity of cultural and social traditions. Fuller anticipated many of the issues now widely recognized as fundamental ecological concerns and the questions he addressed are questions we still ask today, even if we often suggest different responses.

In 1927, Fuller decided to address an issue, housing, that was in particularly short supply at that time throughout the USA. His goal was to create a housing system that solved many of life's problems. The house could be mass produced so that it was affordable, like a car. It was made of light, modern materials so that it could be prefabricated in a factory and then moved to a site. It included all the utility systems in a central mast and was as self-sufficient as it could be, so that the owner would not have to rely on public utilities. It included all kinds of gadgets so women could do household chores easily and men did not have to spend time repairing and painting. The house included a 'go-ahead-with-life' room filled with electrical gadgets that would allow people to entertain, communicate and educate themselves.

Fuller's 'Dymaxion' house caused a stir among architects and his Dymaxion Car, a 3-wheeled, teardrop-shaped car powered by a Ford V-8 captured the popular imagination. Neither was ever commercialized, in large part because Fuller was more interested in generating ideas than profits.

In the late 1940s he produced the one designed artifact that brought him both fame and wealth: a geodesic dome. This is the only structure that gets stronger as it gets larger and encloses more space using less material than any other structure. Fuller's first commercial installation of a geodesic dome was covering the interior courtyard of the Ford Motor Company's Rotunda Building in Dearborn, Michigan, in 1953. Ironically enough, given Fuller's anti-militaristic philosophy, the American military became the largest single purchaser of geodesic domes as they found the structure perfect for housing troops and equipment in harsh environments all over the world. The radar installations installed across the Arctic Circle known as the distance early warning system, for instance, were housed in domes.

In the 1960s many young Americans who felt at odds with or even opposed to the establishment appropriated the geodesic dome as a house style and icon. The dome became the symbol of the communal lifestyle advocated by hippies. And in 1968 *The Whole Earth Catalog*, a kind of counter-culture buyers' guide to environmentally responsible and alternative lifestyle goods, was launched with an acknowledgement to Buckminster Fuller's inspiration.

Fuller, then in his late sixties, went from college campus to college campus building domes and, in the midst of eight-hour lectures coining phrases like, 'Think global, act local', 'Do more with less', 'We are all astronauts on Spaceship Earth' (Fuller, 1969). He emphasized the efficient use of world resources, the power of human intelligence unrestrained by tradition, the necessity to work with nature and not against it and a motivation that comes from humanism rather than corporate or personal profit. Environmentalists of the 1960s focused on preventing air and water pollution and often looked upon technology, especially atomic energy and the internal combustion engine, as dangers to society. On the contrary, Fuller encouraged the use of more technology. He simply believed that we needed to make our technologies radically more efficient. To Fuller, 'more with less' meant a revolutionary definition of efficiency based on his design analysis, not anti-materialism or Luddism.

Another popular strand of environmental concern focused on the overpopulation of the earth and the massive natural resource depletion that population growth entails. Fuller denied that there was a problem with overpopulation or resource depletion, claiming that there were plenty of resources to last for eons if only we used them efficiently. Fuller rejected the belief that 'small is beautiful', the advocacy of 'appropriate technology' and fears of 'the population bomb'. He was an enthusiastic advocate of radical technical efficiency, the 'poet of technology'.

Most of his followers have repudiated this position and acknowledged the exhaustible nature of the world's resources (Papanek, 1995, p. 165). However, Fuller stands as a hero of the environmentalist movement and his own work presents a counterpoint to the resource-intensive activities that dominate the historical experience of mass production and mass consumption. Much of the philosophical basis of the USA Green Building Association can be linked to Fuller's ideas. Fuller's long-term impact has been the inspiration for an entire generation of 'green' architects now working in the USA (Zelov, 1997; Zung, 2001) and his 'comprehensive anticipatory design science' is being reinvigorated by none other than William McDonough, one of the most prominent proponents of green design and sustainable manufacturing in the USA (McDonough, n.d.).

## *Principle 3: Assess Technological Systems as Socially Designed, Not Technologically Determined*

For many people the world over, technology just *is*. Either out of tradition or scientific rationalism, many people experience contemporary technological systems as

the one and only way a particular need or want can be satisfied. For decades scholars contributed to this perspective by naively focusing attention on successful inventors and technologies. Largely ignoring competing or alternative technological solutions, scholars promoted the notion that successful technologies succeeded fundamentally because they were clearly technically superior. This particular form of technological determinism thwarts any investigation of the social values designed into technologies. Efficacy and efficiency, in both technical and economic terms, are privileged over all other values. Sustainability, social equity, or worker empowerment are, for instance, thought to be irrelevant.

Recently, however, scholars have been exploring the impact of the social values that inventors, promoters and consumers bring to new technological ventures. The result is that we now can view technologies, at least at certain points in their development and introduction, as more malleable than they were previously thought to be. TVET programmes can thus justifiably introduce discussion of social values into their curriculum, since the process of technological change is suffused with issues of value, and the designers or redesigners of technological systems can legitimately reconsider the definitions of efficacy and efficiency.

For the past generation, historians of technology have been exploring the nature of technological development and innovation from the perspective of technology as a social phenomenon. This study often focuses on the systems in which technologies are developed and become embedded, including the political, social, and economic contexts. Recent research suggests that internal technical functional issues often heavily influence the invention and development process, while social context comes to play an ever larger role as technologies are introduced into the marketplace (Bijker and Law, 1992; Bijker et al. 1987). Thus, technical systems designed without regard to sustainability might be refined to meet new criteria.

Integrating this perspective into TVET will alert students to the issues beyond technical competency that will influence their career paths but will also open up the issue of sustainability as an appropriate topic for discussion, debate and discipline. (McDonough and Braungart, 2002). If we can discipline a generation of technicians to routinely ask questions regarding sustainability of technical systems, we shall have gone far toward integrating sustainability into TVET. Design and engineering programmes, as well as TVET programmes, should incorporate sustainability into their individual courses and form the basis of an introductory course on the ethical and social issues facing their professions. This is simply to conform to the nature of the professions, by considering their social roles as well as their technical competence.

## *Principle 4: Embrace Multiple Paths*

Avoid a key mistake of many previous progressive movements, sectarianism. As we promote social diversity and bio-diversity, let us encourage intellectual and

ideological dialogue. How can we claim that values must guide our work towards sustainability and then refuse to debate the efficacy of those values with those who disagree?

The past is a prologue, not a premonition. Automotive pioneer Henry Ford once famously said, 'History is more or less bunk. It's tradition. We don't want tradition'. It has been all but forgotten that Ford was obsessed with eliminating waste in his manufacturing operations. He practiced recycling on a massive scale, developed innovative energy co-generation systems and employed a number of 'reduce, re-use' programmes at the massive Ford Rouge Plant near Detroit. Ford also created one of the great museum collections of American technology, a paean to the era of iron and fossil fuels, saying, 'the further I can see behind, the further I can see ahead' (Watts, 2005).

In *Collapse: How Societies Choose to Fail or Survive*, Jared Diamond surveys the processes by which previous societies, such as the Anasazi of the American Southwest and Mayan civilizations and those on Easter and Pitcairn Islands or Norse Greenland, have ceased to exist. Diamond even identifies eight ecological circumstances that have contributed to undermining these societies: deforestation and habitat destruction, soil problems, water problems, over hunting, over fishing, invasive species, human population growth and increased per capital human impact on the resources. In the contemporary era, he adds these four: human-induced climate change, toxic chemical buildups, energy shortages and exhaustion of the earth's photosynthetic capacity. In addition to these ecological factors, societies on the brink of destruction have routinely faced one or more additional issues: unanticipated environmental damage, climate change, hostile neighbours and the retreat of friendly neighbours.

Finally, the one ubiquitous factor that differentiated successful from unsuccessful societies was the societal responses to crisis (Diamond, 2005, pp. 6–14). Diamond examines societies that faced similar issues and responded differently, thus producing different results, the difference being, literally, between survival and destruction. No two societies responded precisely alike and yet the results were often similar. Says Diamond:

> A society's responses depend on its political, economic and social institutions and on its cultural values. Those institutions and values affect whether the society solves (or even tries to solve) its problems. (Diamond, 2005, pp. 14–15)

Thus, we are brought back to key issue, the issue of values, values that differ from society to society and still provide the basis for sustainable development. What overarching values and priorities are evident in local TVET programmes? What are absent now, but could be incorporated locally in the future?

It has become commonplace to recount the events, decisions and developments that have brought us to the current watershed. History, we often hear, provides us with the lessons of unbridled growth and wasted resources that we cannot repeat. However, by carefully exploring our national histories we also can find traditions, role models and inspiration for a sustainable education that can nourish sustainable development.

## Local Knowledge

### *Principle 5: Respect Local and Tacit Knowledge*

Out of cultural context, 'commonsense' is neither common nor sensible. In context, commonsense can be immensely efficient. Explore indigenous traditions of sustainable consumption/production practices in your culture's past. Local knowledge is a strong motivator (Geertz, 1983).

Our respect for cultural history and local knowledge can pay huge dividends. Americans are quite familiar with stories of the native peoples' respect for nature as sacred Mother Earth and their capacity for living in concert with the environment instead of controlling and dominating it (Cronon, 1983; Steinberg, 2002). In addition, however, in a recent assessment of domestic architecture in the USA between 1790 and 1840 historian Jack Larkin finds several Anglo-European traditions relevant to this discussion. Lacking transportation facilities, early Americans built houses of local materials out of necessity and found local materials entirely up to the task. Without a national taste and uniform fashions, house designs were informed by local climate, geography and ethnic tradition, producing both aesthetic variety and energy efficiency. An economy of scarcity induced an ethic of recycling building materials. If, as Larkin concludes, 'the past anchors us', then even we Americans are anchored in traditions of resourcefulness and respect for nature as well as traditions of extravagance and excess (Larkin, 2006, p. 265). Over 150 years later, similar practices are being reinvigorated today by environmentally aware builders across the nation.

Similar types of local traditions are still in play around the world. They need to be supported and respected rather than stamped out in favour of some external version of 'rationality' and 'efficiency'. The articles in Part II of this volume contain examples of these traditions as well as of emerging innovations.

### *Principle 6: Infuse Programmes with the Social as Well as the Ecological Values of Sustainability*

Create programmes supportive of sustainability, whether of the TVET sort or not, that in themselves exhibit the values of sustainability: participatory, equitable, effective, renewable and innovative.

Establishing TVET programmes that promote sustainable development involves defying or at least challenging common Western assumptions about technological knowledge, technical skill, economic growth and social wellbeing. Relying on the conventional wisdom of 'how the West grew rich' and the understandable desire to maintain social order, ruling groups in developing nations often pursue economic development at all costs and think about social and environmental justice second, if at all. After all, the common renderings of industrial progress in England, Western Europe and the United States in the nineteenth and early twentieth centuries tend

to emphasize the primacy of competitive capitalism, technological progress and individual accomplishment with little regard for equity or ecology. But is this the whole story?

Modernization theory, technological determinism and liberal theories of economic growth have all faced severe criticism in recent decades. Historians have documented extensive conflict over different notions of progress, widespread misgivings about certain developments and radical and not-so-radical alternatives proposed by people at the time. Studying the ebb and flow of global population, anthropologists have begun to question the utility of the 'trickle down' theory of economic development and to theorize about the essential difference between growth and development (Bodley, 2000, pp. 22–23).

## *Principle 7: If the Spirit Moves Others, Allow It to Move You*

Energetically acknowledge spiritual motives for supporting sustainability. The case for sustainability does not have to rest on rational analysis alone. Cultures that attribute spiritual value to the earth abound around the globe. Drawing on those faith- and spirit-based systems of ecological wisdom is one way of respecting local belief systems.

Faith can inspire progressive action. As Columbia University philosopher Irwin Edman pointed out years ago, 'It is a myth, not a mandate, a fable not a logic, and symbol rather than reason by which men are moved.' Indeed, Ray C. Anderson, CEO of Interface, Inc., one of the most progressive American corporate leaders on this issue, refers to the combination of hard profit with ecological responsibility as 'ecometrics', or 'God's currency' (Anderson, 1999). For a clear exposition of this profit-seeking corporation's comprehensive and thorough development of sustainability *as* corporate strategy, see the Interface website (n.d.).

## *Principle 8: Do What Works, Share Knowledge and Employ Locally Acceptable Methods of Participation*

Promote sustainability programmes outside the traditional formal educational system. Make use of interactive media and informal learning opportunities in museums, libraries and community centres. Remember Carver's mobile school wagons. Take your energy and resources to where the people are: don't expect them to come to you.

Looking at a number of assessments from different nations, it is difficult to be optimistic about empowering indigenous people through the applications of a national curricula disseminated in formal educational settings, especially if those curricula are developed outside the cultural context in which they are to operate. In addition to, or perhaps in lieu of top-down prescribed school programmes, people around the world seem to find programmes acceptable and useful when they rely on:

- Wide community participation from groups with differing agendas;
- The local language;
- A validation of local practices regarding production, habitat, husbandry, medicine and social relations;
- A respectful balance between strengthening local traditions and norms and new attitudes that prepare young people for, even promote, change. (Ezeomah, 1997)

Often these attributes are associated more with informal learning environments than formal educational institutions. Thus, locally supported camps, community centres, museums, science centres, libraries and parks – places of so-called 'free-choice learning' – may provide an effective alternative to formal schools. In some societies schooling is thought to be a threat to established sources of religious or civic authority. In other contexts, schools are distrusted by common people who fear indoctrination into an elite, authoritarian culture or the loss of their local, indigenous ways of life. All sides have many historical precedents to call upon in defense of their position. Thus, localized free-choice opportunities have immense potential for good everywhere.

One of the more promising emerging innovations is the development of the knowledge systems of sustainable development, a collaboration between Harvard and Stanford universities in the USA, Chiang Mai University in Thailand and the UN Economic Commission for Latin America and the Caribbean. The group focuses on understanding effective knowledge systems for sustainability, discovering what supports them and what will make the development and dissemination of knowledge most effective in different contexts. The key, however, is that the group recognizes the intimate relationship between formal research and development and 'other forms of traditional, tacit, or experiential information'. They recognize that different systems serve different groups and their goal is to help local practitioners develop or adopt the best systems for generating and putting to use knowledge in support of sustainability (Knowledge Systems for Sustainable Development, 2007).

Another element of this effort is the evolution of scientific and economic research aimed specifically at sustainable development. One example from the emerging field of 'sustainability science' will suffice to suggest the close relationship between interdisciplinary research and local knowledge. Together, an agronomist, economist and ecologist were seeking to mitigate the impact of intensive agriculture in the Yaqui Valley of Mexico. They realized that farmers used excessive amounts of nitrogen-based fertilizer that was contributing to greenhouse gasses as well as affecting the viability of the Sea of Cortez. The group demonstrated to the farmers that less fertilizer applied later in the growing season would produce higher yields at lower expense with less environmental impact. Unfortunately, they failed to recognize that local credit unions acting as trade associations actually subsidized the use of fertilizer and discouraged innovation as a potential threat to their profits. Traditional practice trumped science and economics. The introduction of new, sustainable practices required the active participation of all local actors, not just the farmers. The programme proceeded once the credit unions were convinced that the new system did not reduce their productivity (Platoni, 2007).

## Conclusion

The ecological challenges facing us are becoming ever more clearly understood by leaders and followers the world over. The scientific and technical challenges are receiving more and more attention in laboratories and workshops. The current generation of TVET students recognizes the challenges they will face during their careers. As the next generation of engineers, designers and technicians, they are anxious to get on with their work in a manner that provides for their children and their children's children. In other words, they want to develop systems that provide wellbeing for the present and future. One of our most critical roles now is to develop an educational vision that values the future as well as the present and leads to a sustainable education, and to promote that vision across borders and generations. Other, more isolated societies have done as much in the past; our global society can do no less in the future.

## References

Anderson, R.C. (1999) The next industrial revolution. http://www.gtalumni.org/ StayInformed/magazine/spr99/anderson.html. Accessed 21 May 2006.

Bijker, W.E. and Law, J. (eds) (1992) *Shaping Technology/Building Society: Studies in Sociotechnical Change*. MIT Press: Cambridge, MA.

Bijker, W. E., Hughes, T.P. and Pinch, T. (eds) (1987) *T*he Social Construction of Technological Systems. MIT Press: Cambridge, MA.

Bodley, J.R. (2000) *Cultural Anthropology: Tribes, States, and the Global System.* Mayfield: Mountain View, CA.

Cronon, W. (1983) *Changes in the Land: Indians, Colonists, and the Ecology of New England*. Hill and Wang: New York.

Diamond, J. (2005) *Collapse: How Societies Choose to Fail or Survive*. Penguin: London.

Ezeomah, C. (1997) *The Education of Nomadic Peoples in East Africa*. http://www.unesco.org/liep. Accessed 15 May 2006.

Fuller, R.B. (1969) *Operating Manual for Spaceship Earth*. Southern Illinois University Press: Carbondale, IL.

Geertz, C. (1983) *Local Knowledge: Further Essays in Interpretive Anthropology*. Basic Books: New York.

Gladwell, M. (2000) *The Tipping Point: How Little Things Can Make a Big Difference*. Little, Brown and Co: Boston, MA.

Interface (n.d.) http://interfacesustainability.com/. Accessed 20 March 2007.

Knowledge Systems for Sustainable Development (2007) Forum: Science and innovation for sustainable development. http:// www.sustsci.aaas.org/content.html? conatentid=713. Accessed 3 May 2006.

Larkin, J. (2000) *Where We Lived: Discovering the Places We Once Called Home*. Taunton Press: Newtown, CT.

McDonough, W. (n.d.) http://www.mcdonough.com. Accessed 1 June, 2006.

McDonough, W. and Braungart, M. (1998) The next industrial revolution. *Atlantic Monthly*, October, 82–92.

McDonough, W. and Braungart, M. (2002) *Cradle to Cradle: Remaking the Way We Make Things.* North Point Press: New York.

McMurry, L.O. (1982) *George Washington Carver: Scientist and Symbol*. Oxford University Press: New York.

Papanek, V. (1995) *The Green Imperative: Natural Design for the Real World*. Thames and Hudson: New York.
Pawley, M. (1990) *Buckminster Fuller.* Taplinger: New York.
Platoni, K. (2007) Field work. *Stanford*, 36(3): 46–51.
Quisumbing, L.R. and de Leo, J. (eds) (2005) *Learning to Do: Values for Learning and Working Together in a Globalized World*. Asia–Pacific Network for International Education and Values Education: Manila.
Shaw, M. (2006) Sustainable development: creating a crisis, shortage and a police state, parts 1 and 2. http://www.newswithviews.com/Shaw/michael.1.htm. Accessed 21 May, 2006.
Sieden, L.S. (1989) *B*uckminster Fuller's Universe: An Appreciation. Plenum Press: New York.
Steinberg, T. (2002) *D*own to Earth: Nature's Role in American History. Oxford University Press: New York.
Swanson, H. (2005) Cowards, communism and education for sustainability. http://www.newswithviews.com/Swanson/holly.htm. Accessed 12 December, 2005.
Taylor, J. (2006) Sustainable development: common sense or nonsense on stilts. http://libertyhaven.com/politicsandcurrentevents/environmentalismorconservation/sustainability. Accessed 14 March 2008.
Watts, S. (2005) *The People's Tycoon: Henry Ford and the American Century*. Alfred Knopf: New York.
Zelov, C. (1997) *Design Outlaws on the Ecological Frontier*. Knossus Publishing: Philadelphia, PA.
Zung, T.T.K. (ed.) (2001) *Buckminster Fuller: Anthology for the New Millennium*. St Martin's Press: New York.

# Chapter 29
# School Enterprises Revisited: Combining Vocational Learning with Production

**Madhu Singh**

## Introduction

The present discussion on school enterprises is a revisit to a previous study which the author conducted in 1998 within a UNESCO–UNEVOC project (Singh, 1998). Two issues inspired the study at that time. One was linking the process of technical and vocational education to real work and market situations and the other was the self-financing of secondary schools and technical and vocational education institutions.

The above issues are of even greater importance today, and in fact have relevance for the whole post-primary education and training sector. Post-primary institutions in developing countries are increasingly expected to generate alternative resources of financing as well as to interlink with skills development and the labour market.

School enterprises are of paramount significance for the sustainability of learning and sustainable development. Central to the notion of education for sustainable development (ESD) is the view that a transition to a socially, economically and ecologically sustainable society is possible only by promoting learning from the perspective of lifelong and life-wide learning, engaging all spaces of learning – formal, non-formal and informal, from early childhood to adult life, and in which everyone is a stakeholder, be it the government, civil society or the private sector, the individual, the employer or the enterprise (UNESCO Implementation Scheme, 2004).

Equally important is the view that education for sustainable development is about respect both for academic learning as well as for practical and experiential learning. Experiential learning first immerses learners in an experience and then encourages reflection about the experience to develop new skills, new attitudes, or new ways of thinking. Recognizing the importance of experiential learning should not be seen as promoting a learning system for the poor or for that matter for the developing countries only nor is it an attempt to denigrate academic knowledge in order to substitute it with 'practical know-how'. It is essentially to admit that there are numerous ways to learn and the many avenues which led to the mastering of skills knowledge

M. Singh
UNESCO Institute for Lifelong Learning, Hamburg, Germany
e-mail: m.singh@unesco.org

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and competencies, which lead to autonomy and self-sufficiency in the exercise of professional activities and social life.

School enterprise is an alternative model for linking the processes of secondary and technical and vocational education to real work and market situations, as well as providing self-sufficiency in financing. School enterprises, which combine market production with systematic vocational learning, bring conventional schools and vocational institutes closer to the realities of life, particularly the world of work and self-employment. The basic feature of school enterprise is the increasing interest and motivation of students in their studies. The quality and sustainability of learning is crucial to the quality of work and income-generation (Kafka and Stephenson, 2006). School enterprises inspire us to question pre-given syllabuses and curricula and replace them with active learning processes that are developed by the learners.

The issues that school enterprises seek to address are particularly relevant to developing countries:

- Current secondary and vocational educational models fail to adequately prepare students for the high probability of self-employment, which is a reality in most developing countries on account of the lack of formal sector jobs.
- Increase in the number of students completing primary education is not accompanied by increase in finance to respond to the growing demand for post-primary education.

Building and increasing additional and relevant capacity in post-primary education for young people in both rural and urban contexts will depend on making known some of the features and successes of the school enterprise model, even if the number of schools committed to this approach is still very small. The rural context is particularly highlighted in the two new examples from Paraguay and Benin (Kafka and Stephenson, 2006).

This chapter seeks to highlight some of the successes of the school enterprise model in interlinking production with learning. By referring to literature[1] on various examples of school enterprises, it examines, first, the issue of school enterprises as part of a larger educational project, influenced by the wider social and economic climate and the bigger policy discourses of multilateral and bilateral agencies. Secondly it spells out the conceptual framework as a useful yardstick for analysing differences on the effectiveness of school enterprises. Thirdly if highlights the various features of school enterprises. The chapter concludes by looking at factors that may enhance the school enterprise environment, and highlights some of the basic principles that need to be borne in mind while setting up school enterprises.

## The Changing Socio-economic Environment and Broader Policy Discourses

The world is experiencing major changes in patterns of production and trade as well as dramatic innovations in technologies. Changes in the nature of work and the technologies of production and in standards for manufacturing and agriculture have

pedagogical and educational implications. With new and complex inputs to factor into a production equation, other operations and new core competencies become necessary. There is evidence that many developing countries are facing the problem of lacking skills that are highly developed elsewhere. The question arises, how and where are we going to get this skills-based education?

Even though the millennium development goal (MDG) 8 Target 16 mentions that employment and decent work are main pathways out of poverty for the poor, developing and implementing strategies for decent and productive youth for work, entrepreneurship education, and more generally skills development have been sidelined rather than integrated into development and educational reforms.

Seen demographically also, many developing countries are presently experiencing a period of growth in a very young population. The World Development Report (World Bank, 2006) emphasizes the importance of not losing the opportunity of human capital formation which is most effective during childhood and youth.

While priority is being given to Education for All at the basic level, which is good, there is little attention focused on the articulation between education, skills development and entry into the labour market. The six Dakar goals have included the goal of 'ensuring that the learning needs of all young people and adults are met through equitable access to appropriate learning and life skills programs' (UNESCO Global Monitoring Report, 2002). Even Article 5 of the World Declaration of the World Conference on Education in 1990 has been more progressive than the MDGs, by including skills training, apprenticeship and formal and informal education programs (UNESCO, 1990). However, coherent implementation strategies have been lacking.

Another important context to highlight is that primary education is advancing at a rapid pace. In sub-Saharan Africa yearly primary enrolments grew by about 40 million between the World Conference on Education in 1990 and 2002 (World Bank, 2006). Given this situation, it is crucial that the gains of primary education are consolidated by continuing education into the secondary stage where the full potential of children can be realized. The World Bank's New Agenda for Secondary Education (World Bank, 2005) argues that ensuring quality universal primary education requires concurrent expansion of secondary education. It also warns against uncontrolled expansion of secondary education, especially of an education that is unrelated to the labour market and the learning needs of the students.

School enterprise could be one way for governments to meet partially the financial costs arising from the massive demand from children seeking entry to secondary education. Furthermore, since secondary schools are not only expensive but often irrelevant, school enterprises that combine production of goods and services with education can be a good model to help pupils to complete the secondary stage. Currently, in most countries in sub-Saharan Africa, the gross enrolment rates in secondary school are below 40 per cent.

The approach of school enterprise provides a possible answer not only to increasing the relevance of learning, but also provides a possible means of finance for the school or the vocational institute. It has the potential of contributing not only to sustainable development but also to sustainability of learning.

## Challenges in Secondary and Vocational Education

With the scarcity of formal jobs and as self-employment is an important means of earning a living in developing countries, the question arises: how can traditional secondary and vocational education institutions better prepare their students with the skills needed to survive in the market and react better to changing market situations?

Overall trends point out that technical and vocational systems are far removed from market realities and that their graduates are out of touch with the working conditions and technical possibilities in small and micro-enterprises. Furthermore, budget allocations to technical and vocational education have often decreased dramatically and, in view of the high costs associated with this form of education, the time has come when developed and developing countries alike have to increasingly consider the possibility of generating alternative resources for financing technical and vocational education with minimum possible financial support from the government.

Not only have technical and vocational systems failed to facilitate an adequate approach to dealing with real-life situations in general, so also has our general educational system. Ivan Illich pointed out that most learning takes place in out-of-school contexts and is a result of unrestricted participation in life situations.

The question of increasing relevancy of secondary education is not new. The World Bank had engaged with the relevance of secondary school education since the 1980s (Psacharopoulos and Loxley, 1985). It pushed for pre-vocational training in many or most general secondary schools. However, findings with respect to the effects of pre-vocational versus general programmes on the subsequent jobs and incomes of graduates had shown that they failed to provide a reasonable financial social return on the extra costs of the vocational components in the curricula. At the same time, the strategy of combining general secondary education with production met with disfavour among bilateral donor agencies on the grounds of the high costs, poor service infrastructure and ineffective linkages with the labour market of such projects.

Nevertheless, the question of secondary education relevancy needs to be revisited, because in countries with limited employment opportunities in the formal sector, it is particularly useful for learners not only to acquire technical skills, knowledge and competencies, but also to understand the role of an entrepreneur in a market situation. This helps in promoting entrepreneurship and self-employment among graduates.

What makes this revisiting even more challenging is the urgency of meeting the learning needs of the beneficiaries from rural backgrounds (Kafka and Stephenson, 2006). Rural secondary school students come from farming backgrounds and they make up almost 70 per cent of the population in their respective countries. The dissemination of agricultural techniques to farmers is not enough (Kafka and Stephenson, 2006). Programmes are needed to impart proper attitudinal and behaviour skills for young people, so that they see agricultural production and services in a positive way as having the potential to provide a decent living (Kafka and Stephenson, 2006). The UN Food and Agricultural Organization (FAO) has

been developing programmes in youth education and training that aim to prepare young people to engage in agriculture. However, training programmes in agriculture are going to have little success if they are not combined with entrepreneurship education, because technical training alone cannot lead to self-sufficiency and sustainability: what is needed along side technical training is an education that imparts new ideas and innovative practice in agriculture (Kafka and Stephenson, 2006).

## The International Discussion on School Enterprises

During the 1980s much attention was given to the combination of education with production at the level of international co-operation in the field of education. In November 1981 the 38th Session of the International Conference on Education adopted Recommendation No. 37 on 'Interaction between education and productive work'.

'Productive work' here does not only mean the production of physical goods, but also services such as tourism, hospitality, hairdressing, accounting or running a cafeteria. Further, the education of the whole worker is implied, not because it is required for production alone, but because it affects them as critical beings with a social and cultural understanding of the world of work. Productive work cannot be reduced only to what people do for a wage or self-employment, but also implies attitudinal and value changes for better and more active citizenship.

It was recommended that UNESCO member states should co-operate at various levels in the development of programmes and practices through the exchange of information and experience, joint experiments and evaluation (UNESCO, 1982). In 1984 the 9th Conference of Commonwealth education ministers was partly devoted to discussing youth unemployment and it was noted that the 'criterion of production units within schools, and the integration of work experience with formal education' were among 'a number of different ways of relating schools more closely to the world of work'. UNESCO's international symposium on innovative methods in technical and vocational education, held in 1989 in Hamburg underlined further the international interest in production-oriented learning and teaching (Wiemann, 1989). One of the major objectives was to define elements of close co-operation between schools and enterprises both at the level of the educational system and at the level of the process of vocational learning.

In 1990 the working group on production schools organized an expert meeting with a specific focus on the theory and practice of production schools (*Arbeitsgemeinschaft 'Productionsschule'*, 1990). The aim was to gain information on the feasibility of such approaches and to develop models of school enterprises and the specific conditions of their existence in less industrialized countries. The central motivation was to analyze reforms in didactic and vocational learning with special reference to school enterprises in industrialized countries and compare them with corresponding attempts in less industrialized countries.

At the secondary school stage, international experience shows that such training is most efficiently provided in institutions under, or strongly influenced by, the ultimate employer and the reality of the market. This does not exclude practical subjects such as teaching applied science, biology, chemistry or physics, or subjects such as electronics, nutrition, fundamental health practices and sanitation at both basic theoretical and immediate practical levels. General education and practical education are important foundations for change, but so is job-specific and enterprise training. In so far as one enhances and complements the other, this is a real foundation for change. Practical education does not suffice to make school-leavers both willing and able to become productively self-employed. Job-specific training is most important for creating self-employment, as well as for meeting the new challenges in the world of work.

Because of the above developments, alternative methods have emerged in conventional institutional formats (secondary schools and technical and vocational training institutes) that attempt to provide economically useful qualifications and facilitate their students' transition into the employment system in which the graduates are able to immediately apply their skills. Within this perspective, there are entities that combine market production with systematic vocational learning that have come to be called 'school enterprises'. The introduction of production is assumed to bring the school closer to the realities of life, particularly the world of work, and goes beyond the prevailing thinking that individual lives are divided into one span of time just for study and another just for work. It is also justified by the need to find new ways of teaching and learning so as to increase pupils' interest and motivation in their studies. An important aspect of school enterprises is the motivation for effective learning by combining learning with production, in that the training underlines the importance of visible future returns. The teaching personnel are compelled to undertake continuing educational courses to adapt to new market conditions and to introduce new curricular conceptions adapted to new technological processes. Last, but not least, through the synthesis of education and production, technical and vocational education institutions are expected to exploit new financing options for meeting training costs.

## Conceptual Framework

A conceptual framework will enable us to map out a wide variety of experiences in different systems and institutions based on certain indicators. The notion of school enterprises is to be seen as part of a broader educational methodology of providing educational experiences which link the teaching–learning process with the world of work, so that students not only gain relevant skills, knowledge and attitudes and values, but also the necessary hands-on experience to apply these competencies in producing goods and services. The conceptual framework for analysing school enterprises includes two fields or contexts (Hoppers and Komba, 1996):

working and learning. Education and training form part of the broader domain of learning, whereas productive enterprise forms part of the world of work. Each domain has its own characteristics and typical sets of activities. The major focus in combining the two domains lies in using productive enterprises as instruments to reinforce and enhance systematic and reflective learning, and for the sake of improving the relevance of education for later employment and self-employment, as well as for the sustainable socio-economic development of local communities and regions.

Although it is common to refer to education in terms of activities aimed at acquiring general knowledge, attitudes and values, and the term, 'training' to the acquisition of occupational or job-related skills, the division needs to be seen as a purely analytical one, as the two are interrelated dimensions within the domain of learning (Castro, 1988; Hoppers and Komba, 1996). Training and technically specialized job-related skills and general skills cannot be isolated from one another, as both are necessary for successful work performance. The notion, 'productive enterprise' goes beyond productive activities in a narrow sense, i.e., which stipulate merely that the volume of the goods and services produced by the students is to be substantial. Where the specific term, 'productive enterprise' is used it is meant to cover work activities such as the production process, organizing, planning, designing and marketing that are aimed at generating goods or services that have an economic, social and pedagogical value.

Productive activities are included in the context of educational enterprises only where there is a shared conviction about their pedagogical value and their economic necessity (Greinert and Wiemann, 1993). Their income-generating aspect is to be seen as enhancing learning potential and as a focus of reflective learning. A school enterprise is one where an educational or training institution related to the world of work. The training institute or school may be a public institution or one run by a non-governmental agency. Some non-formal institutions may be quite highly formalized. The concept 'school enterprise' entails the combination of learning and production at several stages, such as the education and training stage, the production stage and the enterprise stage. If is an approach to learning involving an organized and direct interaction between the development of knowledge, skills and attitudes and values (competencies) on the one hand, and the production enterprise on the other. The subject is involved in both processes. The above view, however, does not imply that the planned introduction of productive work automatically leads to involving trainees in vocational learning and training.

'Self-sufficient schools' is another term used for school enterprises. These schools combine the practice of entrepreneurship and vocational education to increase the relevance of learning, as well as to give the school a sustainable means of finance. This is an approach that is being currently being implemented by the international education NGO, Teach A Man to Fish (Kafka and Stephenson, 2006). This NGO has implemented two school enterprises, one in Paraguay and the other in Benin, and which will be discussed below.

## *Economic, Educational and Social Objectives of School Enterprises*

The school enterprise principle can serve a variety of economic, educational and social objectives. Seen from the economic perspective, many students who come from disadvantaged families and cannot afford to prolong their education find school enterprises a way to shorten the period of transition between school and the labour market. The linkage of education and production, while meeting the existing skill requirements of the rural economy, can also help in diversifying the rural economy. School enterprises provide a good alternative for matching operating costs by means of production for the market.

Seen from an educational point of view, the knowledge and skills acquired can be used to provide the goods and services required in the community. Learning through hands-on experiences could improve the integration of theory and practice as well as in learning the role of different technologies and new methods of production. Apart from promoting the ability to create one's own work, school enterprises aim to develop general personality traits or non-cognitive dispositions and orientations through involvement in real work processes and market production. The notion of combining production with learning in Waldorf schools (Rist and Schneider, 1977), in the alternative projects of *Jugendberufsschule* (Ketter et al., 1986) in Germany, in Don Bosco schools (Oerder, 1991) in developing countries, as well as in the Danish production schools, derives mainly from the importance of practical learning in the development of personality and the teaching of work tasks in order to inculcate values (Castro, 1988, pp. 195–206). The expectations for these so-called 'soft skills' is increasing. Thus, the idea of school enterprises is to ensure of physical, emotional and mental and moral and aesthetic values in the youngsters themselves and in society (UNESCO, 1982). Components such as developing and generating innovative ideas, the in-depth analysis of a particular business field, as well as perseverance in trying to create a new solutions all provide opportunities to enhance the curriculum.

The third rationale for the school enterprise is social. Social and pedagogical considerations are mutually related. Thus, preparing and training for co-operative and participatory forms of production has not only pedagogical value (learning in teamwork) but social value as well. It assist in bridging the gap that presently exists between education, the community and the work situation, thus promoting integration between education and development at the community level. Further, school enterprises are expected to reduce discrimination against manual work and promote social mobility. They are expected to teach students to recognize the economic and social values of the various types of work by teaching them to respect workers and the realities of work and the world of labour in general (UNESCO, 1982).

There are a range of benefits inherent in school enterprises both for the students and for the institutions themselves. These are outlined in Table 29.1.

Awareness of the benefit of these issues allows institutions to put in place formal policies and management structures to minimize the occurrence of problems (Kafka and Stephenson, 2006).

**Table 29.1** Benefits of School Enterprises, and Some Possible Problems

| Benefits | Possible problems |
|---|---|
| **To learners:** | |
| Ensures high quality of learning in order to ensure efficiency of production, quality of work and income generation | Exploitation of student labour |
| Immediate application and tangible benefits increases motivation, interest and ownership | Too much focus on production rather than on learning |
| Increased educational relevance | |
| Soft skills (collaborative and cooperative forms of working) and real-life experience of running a business | |
| Nearness to technical and organizational reality | |
| Ease of transition from school to work by enabling learners to recognize the importance of learning through experience | |
| Inculcating entrepreneurship by experiencing it | |
| Emphasizing specialization and genuine expertise in a given area* | |
| Increasing graduates' confidence that they can run an enterprise in the school setting* | |
| **To institutions:** | |
| Increased autonomy and greater control of their budgets, so that investments in ICT equipment, to supporting student creativity in the arts can be made. This leads to diversity of experience* | Lack of recognition by the mainstream educational system. In addition, because of this the process may not lead to further education and training possibilities. |
| A school that can finance its own operating costs increases its credibility. It can be trusted with further investments | Corruption<br>Who should grade the examinations and provide school-level observations? |
| Relations with the local economy on a learning and social partnership model are central to the functioning of school enterprise | |
| Schools have to keep searching for improvements in educational work, because this is the motor that adds value to their products and services. This it does by reaching out to a greater number of beneficiaries and maintaining a competitive advantage | |
| Theory is not neglected: it is put into practice | |
| Learning by doing, one of UNESCO's four pillars of learning, is the cornerstone of the school/institute's ideology | |
| Can promote a new teaching – learning culture and new mindset among teaching staff | |

**Table 29.1** (continued)

| Benefits | Possible problems |
|---|---|
| **To nation:** | |
| Acquires a certified skilled workforce | |
| Acquires an empowered citizenry/multi-skilled people and entrepreneurial culture | |
| Costs of training people reduced | |
| Costs arising from uncertainty of employment reduced | |
| Use of human capital optimized | |
| Mismatch of skills requirement reduced | |
| Number of students completing post-primary education (secondary, further education and training) | |

Source: * Kafka and Stephenson, 2006

## *A Rough Typology of School Enterprises*

School enterprises can be roughly classified in terms of those that give priority to economic or educational goals and those that attempt to reach a balance between economic and educational considerations.

*Placing priority on economic goals*. The economic and financial situation of many school enterprises may require priority to be given to production goals. The recruitment of instructors from enterprises and the resulting socialization problems concerning patterns of thinking and behaviour can also bring about a situation in which school enterprises are dominated by economic considerations. The pressure exerted by the partner enterprises to achieve specific market goals with the help of the school enterprise may be another factor that creates a situation in which economic considerations may dominate. In China, there has been a tendency to employ professional workers in addition to students in order to meet the quality demands of the market, although students can finish part of the production (Cheng, 1992; Hook, 1997).

*Placing priority on educational goals*. On the other hand, the learning climate in a school enterprise, the prevalence of curricula and examinations and the socialization of teaching staff (recruited from higher education institutions) can bring about a situation in which learning dominates while production is neglected. There are, however, only a few examples, which indicate this trend.

*Balancing economic and educational considerations*. Most school enterprises have evolved diverse approaches to reaching a balance between economic, financial and educational goals. In the Indian Service Production Centre, Vigyan Ashram at

Pabal, Pune (see Verma, 1996) the school enterprise has adopted the notion of a 'semi-commercial enterprise'. According to this notion, training in the management of school enterprises is given priority. In normal circumstances, the school enterprises would gain some profit, which is a good in itself. Yet the pursuit of profit is not taken to be the major purpose of such enterprises, as it would interfere with the fundamental goal of training students. In the Indonesian example, sekolah pendidikan industri kayu atas (PIKA) (Greinert and Wiemann, 1993), the outcome is the separation of training and market production. In this variation, the balance between economic and educational considerations can be reached when the school's production unit produces a quantity that can be sold in the market, whereas the teaching workshop produces the quantity (for market and internal needs of the school) that is required for teaching and practicing. Production for the market is a vehicle for learning complex behavioural patterns, gathering relevant experience and dealing with it in an abstract, reflexive manner.

The challenge of the Botswana Brigades (Chiepe, 1995) is also to find ways to optimize production while providing opportunities. Since some repetitive production processes lose their training value very quickly, some Brigades have hired permanent production workers to handle routine jobs. Trainees participate only in tasks where the training benefit is high. Overall, arriving at an optimal synchronization of different forms of training in view of the variable market situation is probably one of the most difficult problems of school enterprises, especially in view of the variable market situation. Regarding synchronizing economic activities and training programs, some school enterprises accept orders according to purely commercial criteria. Experienced instructors and technicians then sort the incoming orders according to their respective degrees (King, 1985) of training suitability.

## Features of School Enterprises

### *Structures of School Enterprises*

As in Table 29.2 a wide diversity of structures and focus is to be found in school enterprise programmes, depending on whether production for the market takes place predominantly in an enterprise or in a learning workshop, and whether the learning takes place in a school or training institute or in an enterprise with training functions. The two contexts – the learning workshop and the enterprise – should be seen as ideal types with a relatively high degree of functional specialization, but whose nature changes according to the nature and degree of interaction with the other domain. The key conceptual frame is the interaction between learning and production and its location in the curriculum. Most school-based programmes at the secondary school level, combine learning with production in a learning workshop. However, in some schools, experiences with the logistics of production and the continuous dilemma between pedagogic and economic considerations have led to a separation of types of activities. The emphasis here is on the combination of education with production, but production for the market takes place in a separate enterprise attached to the

school or training institute (Greinert and Wiemann, 1993). The enterprise serves not only to produce goods and services for the market, but also as a location for applying skills learned in the workshops.

**Table 29.2** Features of School Enterprises

| |
|---|
| **Diversity of structures** |
| Separate training and market production<br>Integrated training and market production and services |
| **Organization of learning** |
| Formal training methods such as course method, practical training and project method<br>'Apprenticeship' and 'on-the-job experience' approaches (enterprise-based learning approaches) |
| **Core competency** |
| Entrepreneurial skills<br>Self-employment skills<br>Process skills<br>Basic skills |
| **Curriculum** |
| Translating the variety of work into a range of skills dealing with operational functions, inter-relationships, jobs and work organization<br>Introducing systematic teaching aids<br>Reflecting opportunities to diversify into new lines of production<br>Learning about market analysis, product design, cost calculations, tenders, purchase of supplies, accounting, marketing and sales<br>Adapting curriculum to local context |
| **Training stages** |
| Sequencing basic, specialized and apprenticeship, full-time operators, entrepreneurs |
| **Assessment** |
| New criteria for assessment need to be given more emphasis, such as:<br>• Project work<br>• Teamwork and creativity<br>Problem: who should grade the examinations and provide school-level observations? |
| **Teaching staff** |
| Well trained instructors for training<br>Master craftspeople for production, training and economic activities<br>Local craftsmen, social workers, technical experts for support<br>Problems of teaching staff:<br>• Out of date knowledge<br>• Teaching staff engaged in school enterprises in addition to their full-time duties in VET Institutes<br>• Change in mindsets |

**Table 29.2** (continued)

| |
|---|
| **Regulatory framework move** |
| Remuneration |
| Upgrading of training personnel and production workers |
| Choice of financing methods |
| The examination and certification procedures |
| Incentive structures |
| **Selection of students** |
| Equity considerations |
| Market considerations |
| Rural background |
| **External relations: integration with the community** |
| Sharing responsibility for production and services among schools, communities, non-governmental organizations, industry and informal sector micro-enterprises |
| Promoting contact with informal sector small enterprises; even delegating some responsibility for training to them |
| Providing counseling opportunities for continuing technical and vocational education (depending on the level) |
| Social partnership and integrated approach |
| **Main learning outputs of school enterprises** |
| Trainees' competencies and qualifications |
| Trainees achievement in the process of production and services |
| Earnings from the sales of goods and services emerging from the training process. |
| **Principles for assessing different financing modes, emphasizing:** |
| Monetary value to the learning outputs |
| Investment costs such as infrastructure, but also operational costs, such as salaries for training instructors |
| Investment on effective linkages between school and community |
| Training people from disadvantaged communities |
| Mixes of financing from governments, private institutions and donor agencies |
| Self-sufficiency in financing, as against partial financing |

Source: Kafka and Stephenson, 2006

## *Organization of Learning*

School enterprises incorporate elements from several formal and non-formal modes of organizing learning and training for skill development. Formal vocational training is but one way of training. Enterprise-based training, such as on-the-job training, the apprenticeship method and 'attachment learning' (Bowman and Anderson, 1976) are modes of training that complement formal training methods. These refer to an attachment of the learner to the person or agency providing the training. Recent studies have investigated the contribution of these informal processes of learning to skill development and their relevance to future employment (Singh, 1996). It will be useful, therefore, to elaborate the main features of the various modes of organizing learning and training.

## *Formal Training Methods*

According to Greinert and Wiemann (1993) normally school enterprises also incorporate several types of training methods that have evolved for teaching vocational competencies outside genuine work situations. These basic types include the training course method, practical learning and the project method. These forms of training have evolved in situations existing outside the real work process and economically imposed constraints, and constitute an essential form of training conducted in vocational centres, industrial training institutes and off-enterprise training centres. Training according to modular learning units has also been employed in some case studies of school enterprises (Costa Rica) (Lohmar-Kuhnle, 1992). This training is based largely on modular learning units similar to the modules of employable skills (MES). One advantage of the MES training approach is that it allows the choice of individual learning programmes suited to the specific qualification needs, starting level of technical skills and time constraints of each participant. On the other hand, as MES are especially designed for self-training purposes, this may be too individualistic an approach for participants from the informal sector, who need guidance because of their particular learning disadvantages. In the Talleres Públicos (Costa Rica) these shortcomings can be partly offset, in principle, by technically and didactically trained instructors (Lohmar-Kuhnle, 1992). The general tendency is, however, for people with little previous training and education not to start a training course at all for fear of dropping out.

## *Informal Training Methods*

Since school enterprise is a particular form of enterprise, it may be necessary to highlight some of the features of 'enterprise-based training' as a learning model. School enterprises that follow methods that are employed in enterprise-based training include informal apprenticeship and on-the-job training. In traditional apprenticeships the same master craftspeople, journeyman or experienced workers responsible for the production process and economic activities also transmit skills and knowledge to trainees, taking orders, negotiating with customers, passing on parts of their own work to trainees, and planning the work and work sequences, often contributing to the work and helping trainees. The craftspeople monitor the work and evaluate the work outputs.

Informal apprenticeships can also be used to delegate responsibility for some of the training to enterprises, particularly in the informal sector, in order to provide entrepreneurship and specialized training to a greater number of students. This is especially important because of the limited training capacity in school enterprises. The traditional apprenticeship training in the informal sector has been an important way to complement training in the business centres of public training institutes in Ghana and Kenya. Despite the acknowledged limitations of the apprentice masters as trainers, there is clearly merit in expanding the intersection between these two training sectors (Ferej, 1996). Communicating the rudiments of business know-how

in association with apprenticeship training and participant observation, rural or urban, is generally successful in formal vocational and technical training institutions.

In developing countries, such as most countries in Africa, the apprenticeship has often been viewed as an aspect of industry rather than of education. The apprentice in the informal sector is a low-cost laborer ultimately rewarded for years of menial service. The apprentice is indentured and only after trade skills are acquired does the apprentice become free to travel (a 'journeyman'). This model of training served industry well when much of the labour needed was unskilled. However, today industry is moving towards a greater need for higher skills. There is a need, therefore, for school enterprises to adopt an apprenticeship model that does not base itself upon the cheap workforce model of the developing countries' informal sector, but instead is conceived as one in which a variety of process skills develop through active learning. Such on-the-job training is recognized as a part of the educational system when it is deliberate, rather than accidental.

All jobs where productivity, output and innovation are influenced by experience have an educational component.

In the context of school enterprise, the apprenticeship model of learning refers to the acquisition of a vocational skill through work under the supervision of established practitioners or master craftspersons recruited into the school enterprise. Apprenticeships vary substantially in duration, covering both artisan and craft skills as well as both commercial and manual skills. In the case of PIKA (Greinert and Wiemann, 1993), the apprenticeship is driven by a large number of complex moves that must be learned to complete a process. PIKA, for instance, takes on apprentices who are ultimately expected to be able to create an organ single-handedly. Others are motivated by a commitment to learning different aspects of the trade. Building tradespeople like plumbers and electricians seem committed to this kind of on-the-job training programme. In fully fledged apprenticeships the attachment to an enterprise continues with the utilization of increasing manual and commercial skills. Apprenticeship arrangements commonly involve acquiring skills that have wide applicability, hence are portable across agencies and activities.

## *Core Competencies*

*Entrepreneurial skills*: To enter the market requires innovative ideas. Lacking this means that existing businesses – which already have customers, experience with suppliers, knowledge about the product and their environment – will have a competitive edge. Entrepreneurial skills are needed to maximize the returns to more technical training. This is particularly pertinent for rural youth. Simply teaching them farming methods and extension services will not be enough. They probably already know how to do that. In order to add value to that technical knowledge, it is necessary to complement technical methods with programs that develop core competencies and entrepreneurial behaviour and attitudes.

The emphasis in entrepreneurship should be on innovation and the start up of a new venture. At the Berlin Institute for Entrepreneurship of the Free University the

workshop method, called the entrepreneurship laboratory, is used to develop and generate innovative ideas for establishing a business. Students analyse a particular business field in depth, refine ideas and persistently reassess problems. Furthermore, new ideas are introduced into entrepreneurship by seeing that they are in tune with society, environmental and social concerns, rather than being viewed simply in terms of short-term profit-making (Faltin, 2000).

*General components of vocational skills*. There has been much international attention to the contribution of key qualifications, or generalized capabilities in vocational preparation. It has been argued that in a rapidly changing environment, schools should promote the development of generalized capabilities that are built into vocational skills. The greater interest in promoting pupil creativity, problem identification, trying out different solutions, manipulative skills, familiarity with different materials and technologies, insight into the practical applications of scientific concepts and principles have led to a reduction in the distance between vocational and general competencies.

General components of vocational skills have a direct relevance to work. Many of these are actually 'process skills', whereby the product is of lesser importance than the way the trainee goes about doing things. Examples are a scientific approach to occupational trades, the ability to identify problems and explore solutions or to plan and execute one's work, to understand the management structure and work organization of the enterprise, to solve problems by learning to integrate various techniques, social processes, various workplaces, various social relations, various management and administrative functions (job scheduling, job evaluation, insurance and health) and various production and entrepreneurial skills.

*Basic skills at the workplace*. (Carneval et al., 1990) describe the need in the modern workplace for basic competencies such as oral communication skills, adaptability skills, development skills, collaborative skills and leadership skills. Although this term has come to be used in modern industry and its role in supporting education in basic competencies, school enterprises have a similar role to play in promoting basic skills (reading, writing and computation), collaborative skills (interpersonal relations, teamwork and negotiation); communication skills (listening and speaking); development skills (building confidence, motivating, setting goals and planning) and, finally, adaptability skills (resourcefulness and creative thinking).

The competency profile, i.e. the mix of generalized and vocational skills imparted by a school enterprise ultimately depends on the form of learning adopted. Ideally, once the aims of the programme have been clarified, these should be translated into a range of specific skills, knowledge, understanding and attitudes, which the programme can help to develop.

## *Integrating Productive Activities into School Curriculum*

Any discussion on job-related vocationalized competencies and education linked to the market and employment will need to take account of questions relating to the extent to which school enterprises are in a position to adopt a market perspective

without neglecting pedagogical aspects. Nearness to technical and organizational reality and the applicability of skills is an important principle of school enterprises. The work organization can take the form of a craftspeople's workshop, a construction site, a production assembly line, a bakery or a farm. The technical and social organization of work can be disclosed to the trainee via abstract theory and reflection. In many schools, however, school enterprises overstress the technical aspects of production. In doing so, they too frequently neglect the work organization aspect. Such school enterprises put a higher emphasis on the economic goals while neglecting their educational goals.

Integrating production process into the curriculum entails translating the complexity and variety of work reality (industrial work, services and commerce), such as the operational functions, inter-relationships, e.g., the mechanical systems, work organization and jobs into a range of skills in order to make the complex reality more comprehensible for the learner. Learning is supported by introducing systematic teaching aids (such as textbooks and tables, laboratory devices and audiovisual aids), the express purpose being that learning goals are achieved.

A curriculum need not always be in written form. It can be designed on the basis of products around which basic technical skills can be learned. This method has the advantage of saving on programme costs, as the products can be sold or used for the students' own consumption. Furthermore, the products can be more easily adapted to local market demand than written materials and are less amenable to standardization. Instead of introducing industry-oriented theoretical courses built around products manufactured in the modern formal sector, it makes more sense to design courses around the repair of products. Again, the repair of products does not lend itself easily to a standardized curriculum.

A major problem is producing identical items within the restricted geographical space of a local settlement. Therefore, training contents should not be the same for all, but should reflect opportunities for diversifying into new lines of production and products. This may help the graduates from school enterprises to overcome extreme competition while setting up their own enterprises. The restricted financial situation of youngsters means that they may have to creatively adapt to available technology later on. A challenge of curriculum development is, therefore, to develop courses built around improvised techniques.

Apart from learning how to produce goods and services, it is necessary to learn about market analysis, product design, cost calculations, tenders and purchase of supplies, accounting, marketing and sales.

A critical step in the design of the curriculum is to identify, on the basis of a broader conceptualization of employment and business-related skills, the desirable range of skills and knowledge outcomes, then to operationalize these in terms of involving the learners in the learning situations. For example, an awareness of the factual method is better achieved through the vocational course method. On the other hand, the project method is more suited for using information to solve new and unanticipated (not in the text) problems. Apprenticeships are a good way to acquire application skills, i.e., to learn to apply information (Greinert and Wiemann, 1993). Both, development of innovative ideas as well as competencies related to the day-to-day organization of production processes need to be emphasized.

## *Training Stages*

Once the technical and work organizational aspects of the production process are translated into a range of skills, it is possible to scale the skills according to basic, intermediate and advanced skills. The structure and size of school enterprises determines the extent and depth of the skills imparted to the trainees. In some schools, such as PIKA in Indonesia and the Don Bosco Technical Institute in India (Don Bosco Technical Institute, 1997), there are more options to structure the sequence of production activities and allow different approaches to complement one another. As a result, it is possible to have different stages of vocational education ranging from basic, specialized and apprenticeship stages to being full-time operators and entrepreneurs. This contrasts with the business centres in public technical institutes in Ghana and Kenya (Abban and Quarshie, 1996; Ferej, 1996), as well as the example of the Industrial Training Institute in Bangalore (Awashti, 1996), where delegating responsibility to non-formal provisions and informal sector apprenticeships for the more explicit application of vocational specializations makes more sense, as governments have to choose between investing in vocational education for the few and an improved quality of vocational education for the many.

## *Assessment*

There is the problem of how productive work should be assessed, particularly how to capture the more complex learning outcomes such as cognitive and problem-solving skills and practical competencies. In the context of school enterprises, new criteria for assessment, such as project work, teamwork and creativity need to given more emphasis. Many questions remain, however. Who should grade the examinations and provide school-level observations? The answer could include teacher associations, parent committees and representatives of the ministry and the academic community.

## *Teaching Staff*

Without well-trained instructors, school enterprises cannot be successfully implemented. School enterprises incorporate the notion of social education and effective linkages between school and community as well as between production and learning. These extra functions of school enterprises require expensive investments in adequately qualified teachers and instructors as well as in the employment of local craftsmen, social workers and technical experts for support. Furthermore, with regard to equity and social considerations, the training of people from low-income families requires more time and personnel in order to make up for restrictive out-of-school influences.

In the dual system of vocational training in Germany (Greinert and Wiemann, 1993), teaching staff in school enterprises include a wide variety of personnel. Master craftspeople are normally responsible for production as well as training and

economic activities, while instructors are responsible for training. They supervise and help trainees acquire certain skills, knowledge and attitudes. Theory instructors hold theory classes. Experts from industry, such as qualified engineers, are expected to offer expert advice on demand. However, in most of the school enterprises in developing countries, teaching staff are expected to participate in more than one function. They are responsible for not only the production process but also for production for the market, and they are, at the same time, responsible for making a meaningful vocational education possible in theory and practice. However, the effective functioning of school enterprises necessitates a division of labour of teaching staff with different skills and different backgrounds.

There are several problems faced by the teaching staff in school enterprises: teaching staff may find that their productivity is low because of their out-of-date knowledge and experience; they may not be able to perform at a high enough standard and the training of technical and vocational teachers may not have included a true exposure to the world of job and enterprise-related competencies. There may be a low motivation to work in school enterprises because of the lack of career mobility resulting from their lack of industrial experience. The trainers may be engaged in school enterprises in addition to their full-time duties in technical training institutes. This leaves them very little time to devote to the preparation of course material. They have usually had their training a long time ago and usually have no pedagogical experience themselves except for from demonstration and imitation. Overall, licensed teachers with an official mentality may be inherently less suitable instructors than are master craftspeople, technicians and engineers. The latter instructors can play an important role in imparting existing skills needed by local enterprises as well as in transmitting new emerging skills and, therefore, creating new markets.

The institutional level, the role and responsibilities of the head teachers and the staff are crucial. Those who get involved in school enterprise programmes find themselves turning into part-time farmers, wood or metalworkers, builders, supervisors of working parties, office managers, procurement officers and financial administrators. Very often they have received no prior training for these roles or their original training proves to be insufficient. School enterprises may also involve extra duties during out-of-school hours with regard to preparation, repair or maintenance, extracurricular activities, industrial visits or community service. This is without counting the large amounts of time and energy being spent on professional development activities away from school.

## *Regulatory Framework of School Enterprises*

School enterprises must have a certain freedom to move on the market. This autonomy should also extend to the training concept, the selection of students, the use of earnings, the remuneration and upgrading of training personnel and production workers, choice of financing methods, the examination and certification procedures and various other regulation and incentive structures. Public educational institutions

may lack an effective relationship between the school and the market. This may hamper the effective functioning of school enterprises. By contrast, integration with the market may be easier and more real in the case of programmes conducted by non-state organizations and local community bodies.

## *Selection of Students*

According to Grierson and McKenzie (1996), selection criteria need to be consistent with the development objectives of the vocational institute. If self-employment is the focus of a school enterprise, then trainees who have an aptitude for self-employment should be selected. This has been demonstrated in the case of the Don Bosco Self-Employment Research Institute, Calcutta (Lohmar-Kuhnle, 1992), which selects students based on their social and economic disadvantage as well as their entrepreneurial skills. Equity considerations play an especially important role among school enterprises that are run by church organizations, rather than private industry. The good opportunities for graduates of the Don Bosco technical institutes to find jobs in the modern sector induces middle-class families to obtain a training place for their children, even in schools set up for poor children. Nevertheless, many of the Don Bosco institutes recruit children exclusively from very poor families.

## *External Relations*

While school enterprises provide skills for traditional and new jobs, there needs to be close co-operation with enterprises to enhance the quality and efficiency of product development, production and maintenance. Large enterprises can provide technology and expertise to trainees in school enterprises in both traditional and newly emerging skills. Even small enterprises in rural and urban informal sectors can produce experts to provide the training needed for existing jobs and production practices.

An indispensable prerequisite for enterprises to play a major role in vocational education is the attitude of the entrepreneurs and trade unions in supporting school enterprises (for example, in Germany). Another important function of school enterprises could be promoting vocational training for existing micro-enterprises in the informal sector. These take into account the principle of satisfying basic needs through the development of appropriate technology, regional and community development, self-help, self-employment and self-management. The interlinking of education and production is flexible and varies according to the basic needs approach taken, as in the vocational training centres, Papua New Guinea and the public workshops of the Instituto Nacional de Aprendizaje (INA) Costa Rica (Haan, 1989; Lohmar-Kuhnle, 1992). Support usually includes retraining, marketing advice, intervention with suppliers and officials, fact-finding and liaison with the local market.

## *Impact of School Enterprises*

With regard to the external impact of school enterprises the relevant questions are: does the incorporation of market production in schools make a difference to

employment, self-employment, economic development, the socio-economic survival of young people and the life chances of girls? With regard to its internal impact, does it develop relevant skills? Does it improve learning achievement and work performance? Even though the economic contribution of school enterprises may remain modest, especially in the initial stages of their introduction, at the level of subsistence, the sustained involvement of pupils in commercial production can be crucial to improving their working and living conditions. This involvement helps to prepare students for cost-saving, less hard and more effective subsistence work for improving their home and working conditions through their own efforts. With respect to individual working careers, personal development and the development of middle-level specialists, school enterprises give good basic training or full qualifications. School enterprises develop the necessary competencies, i.e. skills, values, knowledge and attitudes among students for meeting the challenges of the world of work and, especially in enhancing their capabilities of being self-supporting (through self-employment or self-management).

For school enterprises to be effective there should be clarity with regard to what role market production in the educational context should play within vocational and technical institutions and what they are supposed to achieve. Are they supposed to achieve self-employment and enterprise development or industrial employment? Brigades in Botswana originally focused on self-employment generation vis-à-vis employment in the formal sector, rural development vis-à-vis industrialization and training in rural areas versus training in urban areas. Vocational training centres in Papua New Guinea have introduced market production so that youngsters are in a position to earn a living upon returning to their villages Preston (1993). The broad impact of school enterprises has to do with the fact that their intended objectives go beyond the conventional orientation of classical vocational training. The objectives are more comprehensive, i.e., school enterprises offer training not only in the classical trades, but also in activities that satisfy basic needs to secure people's survival. They extend beyond training and production to the marketing of consultancy services, product development, technology transfer and information services.

## *Mixes of Private and Public Roles*

Literature on school enterprise shows that there are a variety of initiatives with both public and private roles and responsibilities.

The sponsors in school enterprises are mostly governments, private institutions and donor agencies. Private sponsors include churches and non-governmental agencies. Their existence is often separate from the management of the school.

The importance of an environment that will encourage and accept widely dispersed initiatives in such endeavours has long been stressed. School enterprise is increasingly coming to be incorporated in government educational policy. The manner in which this is being done is unique in India, where the government has delegated apex institutions to provide adequate guidelines on the planning and implementation of school enterprises. In China also, the open door policy and the creation

of special economic zones in certain areas of China have provided the momentum for vocationalizing to change the ratio of general secondary school students to vocational school students. School enterprises have become an accepted part of the school with considerable support and guidance by state laws, local ordinances and policies (Cheng, 1992, pp. 47–52). The practice, now common in industrialized countries, is for ministries of education to set a curriculum framework with attainment targets that specify types of skills and knowledge, and for appropriate curriculum organizations to develop model work plans for institutions to use as references. This state-controlled market model may be useful for less industrialized countries as well.

External donor agencies participate in school enterprise programmes in a significant way, being directly involved in key elements of the programmes, including the very design of the learning content, its substance, structure and methodology. The case studies of the Don Bosco Technical Institute (India) and PIKA (Indonesia) illustrate that a greater involvement of donor agencies generally assures the successful launching of a new approach. However, the danger clearly lies in a poor spread of these innovative approaches.

More recently international NGOs such as the Teach a Fish to Fish (Kafka and Stephenson, 2006) promote school enterprise. They emphasize financial sustainability and economic self-sufficiency without ignoring core competencies and educational aspects.

## Curriculum in Agricultural Entrepreneurship

It is not enough to concentrate school enterprises in the urban areas only. More important is to introduce them in the agricultural context. This offers direct benefits to rural youth in setting up innovative enterprise and valuing agricultural life, rather than forcing them to migrate to urban areas, where they would otherwise be obligated to take up some petty or survival job. Below are two examples of self-sufficient schools implemented in two rural secondary schools of Paraguay and Benin (Kafka and Stephenson, 2006), which focus on a agricultural entrepreneurship. These are highlighted because they represent relatively new examples in the field.

**Box 29.1 The Fundación Paraguaya Model**

The full course is divided into three years and caters to a co-ed body of 115 students aged 15–18. Business plans for each activity emphasize the profitable use of student time – both from an educational and financial perspective. Students in the lowest year receive as wide an exposure as possible to different activities, focusing on theory and practical skills. Those in the final year are able to specialize and build on their entrepreneurial skills by taking over responsibility for the profitability and productivity of their chosen business areas.

**Box 29.1 (continued)**

As an accredited high school, alongside the agricultural and entrepreneurship education programme students study traditional academic subjects (math, languages, science, etc.). Purely academic teaching staff are distinct from agricultural and enterprise trainers, the latter taking direct responsibility for the profitability of their activities in addition to the educational achievements of their students. Curricular reform is however underway and is designed to increase the linkages between academic subjects and their application to income generating activities (while nonetheless adhering fully to the national curriculum).

The course ensures that on graduation students not only have the skills required to start out in business themselves, but also are extremely sought after as employees on ranches and commercial farms. Because successful graduates also receive a nationally recognized qualification they retain the option of continuing in higher education – indeed many choose to do so, and several have even won highly competitive scholarships to attend a well-known international agricultural research centres.

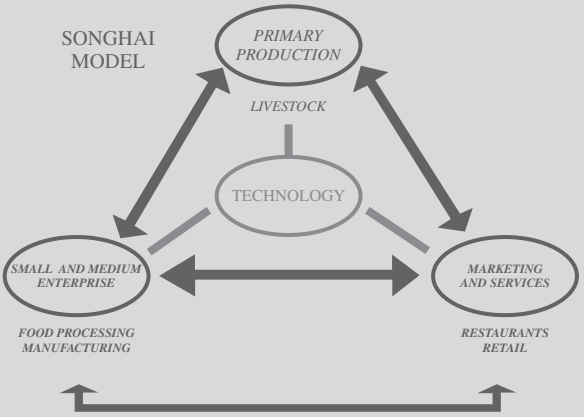
Practical training covers a wide range of agricultural activities (animal husbandry, horticulture, aquaculture etc.), while value-added areas (e.g. specialist cheeses) offer students a chance to build commercially valuable skills. Development of such higher profit-margin products is key to maintaining the competitiveness required for self-sufficiency. Course graduates embarking in business continue to benefit through the availability of microfinance start-up loans.

Now just over half way through its five-year plan for attaining full financial self-sufficiency – and despite having only 60 hectares of land to work with – the school is already covering almost two thirds of its recurring costs from production and sale of goods and services.

Source: Kafka and Stephenson, 2006

**Box 29.2 Songhai Model, Benin**

The Songhai Centre operations can be divided into three key areas: agricultural and entrepreneurial training, production units and research and development into sustainable agricultural practices.



**Box 29.2 (continued)**

These divisions overlap in numerous ways with trainees taking active roles in production units as part of their education and the results of R&D activities feed back into improved production as well as into more advanced educational materials.

Entrance to Songhai's core 18-month course (basic training) requires a certificate of primary school completion. The Centre accepts both male and female students in the 18–35 age range. Comprehensive agro-technical and business education is provided with practical work occupying around 90 per cent of participant, time.

The requirement to provide a rounded education means that student labour alone is not sufficient to support the necessary level of production required for financial self-sufficiency. To this end, a large staff of permanent and temporary employees is maintained to augment the institution's capacity.

A secondary 'application' phase lasts between one and two years. In this phase students, working normally in teams, draw up and implement their own business plans. Work takes place within the Centres dedicated extension spaces and start-up credit is provided subject to the quality of plan presented. Success in this phase results in the award of a certificate of achievement, moreover after repaying their start-up loan, all profits from their work accrue to the students.

The inter-relation of the components of Songhai's work, and their contribution towards its financial self-sufficiency are expressed in the diagram inset.

In addition to its direct teaching work, Songhai maintains a graduate network which it uses in its community outreach work. Alumni groups bring the members benefit such as being able to sell surplus produce through Songhai when needed.

Source: Kafka and Stephenson, 2006

## Options for Financial Sustainability

Closely related to the question of who should bear the cost of school enterprises is the question of the mode of financing school enterprises, as they are not merely commercial institutions oriented to the goals of market production, but are primarily oriented to the goals of training and education as well as to social goals. Theoretically, there are at least three choices in financing school enterprises.

One option is combining public and private sources as well as profit-making and non-profit-making means. This could mean a combination of direct financing from government budgets, the partial self-financing of school enterprises with assistance from donor agencies and complementing training in school enterprises with apprenticeship training in the modern sector as well as in the informal sector, carried out mainly by private enterprises at their own expense in accordance with their labour demands.

The second option is cost recovery methods, such as fees for laboratories, marketing of enterprise copyrighted inventions, contracts, consultancies, and sales of products and services. Another form of cost recovery is charging fees to the enterprises benefiting from the supply of skilled labour, and partial cost recovery through fee charged to the trainees.

The third option is increasing institutional efficiency. This includes economic efficiency in the use of available educational resources so that the institution is in a position to finance its operation at cost from its income. This includes close attention to student–teacher ratios, less expensive contractual arrangements and divergence in salaries to reflect market demand for students. This option is discussed in detail as school enterprises may be said to be oriented towards internal efficiency because they pursue both educational and economic goals.

A major raison d'être for establishing school enterprises is the belief in internal economic efficiency in the use of educational resources, particularly in field of public sector education where the gap is widening between the increasing demand for education and training on the one hand, and the limited amount of resources to meet such demand on the other. According to Greinert and Wiemann, using analyses on educational efficiency from the USA, most methods for measuring educational efficiency attempt to measure the performance of training and compare it with the necessary inputs in order to obtain information on the optimal utilization of financial inputs by decision makers. According to these methods it becomes necessary not only to quantify the cost of training, but also to attach a monetary value to the learning outputs. The range of learning outputs subject to evaluation is enormous. Nevertheless, the main learning outputs of school enterprises may be characterized as follows:

- The learning outcome, i.e., the trainees' competencies and qualifications as skilled workers;
- The trainees' productive achievements, e.g., an apprentice's competency utilization in the production process, with a valuation according to the equivalent skilled-worker wage;
- Earnings from the sale of goods and services emerging from the training process as well as other proceeds: e.g., rent, tuition, income from the cafeteria.

The learning input (academic achievement) comprises two broad categories: those over which educational authorities have no control (the previous educational and job experience levels of students and their socio-economic background, gender, ethnicity, home environment, learning ability and interest) and those over which educational authorities have considerable control. Within the latter group, further differentiation can be made between financial inputs within the scope of school enterprise – teachers, buildings, teaching and educational efficiency is assessed in several different ways: cost-benefit analysis, cost-effectiveness analysis and input–output analysis (Greinert and Wiemann, 1993, p. 39).

## *Principles for Assessing the Suitability of the Different Modes of Financing*

It is mostly in well-established school enterprises existing outside state control that the training costs are fully covered by the income of the school enterprise, both

from the training and the production divisions (PIKA, Indonesia and Don Bosco, India). However, when assessing the suitability of the different modes of external financing, the educational and equity considerations should be taken into account (Greinert and Wiemann, 1993). The emphasis on investment costs for physical infrastructure, equipment and teaching material and the neglect of operating costs, such as salaries, training instructors and social multipliers, is detrimental to the successful implementation of the learning objectives of school enterprises. Without well-trained instructors, school enterprises cannot be successfully implemented. School enterprises incorporate the notion of social education and effective linkages between school and community as well as between production and learning. These extra functions of school enterprises require expensive investments in adequately qualified teachers and instructors as well as in the employment of local craftsmen, social workers and technical experts for support. Furthermore, with regard to equity and social considerations, the training of people from low-income families requires more time and personnel in order to make up for restrictive out-of-school influences.

Another important principle of assessing the suitability of financing school enterprise is the emphasis on self-sufficiency (see Kafka and Stephenson, 2006). This is in contrast to the partial approach in which schools have found ways to generate additional income to support their activities – from producing items for sale and running small shops, to hiring out their facilities and expertise. In contrast to these partial approaches, self-sufficient schools focus on schools that 'covers the costs of providing and education to its students from internally generated revenue rather than relying on external financing or user fees' (Kafka and Stephenson, 2006) and these can be either fully stand-alone businesses or integrate training with production activities.

Because of the urgent need to finance post-primary education and training, self-financing and cost-recovery methods of financing may have to be seen as not only supplementary options, but rather as alternative sources to public finance. School enterprises nevertheless remain primarily institutions for training human resources, and places where education is a public and not a private good.

## Challenges and Factors that May Enhance School Enterprises Environment

Several factors may enhance the environment for school enterprises:

- Government could improve training's responsiveness to market forces by building a capacity for labour market analysis, monitoring training costs and outcomes, and gathering information from employers.
- School enterprises must be quick to adapt to the demands of new technologies and processes, all of which translate into an adjustment in the training content.
- It is important to ensure that trainees do not become low-wage workers or bound servants to the cause of production.

- The incentives that encourage the achieving of outcomes include reduced taxes for school enterprises, investment incentives, subsidized wages and preferred prices as well as industrial parks where the enterprises in them are exempt from taxes for a certain period. Industrial parks can be designed to enable students to be strongly established before they have to face the rigorous competition of the world of work. In focusing on productivity and competitiveness, school enterprises should not lose sight of the need to bring the poor into these schools.
- Access to a school enterprise should be open to everybody, including the poor. Post-training support structures should be put in place in order to help the poor to start their own businesses. Poor people's knowledge and ideas must be taken into account when improving their productivity and earnings. This is crucial if the idea of a school enterprise is to get people out of poverty. Students may be encouraged to undertake skills training because of a stipend, or poorer adult workers may be exempted from paying fees. The location of school enterprises in poor areas can be a major source of skills acquisition and skills upgrading for the economically disadvantaged, especially those working and surviving in the informal sector. The business risks arising during the starting phase should be taken over by partners.
- School enterprises need to promote an ecological way of production (no expensive outlets, no wastage of packaging materials and no overheads or corporate boardrooms).
- Running a school enterprise will require a dramatic change in the mindset of teachers and the management. Teachers have to take financial responsibility for the their students' learning and get used to operating in an uncertain financial climate. Senior administrators need the skills to be able to balance strategic commercial decision-making with the educational needs of their students. Teachers need to be business specialists as well as educators (Kafka and Stephenson, 2006).
- Robust systems for financial management need to be put in place far beyond those required by traditional schools.
- Rigorous policies need to be developed to prevent exploitation of students and to align staff incentives with educational outcomes of their activities.
- School enterprises need to constantly adapt their activities to maintain profitability. They may do this by finding a competitive edge over their rivals moving from primary production to supplying equipment for primary producers (Kafka and Stephenson, 2007).
- School enterprises, which offer higher wages, greater performance incentives, and increased training opportunities, are better positioned to attract and keep the best talent (Kafka and Stephenson, 2006).

School enterprises will require advice from experts in the government, private enterprise institutions or universities.

The government must recognize the certification of school enterprises. Efforts may have to be made to enhance the social prestige of non-formal institutions by establishing communication with formal institutions and by endeavoring to obtain

official recognition for the diplomas and certificates. To the extent that school enterprises may socialize students to simpler occupations, it may implicitly deny them access to occupations that require a good foundation of general academic science. It should, therefore, be possible to return to the academic stream without undue loss of time.

An essential element can be the enhancement of networking among teachers, managers and educationalists involved in school enterprises. Learning from each other can take place between institutions or between regions and districts and it tends to be very inspiring for all participants. The school management should co-operate with representatives of the local economy, community and region.

For school enterprises to continue, networking, research, increased experimentation and funding will be critical. At present, there is very little research into income generation in schools that actively seek to cover all their costs through a combination of income generating strategies. This research is urgently needed. This should include a study on the impact of such schools on their beneficiaries. More examples in more countries covering an even wider variety of activities will be required to build up a critical mass of knowledge about the replicability and environment-based limitations of financial sustainability in schools.

Because of high infrastructural investments, the need to transform schools into financially sustainable institutions will require huge investments in production capacity, infrastructure and human resources. This will require the backing of donors (Kafka and Stephenson, 2006).

Greater awareness of successes and feasibility of such approaches is needed so that others can benefit from the approach.

## Conclusion

From the study of school enterprises, the following significant principles emerge:

- Both general and technical components of vocational skills in the definition of ‘human capital’ are important.
- Local initiative is a leading force in school enterprises. They are driven, not only by educational authorities, but also by local business and community groups, industries and non-governmental organizations. These groups have the technology and expertise in both traditional and newly emerging skills. These new categories of participants deeply affect the vision and expressed interests of traditional central educational authorities.
- It takes a combination of methods of vocational education theory, on-the-job training and diverse sorts of non-formal methods to provide a flexible system for the formation of human resources in any society.
- Closeness to the utilization and application of competencies is of crucial importance for investments in employment-related vocationally specialized skills. School enterprises entail the notion of training people in close relation to future employers, so as to place them straight away in jobs that use their skills.

- People are motivated and show an interest in studies not only when future economic returns become visible to them. Motivation also means giving scope to independent endeavours as well as social and environmental concerns, thereby enlisting the creative potential and active participation of many people in the formation and utilization of skills, knowledge and ideas woven into the fabric and shared problems of society.
- Basic educational competencies are the prime step in developing vocationally specialized competencies in men and women. If insufficient attention is paid to these competencies, investments in technical and vocational education can have a distorting effect.
- The scope for development through vocational specialization and employment-related training depends on the scale of the market. This means participation in markets for new and innovative products must be greatly enlarged. It also means producing goods of high quality, rather than poor imitations of products that others produce better.

The benefits of the school enterprise approach for students and institutions are manifold, but methodological as well as substantial organizational and cultural challenges vis-à-vis conventional educational institutions are significant. Even though the number of schools committed to economic self-sufficiency is extremely low, the above cases taken from secondary data demonstrate that such an approach is indeed feasible, and provides a guide for governments and other stakeholders wishing to replicate their successes.

## Notes

1. The examples highlighted from these studies are: school enterprises in vocational secondary schools (India); Service Production Centre, Vigyan Ashram at Pabal; Don Bosco Technical Institute, New Delhi; Don Bosco Self-Employment Research Institute, Howrah, West Bengal; Production Centre in Shantikunj Ashram, Haridwar, Industrial Training Institute Bangalore; Technical College of Wood Technology, Semarang, Indonesia; vocational centres, Papua New Guinea; MAN Salzgitter, Germany; Botswana brigades; small business centres in vocational training institutes, Ghana and Kenya; the Offices for Practical Works in Vocational Training, Algeria; The National Pioneer Centre Havana, Cuba; the training-cum-production workshops 'Talleres Públicos', Costa Rica; Jinsong Vocational Senior Middle School in Beijing; the Secondary Vocational School of Nangong County, Hebei Province; Xianyang Machine Tool Technical School; Baofengsi Secondary Forestry School; Guangzhou School No. 38; Guangzhou School No. 6. The Fundación Paraguaya Model; The Songhai Model, Benin.

## References

Abban, C.K. and Quarshie, J.P. (1996) Integrated skills training for self-employment: the case of Ghana, in Grierson, J.P. and McKenzie, I. (eds) *Training for Self-employment through Vocational Training Institutions.* International Labour Office, International Training Centre: Turin.

Arbeitsgemeinschaft 'Producktionsschule' (ed.) (1990) *Produktionsschulprinzip im internationalen Vergleich.* Leuchtturm-Verlag: Alsbach.

Awashti, D. (1996) Vocational training and self-employment: the Indian experience, in Grierson, J.P. and McKenzie, I. (eds) *Training for Self-employment through Vocational Training Institutions.* International Labour Office, International Training Centre: Turin.

Bowman, M.J. and Anderson, C.A. (eds) (1976) Human capital and economic modernisation in historical perspective, in Stone, L. (ed.) *Schooling and Society: Studies in the History of Education*, pp. 3–19. Johns Hopkins University Press: Baltimore, MD.

Cheng, K.K. (1992) Theme edition: reform in the financing of education in mainland China (II). *Chinese Education*, 25(2): 47–52.

Chiepe, G.K.T. (1995) The brigades movement in Botswana: a model for replication? *Development Dialogue,* 148–56

de Moura Castro, C. (1988) The soul of vocational schools: training as a religious experience, *International Review of Education*, 34: 195–206.

Don Bosco Technical Institute (1997) *Silver Jubilee Souvenir.* Don Bosco Technical Institute: New Delhi.

Faltin, G. (2000) Competencies for innovative entrepreneurship, in Singh, M. (ed.) *Adult Learning and the Future of Work*, UNESCO Institute for Education: Hamburg.

Ferej, A. (1996) The use of traditional apprenticeships in training for self-employment by vocational training institutions (VTIs) in Kenya, in Grierson, J.P. and McKenzie, I. (eds) *Arbeitsgemeinschaft 'Produktionsschule' Produktionsschulprinzip im internationalen Vergleich*, Leuchtturm-Verlag: Alsbach.

Greinert, W.-D. and Wiemann, G., in collaboration with Biermann, H. and Janisch, R. (1993) *The Training and Production Concept*: *Analysis and Descriptions*. Nomos: Baden-Baden.

Greinert, W.-D. and Wiemann, G. (1993) Sekolah pendidikan industri kayu atas (PIKA) in Semarang, Indonesia, in Greinert, W.-D. and Wiemann, G., in collaboration with Biermann, H. and Janisch, R., *The Training and Production Concept. Analysis and Descriptions.* Nomos: Baden-Baden.

Grierson, J.P. and McKenzie, lain (eds) (1996) *Training for Self-Employment through Vocational Training Institutions.* International Labour Office, International Training Centre: Turin.

Haan, H.C. (1989) Two examples of training projects for the informal sector in Central America, in Fluitman, F. (ed.) *Training for Work in the Informal Sector* ILO: Geneva.

Hook, B. and Lee, W.O. (1997) The implications of the market: the development of human resources in Guangdong, in Hook, B. (ed.) *Regional Development in China*, Vol. 1. Oxford University Press: Guangdong, Hong Kong, Meng.

Hoppers, W. and Komba, D. (1996) *Productive Work in Education and Training: A State-of-the-Art in Eastern Africa*. Centre for the Study of Education in Developing Countries: The Hague, 240 pp. 194–95.

Kafka, N. and Stephenson, J. (2006) *Self-Sufficient Schools: Fostering Entrepreneurship to Finance Sustainable Education*. Paper for presentation at the APEID Conference 'Learning Together for Tomorrow for Sustainable Development'. Bangkok, December 2006.

Ketter, P.-M., Petzold, H.-J. and Schlegel, W. (1986) *Qualifizierung für alle. Ein Leitfaden Zur Projektplanung neuartiger Ausbildungs- undBeschäftigungsprojekte für arbeitslose Jugendliche inder EG.* European Centre for the Development of Vocational Training: Luxemburg.

King, K. (1985) *The Planning of Technical and Vocational Education and Training,* IIEP Occasional Papers 72, UNESCO/International Institute for Educational Planning: Paris.

Lohmar-Kuhnle, C. (1992) *Occupation-Oriented Training and Education for Target Groups from the Informal Sector*. Research Reports of the Federal Ministry for Economic Cooperation of the Federal Republic of Germany: Bonn.

Oerder, K. (1991) Produktionsschulen der Salesianer Don Boscos in Afrika, Asien und Lateinamerika, in Arbeitsgemeinschaft 'Produktionsschule' (ed.) *Produktionsschulprinzip im internationalen Vergleich*, Leuchtturm-Verlag: Alsbach.

Psacharopoulos, G. and Loxley, W. (1985) *Diversified Secondary Education and Development: Evidence from Colombia and Tanzania*, John Hopkins University Press: Baltimore.

Preston, R. (1993) Gender and relevance: decentralised vocational education in Papua New Guinea. *Oxford Review of Education*, 19(1): 101–115.

Rist, G.P. and Schneider, P. (1977) *Die Hibernia Schule. Von der Lehrwerkstätten zur Gesamtschule: Eine Walddorfschule integriert berufliches and allgemeines Lernen.* Hamburg: Reinbek.

Singh, M. (1996) *Überlebenssicherung und Kompetenzerwerb im städtischen informellen Sektor in Indien: Am Beispiel Kleinproduzentenin Neu-Delhi.* IKO-Verlag: Frankfurt/Main.

Singh, M. (1998) *School Enterprises: Combining Vocational Learning with Production*. UNEVOC International Project on Technical and Vocational Education, UNEVOC: Berlin.

UNESCO (1982) *International Bureau of Education*. *Final Report.* International Conference on Education, 38th session, 10–19 November. UNESCO: Geneva.

UNESCO (1990) *World Conference on Education for All (WCEFA) World Declaration on Education for All. Meeting Basic Learning Needs.* Jomtien, Thailand.

UNESCO (2002) *EFA Global Monitoring Report. Education for All. Is the World on Track?* UNESCO: Paris.

UNESCO (2004) *United Nations Decade of Education for Sustainable Development: Implementation Scheme*. UNESCO: Paris.

Verma, A.P. (1996) *Establishment of Production-cum-Training Centre in Vocational Education Institutions.* PSS Central Institute of Vocational Education, Guidelines, NCERT: Bhopal.

Wiemann, G. (1989) An International comparison of didactic models in technical and vocational education, in *International Bildung Wissenschaft*, No. 2. Report of the UNESCO International Symposium on Innovative Methods of Technical and Vocational Education, held in 1989 in Hamburg. German Federal Ministry of Education and Research: Bonn, pp. 33–40.

World Bank (2005) *Expanding Opportunities and Building Competencies for Young People: A New Agenda for Secondary Education.* World Bank: Washington DC.

World Bank (2006) *World Development Report 2007: Development and the Next Generation.* http://siteresources.worldbank.org/INTWDR2007/Resources/1489782-1158107976655/overview.pdf. Accessed 29 October 2006.

# Chapter 30
# School-based Enterprises and Environmental Sustainability

**Alberto Arenas**

*The goal of production is to produce not commodities, but free people in harmony with nature.*
*Adapted from John Dewey 1916*

A school-based enterprise (SBE) is a student-led productive activity that provides a product or service for the school or the community. Sometimes an SBE constitutes a course independent of the academic curriculum; at other times it serves as a generating theme for the entire curriculum. An SBE is important for several reasons: it provides relevance, context and concreteness to abstract material learned in the classroom; it supplies a product or service that is lacking in the school or community; it challenges the individualized nature of modern education by engaging students in a co-operative endeavour; it increases students' awareness of the connections between work and community wellbeing; it enables students to take pride in their work and it allows students to develop confidence in their leadership capabilities. Examples of SBEs include raising crops and farm animals, manufacturing household items, operating a radio station, selling beverages and pastries, managing a restaurant, repairing old homes, maintaining local parks and providing childcare services.

This form of learning through production is not new. Schools in many countries have used structures similar to SBEs for decades (Borstel, 1991, 1992; Singh, this volume). *School-Based Enterprise: Productive Learning in American High Schools* (Stern et al., 1994) is a book that laid out some of the theoretical and practical considerations for starting and consolidating SBEs, based on the stories of 16 high schools in the context of the USA (for other relevant literature, see Brown, 1995; Singh, 1998). In this chapter I seek to extend this discussion by considering the environmental consequences of the production process and the products and services delivered by SBEs. More generally, I present a broad educational framework to assist educators in restructuring their current vocational practices to promote environmental stewardship. Given the heightened global consciousness regarding environmental problems, the field of vocational education is ripe for this kind of exploration.

A. Arenas
University of Arizona, Tucson, USA
e-mail: arenasa@email.arizona.edu

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The inclusion of environmental concerns in vocational education is, in fact, a natural extension of the application of a social justice lens to work education (for examples see Dentith, 1997; Gregson, 1996; Kincheloe, 1995; Simon et al., 1991). This lens has been identified as essential for teaching students from low-income backgrounds how to challenge oppressive systems of belief such as classism, racism and sexism. Given that poor and ethnic minority students constitute a disproportionate percentage of the student population in vocational programmes, it is essential for teachers to foster in them an understanding of the political nature of education. This political consciousness allows students to see the connections among low-income communities, social problems and environmental deterioration that go hand in hand with poverty. People in poor communities are exposed to a wider array of environmental and social harms than are residents in higher socioeconomic areas, including mediocre air and water quality, homes with toxic levels of lead and asbestos, neighbourhoods with few parks and poor sewage systems, land prone to erosion and heavy deforestation, substandard nutrition and inadequate health care. Although vocational education (or any form of education, for that matter) is incapable of directly solving these problems, a heightened social and environmental awareness may lead students to understand that these conditions are not inevitable, but result from political and economic decisions that can be reversed.

Given that vocational education provides one of the clearest links between learning and economic productivity, it is important for career and technical educators to ask themselves about the environmental impact of any line of production or service. All forms of production involve an exchange of matter and energy, which inevitably carries with it an environmental effect (see, for instance, Ashworth, 1995). If vocational education is designed to have the least possible impact on natural resources, these lessons can positively affect students' daily lives and perhaps even influence the type of employment they obtain after graduation – after all, an increasing number of firms, big and small, are supporting environmental conservation, enabling like-minded employees to ensure that their employment follows more closely their environmental ethic.

Borrowing from John Dewey (1916), the ultimate goal of production is to produce, not commodities, but free people who live in harmony with nature. For instance, in the USA the environmentally friendly trade programmes at La Follette High School in Madison, WI, and Birmingham Seaholm High School in Birmingham, MI, are two rare examples of vocational programmes that take environmental concerns seriously (Wolf, 2001). At both schools students build homes and retrofit buildings following eco-architectural principles, addressing such issues as energy efficiency, resource conservation and indoor air quality. Students could take these lessons and apply then later on in their future lines of work. Despite the success of these and other programmes, very little research has been done on the connections between the natural environment and work education (Dippo, 1998; Lakes, 2000), leaving practitioners, even those with the best of intentions, at a loss about how and where to start. Thus, in this chapter I seek to contribute to this inchoate literature by assessing the strengths and weaknesses of environmental SBEs that enjoy very few financial resources.

This chapter is divided into four parts. It starts by presenting a framework of environmental education as it relates to the production of SBEs. It then focuses on the methodology used to explore two public secondary schools in Colombia, South America that have for several years implemented SBEs with an environmental orientation. Thirdly, it uses the educational framework developed in Part I as an analytical tool to study the Colombian SBEs and finally, it discusses the difficulties of fostering environmental protection in light of the obstacles schools encounter in implementing their vocational programmes.

## Conceptual Base for the Study

During the last two decades several publications have made explicit the connections between Western schooling and the global ecological crisis (Bowers, 1987, 2001; Hutchison, 1998; Orr, 1994; Smith and Williams, 1999). Among other topics, these publications have focused on philosophical issues concerning the purpose of education, alternative curricular and pedagogical strategies, the links between school and community, the importance of local lore and transgenerational communication and the green design of K-16 buildings. A ramification of this growing literature is the connection between environmental sustainability and vocational education or, for the purposes of this chapter, SBEs.

The following framework, adapted from the work of Smith and Williams (1999) and John and Nancy Todd (1984), may prove useful in guiding educators to design and implement environmentally sensitive SBEs. It consists of a series of principles that, without being mutually exclusive, can serve as a starting point for any school that wants to implement a green vocational programme or modify an existing one. Not all principles are applicable to every SBE and the list should not be followed dogmatically. Rather, it can stimulate educators to think about the most appropriate applications of these ideas. This framework need not be restricted to SBEs but could be applied to other forms of vocational education, including career academies, clusters, occupational high schools, and magnet schools (for a more complete list of possibilities, see Grubb, 1996). The framework consists of the following principles:

- Focus on local knowledge and skills that support ecological renewal;
- Use nature as a model for design;
- Employ sustainable methods of cultivation and management;
- Integrate living systems;
- Make products that are durable, repairable, remanufacturable and recyclable

### *Focus on Local Knowledge and Skills That Support Ecological Renewal*

Prior to the widespread implementation of the Western model of schools and universities worldwide, it was common for villagers and townspeople to rely on the local

knowledge, skills, traditions and technologies that emerged from the interaction of the locality with the surrounding ecosystem (Bowers, 1992). In pre-modern times, elders also played an important role in maintaining ancestral traditions and the propagation of local histories. With industrialization and Western schooling becoming common in most nations, local knowledge and skill have been gradually displaced and ignored, leaving elders feeling that they are inadequate contributors in guiding youth in their transition into adulthood. Moreover, increases in family mobility, electronic means of communication and modern forms of transportation like the automobile have undermined young people's sense of belonging to a particular locality. To counteract these trends, it is imperative for educators to assist students in generating appropriate responses to local problems based on resources available in the local ecosystem and in the collective wisdom of the community.

## *Use Nature as a Model for Design*

Barry Commoner, a leading environmentalist, has emphasized that unspoiled ecosystems are the only systems humans are aware of that maintain stability and protect their members and inter-relationships over a long period of time. Therefore, it makes sense to use the ecosystem as a guiding metaphor for changing the operation and structure of social systems and technologies (Commoner, 1992, p. 11). Although there is not complete agreement among ecologists regarding the basic principles that govern the behaviour of ecosystems, most observers agree that ecosystems display at least the following six principles: interdependence, carrying capacity, diversity, resilience, relationships and energy and matter flows. The last principle, energy and matter flows, can serve as an example for explaining nature as a model for design. All ecosystems are open systems that require a constant flow of energy and matter. Energy enters an ecosystem in the form of solar energy, matter enters as water and carbon dioxide, among other forms. Plants, which use these elements in their growth process, are eaten by primary consumers (e.g., cows), which are in turn eaten by secondary consumers (e.g., pumas). After plants and animals die, their organic material decomposes. Decomposers such as bacteria and fungi release carbon dioxide and mineral salts. Plants absorb these inorganic compounds and the whole cycle of energy and matter flows begins again. An important lesson gained from this principle is the absence of waste. What for one organism is refuse for another is a feast, as in the case of manure decomposed by microorganisms.

## *Employ Sustainable Methods of Cultivation and Management*

SBEs dealing with renewable resources, such as crops, livestock, trees and the like can play a vital role in motivating students to switch to sustainable methods of cultivation and management. In the case of agriculture, a sustainable approach uses biological controls, crop rotation, composting, mulching and other low-input strategies to avoid the use of synthetic fertilizers and pesticides. This approach also uses less

water, protects the biological richness of the soil and prevents erosion. In the case of raising livestock, a sustainable approach uses feeds and forages free of synthetic chemicals, physical environments that allow animals ample movement to express normal patterns of behaviour and a diet free of hormonal growth promoters and antibiotics. In the case of forestry, the quantity of the renewable resource removed does not exceed the amount that grows in the interval between harvests and an effort is made to maintain the habitats of all native plant and animal species. Sustainable methods of production provide win–win situations where producers and consumers benefit and biological diversity is enhanced.

## *Integrate Living Systems*

Human and nonhuman life constitute systems nested in larger systems that are fully integrated. As Barry Commoner stated succinctly in his 1971 classic *The Closing Circle*, 'Everything is connected to everything else'. Systems form web-like structures that are symbiotic and interdependent. A forest presents a good example. A tree is a living system composed of roots, a trunk, branches and leaves. Each of these is composed of tissue, which in turn is made up of a collection of cells. Simultaneously, the tree is part of a larger ecosystem called a forest, which is part of a biome. Such interrelationships at the micro and macro levels could be elaborated endlessly. The point is that no living system can exist in isolation from other living systems. Social systems that follow this integration tend to be very resilient and able to withstand outside pressures, just as an ecosystem does.

## *Make Products That are Durable, Repairable, Remanufacturable and Recyclable*

This principle does not apply to SBEs that provide a service or a perishable good (e.g., a student-run radio station or a student-maintained orchard). Instead, it is applicable to SBEs that produce a consumer good for sale. An environmentally sustainable SBE should steer clear of the notion that disposable products are desirable because they are cheaper. Products that are durable, repairable, upgradable, remanufacturable and recyclable must be the goal of any SBE. Extending the useful life of a product allows educators to send the critical message to students that any form of production has an environmental impact. The throwaway quality of today's commercial products has the all too appealing incentive of a low price, making them attractive to producers and consumers. However, too often these products are of poor workmanship and require frequent replacement. Not only are natural resources squandered, but human labour is also denigrated. The educational function of SBEs places them in an ideal situation for promoting the concept that consumers benefit from paying a higher initial cost for a durable product. Students can experiment with different materials and forms of production without fear of losing their jobs, or losing customers, as workers in a real firm would.

## Methodology

A qualitative research methodology was used by means of in-depth interviews, direct observations and document analysis. This method was used to answer the following questions: 'Do schools that foster environmental stewardship and have a vocational component follow the educational framework suggested by the literature? If so, how? If not, why not?'

To answer these questions I contacted the Colombian Ministry of Education, which provided me with a list of schools considered models for the rest of the nation in terms of promoting environmental sustainability. I used four criteria in selecting schools from this list for examination. Firstly, I chose only public schools because Colombian public schools tend to operate with small budgets and serve low-income students. These characteristics increase the potential for generalizing results. Secondly, I selected secondary schools. Although the literature is rich in descriptions of environmentally sensitive elementary school programmes, there is a dearth of case studies of secondary schools with a similar philosophy and practice. Thirdly, I sought one rural, one semi-urban and one urban school (but I was able to gain access only to a rural and a semi-urban school). Again, my rationale was to ensure the results were generalizable to as many settings as possible. Fourthly, the schools had to have a vocational component. Based on these criteria, I obtained a purposeful sample of two schools: the Fernández Guerra Secondary School (better known as Ferguerra), located in southwestern Colombia, and the Tomás Herrera Cantillo Secondary School (better known as Peñoncito), located in the northern part of the country. During the 1990s both schools had set up one SBE per grade level to promote environmental awareness and protection.

After contacting the two schools and obtaining the appropriate permissions, I spent several months at each school in 1997 and 1998, conducting a qualitative study of various aspects of the schools (for an analysis of the schools' academic curricula, see Arenas, 2001). One key motivation for the schools to accept my presence was that I would provide information to help them improve various aspects of their schools, including their vocational programmes. Prior to my arrival, administrators and faculty were informed about the objectives of the study and the use of the educational framework for environmental protection. School officials liked the idea of using a deductive approach whereby a framework developed elsewhere could be used in assessing their SBEs. It was determined that a deductive approach would be superior to an inductive one, given the broad theoretical literature that already exists regarding the greening of the economic system and production processes in general (although there is a dearth of literature connecting it to vocational education). This etic perspective (as opposed to an emic one), as it turned out, provided a starting point for systematically analysing the environmental advances of their SBEs, something that had not been previously done.

I chose a qualitative approach because each school had a unique model for providing experiential environmental education. At each school I conducted in-depth interviews of key stakeholders (i.e., students, parents, teachers and administrators); direct observations of the various activities of the SBEs; participant observations of the entire vocational programme; and an analysis of documentation, including

the schools' mission statements and other administrative documents, articles from local newspapers, student homework and reports prepared by the vocational teachers. Using several sources of data allowed me to triangulate key observations to strengthen the results of the study (Patton, 2002). Between the two schools I conducted a total of 18 formal interviews (based on open-ended questions) and about 40 hours of field observations. Prior to the observations, students were informed of the research objectives. The following are English translations of some of the questions asked by the teachers:

- Why were the SBEs started?
- Is there a relationship between the SBE and the academic curriculum? If yes, how is it manifested? If no, are there any plans to bring them together?
- What type of training, if any, did you receive to run the SBE?
- In what ways, if any, do you feel your SBE contributes to the larger environmental mission of the school?
- What are the main obstacles faced by your SBE?
- Do you feel your SBE should make a profit? Why, or why not?
- Do you feel that you received adequate training at the university or SENA (equivalent to a community college) on issues related to environmental sustainability? If yes, in what ways? If no, in what areas would you like to learn more?

For the direct observations I participated with the SBE instructors in the weekly classes for one month, sometimes as a co-instructor, at other times as an observer. Generally, each class met for two consecutive hours per week. Whereas I looked specifically for examples of environmental sustainability during the formal interviews, I looked for the opposite in the field observations. Here the main focus was on locating and examining negative cases that disconfirmed my expectations and framework (Patton, 2002, pp. 554–556). Specifically, I paid attention to conversations and aspects of the SBE that dealt with non-environmental issues (e.g., how to increase student participation in the SBE, how to make the product more efficiently, or how to market it better). Just as with the triangulation of methods, this strategy helped to promote research validity. The negative cases were particularly important in understanding the many difficulties the SBEs encountered in the educational framework and the limitations imposed by a strict adherence to an environmental sustainability approach.

I analysed my field notes at the end of each day or as soon as possible thereafter. I often shared my descriptions of events with teachers and administrators to verify their accuracy. At the end of the study I delivered a written report and an oral presentation to the faculty, staff and students of both schools. Following is a description of each school (for a summary, see Table 30.1).

## *Fernández Guerra Secondary School (hereafter Ferguerra)*

Ferguerra is a semi-urban secondary school inaugurated in 1941 as a private Catholic school and remaining so until the mid-1980s, when it became a public institution.

**Table 30.1** Characteristics of two Colombian secondary schools as of 2000

| Characteristic | Ferguerra | Peñoncito |
|---|---|---|
| Location | Semi-urban, located in Santander De Quilichao (Department of Cauca), Near the city of Cali (population 2 million). | Rural, located in the village of Peñoncito (Department of Magdalena), near the town of Mompox (population 25000) |
| Status | Public | Public |
| Type of school | Academic | Vocational |
| Number of students | 700 | 180 |
| Number of teachers | 30 | 12 |
| Socio-economic level | Serves poor students | Serves poor students |
| Selection of topics for SBEs | By teachers, but seniors select their own SBE | By teachers |
| Administrative support for SBEs | Yes | Yes |
| Environmental principles followed in SBEs | Some | All |
| Products or services provided by the SBEs | | |
| Sixth grade | Paper made from fruit waste. Fruit waste is obtained free. With the paper, students make cards and decoration boxes for sale. | Medicinal botanical garden. Medicinal plants are sold. |
| Seventh grade | Brooms. Students buy the sticks and synthetic fibres. The brooms are assembled and sold. | Organic garden and raising rabbits. The produce and rabbits are sold. |
| Eighth grade | Picture frames made from scrap metal obtained for free. The picture frames are sold. | Greenhouse and veterinary services. The produce is sold and veterinary services are provided to local farmers for free or a small fee. |
| Ninth grade | Plant pots and curtains made from bamboo shoots planted by students. | Vermiculture. The compost obtained is sold. |
| Tenth grade | Hydroponics. Project is in initial stages. | Aquaculture. Not enough fish are produced for sale. |
| Eleventh grade* | T-shirts. Designs are printed or purchased. T-shirts are then sold. | Aquaculture. Not enough fish are produced for sale. |

* Colombian secondary schools only go up to eleventh grade

The academically oriented school is located in southwestern Colombia in the town of Santander de Quilichao (population 50 000), department of Cauca (departments are equivalent to states or provinces). The town is near Cali (population 2 million), one of the most populous cities in the country. In the mid-1980s, feeling a general disenchantment with traditional methods of education, a small group of Ferguerra

administrators and teachers proposed a new model of education that integrated the different disciplines around a theme of the local and regional ecology. They believed that by adopting a holistic approach revolving around environmental issues to which students could relate, they could encourage students to be more enthusiastic about learning and more willing to participate actively in improving their community. The rest of the faculty gradually embraced the model and slowly started to implement the new ideas – starting with sixth grade and adding a new theme to the next higher grade level with each successive year.

The afternoon session, where the environmental model was implemented, has 700 students and 30 teachers. In the mid-1990s the teachers decided to complement their educational model with an SBE for each grade level. Not all these SBEs meet the principles of environmental production, and for the most part they constitute an extra course unrelated to the other subjects.

### *Tomás Herrera Cantillo Secondary School (hereafter Peñoncito)*

Peñoncito is a rural public school inaugurated in 1988 as a non-profit private school, which it remained until the mid-1990s, when it became a public institution. The vocationally oriented school is located in northern Colombia in the village of Peñoncito (population 2000), department of Magdalena. The village is near Mompox (population 25 000), one of Colombia's colonial gems. The school, started by local teachers and parents, was originally conceived with the goal of preparing students to understand, protect and care about the region's heritage in all its manifestations; social, cultural and environmental. In comparison to Ferguerra, Peñoncito is an extremely poor school. It lacks the most basic services, including running water. The only source of water is an artesian well in the school compound that serves inadequately the needs of a school specializing in agriculture and livestock. Moreover, the school has no teachers' lounge, no cafeteria, only two makeshift toilets, insufficient desks for all student and at most one textbook per classroom.

Peñoncito has 180 students and 12 teachers. As in Ferguerra, there is one SBE per grade, but unlike at Ferguerra, all SBEs meet several principles of environmental production. Moreover, the curriculum was developed around the SBEs, allowing for substantial integration among most subjects.

## Results

To illustrate each principle of the educational framework, I present one SBE and some of the obstacles it encountered. In practice, each SBE could be used to illustrate more than one principle, which is not surprising given the overlap in the content of the principles. Therefore, the choice of SBE is merely expository rather than exclusionary.

## *Focus on Local Knowledge and Skills That Support Ecological Renewal*

Peñoncito addresses this principle through the cultivation of a medicinal botanical garden by sixth grade students. The biology teacher began the botanical garden in the early 1990s. She had her students ask their mothers and grandmothers to list all the medicinal plants they knew, then to choose from the list those plants that were difficult to find. The teacher's assumption was that the rarer the plant, the greater the likelihood that it was becoming endangered, an assumption later corroborated by university botany students who were doing research in the region. The teacher, with the aid of some mothers, studied the lists and selected about 50 rare and common medicinal plants. The students found specimens of these species and planted them in the school garden. As part of the SBE, each student was charged with the care of several plants and two or three times a year goes to different towns in the region to sell them.

This SBE supports intergenerational communication by bringing together elders and students. The valuing of information that mothers and grandmothers have accumulated through generations brings to life an oral knowledge that is not codified in textbooks and is often neglected in the modern classroom. The SBE teaches students the skills of identifying and taking care of medicinal plants and even protects them from extinction. It also teaches students that they can rely on their own skill and knowledge, rather than the pharmaceutical industry, for palliatives for many common ailments.

One important obstacle to this and other SBEs at Peñoncito has been the lack of funds to improve them. Funds are scarce in great part because the municipal office (which under the decentralization process in Colombia is in charge of disbursing key funds for schools) has withheld much-needed funds as a way of punishing the school for acting as a watchdog in local politics. School officials see it as their responsibility to promote not only environmental awareness but also a larger sense of ethics in local politics. 'The mayor sees in me an enemy', Peñoncito's principal said:

> He even threatened me with jail if I kept pushing for our aqueduct. They [politicians] do not seem to understand that it's no longer business as usual. They're accountable to us now. (Personal communication, 25 November 1998; I have translated all personal communications from the original Spanish)

## *Use Nature as a Model for Design*

Ferguerra applies this principle in its sixth grade SBE, which transforms fruit waste into paper. Students obtain the waste from vendors of pineapple, banana and *lulo* (a local fruit) juice and fruit in the town's main plaza. In the past, the skins, stems and part of the pulp of these fruit would be thrown in the street as trash. Thanks to the cajoling of students and the local waste collector, vendors now put this refuse

in plastic bags that are later retrieved by the garbage disposal company. Every two weeks the students collect the bags from the disposal company and take them to the school, where they manufacture paper, decorative boxes and cards from the contents. The products are then sold at school bazaars and to local merchants. The SBE has become so successful that students have started to export their products to nearby towns.

Through this SBE the concept of waste acquires a new dimension. It is no longer seen as a nuisance but as an economic asset. Thanks to the students' efforts, the plaza remains clean and the environmental consciousness of merchants and other citizens is increased. Given that the waste is free, students do not have to spend any money in acquiring the raw material. Moreover, students learn an innovative way to produce a basic product without destroying any natural resources.

A key obstacle for implementing this principle has been the lack of teacher training in sustainable development issues. The vocational education teachers received conventional vocational training and are therefore unaware of the various social and environmental dimensions related to production. Although the school provides professional development opportunities through the SENA (the Colombian national apprenticeship system, a post-secondary community-college type of institution), these courses focus mostly on issues of efficiency and profitability, not on environmental sustainability. The teacher in charge of the papermaking SBE explained, 'I knew about this project through my own experience as an artist, but not because of any knowledge of ecology or sustainability' (personal communication, 13 October 1998). Another vocational teacher said:

> It has been really difficult to do stuff I wasn't trained for. I'm all for environmental education but, frankly, I learn as I go along and I'm sure I make lots of mistakes. (Personal communication, 15 October 1998)

Teachers are thus forced to learn on their own or with other community members, which so far has been an inadequate substitute for more systematic training.

## *Employ Sustainable Methods of Cultivation and Management*

Ferguerra has implemented an SBE that faithfully adheres to this principle. For their ninth grade SBE, students make plant pots and curtains from bamboo shoots that they cultivate themselves. This SBE started in 1995 when teachers at the school contacted a local environmental organization that donated 5000 bamboo starters on the condition that the students would plant the starters and, once they grew to an appropriate size, would transplant half along the banks of the local Quilichao River. In exchange, the organization agreed to pay the school the equivalent of US$0.20 per stem planted along the river. The students cultivate the bamboo stems using organic methods and with the half they keep, they make plant pots and curtains for sale. By cultivating their own bamboo, it is quite easy for students to harvest sustainably. At the same time, they combat erosion and protect the river from sedimentation. One student summarized what appeared to be a common sentiment:

> I love this project because I have a great time planting bamboo with my classmates and I get to go to parts of the river that I generally wouldn't go to on my own. (Personal communication, 13 October 1998)

Other SBEs at Ferguerra, however, do not follow this or any other ecological principle. For instance, the broom-making SBE managed by seventh graders is by and large a conventional enterprise with no concern for sustainability. To manufacture the brooms, students buy the wooden sticks from a local lumber company and the whisks (made from synthetic fibre) from a regional wholesale company. Neither of these components is produced sustainably. When the teacher in charge was asked about this problem, she said:

> We started this project because a local drug rehabilitation centre offered to train our students how to make brooms. It was a great opportunity that we didn't want to miss and we don't feel we are in a position to suggest to them the use of sustainable materials. Also, it's difficult to find sustainable materials as substitutes. (Personal communication, 14 October 1998)

If the relationship prospers, the teacher concluded, then Ferguerra would be in a stronger position to suggest some changes.

## *Integrate Living Systems*

Most of the SBEs at Peñoncito adhere to the cardinal rule of integrating living systems. For instance, the aquaculture (fish farming) SBE for the tenth and eleventh grades uses waste from the organic garden. The vermiculture SBE, devoted solely to compost making, uses leftovers from the sixth, seventh and eighth grade SBEs. Soil from the bottom of the aquaculture ponds – enriched with fish excrement – serves as an excellent fertilizer for the greenhouse and the various gardens. This basic integration combines production and waste-elimination processes in a single system. Another advantage of integrating the different systems is that this reduces the costs of acquiring basic materials. In this case, compost and fish food is obtained for free from several SBEs.

The aquaculture SBE in particular has proved to be an extremely important experiment. Local residents practice mostly subsistence fishing, despite being surrounded by at least 11 marshes of colossal size. Fishermen tend to use nets with very small holes, catching adult and young fish alike and thus reducing the fish population in the waters, making the practice unsustainable. Realizing the enormous economic potential that aquaculture has for the region, the school has devoted the upper two grade levels to its study. The school started by building two large fish tanks – essentially by digging two large holes lined with clay to prevent water seepage, then waiting for the holes to fill with rainwater. The students added young fish of two different species (*mojarra* and *bocachico*), which they feed with plankton and organic waste. Not enough fish have been produced to allow for marketing them, but with greater experience and knowledge, fish production promises to become more successful in the future.

One aspect of integrating systems is the push to unite the academic and vocational curricula. At Peñoncito this has not been a problem, given the original vocational orientation of the school and the fact that teachers and parents want both activities to be as closely aligned as possible. In addition, although academic schools enjoy more prestige than vocational ones, in the region around Peñoncito most schools are vocational and thus there is little pressure to change. Ferguerra, in contrast, is an academic school and as one teacher said:

> I don't think it would be prudent for us to concentrate our curriculum around the SBEs because it could be perceived as the 'vocationalization' of the school and many parents would not see that in a good light. We've been able to secure parental support in part because we're academically rigorous and parents hope that will translate into better jobs in the future. If we were to become more vocational, it could be perceived as a move in the wrong direction. (Personal communication, 14 October 1998)

This impression was corroborated by several parents who said they liked the school as it was. One parent said that although the SBEs were important, they 'were not as important as academic courses' (Personal communication, 18 October 1998).

## *Make Products That are Durable, Repairable, Remanufacturable and Recyclable*

The eighth grade SBE at Ferguerra follows the principle of making durable products by making picture frames out of scrap metal. The material is acquired at landfills at no cost. Students help reduce the amount of waste in the landfill, thus following the principle of viewing waste as an economic asset. Being made of metal, the picture frames are generally extremely durable and resistant to breakage. Making the picture frames also benefits from added value (i.e., the cost of labour, energy and processed materials minus the cost of raw materials), just as a typical remanufacturing process does. In both schools the issue of quality is addressed by having producers (students working at the SBE) and other students at the school use the product. This testing system has led to several improvements along the way.

Durability needs to be contrasted with other sustainability factors, however. When eleventh graders at Ferguerra decided to print T-shirts, they chose Disney motifs for the designs. Several questions related to sustainability were not asked: what values were being promoted through the Disney designs? Was it possible to use local motifs (e.g., the local river, the school's logo, an important town landmark)? Were the inks used in printing non-toxic? Could the wisdom of local indigenous groups be used to learn about natural dyes? (There are several indigenous reservations close to Santander de Quilichao, Ferguerra's hometown.) Was the cotton used to make the T-shirts cultivated organically? If not, are organically grown alternatives available? For many of these questions there are no easy answers, but the mere attempt to answer them raises students' consciousness. When I posed these questions to the students and the teacher in charge, it became clear that there was great eagerness to investigate these issues. As an eleventh grader said:

> I do like the Mickey Mouse logo, but it would also be nice to have an indigenous design. And maybe those [T-shirts] will sell as well as the Mickey Mouse ones. (Personal communication, 5 October 1998)

Just as with any SBE, the more a teacher understands about sustainability issues, the greater the likelihood that these will become an integral part of the SBE.

## Discussion: The Limits of Environmentally Sensitive Production

This article has applied an educational framework for environmental protection as a theoretical guide to explore SBEs in two secondary schools in Colombia. In addition, it identified various issues that have surfaced during the establishment and consolidation of these educational programs, including coping with minimal financial resources, improving the role of teachers, overcoming obstacles to the integration of SBEs into the general curriculum and identifying the difficulties in attempting to make every SBE environmentally sustainable. Although the focus of this article has been environmental stewardship, I do not mean to imply that the social considerations of the production and the final product are any less important. Social and environmental issues need to be considered in tandem. Both sets of issues have been under-explored in the field of vocational education, but environmental issues even more so, thus the focus of this article.

Based on these findings, several conclusions can be reached. Firstly, given that the primary mission of an SBE is to foster an exciting learning environment rather than to turn a profit, SBEs have greater latitude to experiment with alternative production and design processes that respect the integral interrelationship between human communities and surrounding environments. Although profit-making businesses can (and some do) engage in forms of production that are respectful of environmental systems, the reality of the capitalist marketplace often pressures businesses to relegate this consideration to a secondary position. On the other hand, although it is not necessary for an SBE to make a profit, eventually it needs to break even to recover costs. This is especially true for schools with limited resources that may find themselves in the situation of having to close down SBEs due to a lack of funds. For example, Peñoncito faculty fear that its aquaculture projects may suffer this fate if an aqueduct is not built to maintain an adequate water level in the ponds.

Secondly, while both schools suffer from inadequate teacher training in environmental sustainability, Ferguerra has suffered more because none of its SBE teachers have received any post-secondary training in this area. They were trained in normal schools that focused on academic, classroom-based pedagogies. These teachers support the environmental mission of their school, but by their own admission they have little understanding of how to translate this concern into environmentally sensitive SBEs. Training in this area is hard to come by and this absence will inevitably continue to affect negatively the SBEs at Ferguerra. Several Peñoncito teachers, in contrast, did learn about organic and low-input forms of production at university because they were trained as agricultural technicians (not as teachers) and they knew that eventually they wanted to put into practice some of these ideas in their region.

Thirdly, environmentally sustainable production is easier to implement in the primary sector (e.g., agriculture) than in the secondary and tertiary sectors (e.g., service and manufacturing). The more the production uses natural, renewable-energy-based products, the less the environmental damage and the greater the possibility of recycling or composting the final product. The closer the production is to nature and the fewer synthetic products used, the easier it is to detect and correct unsustainable practices. The bamboo cultivation at Ferguerra, for instance, can be kept organic and synthetic-free relatively easy, whereas for broom production to be sustainable (using sticks that come from a conventional lumber company and synthetic fibers that are based on fossil fuel) would require replacing the materials currently being used. High-tech production (e.g., computer manufacturing), which requires a myriad of components, most of which are fossil fuel-based, is even farther removed from nature and consumes more resources. Engineers and technicians involved in the final production and assembly of tertiary sector products have little knowledge of the origin of most of the components. To minimize the environmental impact, producers should ensure that their products follow strict energy-saving standards, are durable and contain mostly or exclusively recycled components. On the demand side, consumers need to be educated to demand environmentally sensitive goods.

A similar line of argument can be developed in favour of labour-intensive processes over capital-intensive ones. Schools like Peñoncito and Ferguerra tend to rely on labour-intensive processes given the relative affordability of these forms of production, an important consideration for any poor school. Beyond the cost savings, a key principle is that the less mechanized a workplace, the easier it is to follow environmental guidelines. For the sake of argument let us assume that Ferguerra's papermaking SBE becomes so successful that the school decides to buy a large mechanical press. With this new technology more paper can be made with fewer hands, which would have the unintended consequence of giving fewer students the opportunity to learn the craft of papermaking. This could even glut the local market so that markets farther away may need to be found, which presents a new set of possibilities but also of challenges from an environmental and social perspective. More directly related to our analysis, students and teachers will be hard-pressed to determine how the machine was manufactured, adding a new layer of ignorance to the production process and increasing the likelihood of non-sustainability.

By this argument I do not intend to advocate eliminating capital-intensive forms of production or synthetic fossil fuel-based products. Rather, I seek to tease apart the production process and help schools decide when it makes sense to use one form of production over another. If a school decides to use a capital-intensive process, it would be useful for teachers and students to do a life-cycle assessment (LCA), a process that identifies and assesses the environmental impact during the lifespan of the product, from its extraction, manufacturing, transportation, use to its eventual disposal. Doing an LCA, however imperfect, would be an extremely useful educational exercise, given the dearth of information on the origin of the various parts of manufactured products and the limited experience and time available at the school to search for such information.

This leads to the last consideration. It is unreasonable to expect any SBE, or any organization for that matter, to be completely sustainable. SBEs are part of unsustainable practices that permeate the world in the social, economic, political and environmental spheres. Living in modern societies inevitably means making compromises and it is not particularly surprising to find a self-proclaimed environmental vocational programme engaged in a mix of sustainable and unsustainable practices. For example, even if Ferguerra's broom-making SBE were able to identify a timber company that follows sustainable harvesting – no small feat in itself – the synthetic fibres would still need to be replaced and even then questions of economic viability and social justice would need to be addressed as well. The lesson here is that any vocational programme needs to be cognizant of when a compromise is being made and to determine the consequences of such a compromise. Students and teachers must discuss these matters fully and transform as many aspects of their SBEs as realistically possible. Ultimately, the educational framework presented in this article is useful only in so far as it provides some general and flexible guidelines to follow, without falling prey to dogmatic or fundamentalist positions.

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## References

Arenas, A.If we all go global, what happens to the local? In defense of a pedagogy of place. *Educational Practice and Theory*, 23(2): 29–47.

Ashworth, W. *The Economy of Nature: Rethinking the Connections between Ecology and Economics.* Houghton Miflin Company: Boston and New York.

Bowers, C.A. (1987) *Elements of a Post-Liberal Theory of Education*. Teachers College Press: New York.

Bowers, C.A. (1992) *Educating for an Ecologically Sustainable Culture.* State University of New York Press: Albany, NY.

Bowers, C.A. (2001) *Educating for Eco-justice and Community.* University of Georgia Press. Athens, GA.

Brown, D. (1995) Giving students the business. *Vocational Education Journal*, 70(60): 41–43.

Commoner, B. (1971) *The Closing Circle: Nature, Man, and Technology.* Knopf: New York.

Commoner, B. (1992) *Making Peace with the Planet.* New Press: New York.

Dentith, A.M. (1997) Preparing smart workers for tomorrow's uncertainties: implications of critical postmodernism and vocational education. *Journal of Vocational Education Research*, 22(3): 187–205.

Dewey, J. (1916) *Democracy and Education: An Introduction to the Philosophy of Education.* Macmillan: New York.

Dippo, D. (1998) An ethic of sustainability for work education. *Journal of Vocational Education Research*, 23(4): 325–338.

Gregson, J.A. (1996) Continuing the possibilities: problems, politics and possibilities of vocational curriculum. *Journal of Vocational Education Research*, 21(1): 35–64.

Grubb, W.N. (1996, April) The new vocationalism: what it is, what it could be. *Phi Delta Kappan*, 535–546.

Hutchison, D. (1998) *Growing up Green: Education for Ecological Renewal.* Teachers College Press: New York.

Kincheloe, J. (1995) *Toil and Trouble: Good Work, Smart Workers, and the Integration of Academic and Vocational Education.* Peter Lang: New York.

Lakes, R. (2000) Spirituality, work, and education: the holistic approach. *Journal of Vocational Education Research*, 25(2): 199–219.

Orr, D.W. (1994) *Earth in Mind: On Education, Environment and the Human Prospect.* Island Press: Washington, DC.

Patton, M.Q. (2002) *Qualitative Research and Evaluation Methods*, 3rd edn. Sage: Thousand Oaks, CA.

Simon, R.I., Dippo, D. and Schenke, A. (1991) *Learning simon1991 Learning Work: a Critical Pedagogy of Work Education.* Bergin and Garvey: New York.

Singh, M. (1998) *School Enterprises: Combining Vocational Learning with Production.* International Project on Technical and Vocational Education, Document No. ED/IUG/015. UNEVOC–UNESCO.

Smith, G.A. (1999) *Ecological Education in Action: on Weaving Education, Culture, and the Environment.* State University of New York Press: Albany, NY.

Stern, D, Stone, J. III, Hopkins, C., McMillion, M. and Crain, R. (1994) *School-Based Enterprise: Productive Learning in American High Schools.* Jossey-Bass: San Francisco, CA.

Todd, J. and Todd, N. (1984) *Bioshelters, Ocean Arks, City Farming: Ecology as the Basis for Design.* Sierra Clubs Books: San Francisco, CA.

Von Borstel, F. (1991) The development of the concept of productive education, Part I. *Education with Production*, 7(2): 19–51.

Von Borstel, F. (1992) The development of the concept of productive education, Part II. *Education with Production*, 8(1): 5–36.

Wolf, J.E. (2001) Building green: creating environmentally friendly trade programs in vocational-technical schools. *Green Teacher*, 66: 14–18.

# Chapter 31
# Sustainability Covenants: A Case Study of a Government–College Partnership

**Beth McLachlan, Greg Waddell and Frank Mitchell**

## Introduction

In December 2004 Kangan Batman TAFE College (KBT) entered into a partnership with Environment Protection Agency (EPA) Victoria, in the form of a sustainability covenant. The sustainability covenant provided a framework to assist KBT in their efforts to increase resource efficiency and reduce the environmental impacts of its services, enabling KBT to demonstrate sustainability leadership in the vocational education and training (VET) sector. The sustainability covenant with KBT recognizes the importance of the VET sector in achieving sustainability and, in particular, aims for the development of sustainability knowledge and skills across all business and industry sectors.

KBT has as its vision to be the 'Learning Partner of Choice'. This chapter outlines how the sustainability covenant between EPA Victoria and KBT is driving and supporting initiatives for sustainability at KBT in both their teaching and learning programmes and facilities and organizational management.

## About Sustainability Covenants

Sustainability covenants[1] are voluntary statutory agreements through which EPA and a company, organization, a group of companies or an industry sector can explore new, creative and innovative ways of reducing the environmental impact and increasing the resource efficiency of their products and services. They are a relatively new initiative being trialled by EPA Victoria in an attempt to take a more proactive approach to addressing Victorian industry's pollution and environmental impacts.

The most commonly used definition of sustainable development (SD) comes from the World Commission on the Environment and Development's 1987 report,

B. McLachlan
Environment Protection Authority Victoria, Melbourne, Australia
e-mail: Beth.McLachlan@epa.vic.gov.au

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*Our Common Future,* and defines the concept as 'development which meets the needs of the present without compromising the ability of future generations to meet their own needs'. Working towards sustainability involves addressing three primary areas of impacts; economic, social and environmental impacts. EPA Victoria's sustainability covenants focus primarily on environmental impacts. However, this is done in the context of an organization's social impacts, such as working with local industry and incorporating the considerations of the local community, and within the economic boundaries of the company. Through sustainability covenants an organization can strengthen the sustainability of their own products and services as well as influence and lead those of the broader sector. In doing so, sustainability covenants can help realize new commercial opportunities.

EPA Victoria has recently embarked on a number of sustainability covenants with a diverse range of partners including education facilities; the financial services sector and industry associations. Each covenant varies in its detail. However, they all strive to make Victoria more sustainable through increased resource efficiency and reduced ecological impact. Other fundamental similarities of sustainability covenants include their innovative, exciting approach to achieving systematic change in key impact areas, integration with corporate priorities, processes and planning, a focus on achieving environmental and business outcomes and on influencing the whole sector.

Sustainability covenants were introduced into the *Environment Protection Act* 1970 in 2002 and are voluntary agreements in which each party works to achieve specific agreed commitments. Sustainability covenants are publicly available on EPA's website. Sustainability covenant partners report that they value the statutory relationship with EPA for a number of reasons including:

- Receiving public, statutory recognition of environmental leadership in their efforts to reduce the ecological impacts of commercial activities;
- Empowerment and legitimacy to drive and shape environmental agendas in consultation with its stakeholders;
- Improved long-term sustainability and increased profitability;
- Reducing the potential for restrictions imposed by regulation;
- Providing an opportunity for competitive advantage through product and service differentiation on the basis of environmental characteristics.

The value of a sustainability covenant to KBT in its efforts to be the Learning Partner of Choice is discussed in detail below.

## Importance of VET

### *VET in Australia*

VET is a large and diverse education sector in Australia. In the public VET sector alone approximately 1.64 million Australians (or around 8 per cent of

the population) accessed educational programmes in 2005 (National Centre for Vocational Education Research, 2006). If the smaller, but significant privately funded VET component is added to these figures, the significant level of penetration of VET into the lives of Australians can be envisaged.

Students attending VET institutions or completing VET programmes in industry, school or community settings represent a wide spectrum of the population. School attendees wishing to gain vocational skills, school leavers embarking on new career directions, graduates seeking to add an employment focus to their university qualification, existing employees wishing to update or learn new skills and mature-age workers seeking to retrain for new vocational pathways are all customers of the VET sector. The ages of participants range from 15 to 80.

The VET sector in Australia is highly industry driven. The curricula utilized to deliver VET qualifications are developed by processes in which industry representation is central. Through their partnership with EPA Victoria, KBT has begun a process of enhancing partnerships with industry to identify areas of opportunity and demand for sustainability in education, thereby helping KBT achieve this core business objective.

At both the national and state level the VET sector is tasked to address identified skills shortages including traditional trade areas such as automotive, building and manufacturing. Anecdotally, there appears to be a growing need for knowledge and skills in environmental sustainability. Work under this covenant is helping KBT anticipate such needs and develop the capacity to respond to them as they appear in the many industry sectors in which it provides training. The VET sector has a high profile in the national discourse on skills shortages, and represents a crucial part of how Australia will deal with the problem of skills shortages. Responding to these shortages will be a significant component of the country's economic future. There has been a rapid and accelerating change in workplace technology and this has been reflected in the VET curricula. For example, while student numbers in generic information technology (IT) programmes have diminished, the IT requirements across most industry courses have increased. Similarly, VET curricula have reflected the global importance of sustainability considerations by industry sectors.

## *Strategic Positioning of the Covenant at KBT*

KBT and EPA Victoria have found that in order to have the highest chance of reducing the environmental impacts of a business they must first identify the impacts of the organization's core business. In KBT's core business (education) two main areas contribute to its environmental impact:

- The type of SD training the students receive that occur once they enter the workforce;
- The activities that take place during training.

By decreasing the environmental impacts of activities at the KBT, students will learn how to conduct many of the activities they will use in future employment in the

most environmentally efficient way. By incorporating environment and sustainability components into course curricula, with the aim of having all students exposed to some level of sustainability education, KBT will give students the knowledge and skills to address the environmental issues they may encounter in their chosen professions.

KBT has recognized the importance of the implementation of the covenant and achievement of its objectives, and accordingly has incorporated it into the Institute's strategic plan a key performance indicators for the organization. It is anticipated that two of the key benefits which will benefit the organization are:

- Opportunity for competitive advantage through product and service differentiation on the basis of environmental characteristics;
- Statutory recognition of environmental leadership in efforts to reduce the ecological impacts of commercial activities.

Implementation of the covenant will generate an exemplar of environmental initiatives in the VET sector, to lead an uptake of sustainability initiatives in the VET sector and support incorporation of sustainability in the business of providing education.

## *Sustainability Objectives at KBT*

KBT's vision is to be the 'learning partner of choice', its purpose being to help enterprises grow, communities prosper and individuals to realize their full potential. Sustainability is an essential part of this goal. Following a change in attitudes in many Western cultures, the management of many education institutions, including KBT, are beginning to receive pressure from students and staff alike. For example, questions are asked such as, 'we are recycling at home, why aren't we recycling here?' Additional drivers identified by KBT include product differentiation, cost savings and reputation benefits.

## *KBT Sustainability Objective in Education*

In its educational role, KBT works with approximately 24 000 students, more than 100 secondary schools, many universities, hundreds of enterprise and industry clients and a vast number of community organizations. It works closely with key Victorian industries, including manufacturing, automotive work,[2] aviation, polymer industries, transport and logistics and building and construction.

## *Teaching and Learning*

Many challenges are encountered by organizations in the VET sector, including addressing skills shortages, identifying growth areas and catering for the direction of a large number of differing industries. Catering for sustainability is another

challenge faced by the VET sector. As many organizations begin to identify sustainability, efficiency and innovation as being beneficial to their business, students with these skills are becoming more appealing to potential employers and the VET sector must cater for this shift in culture. By identifying opportunities to incorporate these ideas into the courses offered at KBT, the Institute will not only influence future generations of workers and their associated industries but will give the Institute a competitive advantage through product differentiation.

One of the primary challenges in attempting to incorporate sustainability into course curricula for a wide range of teaching disciplines is providing the teachers with the skills and expertise to deliver the education. 'Training the trainers' can be a significant challenge, as teachers in a range of disciplines need to be taught how to identify (and educate students on) the differing impacts of their respective industry. KBT in 2006 embarked on their first sustainability sessions that focus on training the trainers. These sessions assist teachers in understanding sustainability and in identifying and understanding the impacts of their sectors, and what is being done (and can be done) to address them.

A number of recent workplace training initiatives at KBT have much in common with training for sustainability. For example education for competitive or lean manufacturing focuses on decreasing waste and maximizing outputs against inputs, resulting in efficiency. This overlaps with the environmental component of sustainability. Lean manufacturing focuses on achieving financial benefits for a business by reducing resource use, time, money, energy and waste. These targets could also represent environmental objectives.

The context in which sustainability is delivered is one in which department managers are restricted by commercial targets. KBT is a not-for-loss organization that is required by government to manage its finances prudently. In considering new programmes and services, managers are required to understand the market and develop viable business plans. This applies to any introduction of sustainable courses or components. While demand can be created by energetic marketing, in time managers will need to demonstrate that there is employment-driven demand in their particular industry sectors to meet the Institute's strategic financial objectives.

As KBT is a multidisciplinary institute, identifying and incorporating the environmental impacts of each sector into the student's curricula is but KBT is addressing difficult this and is presently leading the way in the Victorian TVET sector. In summary, KBT has found that in building the environmental sustainability of its educational programmes and services, there are opportunities to:

- Reflect the demands of government and licensing bodies in industry-focused courses;
- Provide basic environment and sustainability information to most students;
- Assist industry and enterprises to address their own regulatory and strategic environment and sustainability initiatives through customized training;
- Improve graduate employment opportunities by augmenting their existing qualifications with environment and sustainability components.

By including sustainability considerations into courses KBT will provide their students with an education that caters for the changing direction of industry and enable them to identify and address the environmental impacts their chosen profession. Graduates of KBT will be more appealing to potential employers as they will bring with them an education with a difference. There has already been interest by industry in a range of sectors in employees who are trained with sustainability skills and this demonstrates the market potential for KBT students. The aim is that over time KBT will develop a reputation not only for considering the sustainability impacts of their education, but also for producing graduates who can do the same in industry.

KBT and EPA Victoria have worked together to conduct an audit of the current environment and sustainability components existing in courses at the Institute, and have developed a list of opportunity areas which will be considered for implementation.[3] Some examples of work that is being done include the participation of the building department in a range of green building projects with the housing industry and the installation of $810 000 worth of heavy vehicle emission testing equipment and an associated training module in the Department of Heavy Vehicle Training.

Currently at KBT members of the executive team are meeting department managers of areas that have been identified as having opportunity, such as competitive manufacturing, Koori programmes, horticulture and construction, to develop an action plan for increasing the environmental and sustainability education provided to students. The sustainability covenant has helped to identify and develop this aspect of KBT's journey towards sustainability. This is one of the most significant impacts the Institute can have with regards to the environment. Since establishing this as an opportunity area, KBT and EPA have worked together to develop programmes and networks and share information and experiences.

## *KBT Sustainability in Facilities and Organizational Management*

In order to decrease their environmental impacts, KBT must not only consider what they teach their students, but how they operate on a daily basis. KBT felt it must lead by example and practice what it preaches. KBT therefore began its own programme to improve its own environmental management.

This began by taking steps to increase staff awareness. These included the development of a green office team (to work with office-staff on addressing their environmental impacts), investment in energy management of buildings, a sustainable transport plan for staff, general environmental awareness training for all staff, regular articles appearing in the Institute's newsletter and information sessions being held for staff regarding sustainability. In addition a range of activities aimed at various levels of staff are being implemented across the organization to increase their overall awareness of the institute's environmental impacts, encouraging them to consider the impacts associated with their role in the organization and to begin to incorporate these considerations into their teachings.

However it is important to remember that much social research shows that 'awareness' is only a small contributing factor to generating behaviour change. Thus, KBT has embarked on a range of other initiatives to address the actions of staff and students. Many of the projects, which aim to complement the increased environmental awareness at the Institute, involve supporting the right behaviour by making it easier and more convenient to do so, by providing leadership and by creating a sustainability social norm. Some of these projects, ranging from energy and water conservation initiatives to waste management and recycling and addressing infrastructure development and transportation impacts, are discussed below.

In consultation with EPA Victoria and under the framework of the sustainability covenant, KBT aims to address water and energy consumption on all campuses. A range of projects have accordingly been developed. Some of these projects include installing rainwater tanks and light sensors, a building automation system and water efficient infrastructure. The State Government of Victoria (that provides a large amount of the funding to the VET sector in Victoria) has identified the benefits and payback periods associated with the implementation of energy saving projects and is therefore investing in projects that decrease the energy consumption of institutes. KBT has chosen to look at the bigger picture and is investing in monitoring and control measures such as the installation of a building automation system and submetering. This will permit greater identification and control of areas where most energy is used.

KBT is also planning to enter into an energy performance contract with a private provider to address energy usage at one of their campuses. This is an innovative and leading example of supply chain interactions with a shared value for both the supplier and KBT. Through this performance-based contract KBT will ultimately realize energy and financial savings and the supplier benefis by demonstrating the value of their product, creating a demand for it and sharing in the efficiency gains created. One critical component to the success of this partnership is that the service provider is funding the initial capital outlay and in return receives the financial benefits of the energy savings generated for a fixed period of time. This overcomes the common financial hurdle of making a large financial investment in infrastructure.

Another objective of KBT is to consider the environmental impacts that may be associated with all future infrastructure. KBT has recently received a Five Green Star rating from the Green Building Council of Australia for the construction of its newest campus, the Automotive Centre for Excellence, based in Docklands, Melbourne. This award recognizes a number of innovative energy and water saving initiatives incorporated into the building design.

KBT is also working with Sustainability Victoria and EPA Victoria to develop a waste management plan for each of their campuses. KBT has recently undergone a thorough waste audit and is currently implementing a number of recycling programmes and streamlining their waste management practices. Those working on the covenant also recognize the importance of working with the Institute's contractors

and are currently consulting them to ensure that all working at the Institute are striving for KBT's environmental objectives.

Additional objectives developed through consultation between EPA Victoria and KBT include:

- The development of an environmental management system and the creation of an Institute ecological footprint calculator. Both these tools will measure and track progress on the Institute's environmental impacts.
- KBT is also committed to offsetting fleet vehicle emissions through the green-fleet programme and it has joined the Victorian Department of Infrastructure's Travelsmart programme to address the environmental impacts of staff and student travel.

KBT and EPA Victoria have worked together to develop this broad range of environmental objectives for the VET institute, with the aim to educate students in a more sustainable environment and to enter the workforce with an increased awareness of their environmental impact.

The framework of the covenant consists of five strategic objectives. These objectives, which aim to address the variety of ways in which a VET organization impacts on the environment, are

- Integrating sustainability approaches into all internal policies, processes and procedures;
- Improving the environmental performance of KBT's activities;
- Researching and develop new sustainability products and services;
- Advocating and build strategic partnerships focused on sustainability;
- Incorporating environmental principles into training packages and courses.

## The Immediate Challenge

The KBT/ EPA covenant's immediate challenge is to ensure that it achieves its declared objectives. Through their work with EPA Victoria, KBT has developed a range of goals and projects that are all at varying stages of achievement. In order to claim leadership in sustainability in the TVET sector KBT must fulfil a number of these objectives and demonstrate clear results and benefits have been achieved. As the projects developed through the KBT–EPA partnership begin to achieve results, KBT will use them to communicate the benefits of sustainability to other institutes in the TVET sector, both in Australia and internationally, thus encouraging other institutes to participate in implementing sustainability projects and decreasing the environmental impact of the entire sector.

As some of KBT projects are currently being completed, KBT has begun working on publicizing a number of their achievements. Promoting KBT's environmental achievements as 'Corporations are learning from relationships with other sectors' (Dunphy et al., 2003), a multidisciplinary institute such as KBT is in a position to influence a range of organizations from a range of industries. It is also important

to promote environmental achievements to encourage students to consider studying at KBT as an environmentally responsible organization that will give them an edge in obtaining employment. This will also influence other educational institutions to consider addressing their environmental impacts.

## The Long-Term Challenge

This challenge is to realize the benefits of building sustainability into KBT's teaching and learning programme and into the management of its own activities. A decade from now, the challenge is to demonstrate that KBT's mission to be the 'learning partner of choice' has been significantly and demonstrably aided by consistent, credible and long-term efforts in building its sustainability credentials.

## Conclusion

The covenant between EPA Victoria and KBT has enabled KBT to establish a variety of initiatives in order to address their environmental impacts and to position KBT as an industry leader (as the learning partner of choice). It is anticipated that in the 3-year period of the covenant the range of projects will present a case study for replication across the sector. Although many of these projects are well underway, there is much work still to be done over the remaining 18 months of the covenant. This partnership between Victoria's EPA and a vocational educational institution has resulted in progress in a framework for addressing the environmental impacts of an important and potentially highly influential sector. KBT has received support from EPA Victoria in identifying environmental impacts and in developing initiatives to address them by creating partnerships and identifying industry opportunities. KBT has received ongoing assistance from EPA Victoria in their journey towards sustainability. EPA Victoria will benefit through this relationship by establishing a strong relationship with a sector that influences a large number of industries with highly significant environmental impacts.

## Notes

1. See www.epa.vic.gov.au/Sustainability_Covenants/default.asp
2. Initiatives towards reduce the social, environmental and economic impact of automotive spraying have been incorporated into the training provided at the Institute's new Automotive Centre for Excellence. These include a range of efficiencies that are incorporated into the programmes, and state of the art equipment has been installed. Water-based paints are primarily used now, replacing the solvent-based paint which has traditionally been used in spray painting automotives.
3. Some of the steps that have recently being taken are listed here. In 2004 a sustainability covenant was signed. In 2005 an extensive audit was made of the entire curricula of the Institute and opportunities for improvement were identified. In 2006 sustainability was included in three

additional courses. From this time on the opportunities identified continue to be implemented, while the Institute continues working to cater for industries' needs.

## References

Dunphy, D., Griffiths, A. and Benn, S. (2003) *Organizational Change for Corporate Sustainability.* Routledge: London.

National Centre for Vocational Education Research (May, 2006)*Vocational Education and Training Statistics: Students and Courses 2005: Preliminary Data.*

# Chapter 32
# A Framework for Developing Teaching Approaches and Resources for Education for Sustainable Development

**Margarita Pavlova**

## Introduction

The urgency of addressing sustainability by means of education has been reflected in the aim of the UN Decade of Education for Sustainable Development, (ESD) 2005–2014 launched by UNESCO on 1 March 2005 (UNESCO, 2005a). This initiative seeks to integrate the values inherent in sustainable development into all aspects of learning 'to encourage changes in behaviour that allow for a more sustainable and just society for all' (UNESCO, 2005b). Different local and global initiatives in education, such as the inclusion of ESD in pre-service and in-service courses, the reform of curricula and teaching programmes in many countries, the establishment of sustainability education awards, the sustainable school movement and many other activities indicate an increasing commitment towards an ESD agenda in education.

However, there remains an urgent need to develop teaching approaches and resources that can be used by technology and vocational education teachers to achieve effective classroom practice in ESD. Studies conducted in France, Australia and Russia examined technology teachers' perceptions of sustainability and school practices, and the inclusion of sustainability issues in teacher education curriculum documents (Pavlova, 2004a, 2006b; Pavlova and Lebeame, 2004). Technology education makes an important contribution to TVET at the school level.

To identify teachers' views and levels of understanding of sustainability and sustainable development, a survey and interview questions were designed. They were initially developed in English and then translated into French and Russian. Data were collected among both future (teacher education students) and current primary and secondary teachers of technology education. Schools with established technology education programmes from different socioeconomic areas were selected for the study.

This research found that in France, Russia and Australia education policy documents provided different opportunities for addressing ESD through technology

M. Pavlova
Centre for Learning Research, Griffith University Brisbane, Australia
e-mail: m.pavlova@griffith.edu.a

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education. In the Queensland (Australia) *1–10 Technology* Syllabus (Queensland Studies Authority, 2003) all appropriate concepts were defined. However, in the French programme (Ministry of Education of France, 1996–1998, 2003) there was very limited opportunity to cover issues of sustainable development. In Russia the Standards for Technology Education stated that topics on the social and ecological consequences of using technologies and the protection of individuals from the negative results of economic activities were compulsory (Ministry of Education of the Russian Federation, 2003). However, there were no official documents that stated the place of technology education in the overall strategies for ESD in Russia, Australia or France. As a consequence, technology teachers were not really involved in ESD.

Most pre-service teachers and practicing teachers in the three countries, at both primary and secondary levels (within the limits of this research) were not familiar with what sustainable development or ESD means. The exceptions were teachers who were personally engaged in activities relevant to sustainable development outside their work, or those who had studied environmental sciences at university. Among other findings of the studies, was a request for teaching resources that provide clear guidelines for addressing ESD through learning and teaching.

These studies demonstrate that changes at the level of practice in technology education have been quite slow. Research in vocational education across a number of the Baltic states, including Latvia, Lithuania and Russia, identified a similar situation (Pavlova, 2006c). For example, St Petersburg TVET teachers (in discussions in January 2007) stated that they were interested in including sustainable development issues in their teaching but felt the need for some structure or framework to develop their teaching approaches and materials, along with professional development to do so. Benedict (1999) has similarly found that the 'competence to implement high quality education for sustainability' (achieved through pre- and in-service teacher education and school planning) is necessary for achieving changes in classroom practice.

Thus, this chapter addresses the issues raised by practitioners internationally and proposes a framework that can help teachers and curriculum developers to plan ESD teaching and learning activities for students and for teachers' in-service. It is based on an analysis of modern society and the nature of sustainable development.

## The Framework

The framework for ESD was initially developed by Pavlova (2004b) for the design profession, and is based on the integration of two types of theories: one relates to the nature of society (Bauman, 1995; Habermas, 1981; Lash, 2001) and the other to the concepts of eco-design (Charter and Chick, 1997). However, it is also relevant to the other TVET training areas.

The first dimension of this framework includes cognitive, practical and aesthetic aspects. Philosophers and sociologists (Bauman, 1995; Habermas, 1981; Lash, 2001) have identified these three aspects as important descriptors of a

society. Historically, all three aspects were closely inter-related; however, as argued by Habermas (1981) theoretical, practical and aesthetic spheres of cultural modernity attained autonomy from one another from the end of the eighteenth century. Then, from around the middle of the nineteenth century, the gradual autonomization of the aesthetic dimension in the life of society led to the domination of this sphere over the others. This has caused the tensions among the cognitive, practical and aesthetic spheres that are currently reflected in different areas of human activities.

To apply this dimension of the proposed framework to teaching and learning we must understand the inter-relationships between all three aspects; the nature of the 'aesthetically spaced' world and the ways in which each aspect can influence the development of teaching and learning approaches. Some of these issues are considered in the next section.

The second dimension draws from the 'the quadruple bottom-line' concept and includes the economic, environmental, social and ethical aspects of SD. Many of these issues have been the topic of discussion since the 1970s in relation to corporate social responsibility and have gradually been translated into an agenda for the design profession. A number of principles have been developed by professional designers to ensure that the final product of their designing is sustainable. For example, the Design for the Environment Multi-media Implementation (DEMI) approach includes considering:

- Efficiency – doing more with less;
- Scale – the right size for the right place involving the right people;
- Systems – connections within and between society and nature;
- Appropriateness – choosing the right thing;
- Sufficiency – how much is enough? Do I really need this?
- Equity – fairness within and across all systems . . . not just human (DEMI, 2003)

For professional designers the key aspect of sustainable product design is the 'addition and balancing of social and ethical issues, alongside environmental and economic issues, into the product design process – to achieve "the quadruple bottom-line" (Charter and Chick, 1997, p. 5). This makes the relevance of the framework to TVET apparent.

Together, the cognitive, practical and aesthetic aspects of social life (the first dimension) and the quadruple bottom line of sustainable development (the second dimension) constitute a systematic framework for ESD (Table 32.1).

Although these categorizations are very schematic, they provide a useful framework for curriculum development as they suggest a number of dimensions that should be addressed through learning and the foci for particular activities that relate

**Table 32.1** A systematic approach to ESD

| | Economic | Environmental | Social | Ethical |
|---|---|---|---|---|
| Cognitive | | | | |
| Practical | | | | |
| Aesthetic | | | | |

to ESD. Table 32.1 can help technology and vocational education teachers to plan different learning activities that focus on one or more aspects of sustainability.

Each TVET area should identify ESD aims that can be addressed through the particular curriculum. For example, the aims of technology and design education identified by Pavlova (2006a,b,c) are as follows:

- To know and understand sustainable development problems/issues;
- To contribute towards the promotion and increasing awareness of ideas of sustainable development through projects and activities;
- To design and make products in accord with eco-design principles;
- To work in accord with sustainable development practices;
- To discuss and appreciate the relationships between aesthetics and ethics for sustainability;
- To consider aesthetics as a powerful feature of product design closely related to sustainable consumption.

The above aims are related to the aspects stated in the first dimension of the proposed framework. All three aspects of social life; cognitive, practical and aesthetic, should be addressed through the development of teaching approaches. The cognitive dimension (aims 1 and 2) relates to knowing and understanding the principles of sustainable design, understanding what sustainable development is, and understanding why is should be addressed. The practical aspect of social life (aims 3 and 4) are addressed through designing and making products, systems and the environment. Aesthetics (aims 5 and 6) relates to the appreciation of aesthetics for sustainability (current style, appearance of the product) and reflects the important role it plays in influencing the identity of young people.

The realization of these aims can be achieved through economic, environmental and social contexts. For example, when a teacher uses a life cycle analysis (LCA) of a particular product, such issues as use of energy or water, toxic emissions, transport implications and the health and safety of workers as well as of users can be discussed. LCA is

> . . . a process of evaluating the effects that a product has on the environment over the entire period of its life, thereby increasing resource-use efficiency and decreasing liabilities. It can be used to study the environmental impact of either a product or the function the product is designed to perform. LCA is commonly referred to as a 'cradle-to-grave' analysis.

The learning activity can be focused on the cognitive and moral/ethical aspects that relate mainly to the protection of the environment. However, economic and social issues can also be part of the learning activities.

Another example of the learning activity that is mainly focused on the social aspect of sustainability is a product analysis activity. The purpose of this analysis can be to understand how the product can 'improve the quality of human life within earth's carrying capacity and conservation of the earth's vitality and diversity' (UN, 2001). This analysis can address questions such as: is the product really needed, how does the product make life better for people, is it culturally acceptable for people who use it, does it build on the traditional wisdom and technology of the

community, what is its impact on social relations, does it bring people together in a friendly way, will it enhance or diminish cultural diversity, does it have a long-term impact on future generations; if so, is this impact positive or negative? (see Practical Action, n.d.). The activity can be focused on cognitive, social and ethical aspects with some consideration of aesthetics.

In a similar way, a number of activities appropriate for the particular TVET area can be analysed and developed using the proposed framework (e.g. a LCA of construction materials; an energy/waste audit of an industrial site; an analysis of the social impact of eco-tourism on a particular community; the development of technological processes that will reduce resource consumption). Thus an analysis of the ESD aims for a particular TVET area, together with the framework, can help a teacher to develop teaching approaches and learning activities for students in a holistic manner that will contribute towards a systematic approach towards ESD, where all aspects of sustainable development are addressed, not just environmental issues.

## Aesthetics

In this section of the article, the nature of the aesthetically spaced world is discussed and then related to the idea of sustainability. Describing the nature of the current era, a number of authors (e.g. Bauman, 1995; Habermas, 1981; Lash, 2001) argue that aesthetics prevails above the cognitive and moral dimensions in westernized societies. The appearance of formalized design at the particular time in the history of humankind reflected deep changes in the nature of society and the meaning of Being. Around the middle of the nineteenth century the autonomy of the aesthetic sphere became a deliberate project:

> The talented artist could lend authentic expression to those experiences he [sic] had in encountering his [sic] own de-centered subjectivity, detached from the constraints of routinized cognition and everyday action. (Habermas, 1981, p. 9)

The extravagant art programmes of the twentieth century had attempted:

> . . . to level art and life, fiction and praxis, appearance and reality to one plane . . . to remove the distinction between artifact and object of use, between conscious staging and spontaneous excitement . . . to declare everything to be art and everyone to be artist, to retract all criteria and to equate aesthetic judgement with the expression of subjective experiences. (Habermas, 1981, p. 10)

The gradual emergence of the aesthetic dimension in the life of society has led to the domination of this area over the other spheres. A number of thinkers (e.g., Bauman, 1995; Habermas, 1981; Lash, 2001; Lyotard, 1984 [1979]) have been concerned that the cognitive and moral spheres of human life have been colonized by the aesthetic sphere. Bauman (1995), for example, argues that in the current era, features that belong to the aesthetic space tend to submerge and colonize social space and become the principal tools of social spacing. Bauman makes a clear distinction between a cognitively spaced world and an aesthetically spaced world.

All images in the aesthetically spaced world are structured by 'the relevances of attractiveness, pleasure-potential, interest-arousal' (Bauman, 1995, p. 150). In this world images are more real than reality; 'where everything is a representation and thus the difference between representation and what is represented can no more be made' (Bauman, 1995, p. 150). Advertising objects or commodities are frequently equated with ideas or values:

> . . . a brand of cigarettes with virility, beer with manhood and athletic prowess, a soft drink with being young and vigorous. Equal time and equal weight can be given and are given to the trivial and the profound. In this way, too, many of the increasing services and products of the consumer-oriented society fulfil artificially created rather than genuine need. (Shore, 1985, p. 38)

Another important feature of the aesthetically spaced world is the increasing role of form as compared to function, process as compared to content, as Lyotard (1984[1979]) argues:

> Modern aesthetics is an aesthetic of the sublime, though a nostalgic one. It allows the unpresentable to be put forward only as the missing contents; but the form, because of its recognisable consistency, continues to offer to the reader or viewer matter for solace and pleasure. (p. 81)

These changes represent deep shifts in the meaning of being for the people in the contemporary world. The increasing role design plays in our lives is closely connected to the appearance of the aesthetically spaced world. The role of design in the current era is to create this aesthetically spaced world that has the following distinctive characteristics:

- The cognitive and moral spheres of human life is colonized by the aesthetic realm;
- The role of experiences in the life of the sensation-gatherer is increasing;
- Designed objects are used as the means for obtaining existential meaning;
- People are manipulated through the cultivation of their desires;
- The role of form dominates that of function (Pavlova, 2005).

In the aesthetically spaced world the culture of consumption (which provides the basis of modern economic models) is closely related to the cultivation of desire that is used as a way of manipulating people. This process of cultivation of the dissatisfied consumer can be found as the rationale for the process of designing new products and services. In the aesthetically spaced world 'the value of truth and justice is determined by judgments of taste' (Habermas, 1982, p. 26).

An analysis of the aesthetically spaced world demonstrates that aesthetics plays an increasingly important role in influencing the identity of young people and that at the same time there is a diminishing role for ethics. If we accept this, an important role for aesthetics should be in designing for sustainability.

The aesthetic becomes a 'social attractor', in a sense that it orients the choices of a multiplicity of individuals. Manzini (1994) argues that today 'the perspective of a sustainable society has not yet "taken form" and the aesthetic of sustainability has yet to be born' (p. 42). Moreover, in a transition towards sustainable development

there is a real need for an aesthetic of sustainability. There is a need to understand the interdependence of the ethical and aesthetical components of sustainability in terms of their relationships, as well as the relationships with social and economic aspects of product design. Aesthetics represents the way in which values of a particular historical period take form. Aesthetics is connected to ethics in a sense 'that no true, profound aesthetic renewal can occur without being based on a value system' (Manzini, 1994).

Aesthetics today, conceived in broad terms,

> . . . tends not to concentrate exclusively on the concept of beauty; aesthetics is the attempt to understand our experiences of and the concepts we use to talk about objects that we find perceptually interesting and attractive. (Smith et al., 1991, p. 18)

Due to the nature of modern societies in westernized countries, the aesthetically spaced world is playing an increasingly important role in framing youth identity. Thus, it should be seen as an important aspect of the framework proposed above. The relationship between aesthetics and ethics for sustainability should be discussed in the classroom. A comparison between apples will help us to understand the concept. When you see a glossy, 'perfectly shaped' apple and compare it to an apple that is unevenly shaped with some black spots, which one do you chose? If you value that the apple was naturally grow with no chemicals and sold by local farmers, you would chose the second apple, if not, you would chose the first. There is a need to understand the interdependence of the ethical and aesthetical components of sustainability in terms of their relationships, as well as the relationships with social and economic aspects of product design. A similar example can be found when looking at furniture. What would you prefer: an absolutely straight and even laminated chipboard surface or the slightly uneven surface of natural wood? This close relationship between aesthetics and ethics can be used for the development and use of the concept of aesthetics for sustainability with students, who can 'manipulate' in a positive way the consumer choices of the modern society through their product design.

Thus, the elevation of aesthetic reasoning, as well as the cultivation of the particular desires associated with sustainable development has a huge potential to influence students' behaviour that has not been considered in technology and vocational education. In the classroom the emphasis should be placed not only on ethics but also on all components of the framework. Because aesthetics has such a strong position in society it should be possible to use this position to assist the transition to a more sustainable society. In some TVET areas such as the construction industry, landscape design, product development and similar occupations, the role of aesthetic is particularly high. One way in which sustainability might be accomplished is by making sustainable products that are more aesthetically appealing, so people will willingly make appropriate choices. In other TVET areas such as auto mechanics, electrical fitting or refrigeration mechanics, its role would be more limited and because of that, an understanding of how aesthetics relates to personal experiences and to the collective perception of what is interesting and appealing should be developed to stimulate 'sustainable' consumer choices among the youth. In that

case, sustainability could be studied more at a cognitive than a practical level. The question of how the aesthetic aspects of sustainability might be introduced and assessed in technology and vocational education needs further consideration.

## Conclusion

This chapter responds to the request by many technology and vocational education practitioners to develop a framework that would help them to design an ESD curriculum in a systematic manner, in a way that provides a holistic approach for ESD in their teaching area. The framework proposed in the chapter is based on two sets of theories: the nature of society and the nature of sustainable development. Specific attention is given here to one component of the framework that has not previously been considered by academics writing about sustainable development and ESD. That component is aesthetics.

Aesthetics can play an important role in the ESD curriculum, as it increasingly influences the identity and behaviour of young people. It is suggested that the aims for ESD developed for particular teaching areas and the framework proposed in this chapter can provide an opportunity for teachers to plan and address a number of sustainable development issues through the teaching process. The technology education example illustrates one way of applying this framework.

## References

Bauman, Z. (1995) *Life in Fragments. Essays in Postmodern Morality*. Blackwell: Oxford.

Benedict, F. (1999) A systematic approach to sustainable environmental education. *Cambridge Journal of Education*, 29(3): 433–46.

Charter, M. and Chick, A. (1997) Welcome to the first issue of the *Journal of Sustainable Product Design*. *Journal of Sustainable Product Design*, 1: 5–6.

DEMI (2003) Design for *Sustainability*: DEMI *Principles,* Available online at http://www.demi.org.uk/web/content_a.asp?token0=2 and token7=HTML and type=demi%20principles and token2=demi%20principles and OP=lt and overNo=1.12 and max=all. Accessed 2004.

Habermas, J. (1981) Modernity versus postmodernity. *New German Critique*, 22:3–14.

Habermas, J. (1982) The entwinement of myth and enlightenment re-reading dialectic of enlightenment. *New German Critique*, 26:13–30.

Lash, S. (2001) Technological forms of life. *Theory, Culture and Society,* 18(1): 105–20.

Lyotard, J.-F.(1984[1979])*The Postmodern Condition: A Report on Knowledge* (trans Bennington, G. and Massumi, B. foreword by Jameson, F.). Manchester University Press: Manchester.

Manzini, E. (1994) Design, environment and social quality: from 'existenzminimum' to 'quality maximum'. *Design Issues*, 10(1): 37–43.

Ministry of Education of France (1996–1998) *Programmes de Technologie 6e-3e et Documents d'Accompagnement*. Ministry of Education: Paris.

Ministry of Education of France (2003) *Préparation de la Rentrée 2003, Dans les Ecoles, les Colleges et les Lycees*. Ministry of Education: Paris.

Ministry of Education of the Russian Federation (2003) The Federal Component of the State Standards for General Education (draft). Available online at http://www.ndce.ru/ndce/Min_Edu/stand/index.htm. Accessed 2004.

Pavlova, M. (2004a) Sustainable development: is it an educational priority for French students? in Middleton, H., Pavlova, M. and Roebuck, D.(eds) *Learning for Innovation in Technology Education*, Vol. 3, pp. 36–45. Proceedings of the 3rd International Conference on Technology Education Research: Centre for Learning Research, Griffith University.

Pavlova, M. (2004b) Sustainability: towards systematic approach for its conceptualisation in technology education, in Lebeame, J. (ed.) *Purposes and Assessments within Technology Education*, AEET Conference, Paris, March 2004, Available online at http://membres.lycos.fr/aeet/ (English and French translation).

Pavlova, M. (2005) Social change: how should technology education respond? *International Journal of Technology and Design Education*, 15(3): 199–215.

Pavlova, M. (2006a) Do we value values in technology education? Keynote address to the 4th International Conference on Technology Education Research, Centre for Learning Research, Griffith University, December 7–9.

Pavlova, M. (2006b) Technology education for sustainable futures. *Design and Technology Education: An International Journal,* 11(2): 41–53.

Pavlova, M. (2006c) Education for sustainability through design and technology education: some issues for a research agenda. Second European Fair on Education for Sustainable Development, Hamburg, Germany, 13–15 September, 2006.

Pavlova, M. and Lebeame, J. (2004) Challenges for introducing the concept of sustainable development in French and Australian secondary schools, in Middleton, H., Pavlova, M. and Roebuck, D. (eds) *Learning for Innovation in Technology Education,* Vol. 3, pp. 46–56. Proceedings of the 3rd International Conference on Technology Education Research: Centre for Learning Research, Griffith University.

Practical Action (n.d.) Homepage. Available online at http://www.sda-uk.org;%20www.stepin.org. Accessed 10 May 2007.

Queensland Studies Authority (2003) *Technology Years 1 to 10 Syllabus*. Queensland Studies Authority: Spring Hill.

Smith, R.A., Simpson, A. and Ralph, A. (1991) *Aesthetics and Arts Education*. Illinois Press: Urbana, IL.

Shore, H. (1985) Culture, development and human values, in László, E. and Vitányi, I. (eds) *European Culture and World Development*, pp. 35–53. UNESCO Joint Studies for the European Cultural Forum, Pergamon Press: Oxford.

UN (2001) Indicators of Sustainable Development. CSD Theme Indicator Framework: Social. Available online at http://www.un.org/esa/sustdev/natlinfo/indicators/isdms2001/table_4.htm. Accessed 20 November 2003.

UNESCO (2005a) UN Decade For Sustainable Development 2005–2014. http://portal.unesco.org/education/en/ev.php-URL_ID=23279 and URL_DO=DO_TOPIC and URL_SECTION=201.html.

UNESCO (2005b) UN Decade for Sustainable Development 2005–2014. Objectives and Strategies. http://portal.unesco.org/education/en/ev.php-URL_ID=23295 and URL_DO=DO_TOPIC and URL_SECTION=201.html.

# Chapter 33
# *Learning to Do*: An ESD Resource for TVET

**Lourdes R. Quisumbing and Maria Lourdes Q. Baybay**

## The Need for a Human-Centred TVET Curriculum

It has been recognized that technical and vocation education is an integral part of lifelong learning and has a crucial role to play in this new era of knowledge, information and communication and globalization. It is an effective tool to realize the objectives of a culture of peace, environmentally sound sustainable development, social cohesion and international citizenship (UNESCO, 1999, p. 61).

The Bonn Declaration states that

> . . . since education is considered the key to effective development, TVET must be the master key that can alleviate poverty, promote peace, conserve the environment, improve the quality of life for all, and help achieve sustainable development.

Part III of the Bonn Declaration states that

> . . . preparation for work should equip people with the knowledge, competencies, skills, values and attitudes to become productive and responsible citizens who appreciate the dignity of work and contribute to sustainable societies. (UNESCO–UNEVOC, 2004)

The emerging concept of sustainable development emphasizes the interdependence of people and their society, economy, culture and environment. We cannot accept any form of development that leaves half of humanity in poverty and endangers the rights of future generations. In fact, sustainable development should be viewed more as a moral precept than a scientific concept (UNESCO, 2000). To realize this concept of sustainable development requires fundamental changes in our values, attitudes and behaviour, in our personal lives, in our community activities and in our places of work. These changes are critically dependent on education and training (UNESCO–UNEVOC, 2004, p. 1).

That our knowledge-based society must be value-centred, anchored in a respect for life, human dignity, for the plurality and diversity of societies and cultures, on human labour and work as the source of self-actualization and self-fulfilment,

L.R. Quisumbing
UNESCO Asia-Pacific Network for International Education and Values Education (APNIEVE), President, APNIEVE-Philippines
e-mail: lrquisumbing@i-manila.com.ph

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as well as the power that fuels all economic and social development, cannot be emphasized enough. TVET must include values education in its new modalities of education and training. It must focus on the needs and potentials of the individual in society. This necessitates a holistic and integrated approach to education and development (Quisumbing, 2005, p. 292).

A holistic and integrated human resource development programme for TVET should aim to prepare the individual to become responsible, free and mature, equipped not only with the appropriate skills and know-how of the latest technologies, but also with:

- Deep human and spiritual values and attitudes – a sense of self-worth, self-esteem and dignity;
- An ability to work by oneself and with others in teams, with integrity and honour, with honesty, punctuality and responsibility;
- To adapt to varying situations, to know and understand problems and issues, to work out solutions creatively, to resolve conflicts peacefully;
- To have a good grasp of the reality of the world, of oneself and of others;
- To possess some general knowledge with specialization in some field or area of work;
- To acquire the ability to continue learning and pursue lifelong education in a learning society (Quisumbing, 2005, p. 292).

Thus, one of the major challenges for TVET to fulfil its role in education for human-centred sustainable development is to

> . . . re-orient and re-direct its curriculum to imbue students and trainees with respect for the conservation and sustainable use of resources, social equity and appropriate development plus competencies to practice sustainable tasks at the workplace of today and tomorrow. (UNESCO, 1999, p. 27)

## *Learning to Do*: The Asia–Pacific Network for International Education and Values Education (APNIEVE) Response

It is in response to the need of a holistic and human-centred approach that APNIEVE presents its third sourcebook, *Learning To Do: Values for Learning and Working Together in a Globalised World, A Holistic and Integrated Approach to Technical and Vocational Education and Training*, in partnership with the UNESCO–UNEVOC International Centre for Technical and Vocational Education and Training (TVET) in Bonn, Germany UNESCO-APNIEVE (2005). *Learning to Do* is designed for TVET educators and trainers to serve as an ESD resource material and a training tool for TVET that may be used in the classroom, in non-formal settings and in the work place.

The sourcebook is inspired by the philosophy of lifelong learning, founded on the four pillars of education; learning to know, learning to do, learning to be and

learning to live together, described in *Learning: The Treasure Within* (Delors, 1996, pp. 22–4).

The International Commission on Education for the Twenty-first Century clearly supports a holistic approach to teaching and learning when it stresses the fundamental principle that education 'must contribute to the all-round development of each individual – mind and body, intelligence, sensitivity, aesthetic sense, personal responsibility and spiritual values' (Delors, 1996, p. 94). It describes the learning to do pillar, not only as putting knowledge and learning into practice innovatively, through skills development and practical know-how, but also as the development of competencies, life skills, personal qualities, aptitudes and attitudes (Delors, 1996, pp. 89–90).

The APNIEVE *Learning to Do s*ourcebook identifies those work-related values for technical and vocational education and training that will contribute to the development of a person, a worker and a citizen with the knowledge, values, attitudes, behaviours and skills, needed to be able to participate fully and work effectively, ethically and responsibly in a globalized, human-centred economy for equitable and sustainable development and for the wellbeing of all.

## *Values Framework*

The values needed for learning and working together are based on the overarching value of the dignity of the human person and of labour with the eight core values (listed below) in all the manifold aspects of the human personality: physical, intellectual, emotional, ethical, socio-cultural, economic, political and spiritual, as an individual and as a member of society.

Before we can be trained to be productive and responsible workers, we must first become more peaceful, just and caring human beings. We must therefore blend our personal and work values to function as integrated workers, in harmony with ourselves, our peers and our neighbours, with those in authority, with nature and the world, and with the sacred.

Figure 33.1 is a diagram showing the *Learning to Do* values framework, pointing out the core and related values of the person and of the worker towards a culture of peace in order to improve the quality of life for all. The diagram, representing the blend of personal and work values, reflects the priorities of Asia–Pacific participants after consultations with them during two UNEVOC conferences held in Samoa and Laos, and of respondents from India and other Asian countries in response to a questionnaire.

The wheel is intended to symbolize human invention, imagination and productivity. Its spokes are the inner forces that make the wheels go round. Each value is defined in the *Learning to Do* not only to help teachers understand better and appreciate their meanings but also to enable teachers to be more aware and to consciously strive to integrate these values in their lessons and activities. One of the core values is sustainable development, with related values of orientation to the future, the just stewardship of resources, the work ethic and industry and responsibility. The values are not exclusive of each other; they are interrelated and interdependent.

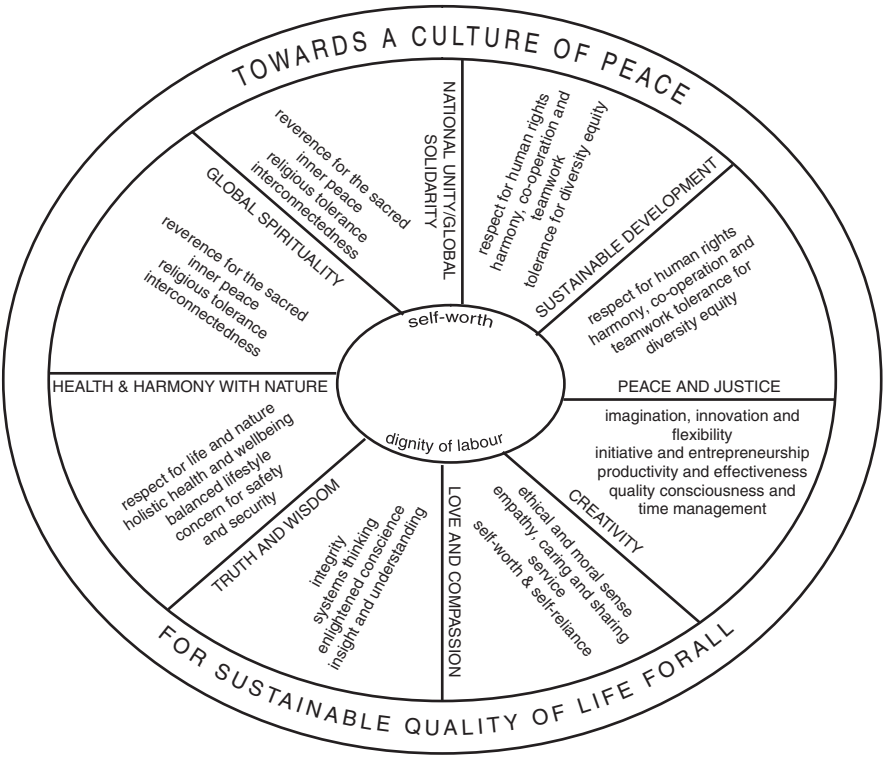


**Fig. 33.1** Learning to do values framework: towards a culture of peace for a sustainable quality of life for all

*Learning to Do* describes an educative process that is both holistic and integrative in approach. The underlying belief is that only when the learner truly experiences being fully human can one become, not merely a skilled and competent worker, but also a socially committed citizen dedicated to group goals that improve the quality of life. A holistic and integrated approach emphasizes that all human faculties of the learners must be tapped and developed. In this light, the teaching and learning cycle is most appropriate as both a reference and a model. It consists of the four-step process shown in Figure 33.2.

*Step One: cognitive level – knowing*. Valuing does not exist in a vacuum. It has to have a knowledge base from which values will be explored and discerned. This level introduces the specific values that are to be examined. There are suggestions for learners to consider about the way these values affect the self and others, our behaviour at work, our work ethic and our lifestyle. Knowing, however, lies only within the parameters of facts and concepts. This level should, therefore, progress to a second step.

*Step Two: conceptual level – understanding.* In the proposed cycle, a distinction is made between knowledge and wisdom. Knowledge without understanding may lead to insult, but knowledge with understanding leads to insight. This is why the conceptual

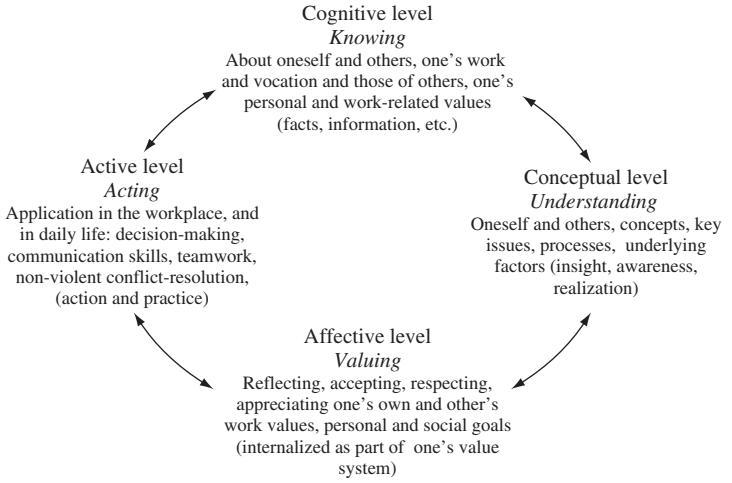


**Fig. 33.2** The teaching–learning cycle

level is divided as two separate steps. Knowledge could be easily explained by the educator and in turn quickly memorized by the learners. For the learners to understand and thereby gain insight, however, requires wisdom. Concepts that are made concrete for the learners can be grasped more fully and easily by them.

*Step Three: affective level – valuing.* Knowing and understanding are not guarantees that values are internalized and integrated. The third step, therefore, ensures that the value concepts are filtered through one's experiences and reflections and are eventually affirmed in the affective dimension. In short, these concepts flow through the three processes: chosen, prized and acted upon. Since teaching and learning is conducted in groups, the additional benefit of this step is the appreciation, acceptance and respect of both one's own value system and those of others.

*Step Four: active level – acting*. The concepts that are valued ultimately lead to action. Whether the action is expressed in improved communication skills, better decision-making, greater teamwork, non-violent conflict resolution and so on, the value concepts find their way into our behaviour. The learners are thereby challenged to see through and to experience the spontaneous flow of the concept and affective dimension into behavioural manifestations. Sometimes this is automatic. At other times, it involves further skills enhancement in the particular area.

Although the steps presented follow a logical sequence, they are by no means sequential. Creativity could allow the interface or reordering of such processes.

## *Modules in Learning to Do*

*Learning to Do* presents 36 modules for the development of the worker as an individual and as a member of the workforce. They are arranged under eight core values needed for the development of the person and the worker anchored in human dignity

and the dignity of labour (asking to be treated with dignity, valuing the meaning of work, advocating decent workplaces):

- **Health and harmony with nature**
  understanding I am a link in a chain
  achieving holistic health
  working safely
  understanding that safety saves
  creating a balanced lifestyle
- **Truth and wisdom**
  appreciating integrity as a way of life
  solving complex problems
  aiming to have an enlightened conscience
  seeking insight and understanding
- **Love and compassion**
  believing in myself
  sharing because I care
  understanding that work is love made visible
  developing an ethical/moral sense
- **Creativity**
  building innovative work cultures
  defining quality and excellence
  taking charge when the winds of change blow
- **Peace and justice**
  respecting human rights
  developing a shared vision
  aiming for a perfect world
  ensuring an equitable workplace
- **Sustainable development**
  seeking a sustainable quality of life
  aiming at sustainable workplaces of the future
  developing a work ethic and industry
  protecting and promoting diversity
- **National unity and global solidarity**
  developing responsible citizenship
  offering committed leadership
  aiming towards participatory democracy
  seeking unity and interdependence
- **Global spirituality**
  understanding interconnectedness
  developing reverence for the sacred
  aiming for religious tolerance
  seeking inner peace

These modules serve as prototype lessons to help the educator gain competence and confidence in facilitating the valuing process. Each module begins with a brief description of the core value and the related value, with the module title, objectives, content and learning activities involved in the teaching–learning cycle. The application of learning in the active level provides an opportunity for the educator to evaluate the effectiveness of both the teaching and the learning. Each module ends with information about materials required and suggested references.

These modules are intended as resource materials and as guides to be adapted to local needs and specific conditions. Each module takes approximately 90–100 minutes to conduct. The educator should feel free to introduce modifications and variations, such as indigenous content and alternative learning modes in diverse cultural settings. Once they are competent in using the valuing process, educators will be able to apply it to any content and in any area of technical and vocational education and training.

As the educator acts more like a facilitator than a conveyor of knowledge and skills, the letter F (for facilitator) is used in the modules. Students are referred to as P (for participant) as they are active participants in the learning process.

The modules may be used in specific values education lessons preceding a learning unit. However, the valuing process may be applied creatively in any area of technical and vocational education and training. In time, educators may gain sufficient confidence to apply the valuing process to their teaching practice as a daily routine, thereby integrating values into learning in a holistic way. It should not be forgotten, however, that the most effective instrument in values education are the educators themselves, hence the importance of educators behaving as role models. Values are likewise reflected in the learning environment and in the quality of the relationships existing in school or in the workplace.

## The APNIEVE Experience

### *The Use of the Teaching-Learning Cycle as a Strategy for Holistic Education*

The teaching–learning cycle has been used in workshops for more than 100 teachers from 41 countries in the Asia–Pacific Region. A workshop, in co-operation with the Asia–Pacific Centre of Education for International Understanding (APCEIU), was held in Korea in July 2001 for teachers from 14 countries and another one was held in Adelaide, South Australia in October 2002 for teachers from 20 countries. The ASEAN Foundation sponsored an APNIEVE workshop in Hanoi for 36 teachers from Vietnam, Cambodia and Lao PDR and another one in Cebu, Philippines for 30 teachers from Brunei, Malaysia, Indonesia and Southern Philippines.

The participants consistently evaluated the workshops as excellent in terms of content and process, facilitators/speakers and learning gained. The participants' comments included: 'Very fruitful interaction. Even the difficult lessons were

prepared in an easy way', 'It was an enriching experience, which added to our knowledge, understanding, application and valuing', the module 'was really challenging and encouraging and made the members participate actively', 'Through this lesson, I came to realize I should do something to make the earth sustainable' (Quisumbing-Baybay, 2002), 'Learning takes place smoothly and attracts the interest of participants' and 'I am impressed strongly by the presentation … on the concept of sustainable development which was done systematically and holistically' (Quisumbing, 2004).

## *The Use of Modules from* Learning to Do *in Philippine Training Workshops*

Right after the launching of *Learning to Do* on 5 March 2005 at the Philippine Normal University in Manila, APNIEVE–Philippines pilot-tested a module on the core value of sustainable development, that is, a sustainable quality of life, which received a rating of excellent. This module was conducted during 16 one-day training workshops on values integration across the curriculum for 1600 high school principals and teachers from all regions of the Philippines under the sponsorship of the Department of Education and the Fund for Private Assistance. It was consistently rated excellent by the participants, notably in terms of learning gained.

In addition, the APNIEVE training team used the module to train about 200 teachers in two Philippine regions: Region 3 at the Angeles University Foundation in Angeles City, Pampanga and Region 4 at the First Asian Institute for Technology and the Humanities in Tanauan, Batangas. Again, the evaluation results received an excellent rating. The participants were vocal about what they had learned about sustainable development, as exemplified by these comments: 'My most significant learning today is about the important 5 Rs which contribute to the preservation and conservation of our environment for the future generations' and

> My most significant learning today is that I am a part of this world and am responsible to apply my learnings in the classroom so that children may learn about the environment. (Quisumbing, 2006)

The module presented here has since undergone modifications and adaptations to suit the needs of the participants, as a result of these successful APNIEVE experiences.

## Concluding Note

APNIEVE is committed to continue its advocacy work in the promotion of peace, human rights, democracy and sustainable development in the Asia–Pacific region towards international understanding and a culture of peace.

Recent developments in China are encouraging. In October 2005, during the 1st International Forum on Teacher Education held at the East China Normal University in Shanghai, an APNIEVE-China chapter was organized under the leadership of

Dr Zhou Nanzhao. *Learning to do* has just been translated into Chinese to be used to train TVET teachers in China. With further co-operation and support from UNESCO, UNEVOC, the Association of Universities in Asia and the Pacific, the Colombo Plan Staff College and other sponsoring agencies, and in collaboration with TVET institutions and schools, APNIEVE hopes that this resource material will contribute towards the human-centred and holistic sustainable development of the Asia–Pacific region.

## Module on Sustainable Quality of Life

This module relates to the core value of sustainable development, which involves striving for environmental protection, equitable sharing of social and economic wellbeing, security and self-sufficiency at local, national, regional and global levels, and seeking peace within oneself and with others. It is sustainable when it is continuing and independent, ensuring the welfare of present and future generations. The module is also concerned with the related value of just stewardship of resources which promotes a caring attitude towards the environment, the wise use of resources and the equitable sharing of finite resources for the benefit of present and future generations.

### Objectives

- To understand the interdependent relationships between the environment, social issues and development in the context of sustainable development;
- To identify the different kinds of environmental problems which may result from development;
- To examine causes and remedial measures of these problems;
- To reflect on one's lifestyle in relation to being stewards of resources;
- To take steps towards living a sustainable lifestyle.

### Content

- Interdependent relationships between environment, social issues and development;
- Sustainable development and sustainable living;
- Environmental problems – causes and remedial measures;
- Environmentally based action plan.

### Procedure/learning activities

Cognitive Level: Knowing

- F introduces to Ps the following key concepts:
  *The care and protection of the environment is one of the most important challenges facing the world today*. Since development depends on the earth and

its natural resources, and peaceful, just relations among peoples, it is essential to study how the interventions for development affect society and the environment. Today, the world's demands have placed intolerable pressures on the environment, in turn impacting on social cohesion. There is therefore a need to strike a balance between these so that development may not exhaust non-renewable resources.

*True development should lead to an environmentally sound, peaceful, just and sustainable quality of life*. Learning about sustainable development will address this concern. The World Commission on Environment and Development (Bruntland, 1987) defines sustainable development as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. At the 2002 World Summit on Sustainable Development in Johannesburg the concept of sustainable development was more fully developed to encompass the three interdependent and mutually reinforcing pillars – economic and social development and environmental protection at all levels, in recognition of the complex and interdependent issues facing the world today.

The example of water may be cited. Although three-quarters of the earth's surface is covered by water, we can drink less than one per cent of it. Most of the water is either salty sea water or frozen in glaciers and polar ice caps. The demand for water today is, however, greater than ever, making every drop valuable. Everyone should learn to use water sparingly in daily life.

- F invites the Ps to identify some of the interdependent social and environmental problems facing the world today. F lists on the board the various responses of the Ps. Some of these responses may include deforestation, the population explosion, poverty, health issues, the violation of human rights, armed conflict, unplanned urbanization and industrialization.

Conceptual Level: Understanding

- F opens a discussion on the reasons why such social and environmental problems exist, the causes of the exploitation of people and natural resources and the rationale for people living inequitably and unsustainably. These reasons, among others, may surface: poverty, greed, short-term orientation versus an orientation to the future orientation, consumerism.
- F also brainstorms with the Ps possible measures that could be undertaken to solve the existing problems relating to development and its impact on society and the environment.

Affective Level: Valuing

- F poses this popular saying of Mahatma Gandhi to the Ps: 'Earth has enough for everyone's need, but not for anyone's greed'. F elicits their reactions on this.
- F leads the sharing to two most important questions: Do you really care for our environment? Do you see yourself as a steward of the environment? F invites the Ps to examine their lifestyle in relation to these two questions.

- F instructs the Ps to list on a piece of paper all the things they buy or consume at present. F may lead by giving his/her own examples.
- Ps then are asked to categorize their lists in the three columns provided in the activity sheet. F explains that needs are defined as those that one requires for living. Wants are those that one obtains for comfortable living. Excesses are luxuries that one can manage without.
- F groups them into triads to share their responses. F gives the following guiding questions:

  What does my consumption lifestyle reflect, in terms of my attitudes towards the environment?

  How do the fulfilment of my wants and excesses affect the environment?

  How do I feel about the present consumption lifestyle I have?

  How can I reduce my consumption lifestyle in order to be a better steward of the environment?
- F asks some volunteers to share their reflection from the activity.
- F challenges the Ps to extend their reflection beyond consumption patterns and examine other aspects of their lifestyle that either promote or degrade the care and protection of the environment.

Active Level: Acting

- F motivates the Ps to become conscious stewards of the environment and its resources by discussing some of the possible actions they could undertake. These are:

  Refusing unnecessary goods and services that are damaging to environment, such as saying no to the use of plastic bags in order to reduce the problem of non-biodegradable waste. Less demands leads to less production.

  Reducing consumption of goods and services that are unnecessary, such as minimizing electricity consumption to save the resources needed to generate it. Less need for electricity will reduce the construction of dams, which in turn will reduce the amount of land being submerged and the number of people displaced.

  Reusing goods to reduce the demand for new goods which will result in a reduction in the use of natural resources. Also, reusing disposable jars, for example, prevents them from becoming additional non-biodegradable wastes.

  Repairing goods, such as repairing old furniture, which is not only is cost-effective but also eco-friendly.

  Recycling goods to ensure they are use in another form. For instance, trees can be saved if used paper is recycled into paperboard or handmade paper.
- F encourages Ps to come up with their own suggestions using the 5 Rs cited above and to record specific actions they will take as emerging environmental stewards.
- F gathers some responses as samples and motivates the Ps to lead a more sustainable lifestyle.

## References

Bruntland, G. (ed.) (1987) *Our Common Future: The World Commission on Environment and Development*. Oxford: Oxford University Press.

Delors, J. (1996) *Learning: The Treasure Within. Report to UNESCO of the International Commission on Education for the Twenty-first Century*. UNESCO: Paris.

Quisumbing, L.R. (2004) Final report on teacher training workshop, learning to live together in peace and harmony. Report submitted to ASEAN Foundation, Jakarta, Indonesia.

Quisumbing, L.R. (2005) Education for the world and citizenship: towards sustainable societies. *Prospects*, 35(3): 289–301.

Quisumbing, L.R. (2006) Report on the teaching training workshops, learning to do. Report submitted to UNESCO–APNIEVE.

Quisumbing-Baybay, M.L. (2002) Evaluation of the workshop on international understanding and values education. *Miriam College Faculty Research Journal,* 21: 25–34.

UNESCO (1999) *Final Report, Second International Conference on Technical and Vocational Education*. UNESCO: Paris.

UNESCO (2000) *Education for Sustainability: Lessons from a Decade of Commitment from Rio to Johannesburg*. Report to World Summit on Sustainable Development. UNESCO: Paris.

UNESCO–APNIEVE (2005) *Learning to do: Values for Learning and Working Together in a Globalised World, A Holistic and Integrated Approach to Technical and Vocational Education and Training*. Asia–Pacific Network for International Education and Values Education: Manila.

UNESCO–UNEVOC (2004) *Orienting TVET for Sustainable Development*. A discussion paper for the UNESCO international experts meeting on Learning for Work, Citizenship and Sustainability, August. Bonn.

# Chapter 34
# Evaluating TVET Programmes through Appreciative Inquiry

**Alberto Arenas**

## Introduction

In connecting TVET to sustainable development, one of the areas ripe for exploration is evaluation. In the field of evaluation, an approach that is still in its infancy is appreciative inquiry (AI), a relatively new assets-based approach derived from the field of organizational development. This chapter seeks to bridge both gaps by proposing the use of AI to evaluate TVET programmes.

AI is a practical philosophy and tool that highlights the best in individuals and organizations and encourages them to strive towards a more positive future. As an evaluative approach it offers a practical strategy for encouraging change based on two main theoretical bases, positive imagery and social constructivism (Preskill and Coghlan, 2003). It encompasses elements from such inclusive techniques as empowerment evaluation (Fetterman, 1994), participatory evaluation (Cousins and Earl, 1995) and advocacy evaluation (Greene, 1997), but it goes beyond these through its systematic data collection process and its call to focus on the most successful aspects of a group. It is in these two latter points where AI differs the most from traditional evaluations. The typical evaluation is deficit-based, focusing on the needs of a group and trying to come up with ways of addressing them. This is most evident through the data-collection interviews ('What are the main obstacles you face? What prevents you from doing your job well? How could you minimize these problems?'). Consequently, evaluations often fail to acknowledge the organization's positive aspects and run the risk of alienating the same people they seek to support, possibly leading to evaluations left fallow. Moreover, TVET evaluations have traditionally focused on a very specific set of outcomes (job placement, academic achievement, programme costs) at the expense of other important goals as those spelled out by sustainable development (such as social equity and environmental protection). In contrast, because of AI's highly participatory nature, because it focuses on the most affirming aspects of an organization and because

A. Arenas
University of Arizona, Tucson, USA
e-mail: arenasa@email.arizona.edu

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it provides a larger vision towards the triple bottom line of economic, social, and environmental goals, it becomes a promising evaluation method to consider.

## Background on AI

AI started in the 1980s through to the pioneering work of David Cooperrider and Suresh Srivastva of Case Western Reserve University (USA) (Cooperrider and Whitney, 2005; Srivastva and Cooperrider 1990; Watkins, 2001). As a doctoral student of organizational behaviour, Cooperrider was highly influenced by the power of positive thinking, which led him to conclude that

> . . . on a collective basis [it] may well be the most prolific activity that individuals and organizations can engage in if their aim is to help bring to fruition a positive and humanly significant future. (1990, p. 93)

Cooperrider was also influenced by the life and work of Albert Schweitzer who practiced a form of biotheism that deemed all life to be sacred and interconnected (Schweitzer, 1955). This biotheism served as a foundational stone to justify a 'reverence for life', one of Schweitzer's intellectual hallmarks that also undergirds AI. Thus, what started as an organizational development tool evolved over time into 'a philosophy and orientation to change that can fundamentally reshape the practice of organizational learning, design, and development' (Watkins, 2001, p. 21). Over the last two decades AI has been applied with great success to a variety of institutions worldwide, including Fortune 500 companies, religious organizations, schools and universities and community-based groups in developing countries.

The actual practice of AI generally follows a four-dimension cycle. In the first stage, *discovery*, group members narrate stories on previously selected affirmative topics. These stories come out of individual interviews that pose a variation of the following question: What was a peak experience or high point in your (personal/professional/organizational) life? For the storytelling to be effective, the questions should affirm individuals' skills and focus on both technical capacity and community development. Once the interviews and stories take place, answers are shared with the group as a whole and common themes related to causes of success are identified.

In the second stage, *dream*, participants envision their organization working at its best. Based on the common strengths identified in the interviews and through various visualization and creativity-enhancing techniques, participants challenge the status quo, confront common assumptions and create a new reality in their minds. This stage is where sustainable development goals start to take shape. Typical questions are: what is your dream for a better world? How can your organization contribute to that dream? What unique contribution(s) can you make to that dream? The answers are then summarized in the form of macro-level provocative propositions, declarative and affirmative 'statements that bridge the best of "what is" with your own speculation of intuition of "what might be" ' (Watkins, 2001, p. 141). A provocative proposition can be in the form of words – a single sentence, a mission

statement, a poem – or a drawing (more appropriate for non-literate groups). The most successful macro-level propositions are those that contain a holistic vision, an image shared by all and a balance between current accomplishments and future goals.

In the third stage, *design,* the macro picture is broken down into specific statements that address short-, medium- and long-term strategies. These statements are micro-level provocative propositions that detail a specific plan of action, with doable activities spread over time. The most successful action plans are those that address the following areas: (a) the roles and responsibilities of various stakeholder groups and individuals in those groups, (b) technical skills as well as 'soft' skills such as leadership and networking, (c) resources such as financial, human, material and so on and (d) structural components such as policies, management, documentation and monitoring.

In the fourth and final stage, *delivery*, the provocative propositions are brought to fruition. This stage emphasizes innovation though the mobilization of new ideas, material resources and personnel. It supports continuous learning so that members can learn from even the smallest of successes for future replication. It pushes for active participation and shared responsibility for decision-making. It stresses continuous evaluation to ensure adequate progress and to revise action plans when appropriate and it encourages an appreciative eye to celebrate the highlights of the organizational transformation. This latter point is a reminder of the cyclical nature of AI, which means that any stage can recur at any point during the transformational process.

Grounding the practice of AI are two main theoretical considerations: positive imagery and social constructionism. Regarding positive imagery, one key principle is (positive) heliotropism, a biological law that describes how plants move in the direction of the sun. A complementary principle is what Edward Wilson (1992) called biophilia, or 'the connections that humans subconsciously seek with the rest of life' (p. 350). While it is still being debated whether it is subconscious or not, biophilia nonetheless describes the human propensity to affiliate with and care for other life forms, human and nonhuman alike. Two well-known illustrations from medicine and education explain this (for other examples, see Cooperrider, 1990).

One comes from the placebo effect, that is, when an inactive substance or procedure used as a control in an experiment is found to be as effective as the active substance or procedure. Numerous carefully controlled experiments have shown that a placebo action can provide relief or the diminution of pain (Evans, 2004). This relief has not only been self-reported but has also been objectively measured and the same improvements have not been typically observed in patients not receiving the placebo. While thought alone cannot cure all diseases, the research has consistently indicated that positive images can be projected into the future to accelerate or even activate the emotional and physiological healing process, even when the patient is receiving no active inducement.

A second example comes from the Pygmalion effect, in which a false analysis of a situation leads one to think and behave in such a way that the original false analysis becomes true. In the classic 1968 Pygmalion study by Jacob Rosenthal

and Lenore Jacobson, a group of children from the 1st to the 6th grade received an IQ test (Rosenthal and Jacobson, 1992). The students were then divided randomly and a false list of the allegedly top scorers was given to the teachers. At the end of the school year, the IQ test was given again and the scores from the two tests compared. Rosenthal and Jacobson found that, in general, those students who had been falsely labelled as being superior had scored significantly higher than those labelled as average.

In these two illustrations there is the element of anticipatory images of the future. This anticipation inspires and guides the behaviour of individuals. It is the image projected into the future that determines how people operate. Inevitably, this will have an effect on the social systems these individuals belong to, both in a positive and negative manner.

In addition to positive imagery, the second theoretical consideration that grounds AI is social constructionism. As originally theorized by Peter Berger and Thomas Luckmann (1967), social constructionism is a theory of knowledge that seeks to understand the ways in which individuals and collectivities make sense of perceived reality. It is concerned with people's shared understanding of the world in the past, present, and future. This shared understanding emerges and is reproduced by social interactions that presuppose a common set of assumptions and knowledge. One typical example is the social construct of gender. The rules by which women behave in certain ways – as evidenced by clothing, speech, employment, leisure activities and so on – is wholly or mostly determined by historical and social processes, regardless of biology.

Kenneth Gergen (2001), a key proponent of the connections between social constructionism and AI, posited that the basic unit of knowledge is not the individual but the relationship among people. This opens up the possibility of going from *cogito ergo sum*, a key tenet of Western modern thought, to *communicamus ergo sum*. In this context, language becomes the main tool by which we establish such communication and vocabularies of understanding change through interaction, negotiation, conflict and consensus building. As we shall see below, the construction of reality as mediated by language has important implications for evaluation theory and practice as stakeholders with diverse viewpoints are present at the same table.

## Connecting AI to Evaluation

To best understand the relationship between AI and evaluation, I use a hypothetical example from a vocational education programme based on a public secondary school, supplemented by real AIs. The programme in question trains students in the design and construction of houses for low-income families through a partnership with Habitat for Humanity. The houses are built on school grounds but, upon completion, they are moved to their permanent site. To evaluate the programme's progress, AI is selected because while in general there have been noteworthy results – namely, the construction of one house a year – there is one area of concern,

the minimal involvement of environmental considerations in the home design and construction. After conducting an initial workshop in which the main principles of AI are introduced, the first step is to engage with the teachers (and later on with the students) in the *discovery* stage; the dimension that acknowledges and celebrates everything that has been accomplished to date. The questions can be made more general or more specific depending on the needs of intended users. The interviews, conducted by an external appreciative evaluator or by the teachers themselves, could encompass the following questions:

- Reflect for a moment in your involvement with the house design and construction programme over the last three years. Now describe high points that made you especially proud. Who was involved? What made that experience possible?
- In your work at the programme, what do you value the most in yourself as a contributing member?
- Describe a positive experience you have had related to design and construction that has sought to minimize its ecological footprint?
- If you had three wishes that would allow you to extend the environmental considerations of your programme, what would those be?
- Imagine it is the year 2012 and your programme has been awarded the Green Architecture award of the year. What is happening in the programme that allowed it to earn such a prize?

The power of appreciative questions should not be underestimated. As Jacobsgaard (2004) said about an appreciative evaluation of a Sri Lankan non-governmental organization (NGO) supporting victims of trauma, when they were initially approached to be evaluated through AI, the NGO members were reluctant to comply, because previous evaluations had mostly focused on the negative aspects of the programme and neglected the positive ones. When AI was introduced, members of the Sri Lankan staff were surprised by the high level of energy generated in comparison to previous evaluations. To a question such as, 'Tell us about a situation when you [the NGO] have been most successful in [the] prevention of torture and violence?' (Jacobsgaard, 2004, p. 58), answers showed how creative the group had been in protecting victims, despite working under extremely onerous conditions.

From this experience and that of other groups using AI, the storytelling of peak experiences, a basic AI data gathering tool, has been found to be ideal for creating the momentum necessary for change. Unlike traditional evaluation techniques that consider the participants separate from the data, in AI the participants, the data collection process and the data itself are viewed as inseparable. Storytelling is a universal activity that involves mind, body and spirit in ways that traditional analytic discussions fail to bring together. The content of the story itself engages the intellect, but then the images evoke a much deeper level of understanding and feeling. It awakens 'the dreaming imagination and intuitive intelligence of the listener' (Watkins, 2001, p. 77), which are essential for helping participants to create new visions of their world.

This leads us to the *dream* stage, which starts the goal driven, action-oriented function of AI. Part of the power of AI is that it encourages participants to defy the

status quo by envisioning a more inspiring and ambitious programme. AI provides a holistic direction for a more humane and efficient organization and, ultimately a more peaceful and harmonious world. As Cooperrider wrote:

> AI is based on a 'reverence for life' and is essentially biocentric in character: It is an inquiry process that tries to apprehend the factors that give life to a living system and seeks to articulate those possibilities that can lead to a better future. (1990, p. 121)

Choosing the right dream, one that is doable but that challenges current practices, is the stage that requires the most creativity. Its starting point is the information collected in the discovery stage, and is organized into macro-level provocative propositions. In the hypothetical case mentioned above, teachers and design and construction consultants could come up with an architectural project that, for instance:

- Follows traditional home designs to respect local architectural traditions;
- Employs passive and active solar designs for energy conservation;
- Uses as far as possible electricity that has been generated on-site (e.g., in solar panels);
- Fosters the use of materials grown locally and/or sustainably;
- Uses wastewater for irrigation purposes;
- Creates a landscape that uses native plants and that promotes biological diversity;
- Integrates design and construction systems to avoid redundancies (Orr, 2002).

While the final list will depend on many local considerations, such as finances, know-how and human resources, the point is to build houses that both the school and future occupants can feel proud of, because they please aesthetically, reduce long-term costs and cause the minimal possible ecological damage.

In the *design* stage, the values and ideals from the dream stage are given specificity. In this stage participants are addressing the what, the who, the how and the when of the evaluation. This includes crafting a new set of responsibilities, roles and relationships among stakeholders. Here, both quantitative and qualitative data can be collected. For our specific example, some of the changes may include:

- Having teachers receive training in green architecture;
- Attending regular workshops and conferences to keep up to date;
- Making necessary curricular additions and changes;
- Establishing partnerships with local environmental and architectural agencies that can assist the school in realizing its vision;
- Communicating with other key actors (such as school administrators and parents) about the importance of the changes to secure their support;
- Writing grants to help fund the needed changes.

In this stage, as in the dream one, the role of language is essential in shaping people's perception of the world. As George Lakoff wrote, 'thinking differently requires speaking differently' (2004, p. xv). A good example is the concept 'employment creation', considered a key goal of vocational education. This concept masks more than it reveals. While programme administrators and evaluators may give positive

marks to a programme in which its students secure employment upon graduation, the jobs may be ones that alienate the individual or that hurt others and the planet. Thus, we are forced to qualify this term with an adjective like 'quality' employment or 'dignified' employment, to signify the push for a new social reality. In a similar vein, language use reflects power differences among stakeholder groups. Those who hold power and who speak the standard (and more prestigious) version of the vernacular end up defining the problems at the expense of the input from marginal groups. For instance, vocational education students are often labelled 'at risk' in the context of US schools and seldom is the effect of this label assessed on the youth's self identity. As Madison (2000), who studied the socio-politics of language in social programmes, wrote:

> For the youth, the language of at-risk conjures up feelings of anxiety and shame. This shame is internalised by some of these youngsters. For some youth, at-risk meant that they are defective in some way. Others stated that 'people think we are losers and have little potential in life'. (p. 23)

Linguistic mental structures, which Lakoff (2004) called 'frames', thus shape an organization's provocative propositions. They help to determine what social policies are possible, or even conceivable. The role of the appreciative evaluator then is to help use language to create alternative, positive views of reality.

The last stage is *delivery*, which turns the macro and micro propositions from the dream and design stages into a physical reality. This is the longest lasting stage and one that requires continuous learning and innovation. Although the changes may require a new structural and social architecture, the likelihood of implementing AI action plans is high for two main reasons. Firstly, the images of the future are grounded in the organization's positive past. Following the principle of heliotropism, people tend to follow positive rather than negative reinforcement more readily, at least when organizations are viewed as families; that is, where respect, high expectations and care abound. Secondly, there is a sense of ownership of the evaluation. As in other participatory forms of evaluation, members focus the questions, come up with the vision, establish priorities, interpret the data and connect processes to outcomes (Cousins and Earl, 1995). Participation is real, not fictitious. Following the tenets of social constructionism about how images create realities, this is especially important when there are divergent views and the evaluator helps them to coalesce into a vision that all or most individuals can agree with.

It should be noted that AI makes most sense as a formative evaluation strategy as opposed to a summative one. People's vision for a better organization will necessarily evolve over time, so there is no single end point but a multiplicity of them. This idea also honours the cyclical nature of AI because the stages can repeat themselves at any moment during the process. In our hypothetical example of the vocational programme, the main actors created a vision that leads them to 2012, and seek to bring about and consolidate those changes in the delivery stage. Ideally, every few years a new evaluation should be conducted to calibrate the original goals and to determine if new ones are needed. In a similar fashion, interventions that have included post-evaluation follow-ups have ascertained the usefulness of AI. Two

years after an appreciative evaluation was done at the African Women's Media Centre (AWMC) based in Dakar, Senegal, a follow up took place to determine if some of the originally identified challenges had been addressed (Catsambas and Webb, 2003; for other examples, see Preskill and Coghlan, 2003). One of the problems the group had initially identified was the lack of African leadership in the organization. The AWMC was funded by an international NGO with headquarters in Washington, DC. Thanks to the AI evaluation vital changes occurred, as AWMC leaders said:

> Since the [AI] evaluation took place, we have made some dramatic changes in the leadership of the NGO. At the time of the evaluation AWMC had an American director … since the evaluation a new director has been hired – a journalist from The Gambia with 25 years of experience in radio and a background in leading NGOs in Africa. (Catsambas and Webb, 2003, p. 48)

This example points to the issue of sustainability and the changes that AI can effect on evaluation procedures long after AI evaluators have left. AWMC's post-evaluation revealed that the staff were actively incorporating AI elements in their own evaluations. For instance, they now asked questions differently from they way they did in the past, with a focus towards celebrating and learning from past successes, and developed a greater long-term vision than previously contemplated. Similar experiences have been documented by other evaluations using AI (e.g., Jacobsgaard, 2004).

## Potential Problems of AI in Evaluation

There are three main potential problems related to the philosophical and practical foundations of AI:

- Detractors have found weaknesses in AI's support for positive imagery. For instance, it has been argued that the medical evidence backing the placebo effect – used in support for positive imagery – is mixed at best (Patton, 2003). For instance, after reviewing the evidence, Kienle and Kiene (1997) concluded that factors such as spontaneous improvement, fluctuation of symptoms, regression to the mean, additional treatment and patient expectation could be more significant. Evans (2004), however, conducted a large-scale analysis of placebo studies dating back to the 1950s and found that in general it is safe to say that the placebo effect is real, but small.

  A similar critique has been made of Pygmalion effect-like research. Wineburg (1987) argued that from a statistical standpoint the effect sizes of studies on self-fulfilling prophesies have been small and the correlations weak, and there is a danger of blaming teachers for problems that should be better attributed to such societal problems as poverty and racism. Nonetheless, recent meta-analysis showed that the Pygmalion effect does exist (athough the effect is typically small) and it tends to affect more markedly stigmatized social groups (Jussim and Harber, 2005). In sum, while the evidence in support of the placebo and Pygmalion effect is not conclusive, there is enough confirmation to show

that people's beliefs about something, or how others view them, do affect their behaviour and their belief in their own capacity to accomplish a desired outcome.

- AI has also been faulted for its lack of objectivity. Because it asks loaded (positive) questions, it has been critiqued as being biased and lacking neutrality. As Patton wrote:

> [AI] may even, ironically, discourage inquiry by discouraging constructive criticism. The focus on appreciation can imply an unwillingness to look at weaknesses, problems, and things that can go wrong. (2003, p. 91)

While this is certainly possible, the wishes and dreams that come out of the appreciative questions implicitly point to deficiencies in the organization. In the evaluation of Senegal's AWMC, a wish that had been manifested was an increase in African leadership, clearly indicating a weakness in the organization. In our hypothetical example, the fact that the evaluation was being conducted in the first place with a focus on environmental sustainability, was precisely due to the willingness of stakeholders to confront their current desires. It should also be emphasized that the owners of the evaluation, the actual intended users, are the ones to decide what makes most sense, given their own values and goals.

As long as stakeholders are aware of the partiality of appreciative questions and find it unproblematic – because they are assuming honesty in the data collection – then this should not constitute an obstacle to ensuring that the findings are relevant and ultimately used. As Patton wrote in his defence of utilization-focused evaluation, 'commitment to intended use by intended users should be the driving force in an evaluation' (1997, p. 382). A different but relevant view is the one presented by Jennifer Greene in her advocacy of evaluators explicitly stating their value commitments. She wrote:

> It is time for evaluators to claim and proclaim their advocacy. To do otherwise is to be disingenuous, even deceptive to our audiences. It is to don a mantle of impartiality that is today tattered and threadbare, that no longer shields our inquirer selves from the prejudicial influences of values and beliefs. (1997, p. 28)

Even when so-called 'objective' evaluations are done (such as those related to needs assessments), the likelihood of uncovering positive aspects is much less certain than the likelihood of AI of uncovering negative aspects. So, for intended users who wish to use AI for a comprehensive picture of their organization, the balance weighs more heavily on AI's side.

- The final problem, related to the previous issue, focuses on the potential for the abuse of power. Because of differential control and influence in an organization, the more powerful individuals will tend to decide the evaluation agenda. They are less likely to choose topics that shed a negative light on their work. Moreover, the positive focus of AI may lead stakeholders to not want to rock the boat, and instead try to foster harmonious relationships in the hopes that a non-confrontational style addresses such thorny problems as poverty, sexism, racism, homophobia and so on. This point was emphasized by Rogers and Fraser (2004, p. 77) when they wrote, '[AI] runs the very real risk of papering over substantive

problems and in fact colluding with the powerful people who want the unexamined to remain so.'

This critique is coupled with another one concerning a main tenet of social constructionism, the idea that perception creates social reality. This view is disputed by the philosophical camp of realism. John Searle, one of realism's most eloquent defenders (1995), wrote that the physical reality does put limits on the socially constructed reality and that, ultimately, the existence of an objective reality should not be made irrelevant. Thus, if a female student in a vocational programme is prevented from engaging in certain activities just because of her gender, her change of perception will not in itself do away with the sexism.

In addressing these critiques, Gergen has sought to find common ground between realism and social constructivism in viewing both as 'cultural resources' (2001, p. 15) to be used in the appropriate context. We can choose to identify an objective reality in cases where there is oppression, and we can choose to challenge it by envisioning a new social reality that lacks that form of oppression. That is precisely what some case studies have revealed. MYRADA is a south Indian development organization that has used AI to promote sustainable development in rural Indian communities (Ashford and Patkar, 2001). MYRADA has worked with about 500 community groups in forest and natural resource management, watershed development, poverty alleviation and gender equity. On one occasion when AI's discovery stage was being conducted in one of the villages, women participants told uplifting stories of how they felt empowered to confront their husbands for the abusive gambling that kept their families poor (2001, p. 14). AI then assisted in solidifying these social gains at the local level. Nonetheless, it should be pointed out that this worked because the rural community had already identified mistreatment of women as a problem. Without this earlier identification, it is unclear that AI would have uncovered the problem. This, however, is true not only of AI but of other forms of evaluation as well.

In sum, to ensure that the above three potential problems remain only potential, the AI evaluation requires time, trust, honesty and a new disposition from the part of stakeholders to embrace change.

## Conclusions

AI, as an evaluation philosophy and tool, is based on the alluring premise that by concentrating on the positive aspects of an organization, more favourable outcomes will be experienced. For sustainable development, AI is particularly tempting because both promote similar goals and strive to inject hope and optimism in forging a better future. For a low status field like TVET that has historically suffered from an ill-deserved reputation as the poor sister of general, academic education, AI presents itself as especially useful in lifting up TVET's self-esteem and directing its mission towards new, daring and powerful directions.

At the same time, one should be wary of the universal application of AI in all circumstances that call for an evaluation. We can see this in the concept of heliotropism, a favourite metaphor used by AI supporters. While the metaphor is highly inspiring, not all plants engage in positive heliotropism and those that do still have parts that behave in heliotropic negative ways – that is, they avoid the sun altogether, such as the roots. Similarly, AI is most useful for only some organizations, especially those that see evaluation as a learning process and those that have been hurt in the past by deficit-based evaluations, and even then AI may be used in combination with other evaluative tools – in a manner akin to combining qualitative and quantitative evaluations. Ultimately, as Patton reminded us, the merit and worth of an evaluation is determined by the organization's renewal that results from the actual use of the evaluation's processes and results (1997). If the transformation is positive, then the AI will have been effective. Otherwise, it will have failed.

Even with this admonition, we should remind ourselves that traditional TVET evaluations focus mostly on judging outcomes such as increasing academic achievement, graduation rates and employability. While these are certainly important goals, evaluations should also encourage stakeholders to embrace more ambitious aims, such as those suggested by sustainable development. In fact, any evaluation, be it AI or some other approach, has a responsibility to push the dialogue and action towards such goals as providing decent and cost-effective housing, safe and adequate food supply, fair and dignified employment, and protecting nature for present and future generations, all appropriate themes for TVET programmes. This entails the idea that one cannot engage in evaluations without becoming contaminated by personal or political sympathies, which should not preclude the candid and precise collection of data in the first three AI stages. In the context of research, but extrapolated here to evaluation, Howard Becker wrote, 'The question is not whether we should take sides, since we inevitably will, but rather whose side are we on' (1967, p. 239). By taking sides on the life-giving energy of people and organizations, AI is explicit in its value stance. AI's conscious focus on positive emotions, such as cheerfulness, confidence, high expectations, love and faith may enable the visions of individuals and organizations a greater likelihood of becoming a reality.

## References

Ashford, G. and Patkar, S. (2001) *The Positive Path: Using Appreciative Inquiry in Rural Indian Communities.* International Institute for Sustainable Development: Winnipeg.

Becker, H.S. (1967) Whose side are we on? *Social Problems*, 14(3): 239–247.

Berger, P. and Luckmann, T. (1967) *The Social Construction of Reality: A Treatise in the Sociology of Knowledge.* Doubleday: New York.

Catsambas, T.T. and Webb, L.D. (2003) Using appreciative inquiry to guide an evaluation of the International Women's Media Foundation Africa Program, in Preskill, H. and Coghlan, A.T. (eds) *New Directions for Evaluation*, 100, pp. 41–51, Jossey-Bass; San Fransisco, CA.

Cooperridder, D.L. (1990) Positive image, positive action: the affirmative basis of organizing, in Srivastva, J., Cooperrider, D.L. et al. (eds) *Appreciative Management and Leadership:*

*The Power of Positive Thought and Action in Organizations*, pp. 91–125. Jossey-Bass: San Francisco, CA.
Cooperrider, D.L. and Whitney, D. (2005) *Appreciative Inquiry: A Positive Revolution in Change.* Berrett-Koehler: San Francisco, CA.
Cousins, J.B. and Earl, L.(eda) (eds) (1995) *Participatory Evaluation in Education: Studies in Evaluation Use and Organizational Learning.* Falmer Press: London.
Evans, D. (2004) *Placebo: Mind Over Matter in Modern Medicine*. HarperCollins: London.
Fetterman, D.M. (1994) Empowerment evaluation. (Presidential address) *Evaluation Practice*, 15(1): 1–15.
Gergen, K.J. (2001) *Social Construction in Context.* Sage: London.
Greene, J.C. (1997) Evaluation as advocacy. *Evaluation Practice*, 18(1): 25–35.
Jacobsgaard, M. (2004) Using appreciative inquiry to evaluate project activities of a non-governmental organization supporting victims of trauma in Sri Lanka, in Preskill, H. and Coghlan, A.T. (eds) *New Directions for Evaluation*, 100, pp. 53–62, Jossey-Bass; San Fransisco, CA.
Jussim, L. and Harber, K.D. (2005) Teacher expectations and self-fulfilling prophecies: knowns and unknowns, resolved and unresolved controversies. *Personality and Social Psychology Review*, 9(2): 131–155.
Kienle, G.S. and Kiene, H. (1997) The powerful placebo effect: fact or fiction? *Journal of Clinical Epidemiology*, 50(12): 1311–1318.
Lakoff, G. (2004) *Don't Think of an Elephant: Know Yours Values and Frame the Debate,* Chelsea Green: White River Junction, VT.
Madison, A.M. (2000) Language in defining social problems and in evaluating social programs, in Hopson, R. (ed.) *New Directions for Evaluation,* 86, pp. 17–28, Jossey-Bass; San Fransisco, CA.
Orr, D. (2002) *The Nature of Design: Ecology, Culture, and Human Intention.* Oxford University Press: New York.
Patton, M.Q. (1997) *Utilization-focused Evaluation: The New Century Text*, 3rd edn. Sage: Thousand Oaks, CA.
Patton, M.Q. (2003) Inquiry into appreciation inquiry, in Preskill, H. and Coghlan, A.T. (eds) *New Directions for Evaluation*, 100, pp. 85–98, Jossey-Bass; San Fransisco, CA.
Preskill, H. and Coghlan, A.T. (eds) (2003) Using appreciative inquiry in evaluation, *New Directions for Evaluation,* 100. Introduction, Jossey-Bass; San Fransisco, CA.
Rogers, P.J. and Fraser, D. (2004) Appreciating appreciative inquiry, in Preskill, H. and Coghlan, A.T. (eds) *New Directions for Evaluation*, 100, pp. 75–83, Jossey-Bass; San Fransisco, CA.
Rosenthal, R. and Jacobson, L. (1992) *Pygmalion in the Classroom: Teacher Expectation and Pupils' Intellectual Development*. Irvington: New York.
Schweitzer, A. (1955) *The Philosophy of Civilization.* Macmillan: New York.
Searle, J.R. (1995) *The Construction of Social Reality.* Free Press: New York.
Srivastva S. and Cooperrider, D.L. (1990) *Appreciative Management and Leadership: The Power of Positive Thought and Action in Organizations.* Jossey-Bass: San Francisco, CA.
Srivastva, S. and Cooperrider, D.L. (1990) Mohr,Appreciative Inquiry: Change at the Speed of imagination, Jossey-Bass and Pfeiffer: San Francisco, CA.
Watkins, J.M. and Mohr, B.J. (2001) *Appreciative Inquiry: Change at the Speed of Imagination*, Jossey-Bass and Pfeiffer: San Francisco, CA.
Wilson, E.O. (1992) *The Diversity of Life.* Harvard University Press: Cambridge, MA.
Wineburg, S. (1987) The self-fulfilment of the self-fulfilling prophesy. *Educational Researcher*, 16(9): 28–37.

# Chapter 35
# Enhancing and Supporting TVET for Sustainable Development: Towards a Synthesis

**Iris Bergmann**

In this section, the theme that stands out is the need to create new images, words and stories that are evocative and relevant for our societies and for a life embedded in sustainability. One inspiring source for this new kind of language is the Nhunggabarra people of Australia. In this chapter I use the characteristics of the Nhunggabarra societal organization as reference points to synthesize the common threads that emerge from the writings of the authors of this section. These are organized under the categories of values, spirituality, respect, institutional strategies and the need for a lifelong dialogue for sustainability.

## New Images, Words and Stories

Pretzer, Pavlova and Arenas (Chapter 34) all call for new images and words for sustainability. Pretzer states candidly that perhaps the sustainability movement needs a 'brand re-adjustment' and 'new images to go with the old words' that will also infiltrate TVET. Similarly, Pavlova refers to a need for an aesthetic of sustainability, while Arenas believes that a new language whose meanings all project sustainability is needed for adequately evaluating our education and training endeavours for sustainable development.

Pretzer believes that we are at a tipping point. Words and images related to sustainability that people understand are emerging in the mass media. We can read in sports magazines articles the potential impact of global warming on skiing and water sports, and find illustrations of sustainable designs of golf courses and sports stadiums. Pretzer urges us to take advantage of this 'watershed moment' and use familiar language and experiences to influence TVET. Ultimately, this will help create a generation who 'routinely asks questions regarding sustainability of technical systems'.

Pavlova presents her innovative systematic framework for teachers and trainers to help them design content that is relevant for TVET for sustainable development. This framework consists of two dimensions. The first one includes cognitive,

I. Bergmann
RMIT University, Melbourne, Australia
e-mail: iris.bergmann@rmit.edu.au

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practical and aesthetic aspects of social life and the second dimension draws on the quadruple bottom line of sustainable development: the economic, environmental, social and ethical aspects. The most salient feature of her framework is the identification of the dominance of the aesthetic sphere that overpowers the moral and cognitive spheres. Pavlova points to the risk but also the potential that lies in a reality that emphasizes form over function and content. The dominance of the aesthetic paradigm and the role it plays in shaping particularly young people's identities can be used positively by employing an aesthetic of sustainability.

Arenas (Chapter 34) introduces appreciative inquiry (AI) as a philosophy and tool to evaluate TVET programmes, and as a strategy for change. AI is an assets-based (rather than a deficit-based) approach derived from the field of organizational development and has two main theoretical bases: positive imagery and social constructivism. As Arenas (Chapter 34) states, it has been applied with great success to a variety of institutions worldwide, including Fortune 500 companies, religious organizations, schools, universities and community-based groups in developing countries. The actual practice of AI generally follows a four-dimension cycle of discovery, dream, design and delivery. Storytelling is the peak data gathering tool for the discovery phase. The content of the story itself engages the intellect, but then the images evoke a much deeper level of understanding and feeling which are essential for helping participants to create new visions. According to Arenas (Chapter 34), the most challenging task is to find the affirmative topics of exploration – for example, questions of social equity and environmental protection will be favoured over questions of job placement, academic achievement and programme costs. The language we use helps determine what is possible or even conceivable. Hence the need for sustainable verbal and visual imagery to change TVET programmes for sustainable development.

## Role Models for a Language of Sustainability

Following Pretzer, Pavlova and Arenas (Chapter 34), the question that arises is whether it is possible or desirable to find a unifying guiding image, a language or aesthetic, and what would it look like? Are there models we can draw on?

Sveiby, a Finnish professor of knowledge management, has an affirmative answer. In Australia he found not only a truly sustainable society, but one with the longest continuous cultural history in the world, the Nhunggabarra people. They are a group of 26 indigenous Australian communities from the Nhunggal country, a region in south Queensland and northwest of New South Wales. Their entire life, their culture and economy are based on such a single guiding image: The mission to keep all alive (Sveiby and Skuthorpe, 2006). In the following, a brief description of their societal architecture is given and the relevant aspects of their economy, relationships and education serve as reference points for the discussion below.

Sveiby applies knowledge-based theory to bring to light how the Nhunggabarra were able to live sustainably until the arrival of the Europeans. The most striking feature of their society is their knowledge economy. Their value generation, production

and consumption is primarily intangible. Their high value intangible goods include education, knowledge, art, law, entertainment, medicine, spiritual ceremonies, peacekeeping and social welfare.

The Nhunggabarra law stories prescribe many processes and institutions for resolving community conflicts, for preventing centralized power, for keeping intercommunity peace, for community welfare and for environmental care. Telling stories repeatedly keeps everybody aware of their laws. Education has a very high status.

The defining differences between the Nhunggabarra and other societies that have collapsed are the organization of the Nhunggabarra society, their leadership and their high level of ecological knowledge. The Nhunggabarra display an advanced government model for a sustainable world. Nhunggabarra's leadership style was context-specific – who was the leader depended on the situation and the context. They did not have a democracy, but their power-balancing mechanisms are inbuilt: consensus-building, context-specific leadership and role-splitting, know-how organizing, the need to show respect for other people, and rules and principles that prevented individuals from rising to absolute power. A peacekeeping, trust-building and relationship building mechanism is, for example, the *tuckandee* system: each Nhunggabarra person had a remote brother or sister in another community, a *tuckandee*, who, in the event of their death, would take on the roles that they have held within their community, including that of custodian of their specific knowledge.

The latest advances in ecological science are currently leading to the recognition of their ecofarming methods. The mission to keep all alive led to the invention of a system of 'live larders' that helped to provide fresh food during the entire year. The dual purpose of ecofarming methods is to sustain the 'customer' (the animals, the plants and the land) and to sustain the 'mob' (their people).

Sveiby and Skuthorpe found that industrialized societies are approaching in some areas the state of Nhunggabarra society. They present a number of examples that demonstrate the increasing value of intangible production. For example, intangible assets have replaced tangible assets as wealth generators in industrial companies that make up the Dow Jones Index. Intangibles can mean education, health, retail, transport, hotels, restaurants, art and entertainment, particularly in the form of digital content production. US investments in intangibles including design, software, ideas, artistic expression and marketing of new products might exceed those made in tangibles, that is equipment and fixed assets. Knowledge-based organizations with intangible production and a more context-specific leadership style are growing. They are found in business services such as accounting and advertising, in information, telecommunication and computer technology, in research (both public and corporate) and the entertainment and performing arts industries. In growth terms, private knowledge-based companies have outperformed the manufacturing industry and other service industries since the 1970s.

In their contributions on enhancing and supporting TVET for sustainable development, the authors of this section reflect on issues that are mirrored in the features of Nhunggabarra society: localization, integration of the sustainable practices and values into all areas of society, spirituality, respect for people in all

directions, respect for knowledge including traditional, experiential and tacit knowledge, simultaneous consideration of social, ethical, environmental, cultural and economic dimensions; communication; peace and harmony; trust; promoting role models; community participation.

Every author of this section makes reference to most of these issues as dimensions to be integrated into the development of TVET systems. The overarching dimensions of values, spirituality and respect are addressed individually next.

## *On Values*

The fact that the Nhunggabarra people have the longest continuous record of a society is evidence that it is possible for society to be entirely based on values that are consistent with every aspects of sustainability. Values feature in the writings of all authors of this section. Pretzer justifies the introduction of discussions of social values into the TVET curriculum because, as he points out, the process of technological change itself is value-laden. In the same vein, definitions of efficacy and efficiency are to be reconsidered to serve the creation of sustainable systems.

Quisumbing and Baybay state that a knowledge-based society must be value-centred. They introduce a comprehensive model for values education. It includes 36 modules designed to help educators and trainers gain confidence in the process of values education. Each module applies a four-step learning cycle that is structured to include the cognitive level (knowing), the conceptual level (understanding), the affective level (valuing) and the active level (acting). The modules are resource materials that can be adapted according to the content needs and the cultural settings and into any area of TVET. The modules are organized in the eight core values needed to educate the person as an individual and as a member of the workforce anchored in human dignity and the dignity of labour. The content of those modules shows parallels to the status of values in Nhunggabarra society throughout.

## *On Spirituality*

Sveiby and Skuthorpe (2006, p. 59) emphasize that the Aboriginal way of life required the development of a highly refined perception, great physical strength and purity of mind. Therefore, spiritual awareness and spiritual capabilities were taught from an early age. Pretzer too demands that spiritual motives for supporting sustainability must be energetically acknowledged. Quisumbing and Baybay also make strong references to spirituality. In fact, spirituality is a growing dimension in the business world, as Pruzan and Pruzan Mikkelsen (2007) show. They portray a global culture emerging in business leadership with executives leading their business from a spiritual base. Next to IQ and EQ, we now find SQ, the spiritual

quotient (Pruzan and Pruzan Mikkelsen, 2007, p. 11). Spirituality here is not to be mistaken as religiosity. As one of the executives is quoted by Pruzan and Pruzan Mikkelsen (2007, p. 4):

> Spirituality is attunement with a universal spirit. It is being so in tune with that spirit that you are not acting from a place of ego or desire or greed, but you are acting from a place that is on behalf of the welfare of the totality.

This definition is consistent with the approach of the Nhunggabarra people. Similarly, the individuals interviewed by Pruzan and Pruzan Mikkelsen strive to lead with integrity and fulfilment, and in harmony with the private and business self. Thus we see an expansion of the concept of 'success', a rewriting and creating of new images relevant for our quest for a sustainable society, business and work.

### *On Respect*

Sveiby and Skuthorpe describe mutual respect in all directions as the glue that kept Nhunggabarra society together – respect for the integrity of the individual which was balanced by the need of the individual to show respect for the community. The respect extended to all living beings, to the land and to other people's opinions. Likewise, Quisumbing and Baybay state that our knowledge-based society must also be anchored in a respect for life, for human dignity and for the plurality and diversity of societies and cultures. Arenas (Chapter 30) and Singh refer to aspects of the quality of the product which respects the labour of the individual that produced it. This can be extended to the resources used and the knowledge required. Pretzer talks about a respectful balance between strengthening local traditions and norms and new attitudes that prepare young people for, promote even promote change. He states that drawing on faith- and spirit-based systems of ecological wisdom is one way of respecting local belief systems.

## Institutional Strategies

Singh, Arenas (Chapter 30) and Waddell et al. present institutional strategies for enhancing and supporting TVET for sustainable development. For the Nhunggabarra, education was a real-life process in real-life settings. In contrast, as Singh points out, TVET and educational systems in general 'failed to facilitate an adequate approach to dealing with real-life situations'.

With reference to Ivan Illich, Singh stresses that most learning takes place in out-of-school contexts and as result of unrestricted participation in life situations. This suggests that we should look for ways of bridging the gap between education, the community and the work situation. Examples of this include combining education and vocational training or enhancing co-operation between educational institutions and enterprises. Singh presents a typology for such school enterprises. Her outline hints at dissonances that arise for educational and training institutions striving to

meet their educational goals, but also in some cases having to self-finance through school enterprises and the perceived need to meet market demands.

In contrast to Singh's review of school enterprises, Arenas (Chapter 30) examines the production process and the products and services delivered by two particular school-based enterprises through the lens of environmental sustainability. He claims that in principal school-based enterprises can support ecological renewal and make products that are durable, repairable, remanufacturable and recyclable. However, he finds that the institutions that he has studied do not exhaust this potential. He also refers to the risk of engaging in a mix of both sustainable and unsustainable practices due to limited practicality, opportunities and knowledge.

From Singh and Arenas (Chapter 30) it follows that enterprises at the interface of education, training and real-life work and business situations are ideally placed to enhance and support TVET for sustainable development. For example, the development of a school enterprise requires the active participation of many stakeholders. Decisions need to be based on the local needs of the particular school community. Products have to be based on their social, environmental, cultural, pedagogic and economic value of that community. Responsibilities for production and education and training are to be shared among schools, communities, local authorities, non-governmental organizations and industry.

For a successful implementation of such enterprises, the decisions must be based on the shared sustainable vision of the community. Thus, there is potential to improve the relevance of education not only for later employment and self-employment, but also for, as Arenas (Chapter 30) states, raising students' awareness of the connections between work and community wellbeing, and for experimenting with 'alternative production and design processes that respect the integral interrelationship between human communities and surrounding environments'.

Shortcomings in sustainability practices of the institutions portrayed by Singh and Arenas (Chapter 30) can be overcome by formalized voluntary agreements as described by Waddell et al. entering into a sustainability covenant with the Environment Protection Agency empowers Kangan Batman TAFE in numerous ways. It legitimizes and drives integrating sustainability approaches into all internal policies, processes, procedures and curricula. It forces the stakeholders into innovation and demonstrates sustainability leadership in the TVET sector. Finally, it advocates and builds strategic partnerships focused on sustainability.

## A Lifelong Dialogue

The authors of this section discuss the fact that education for sustainable development is not a one-off learning exercise. It is a lifelong exchange that must also include the teachers and trainers as students themselves. For example, Pretzer believes that an educational system for sustainable development needs to be durable and flexible at the same time. He goes on to say that 'it probably cannot be a system at all; it is more likely to be a set of overarching imperatives and values that find

their local incarnations formed by local conditions, traditions and visions of the future'. Quisumbing and Baybay refer to the need to create the ability to continue learning and pursue lifelong education in a learning society. Singh emphasizes that TVET requires both technically specialized job-related skills and the acquisition of 'general skills'. Similarly, for the Nhunggabarra people, education was imperative, driven and permeated by images, words and stories of sustainability, and it was a lifelong holistic process. Flexibility was in-built to accommodate changing environmental conditions.

In Nhunggabarra society a primary educational tool is storytelling. Story learning is both a socialization process and a coming-of-age process, with in-built examinations that continued from initiation through out life. The stories are organized in four levels and each level has a custodian who is responsible for it. The first level can be understood at a child's level. It is the text itself and explains natural features and animal behaviour. The second level of meaning concerns the relationships between people in the community. The third level refers to the relationship between your own community and the larger environment. The fourth level teaches spiritual action and psychic skills and is allowed to be accessed by only a few with the responsibilities for these matters. The four levels and the education process ensures that each person understands the story on the level that fits their individual level of development (Sveiby and Skuthorpe, 2006, pp. 53–54). This is consistent with approaches in education for sustainable development.

However, there is more to the Nhunggabarra approach. The individual has to 'pull out the meaning', that is, find the meaning of the story by deduction without guidance. They were not given a new story until the elder thought they understood the previous one. This 'pulling out the meaning' is new for our thinking in education for sustainable development and worth an exploration of its relevance for TVET. Sveiby and Scuthorpe explain further that the ability to pull out meanings depends on the context and it is accumulative: the more background knowledge you have and the more of the law you have already learned, the more you can pull out.

A difficulty in contemporary sustainability education is that our teachers and trainers are at the beginning of their learning for sustainability themselves. Arenas (Chapter 30) found that both schools that he investigated suffer from inadequate teacher training in environmental sustainability. Waddell et al. refer to training the trainers as a significant challenge and all teachers in a range of disciplines need to be taught how to identify and educate students on the differing impacts of their respective industry. Pavlova found that in France, Russia and Australia most pre-service teachers and practicing teachers at both primary and secondary levels were unfamiliar with what sustainable development or education for sustainable development means. Quisumbing and Baybay, in accordance with their values approach, point to the importance of training the educators since they are also role models. This stresses the importance of driving sustainability agendas in all areas of our societies and communities to speed up the process of education and training for sustainability for all.

## Conclusion

What if we lived in a world in which our images, words and stories of sustainability were not simply an add-on but which infiltrated all our knowing, understanding, valuing, decision-making and acting? What if we could close down our centres, departments and faculties of sustainability because sustainability was integrated into the core of our societies' organizations? What if sustainability had become integral to our lives, in the same way as it was the sole reason the Nhunggabarra people kept all alive?

To enhance and support TVET for sustainable development we need to speak the language of sustainability and we need to create and send out corresponding images and aesthetics. Like the Nhunggabarra people we need to create omnipresent images for living sustainably and we need to keep telling and retelling stories of sustainability to keep the mission alive. As Pretzer suggests we also need to find our role models in our histories, in those who have been ignored because their stories were not in tune with the dominant paradigm. Finally, we need to find ways to include teachers and trainers in the learning process for sustainability while they are teaching and training. We need to enable them to make a conscious decision to enter the journey together with their students and trainees.

Using these new images and stories we can train a new generation who, to use Pretzer's words, will gain credibility and status by delivering on sustainable development. Then we can look forward to the design of more new curricula for TVET for sustainable development, new opportunities for new industries and industrial visions such as 'material pooling' (Page, 2006) and more teaching, training and learning approaches for sustainability.

## References

Sveiby, K.-E. and Skuthorpe, T. (2006) *Treading Lightly: The Hidden Wisdom of the World's Oldest People*. Allen & Unwin: Crows Nest, NSW.

Page, C. (2006) Materials pooling: The next industrial vision, in Senge, P, Laur, J., Schley, S. and Smith, B. (eds) *Learning for Sustainability*. SoL (The Society for Organizational Learning, Inc): Cambridge, MA, USA.

Pruzan, P. and Pruzan Mikkelsen, K. (2007) *Leading with Wisdom: Spiritual Leadership in Business*. Greenleaf Publishing: Sheffield, UK.

# Part V
# Conclusion

# Chapter 36
# TVET and Sustainable Development: A Cautionary Note

**Tom Karmel**

In introducing this final chapter, I feel either like a bull in a china shop or a little like a heretic in a room full of true believers. This is the 36th chapter of the book and the passion that the authors bring to their varied contributions is palpable, and this is my problem. How do you synthesise such passion, particularly when you may not agree with the approaches taken by some authors?

The approach I take in the chapter is firstly to look at the issue of sustainable development. It is apparent that this is not a straightforward concept, and the lack of clarity makes it difficult to provide a synthesis. Secondly, I consider the role of TVET. A major issue here is whether TVET should be a leader or a follower in respect of sustainable development. Finally, I end with some challenges for TVET.

## Sustainable Development

There is no doubt of the importance and currency of issues to do with sustainability. Every day in the news we hear about environmental issues, particularly global warming and the impact this is likely to have on weather patterns and regional economies. Around the world increases in hurricanes, floods, heatwaves and droughts are making us all very sensitive to issues to do with the environment.

While there is no argument about the importance of the topic, the concept of sustainable development is elusive: as Fien et al. (Chapter 2) put it:

> Definitions of sustainability and sustainable development are commonplace, often elusive as to the intent and meaning, and vague enough to allow almost anyone to participate under the sustainability banner (p. 21).

The difficulty is that there are strong versions that are very ideological in nature, and a tendency for researchers and policy makers to include their particular concern or orientation under the sustainable development rubric, just as there are, of course, with all educational priorities.

T. Karmel
National Centre for Vocational Education Research, Australia
e-mail: Tom.Karmel@ncver.edu.au

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The strongest version I have seen is attributed to Karl Henrik Robèrt, whose 'natural step' movement identified four 'system conditions' necessary for human and ecosystem survival.

These are that we should not systematically add to the biosphere the materials in the earth, that we should not produce objects more quickly than they can be broken down in nature, that we should not decrease ecosystems in quality or quantity and that basic human needs must be met and distributed fairly among all people in the world.

My response to these four conditions is twofold. Firstly, although the 'natural step' is used by companies such as Ikea, Electrolux, Nike, Starbucks, Du Pont and many others, I cannot imagine a whole society that could operate under the first three conditions. It would have to use no non-renewable resources and to rule out much manufacturing based on chemical changes. Secondly, the relevance of the major point of the fourth condition – fairness – is not obvious to me. I can easily envisage an environmentally sustainable society that is not fair. This last condition seems to me an example of a very common tendency in this area to impose social values on top of environmental ones. I am not arguing that such values do not matter, but they do make discussions of sustainability difficult.

This strong form of sustainability is linked, I think, in some authors' minds with the idea that Western market style economies are misguided and modern development is undesirable. Fien et al. (Chapter 2) refer to 'paradise lost'[1] and 'the ever-increasing demand for superfluous resource- and energy wasteful products and services' (p. 20). They go on to say 'Much of Western culture has to be reversed in a few decades' (p. 31). Damon Anderson (Chapter 11) argues that 'mounting scientific evidence of deep-seated and potentially irreversible environmental problems shows that permanent economic growth is untenable' (p. 148). He remarks that 'the myth of perpetual economic growth must be superseded by sustainable development as the bedrock of TVET'.

These are challenging words, especially to a neo-classically trained economist such as myself. In response I say three things:

- Try telling a subsistence farmer that development is bad (the number of chapters on poverty reduction in this book attest to the importance of economic growth).
- Economic growth is the mechanism by which societies will be able to afford to concentrate on environmental issues.
- Economics has never been about consumption as such. Rather, the simplest model of the consumer presupposes that the individual maximizes their utility, and utility includes all the social and cultural things that individuals value.

Anderson alludes to the points I am making and refers to the fact that 'given the extent to which the training for growth and skills for work assumptions currently constitute TVET, however the transition to ecologism is likely to be highly contested' (p. 150). No wonder I feel a little like a heretic.

A moderate definition of sustainable development is 'development that meets the needs of the present without compromising the ability of future generations to meet

their needs' (World Commission on Environment and Development 1987, p. 43). This is a definition that looks very workable.

An interesting alternative is provided by Elwyn Thomas (Chapter 6), who stresses that sustainability is all about adaptation, defining sustainability as 'the capacity of people to adapt and cope with their environments as individuals and as a part of social organizations' (p. 77). This is a much narrower approach that focuses on dynamics rather than a specific goal.

Most authors in this book, however, are keen to broaden the concept. Several authors wish to include economic, social and ecological dimensions. Johanna Lasonen (Chapter 14) adds a fourth concept: that of cultural sustainability, and talks about sustainable development 'in terms of parity of esteem, equity and intercultural education' (p. 188). Stephen McKenzie (Chapter 13) links sustainable development to the creation and maintenance of 'open democratic societies' (p. 185) in the twenty-first century and introduces the concept of a new type of knowledge: 'knowledge for social sustainability' (p. 178).

This tendency to broaden the concept of sustainable development to cover issues considered to be important in their own right is epitomised by the UNESCO's declaration. According to UNESCO (2005), education for sustainable development should focus on ten key themes:

- Overcoming poverty
- Gender equality
- Health promotion
- Environmental conservation and protection
- Rural transformation
- Human rights and citizenship
- Intercultural understanding of peace
- Sustainable production and consumption
- Cultural diversity
- Information and communication technologies.

The difficulty with this approach is that this list appears to cover every economic and social issue that can be thought of. This is not to downplay their importance. Who could argue about the importance of poverty reduction or achieving equitable outcomes for women and other groups? However, I see difficulties with including all these issues under the banner of sustainable development, especially development when thinking about TVET.

That said, the benefit of the embracing approach is that it has led to the inclusion in this volume of a set of very interesting chapters. Phillip Hughes (Chapter 10) writes about the goal of Education for All. The importance of entrepreneurship for providing a livelihood is emphasized by Tariq Mahmood (Chapter 15) and Park et al. (Chapter 16); John Lawrence talks about sustainable livelihoods in Azerbaijan (Chapter 24); Jagmohan Singh Rajput outlines the challenges for TVET in India (Chapter 25); and Zhao et al. (Chapter 26) look at the needs of migrants displaced by the Three Gorges Reservoir in China. All the insights suggested by these authors – and more – are subsumed in Chapter 9 on 'technacy education' by Seemann, who

points to both the cross-cultural and the 'Deweyian' foundations of TVET for sustainable development.

I now move on to the role of TVET in sustainable development, noting that it would not be surprising to find a synthesis is difficult to achieve, given the lack of clarity.

## The Role of TVET

Most chapters in this book emphasise TVET as a way of ensuring that individuals go out work with appropriate values and understanding sustainability principles. Thus educated, TVET graduates will be at the centre of a society to be transformed on sustainable development principles. This is TVET as a moral leader, emphasizing education for its own sake and the importance of appropriate values.

For example, the importance of morals is vigorously stated by Lourdes R. Quisumbing and Maria Lourdes Q. Baybay (Chapter 33). They say that 'TVET must include values education in its new modalities of education and training' (p. 466) and that TVET should

> . . . prepare the individual to become responsible, free and mature, equipped not only with the appropriate skills and know-how of the latest technologies, but also with deep human and spiritual values and attitudes – a sense of self-worth, self-esteem and dignity

as well as a range of generic skills that equip individuals to work individually or in teams.

Quisumbing and Baybay's chapter outlines a sourcebook, *Learning to Do* that aims to equip 'workers and citizens' with the knowledge and values to work in a 'human-centred economy for equitable and sustainable development and for the wellbeing of all' (p. 467).

William S. Pretzer (Chapter 7) also takes a moral view, this time of technology education (which I take to be a subset of TVET). Pretzer's conviction is that 'technology, like any part of a formal curriculum, should contribute not to just students' skill and knowledge but also to their capacity to develop moral perspectives and social wisdom' (p. 94). Further 'technology education ought to be centred on a love for human beings and Spaceship Earth, not merely on the effort to extend human capabilities and their domination over nature' (p. 99).

This approach is shared by Margarita Pavlova (Chapter 32). She provides an example of a learning activity called a 'product analysis activity' (p. 458), which focuses on the social aspect of sustainability. This analysis, she says, 'can address questions such as: is the product really needed; how does the product make life better for people; is it culturally acceptable for people who use it?' (p. 458) and so on. Pavlova also introduces aesthetics as being relevant to the idea of sustainability, an idea that she sees as closely related to moral values (p. 461): The implicit thinking is that aesthetics consistent with sustainability will favour the 'natural' over the manufactured, but without any real thought on analysing whether chipboard is more or less environmentally destructive than timber. This sort of analysis is important in TVET for sustainable development.

While Quisumbing and Baybay, Pretzer and Pavlova emphasise morals and values, their approach does not imply aggressive incultation. By contrast, Anderson (Chapter 11) sees TVET as in the vanguard of the ecological movement. He argues

> . . . that TVET providers must not only engage in a critical examination of productivism and its negative environmental effects, but also initiate debates and strategies to facilitate the transition to ecologically sustainable development and a new ethos of ecologism (p. 159).

Anderson seems to see sustainable development as a field of contestation in which TVET must find allies agaist vested economic interests (p. 159). This approach stands in contrast with the instrumental view dominant in many countries that expect TVET to produce well-trained graduates who have the skills required by employers. Such a view does not necessarily downplay the importance of sustainable development (however defined) but is based on a world in which sustainability issues are driven by the economy, not the education system. Firms face environmental regulations and prices for raw materials that reflect scarcity and, increasingly, costs associated with the environment. Firms are very keen to minimize their costs and use economically efficient technologies. Thus they look for employees who not only know their trade in traditional terms but who understand relevant regulations and new technologies, and can address new issues as they occur. Under this approach it is still the demands of the labour market that determine what is taught, although environmental knowledge may well become very important. Technical and problem-solving skills are paramount. But this is in sharp contrast to the approach outlined above, in which TVET graduates are expected to be able to deal with the moral righteousness issues involved.

Chapters 22 and 23 by Heila Lotz-Sisitka and Glenda Raven and Lausanne Olvitt, respectively, are the best examples of a more instrumental (in the most positive sense of the word) approach. They are primarily concerned with environmental practicalities, this time in South Africa. Their motivation is driven by the *African Environmental Outlook* report (UNEP, 2006) that argue 'African citizens, managers and workers need to enhance their capacity to manage environmental resources to enable sustainable development'. Lotz-Sisitka and Olvitt refer to the unpreparedness of the country to implement environmental assessment regulations, and go on to develop a framework for environmental management that comprises competencies such as environmental competence, management/planning and administrative competence, legislative competence, social/justice/ethical competence, education and training competence as well as monitoring, evaluation and research competence (p. 327).

Chapter 20 by Linda Condon and Andrew Rickard shows that the instrumental approach dominates in Australia. Their research looked at the way environmental competency is covered by the industry-developed training packages in Australia.[2] Their conclusion was that 'the regulatory environment is a principal driver for environmental competency development in TPs' (p. 287) and observe that the introduction of environmental sustainability into the curriculum is not imposed upon training package developers. The authors do not question this Australian approach, however, and argue that 'industry associations and organizations that influence the

development of industry training packages must revalorize the ecological environment' (p. 291).

I have discussed the role of TVET in preparing students in a sustainable world but there is another role that it can play. This role is that of TVET institutions as a model corporate citizen. This is the subject of Chapter 31 by Waddell et al. on the partnership that Kangan Batman Institute of TAFE (a TVET public provider in Australia) has entered into with the Victorian Environmental Protection Authority. The aim of the partnership, termed a covenant, is to make Victoria 'more sustainable through increased resource efficiency and reduced ecological impact' (p. 446). Kangan Batman see a number of practical benefits of such a covenant including receiving recognition for their environmental leadership, being empowered to shape the environmental agenda, improving sustainability and profitability and reducing the potential for restrictions to be imposed by regulation (see p. 446).

Reflecting on the chapters in this volume that are concerned with the role of TVET in sustainable development, no real consensus emerges. The dominant view appears that the role of TVET is to act as a moral leader, instilling appropriate values in its students as well as ensuring that they acquire technical skills, and the TVET organizations themselves act as leaders in the environmental movement. Such a conclusion poses challenges for TVET as it is currently constituted. Indeed, its whole orientation would need to change from its sole focus on work skills for the labour market (what Anderson calls 'productivism' in Chapter 3) to an orientation that emphasizes citizenship and values education also.

I wonder how realistic this view is. Is it asking too much of TVET and is it losing sight of what TVET is all about? Could one argue that moral teaching values are more appropriately left to parents, the community, the church and schools? Is it losing sight of the primary role of TVET: to provide graduates with the work skills that are required by the labour market? Or does the role of TVET need to evolve in a world beset by climate change? Work skills will change over time and students will need to acquire greater knowledge and skills in many areas as environmental and social concerns impact on the way business is done. However, my fear is that taking a too broad view of sustainable development may create the risk of it being seen as irrelevant to the real world of work and, as a result, those who set the policy framework for TVET will take no notice of those who are the most passionate in promoting the cause of sustainability.

## Challenges for TVET

To me, two challenges emerge from this volume. The first is to obtain some sort of focus in defining sustainable development as it relates to TVET. The definition needs to be useful: a concept that means everything to everyone will not be helpful. If I could I would be happy to stick to the definition provided by the World Commission on Environment and Development in 1987: sustainable development as 'development that meets the needs of the present without compromising the ability of future

generations to meet their needs' (p. 43). If such a definition were to be adopted then it would provide a clear focus on the balanced integration of environmental, social and economic issues without requiring TVET to be a panacea for all the ills of the world.

The second challenge is even more difficult. If we agree on what sustainable development is then the challenge is for TVET to be appropriately involved. An accommodation needs to be reached between those who wish to use TVET as a way of developing and clarifying attitudes and beliefs and those, like me, who see TVET as providing skills that enable individuals to obtain employment and provide a livelihood for themselves and their families. Such a view does not imply that social and environmental issues do not matter. It assumes that community attitudes as a whole will provide economic structures in which such issues are taken into account. It assumes that economic progress will provide the wherewithal to solve social and environmental issues and that TVET will play its part by providing workers with the skills they need to contribute to the economy within that structure. If this view is accepted then TVET is still faced with the challenge to provide the skills that meet the needs of the labour market today and in the future, not the needs of the labour market of 20 years ago. This implies an increasing amount of emphasis on knowledge of environmental and social issues and understanding how business interacts with society and the environment.

## Notes

1. The reference is in the context of a discussion of the Australian Aboriginal vision of the land.
2. Training packages list the skills and competencies that graduates are expected to have.

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