



For some decades, world-wide, there have been national initiatives to improve literacy rates and standards. During the same period, concentrated research studies have been undertaken to find out how best to achieve the desired improvements. Two main thrusts in teaching and learning how to read and write have emerged, often in controversy. One is generally known as the 'whole language' approach and the other concentrates more on instruction in phonics. What works? This paper focuses on the theoretical assumptions underlying these two approaches to the teaching of literacy, and the studies which have been undertaken, in the international arena, to find out how children progress, from their earliest educational years, in attaining both initial reading skills and lifelong literacy.

Closing the gap between research and practice: Foundations for the acquisition of literacy

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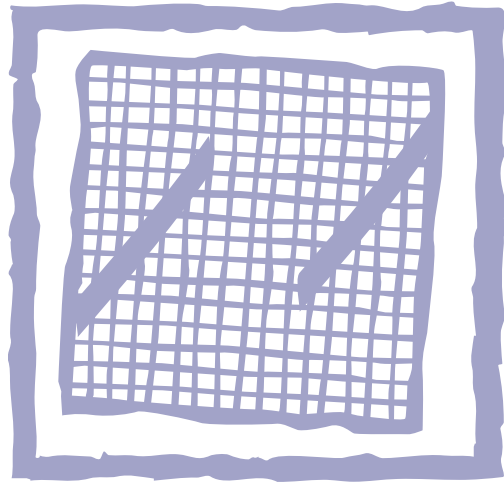
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- teaching practices to improve learning
- vocational outcomes and lifelong learning





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INTRODUCTION

The purpose of this review is to present an overview of the research literature relating to the acquisition of literacy. Its focus is on empirical studies that identify the processes underlying the acquisition of literacy, and the instructional strategies that are most effective in developing effective literacy. Its specific focus is on the acquisition of reading literacy.

The Context of the Review

Teaching children how to read and write has always been the primary objective of education or schooling. However, in recent years there have been concerns that this major objective has not been achieved, or has not been achieved at a satisfactory level, by many students by the end of the compulsory years of schooling. This has led to a renewed focus on literacy at both Commonwealth and state level, and the introduction of new policies and practices which are aimed at improving literacy outcomes. These policies and practices parallel developments that have occurred in a number of other countries, and have included setting standards or benchmarks to make explicit the standards of achievement expected at different levels of schooling, introducing programs of national or state-wide testing to monitor the extent to which these standards are being met, and examining the effectiveness of different instructional and intervention approaches designed to improve literacy outcomes.

At the same time there have been significant advances over the past two decades in the research on reading and on the processes underlying the

acquisition of reading. This research has led to the questioning of some of the assumptions on which current teaching practices have been based, and have identified some of the critical factors associated with the acquisition of reading skills.

This review clearly cannot hope to cover in any depth the vast and growing literature on the development of reading literacy. Nor would it seem useful to attempt to duplicate work that has already been done in terms of reviewing the literature and drawing from such a review the implications for teaching practice. Rather the review will draw on the work already undertaken by experts and expert committees, with the aim of presenting as clearly and succinctly as possible the main issues that have been covered in these reviews, and the implications that are of particular relevance to the Australian scene. In this sense, the review will be an attempt to pick out from the vast literature on reading literacy the 'plums' that might inform educators and educational administrators of the essential findings to emerge from the research literature, and the implications of these findings for teaching practice and educational policy.

DEFINITION OF LITERACY

Literacy has been defined in many different ways, each of which reflects a different theoretical orientation.

A broader definition of literacy is usually adopted by those who see literacy development as a social process, which develops through exposure to literacy practices within a particular environment and which cannot be separated from its social and cultural context. This view rejects the notion that literacy can be defined in terms of a set of narrow psychological skills, and places emphasis on literacy as a process of deriving meaning from text. This definition of literacy usually covers other language skills such as listening and speaking, as well as a range of other skills including the interpretation of visual material, the use and understanding of mathematical concepts and notation, computer 'literacy', and critical thinking.

A narrower definition of literacy, usually referred to as the conventional or commonsense view of literacy, defines literacy as the ability to read and write; that is, to convert the written text to the spoken word and vice versa. Under this view the acquisition of literacy is defined in terms of acquiring the ability to both comprehend and produce written text.

These two opposing definitions of literacy are associated with different approaches to the study of literacy development. Those who define literacy in a broader sense and who view literacy

as a social process (the socio-cultural approach) have focused on studies designed to observe literacy practices in different contexts, and to identify the ways in which literacy is used for different social purposes. Those who define literacy in a narrower sense and view literacy as essentially the ability to read and write (the cognitive-psychological approach) have focused on studies which have sought to identify the processes underlying the ability to read and write, and how these are developed.

Inevitably these two views of literacy have resulted in different types of research study. The socio-cultural view of literacy has led to descriptive studies using ethnographic and case study approaches, which document in considerable detail the interactions between the literacy learner and their environment in a range of different contexts, including the home, the community and the school. The cognitive-psychological approach has led to experimental studies designed to identify the specific processes that underlie the acquisition of reading and writing, and the ways in which these processes can be enhanced by specific teaching¹.

For the purposes of this review, the narrow definition of literacy will be adopted. This will allow the review to focus on those aspects of literacy that are seen as of critical importance in an

¹ A useful presentation of these two opposing views of literacy development is provided in the two special issues of the *Journal of Research in Reading* (Vol. 16, 2, September 1993, and Vol. 18, 2, September 1995) which present the positions of both the 'new literacy group', represented by Street, Bloome, and their colleagues (in the 1993 issue), and the response of the reading research group, represented by Oakhill and Beard, Gough, Stanovitch, Perfetti, Ehri, Goswami, Juel, and others (in the 1995 issue); the paper by Gough in the 1995 issue is particularly useful in terms of clarifying the distinction between the positions held by these two groups.

educational context. The adoption of this definition recognises that the school has a special responsibility in terms of teaching children how to read and write. While speaking and listening skills are acquired at an early age in the home environment, relatively few children learn to read and write before they come to school, and it has traditionally been the role of the school to teach children the skills of reading and writing, as distinct from the skills of listening and speaking. The teaching of more advanced skills and knowledge leading to the development of critical thinking skills in other areas of the school curriculum is also dependent, at least to a large extent, on the ability to read and write. It can therefore be argued that, from an educational perspective, the ability to read and write provides the foundation for the development of the further skills that are associated with the definition of literacy in its broader context. That is, the definition of a literate person as an educated person, rather than as simply a person who can read and write.

A MODEL OF READING AND WRITING

Both reading and writing depend on the ability to relate print to speech. Both therefore require knowledge of the language that underlies the printed and spoken forms of a specific language (such as English), and both require knowledge of the language's orthography (that is, the rules that relate the printed form of the language to the spoken form).

In so far as reading and writing are both dependent on the ability to convert print to speech and speech to print, they are often regarded as different manifestations or mirror images of a single common skill, and a measure of one is often used as an index of proficiency in the other. However, the skills that underlie the recognition and comprehension of written text are somewhat different to the skills that underlie the ability to produce well-constructed text, and from this point of view reading and writing may be regarded as composed of different but related sets of skills.

The basic model of reading and writing that underlies much of the current scientific research on the acquisition of literacy is most easily understood in terms of the simple model described by Juel, Griffith and Gough (1986). According to this model reading and writing are each composed of two distinct abilities; decoding (or word recognition) and comprehension in the

case of reading, and spelling and ideation (or the generation and organisation of ideas) in the case of writing. Thus word recognition combined with the skills involved in listening comprehension provides the basis for reading comprehension, while spelling combined with the generation of ideas provides the basis for writing.

While the specific skills underlying the acquisition of reading and writing are different, both share a common denominator, in that both are dependent on the set of spelling-sound correspondence rules of the language, or what is termed in the literature the orthographic cipher.

Knowledge of the cipher is therefore seen as critical to the acquisition of literacy, since it is a basic component of both decoding, which underlies the acquisition of reading, and spelling, which underlies the acquisition of writing. Knowledge of the cipher is in turn dependent on two main factors; phonemic awareness, or the knowledge that the spoken word can be broken down into a series of specific sounds, and exposure to print, which provides models of written text and specific letters and words, which can then be connected to specific sound sequences. Phonemic awareness and exposure to print are therefore the two factors that are most critical to the acquisition of literacy.²

² The three phonological processes generally recognised as related to reading are phonemic or phonological awareness, phonological coding in working memory, and rapid access to phonological information in long term memory. Of these three processes, phonological awareness has been found to have the strongest causal relationship to word reading skill, and is also the most amenable to instruction, which is why it is usually noted in the literature as being critical to the acquisition of literacy.

While word recognition and spelling are essential to the ability to read and write, these abilities do not in themselves ensure comprehension of complex text or production of coherent and well organised writing. These higher level skills are dependent on a range of factors, including vocabulary knowledge, familiarity with particular areas of knowledge, knowledge and values associated with membership of a particular social or cultural group, and critical thinking skills. However, these higher level skills apply equally to effective use of spoken language. What distinguishes reading and writing skills from listening comprehension and speaking skills is the fact that these skills are expressed through the medium of written text rather than through the medium of the spoken language.

Research evidence that has been accumulated over the past two to three decades has supported this model of the basic processes underlying the acquisition of literacy, and particularly the important role played by phonemic awareness in the development of reading and writing skills. While there may be differences in the specific models proposed by different researchers to explain exactly how phonemic awareness, word recognition and spelling skills are acquired, and how these skills interact in the process of learning to read and write, there is general agreement about the overall model and the crucial role of phonemic awareness and recognition of spelling-sound correspondences in the development of reading and writing.

LEARNING TO READ: THE SELF-TEACHING HYPOTHESIS

Once children have acquired an understanding of the alphabetic principle, and are able to translate print to sound through the process of phonological recoding, this provides a basis for self-teaching based on the independent generation of target pronunciations for novel orthographic strings. That is to say, as children encounter new words or letter cluster strings they are able to apply phonological recoding to generate the sound equivalents of the unfamiliar words or strings, and in this way to acquire the detailed orthographic representations that are necessary for rapid, autonomous visual word recognition (see Share, 1995). While phonological recoding remains essential to this process, other factors such as visual processing skills and short term and long term phonological memory play a role and may lead to individual differences in the speed and efficiency with which the child is able to increase the number of words which are recognised visually with a minimum of phonological processing. This process depends on the frequency of exposure to new words. Thus the more a child reads, the greater the number of words that they will be able to recognise visually, thus enabling more fluent reading and the freeing up of the cognitive demands of the task to allow for more cognitive focus on comprehension as opposed to decoding. This leads to what Stanovitch (1986) has termed the Matthew effect, with the better readers reading more and therefore increasing their exposure to print, and consequently their word

recognition skills and their fluency and speed of reading, while poor readers, who read more slowly, will have less exposure to print and therefore less opportunity to build up a store of visually recognised words, thus spending more of their time and cognitive energy on decoding unfamiliar words, and therefore falling further behind in their reading achievement.

This self-teaching mechanism is based on two fundamental prerequisites – symbol-sound knowledge and phonemic awareness. Neither of these skills develop spontaneously through exposure to print. This has obvious implications for reading instruction. As Coltheart (1980) has argued, getting children ready to read means teaching them the skills they will need in order to read. That is to say, explicit teaching of symbol-sound relationships and phonemic awareness.

FOCUS OF THE REVIEW

Research on the acquisition of literacy has tended to focus more on the acquisition of reading skills than on the acquisition of writing skills, although a number of studies have looked at the development of spelling and the role of invented spelling in the development of writing (see, for example, Nicholson, 2000, Chapter 9). This emphasis on reading can probably be attributed to two main factors. First, the fact that there is much greater emphasis in the school curriculum on the teaching of reading than on the teaching of writing, and second, the fact that standardised assessments are more easily applied to reading than to writing, which makes the acquisition of reading skills more amenable to scientific study than the acquisition of writing skills (see, for example, Nelson and Calfee, 1998).

This review will therefore focus more specifically on research into the acquisition of reading skills, which form the basis for the development of reading literacy. Following Tunmer (1999), reading literacy may be defined as comprising the following abilities:

- the ability to read at a level necessary for self-sustained growth in literacy
- the ability to understand in print what would be expected to be understood in the corresponding spoken language by native speakers of the same age; and
- the ability to understand, use and reflect on written texts in order to achieve one's goals, to develop one's knowledge and potential and to participate in society.

THE AUSTRALIAN CONTEXT

There have been a number of Australian reports and publications relating to literacy and literacy development over the past ten years. These have included policy documents, such as the 1991 policy statement *Australian Language and Literacy Policy* (DEET, 1991), and the 1998 publication *Literacy for All: The Challenge for Australian Schools* (DETYA, 1998), outlining the *National Literacy and Numeracy Plan* agreed to by all Commonwealth, State and Territory Education Ministers in 1997. There have also been reports of review committees such as the 1992 report *The Literacy Challenge*, by the House of Representatives Standing Committee on Employment (1992), and results of national and state surveys including the report on the *National School English Literacy Survey* (Masters and Forster, 1997), as well as publications relating to the development of national standards, profiles and benchmarks.

Two summary reviews of the research literature on factors related to the development of literacy and research on the teaching and learning of literacy have been undertaken at ACER over the past five years; the paper on *Factors Related to the Development of Literacy* (de Lemos and Harvey-Beavis, 1995), prepared as one of the background papers for the *National School English Literacy Survey*, and the review of literature prepared for the *Literacy Advance Project* commissioned by the Catholic Education Commission of Victoria (Ainley, Fullarton, Frigo and Owen, 1999). Other notable Australian reviews of the research literature on reading and literacy development include the summary of the research

literature on learning to read, published by the Tasmanian Department of Education and Arts (1994), the review of research into language and literacy by Freebody and Gilbert (1999), and the review of recent developments in language and literacy development by Bowey (2000). The Tasmanian publication was directed to teachers, and intended to provide them with a knowledge base that would inform their teaching practice and lead to more effective teaching strategies based on established evidence relating to the effectiveness of different approaches to the teaching of reading. The Freebody and Gilbert review provides a broad overview of Australian research in the area of literacy and language over the past 30 years, while the Bowey review provides an overview of current theoretical research on the acquisition of reading and the implications of this research in understanding the underlying causes of reading difficulties.

This review is designed to supplement rather than to duplicate these various reports and reviews, focusing specifically on the findings that are of most significance in terms of identifying the critical factors that are related to literacy development, and the teaching practices and strategies that are most effective in improving literacy outcomes.

FOCUS OF AUSTRALIAN RESEARCH INTO LANGUAGE AND LITERACY

The review on research into language and literacy by Freebody and Gilbert (1999) provides a useful starting point for this review in that it traces the major factors that have influenced Australian research in this area over the past 30 years, and as such provides a framework for placing current developments in perspective.

The authors of this review point to the enormity of their task in terms of the scope, complexity and time frame covered by the review, and acknowledge that their review is necessarily selective, and influenced by their own view of what is important and consequential about the last 30 years of work in this area.

Australian research into language and literacy is considered under two main headings: developments in theorising and research methodologies applied to language and literacy, and distinctive domains of research.

Under the heading of theoretical and methodological developments, Freebody and Gilbert note the shift in emphasis from the paradigms derived from educational assessment and testing, which dominated research on language and literacy in the 1950s and 1960s, to new paradigms that have emerged, derived from sociological and linguistic

perspectives, and which define language and literacy in terms of socially constructed practices.

Some reference is made in this section to research deriving from the cognitive psychological model, which has emanated mainly from university departments of psychology or special education units in faculties of education. Reference is also made to Chall's 1967 survey of the research literature on reading acquisition, and the subsequent 'great debate' between holistic and analytic methods of teaching reading. The work of Australian researchers following this tradition is noted (Andrews, 1989, 1992; Byrne and Fielding-Barnsley, 1989). While recognising that research efforts in these directions have broad applicability, it is noted that their influence has been restricted to debates in special education and psychology, and that the diminished visibility of this line of research in the Australian context relates to influences coming from other sources. Specific reference is made to the 1966 international seminar at Dartmouth College in the United States³, convened to consider critical problems in the conceptualisation of language and literacy education, and the extent to which the impact of this seminar and the research traditions it authorised dominated Australian language and

³ It is of some interest to note that Freebody and Gilbert describe this seminar as attended by 'language research teams' from North America and the United Kingdom, while Dixon's (1967) report on this conference describe it as attended by a group of 50 people 'all concerned in one way or another with the teaching of English'. The topics covered by the conference related to the teaching of English as a subject at both primary and secondary level rather than the acquisition of literacy or reading skills, and was attended mainly by professors and lecturers in English in University departments of Education or in teacher training institutions, rather than by researchers in reading, linguistics or language acquisition.

literacy discourses and their attendant research enterprises for the ten years to follow. The influence of British researchers such as Britten, Burgess, Martin and Rosen⁴, based at the Institute of Education at the University of London, is also noted, and the extent to which their views dominated theorisations of language and literacy research in Australia through the early 1980s.

This review by Freebody and Gilbert documents the influences underlying the shift in emphasis from studies based on experimental designs and quantitative assessment in the 1960s and 1970s, to studies, from the early 1980s onwards, that are based on more descriptive methods derived from sociological models. These methods include those based on text linguistics, which use documentary methods to analyse the conventions of spoken and written language, as well as ethnographic methods, deriving from both anthropological and sociological traditions, which utilise observational methods of documenting material and interactional patterns (as in anthropological studies), as well as the analysis of texts and interactions in order to apply critical theories of social organisation, patterns of dominance and control, and avenues for change motivated by cultural and social equity (as in sociological studies).

Research Studies on Language and Literacy funded by DETYA

The major source of funding for Australian research into language and literacy comes from the Department of Education, Training and Youth Affairs (DETYA), and particularly from the *Children's Literacy National Projects*

Programme (CLP). This program commenced in 1992 and continued to 1996, after which it was incorporated into the Commonwealth's broadbanded *Literacy Programme, Grants for National Literacy Strategies and Projects*. Over the period 1992 to 1996 sixteen national projects were funded under the *Children's Literacy National Projects Programme*. These projects were expected to improve understanding of issues relevant to the national delivery of high quality children's literacy programs within government and non-government schools.

A summary of the findings of these sixteen projects and their implications for future literacy research and professional development strategies to improve literacy teaching practices in classrooms was put together following the 1998 Researchers' Conference organised by the Literacy Section of the Literacy and Special Programmes Branch of DETYA. This conference was designed to bring representatives from each of the projects together to focus on directions for future national literacy research and appropriate professional development based on the CLP research. The outcomes of this conference were reported in two volumes: an Executive Summary, which describes the CLP and provides an overview of the main themes of these projects and a summary version of the position papers and presentations on each project, and a Conference Report, which includes in addition to the above a programme evaluation, together with detailed appendices containing a summary of key findings and recommendations from all sixteen CLP projects (Gunn, 1999).

⁴ See, for example, Britton, 1970; Britton et al, 1975; Burgess et al, 1973; Rosen and Rosen, 1973.

While these sixteen projects covered a range of topics, they were in most cases descriptive studies of literacy practices in different contexts. Of the sixteen studies, six focused on literacy practices in both the home or community context and the school context, while five focused on aspects of literacy in the school or classroom context. Three of the projects focused on assessment and reporting procedures, one on the relationship between first language development and second language acquisition, and one on the development of a classroom resource to support the use of oral language as a tool for learning. In most cases the methodology was based on descriptive methods, including observation and analysis of relevant documents, and in many of the studies intensive case studies of individual children, families, teachers, classes or schools constituted a major part of the study. The studies covered both primary and secondary level, with only one study focusing on the acquisition of early literacy skills. Relatively few provided any hard data in terms of measures of the literacy achievement of students, or data that would allow for any analysis of the relationships between specific school or background variables and literacy achievement. No studies focused on an examination of the effectiveness of different approaches to the teaching of reading, or on the effectiveness of different types of intervention strategies for students at risk. From this perspective, these studies fall outside the focus of this particular review.

Other Australian Research into Reading and Literacy Development

Other sources of funding for Australian research into literacy and reading development include research grants from the Australian Research Council, funding from state education systems, and postgraduate research studies funded through the university system. Funding from the Australian Research Council, as compared with funding through the DETYA CLP program, has tended to cover a more diverse range of studies reflecting different theoretical and methodological viewpoints, and it is from this source that most of the studies of reading development based on a cognitive-psychological approach and employing an experimental methodology have been funded. These studies have been undertaken mainly by psychologists in university departments of psychology or special education, confirming the pattern noted by Freebody and Gilbert (1999), and have focused on basic research into the processes underlying reading development. The work of these researchers is perhaps best represented in the collection of papers published in the 1996 Special Issue of the *Australian Journal of Psychology*⁵, and more recently the collection of papers on language processes and problems published in the latest issue of the *Australian Educational and Developmental Psychologist*.⁶ The papers in the 1996 Special Issue of the *Australian Journal of Psychology* were presented at a symposium on *Reading and Developmental Dyslexia*, which was held at the University of Tasmania in February

⁵ *Australian Journal of Psychology*, Volume 48, Number 3, 1996.

⁶ *Australian Educational and Developmental Psychologist*, Vol. 17, Number 1, 2000).

1996. This symposium, funded mainly by the ARC under their *Special Research Initiative Program*, brought together 12 Australian researchers, all of whom had received their research funding from the ARC, to discuss and review their work in the reading area. As noted by Pratt and Coltheart⁷, the issues covered and the emphases of the different contributors varied, but all researchers at this symposium were firmly of the view that an understanding of the alphabetic principle and a knowledge of sound letter correspondences underlie the development of proficient reading. They also noted the concerns of the participants that many education programs currently used in Australia and elsewhere do not give sufficient recognition to the development of the fundamental skills involved in word decoding. While the research reported in these papers clearly has implications for teaching practice, these studies have generally had little impact on system-wide approaches to the teaching of reading or teacher understandings of the processes underlying the acquisition of reading.

Systematic evaluations of specific teaching approaches or interventions on student outcomes are relatively rare in Australia, but an evaluation of the Victorian *Early Years Literacy Program* is currently being undertaken by Hill and Crévola at the University of Melbourne (Crévola and Hill, 1998) while the Catholic Education Commission of Victoria is funding an evaluation of the impact of different approaches to the teaching of literacy in Victorian Catholic

schools (Ainley and Fleming, 2000). A study of the effectiveness of Reading Recovery was undertaken in New South Wales in 1991 (Center, Wheldall, Freeman, Outhred and McNaught, 1995), and more recently an evaluation of the Macquarie University *Schoolwide Early Language and Literacy Program* (SWELL), (Center, Freeman and Robertson, 1998; 2001a; 2001b).

Summary of Australian Research on Reading and Literacy Development in Recent Years

From the Freebody and Gilbert review of Australian research into language and literacy and the summary of projects funded by the DETYA *Children's Literacy National Projects Programme*, it is clear that Australian research into language and literacy over the past two decades has been dominated by the view that literacy is a socio-cultural phenomenon that cannot be separated from its social context. As a consequence, the bulk of the research into literacy, and particularly the research funded through the DETYA CLP program, has been research into literacy practices in a variety of social contexts, in which the dominant research methods are descriptive and ethnographic, with an emphasis on observational and case study techniques.

At the same time, there is an active group of researchers, based mainly in university departments of psychology and special education, and more recently including people with a background in speech pathology⁸, who have undertaken research into the development of the

⁷ Pratt and Coltheart, Guest Editorial, *Australian Journal of Psychology*, Volume 48, Number 3, 1996.

⁸ See, for example, comment by Janet Fletcher, in her Guest Editorial for the Special Issue of the *Australian Educational and Developmental Psychologist* (Vol 17, No 1, 2000).

processes underlying the acquisition of reading. This research is in general based on a cognitive psychological model, and applies scientific and experimental approaches to the study of reading development.

There is relatively little Australian research which has involved the systematic evaluation of educational programs designed to enhance literacy skills. This is despite the widespread adoption of programs such as the Western Australian First Steps Program and the Victorian Early Years Literacy Program, as well as intervention programs such as Reading Recovery. There have also been various state assessment programs that have been adopted at primary and school entry level, presumably on the assumption that such assessments will have a positive effect on student outcomes. However there is as yet no cumulative body of research which can be used as a basis for evaluating the impact of these programs or initiatives on students' literacy achievement.

THE INTERNATIONAL CONTEXT

While the socio-cultural approach has its supporters in other countries, it is less dominant and has not been as influential in terms of its impact on educational policy and research as has been the case in Australia. This is particularly evident in the United States, where a series of reports published over the last ten years has been influential in drawing attention to the findings of research in the reading area, and the implications of this research for teaching practice and educational policy.

There is now an international body of research on the processes underlying the acquisition of reading. Researchers in the United States, Canada, the United Kingdom, New Zealand and Australia have contributed to this research, as well as researchers in a number of European countries. While recognising the contribution of researchers from all these countries to this accumulated body of research, this review draws mainly on recent United States reports which have sought to synthesise the available research evidence relating to the acquisition of reading and the effectiveness of different approaches to the teaching of reading, and the implications of this research for teaching practice.

The most recent of these reports is the Report of the National Reading Panel convened by the Director of the National Institute of Child Health and Human Development, at the request of the United States Congress, in order to assess the status of research-based knowledge on reading, including the effectiveness of various approaches to teaching children to read (National Reading Panel, 2000). This report is

particularly significant in that the Panel decided to adopt a set of rigorous standards to assess the efficacy of materials and methodologies used in the teaching of reading and in the prevention or treatment of reading disabilities. The standards adopted were the same as those applied to research into the efficacy of interventions in psychological and medical research, on the basis that the standards applied to determining the efficacy of educational interventions should be no less rigorous than those applied to determining the efficacy of behaviourally based interventions, medications or medical procedures proposed for use in the prevention or treatment of medical or psychological conditions affecting the person's physical or psychological health.

If this approach were to be applied to other areas of education and educational research, it could well mark a turning point in the history of education. Up to now innovative educational practices and interventions have been adopted without any requirement for research-based evidence as to their effectiveness or their impact on children's learning or other aspects of their social or psychological development (including the possibility of unintended negative effects). The application of a new set of standards requiring evidence of the efficacy of any proposed new intervention or initiative, including evidence relating to any possible unintended 'side-effects', would have significant implications for education. While it may be argued that educational interventions do not carry the same levels of risk as medical interventions, and the same standards are not therefore

applicable, there is nevertheless a good case to argue that students and their teachers should not be subjected to changes in teaching methodology or educational practices unless there is evidence to support the supposed beneficial effects of the change in practice. In an era of continuously changing policies and practices in education, a more measured approach which involves an investigation of the impact of any proposed change prior to its widespread adoption could well have beneficial effects all round.

In order to understand the context in which this panel was requested, at the highest level of government, to assess the research-based knowledge relating to the effectiveness of different approaches to the teaching of reading, it is necessary to understand the background to this request and particularly the heated and at times acrimonious educational debate that preceded it.

Predecessors to the Report of the National Reading Panel

Prior to the release of the report of the National Reading Panel there were four landmark reports on the status of reading instruction in the United States, each regarded as providing an authoritative view of the research evidence relating to the effectiveness of different approaches to the teaching of reading at the time of their publication.

The first of these reports was Jean Chall's influential book *Learning to Read, the Great Debate*, published in 1967. This was followed in 1985 by the report *Becoming a Nation of Readers*, by Anderson,

Hiebert, Scott and Wilkinson. Marilyn Adams' book *Beginning to Read: Thinking and Learning About Print*, was published in 1990, and the report *Preventing Reading Difficulties in Young Children*, edited by Snow, Burns and Griffin, was published in 1998⁹.

Each of these reports was commissioned or funded by a major national body. Chall's study, undertaken over the period 1962 to 1965, was funded by a grant from the Carnegie Corporation, while the Adams' study, undertaken over the period 1987 to 1989 at the Reading Research and Education Centre at the Centre for the Study of Reading at the University of Illinois, was funded, in part, by the Office of Educational Research and Improvement. In the case of these two reports there was a single author who worked with a group of advisors. The Anderson et al report, published in 1985, was funded by the Commission on Reading of the National Academy of Education, and while conducted under the aegis of the funding body, the content of the report clearly reflected the views of the joint authors. The Snow et al report was undertaken under the auspices of the National Research Council of the National Academy of Sciences, and was funded and jointly sponsored by three federal agencies; the Office of Special Education Programs in the Department of Education, the Office of Educational Research and Improvement – Early Childhood Institute in the Department of Education, and the National Institute on Child Health and Human Development – Human Learning and Behaviour Branch. The report itself was prepared over a period of three

⁹ A historically based review of this report, which identifies the links between this report and its predecessors, is provided by Pearson (1999).

years by a Committee made up of experts drawn from the fields of cognitive psychology, language development, special education, medicine and literacy education. In this case the authorship of the report is less clear, although it can probably be assumed that different sections of the report were prepared by different members of the Committee, with a final draft prepared by the editors and approved by the Committee. As Pearson (1999) points out, given a Committee representing different philosophical positions on both methodological and curricular questions, the process of arriving at conclusions and recommendations that were acceptable to all members of the Committee must have involved a difficult process of negotiation and compromise to reach consensus.

Taking each of these reports in order.

Jeanne Chall's book *'Learning to Read: the Great Debate'* was a response to the debate regarding the role of phonics in learning to read. While this topic has been the subject of debate over many years, it reached a peak in the United States in the 1950s, with the publication in 1955 of Rudolph Flesch's book *Why Johnny Can't Read*. This book followed the shift in emphasis in the teaching of beginning reading from a code-based approach (first teach the alphabet, and the ability to read will follow) to a meaning-based approach (start by teaching children to recognise meaningful words (look-say), and they will gradually pick up the code). Flesch argued that written English is alphabetic,

and thus phonetic, and that phonic instruction is the only natural system of teaching children to read. Mastery of the alphabetic code is therefore the key to learning to read, and the failure of many children to learn to read was attributed to failure to teach children the code.

Chall's comprehensive review of existing methods and research on beginning reading was designed to provide a basis for evaluating the arguments in favour of these opposing approaches to the teaching of reading. The results of this review pointed to a consistent and significant effect of phonics instruction as a factor in reading achievement, and Chall's conclusions were supported by a series of further reviews and studies which were undertaken in response to this debate.¹⁰

Becoming a Nation of Readers, by Anderson et al (1985), was a response to the report *A Nation at Risk: The Imperative for Educational Reform*, by the National Commission on Excellence in Education, which warned of the risk for America of shortcomings in levels of literacy at the secondary level. The Anderson et al report reviewed the evidence relating to reading, including the processes involved in reading, the factors that affect reading development, and classroom practices relating to the teaching of reading. They came up with a set of recommendations with regard to the conditions likely to produce citizens who read with high levels of skill, and do so frequently and with evident satisfaction. These recommendations covered a range of practices relating to the home, the school, and the teacher,

¹⁰ See, for example, Bond and Dykstra (1967), Pflaum, Walberg, Karegianes and Rasher (1980), and Adams (1990). A more detailed review of Chall's study as well as the outcomes of the First Grade Reading Studies is provided in an unpublished paper by de Lemos (1997).

but insofar as instructional practices were concerned, there was a clear emphasis on the importance of well-designed instruction in phonics and the continuing application of phonics to word identification and reading in meaningful contexts.

The review by Marilyn Adams, published in the book *Beginning to Read: Thinking and Learning About Print*, was undertaken in response to the ongoing and increasingly acrimonious debate between proponents of phonics and proponents of the whole language approach to the teaching of reading. This report provided a comprehensive review of the literature relating to the acquisition of reading, including an historical overview of the development from ideographic to alphabetic writing systems, and the central role of phonemic awareness and phonics in providing a basis for mapping symbols to sound in order to convert the spoken work to the written symbol, and vice versa. This review drew on the substantial body of research that had accumulated over the 1970s and 1980s, which demonstrated the link between phonemic awareness and subsequent achievement in reading, and indicated that successful phonics instruction is dependent on the child's ability to recognise the individual sounds within words and to break words down into their separate sounds. This work was widely quoted, and became recognised in the 1990s as the most authoritative review of the research literature relating to reading to date.

However, despite its wide acceptance within the research community, this report failed to resolve the reading debate. As a consequence a new synthesis of the research evidence relating to reading instruction, with a specific focus on strategies that might prevent reading failure, was commissioned by the US Department of Education and the US Department of Health and Human Services, resulting in the Snow et al report *Preventing Reading Difficulties in Young Children*.

This report differed from the Adams report in that it focused much more specifically on the implications of the research evidence for the teaching of reading, with a particular emphasis on the prevention of reading difficulties through intervention programs at the preschool level and effective teaching in the early years of schooling. The report identifies specific teaching goals at the preschool to Grade 3 level, together with recommended teaching strategies to achieve these goals. The report also reviews the research evidence relating to the effects of various school and home factors on early literacy development, as well as the effectiveness of different early intervention approaches for the prevention of reading difficulties in the case of children who might be at risk, or for assisting children who fail to achieve satisfactory progress in the early stages of learning to read.

The Report of the National Reading Panel

While the Snow et al report on *Preventing Reading Difficulties in Young Children* was widely acclaimed, its findings and recommendations were not accepted by all, and it was felt that a more systematic review of the research evidence relating to the teaching of reading was required. This led to the constitution by the US Congress of the National Reading Panel, charged with the task of assessing the status of research-based knowledge, including the effectiveness of various approaches to teaching children to read. The panel was composed of 14 individuals, including leading scientists in reading research, representatives of colleges of education, reading teachers, educational administrators, and parents. In order to cover the major topics designated the Panel established five subgroups to cover the areas of alphabets, comprehension, fluency, teacher preparation and computer-linked instruction.

The Panel developed a set of rigorous scientific standards to evaluate the research on the effectiveness of different instructional approaches used in teaching reading skills. Regional hearings were held to allow public input, and to inform the panel of the issues that were considered important by the public, and the needs and concerns of those who would be required to implement the Panel's findings and determinations.

The key issues that emerged from the public hearings were:

- the importance of the role of parents and other concerned individuals in providing children with early language and literacy experiences that foster reading development

- the importance of early identification and intervention for all children at risk for reading failure
- the importance of phonemic awareness, phonics and good literature in reading instruction, and the need to develop a clear understanding of how best to integrate different reading approaches to enhance the effectiveness of instruction for all students
- the need for clear, objective, and scientifically based information on the effectiveness of different types of reading instruction and the need to have such research inform policy and practice
- the importance of the role of teachers, their professional development, and their interactions and collaborations with researchers, which should be recognised and encouraged
- the importance of widely disseminating the information developed by the Panel.

Their search of the research evidence relating to the teaching of reading identified a total of about 100 000 studies since 1966, and another 15 000 published prior to this time. Because of the large volume of studies, the panel selected only experimental and quasi-experimental studies for their review, and of these, only those that met rigorous scientific standards in reaching their conclusions.

The main conclusions reached by the panel, in the various aspects of reading investigated, are summarised in the following two pages.

Phonemic awareness

Teaching children explicitly and systematically to manipulate phonemes significantly improves children's reading and spelling abilities (an overall effect size of .86 on measures of phonemic awareness outcomes, an overall effect size of .53 on reading outcomes, and an overall effect size of .59 on spelling outcomes, based on a total of 96 comparisons from 52 studies).

The Panel's conclusion was that the evidence on this was so clear cut that this method should be an important component of classroom reading instruction.

Phonics instruction

Systematic phonics instruction (as compared with nonsystematic phonics instruction or no phonics instruction) produces significant benefits for children from Kindergarten to Grade 6, and for children having difficulties in learning to read (overall effect size of .44, based on 66 comparisons derived from 38 studies). The greatest improvements in reading are associated with synthetic phonics instruction¹¹ (effect size of .45), as compared with programs based on analysis and blending of larger units¹² (effect size of .34) or programs using other systematic approaches or where the specific nature of the approach was not specified (effect size of .27). It was also noted that the effects of systematic phonics teaching were greater at Kindergarten and Grade 1 (.56 and .54) than in Grades 2 to 6 (.27), and greater for children from low SES backgrounds (.66) as compared with children from high SES backgrounds (.44). Effects were also greater for children identified as 'at risk' (.58 at Kindergarten level and .74 at Grade 1 level), as compared with children identified as 'reading disabled' or where low achievement was associated with other cognitive difficulties (.32 and .15). Systematic phonics instruction also had a stronger effect on spelling for children in Kindergarten and Grade 1 (.67) than for children in Grade 2 to Grade 6 (.09).

The Panel's conclusion was that the evidence relating to the effectiveness of phonics instruction in improving reading outcomes was sufficiently strong to indicate that systematic phonics instruction should be a part of routine classroom instruction. It was however noted that because children vary in the skills they bring to the classroom, no single approach to teaching phonics can be used in all cases, and that teachers require training in different approaches to the teaching of phonics and how these approaches can be tailored to meet the needs of particular groups of students.

Oral reading

Guided oral reading (that is, reading aloud to the teacher, parent, or a fellow student) is important for developing reading fluency (average weighted effect size of .41). The highest impact was on reading accuracy (mean effect size of .55), followed by reading fluency (mean effect size of .44) and reading comprehension (mean effect size of .35). However, there was substantial variation in the effect sizes reported for these studies (from .05 to 1.48), as well as substantial variation in the sample sizes. Because of the great range in the nature and design of the studies examining the effects of guided reading, and in many cases the lack of either transfer or control data, only fourteen studies were found to be appropriate for inclusion in the meta-analysis from which the average weighted effect size was calculated.

Silent reading

The panel was unable to determine whether reading silently to oneself helped to improve reading fluency. While hundreds of studies have demonstrated that better readers do more silent reading than poor readers, these studies are unable to determine whether independent silent reading improves reading skills or that good readers simply prefer to do more silent reading than poor readers. Although not discouraging the practice of silent reading as a classroom technique, the Panel recommended that this be done in combination with other types of reading instruction such as guided oral reading.

Vocabulary instruction

The Panel was unable to identify the best method for teaching vocabulary, and concluded that vocabulary should be taught both directly and indirectly, that repetition and multiple exposure to words, as well as computer technology, will assist vocabulary development, and that instruction should be based not on a single method but on a combination of methods.

Reading comprehension

With regard to the comprehension of text, the Panel found that reading comprehension is best facilitated by teaching students a variety of techniques and systematic strategies to assist in recall of information, question generation, and summarising of information. It also found that teachers must be provided with appropriate and intensive training to ensure that they know when and how to teach specific strategies.

Teacher training

The Panel noted that existing studies showed that training both new and established teachers generally produced higher student achievement, but that the research evidence is inadequate to draw clear conclusions about what makes training most effective. More quality research on teacher training was one of the major research needs identified by the Panel.

Computers and reading

With respect to computer technology, the Panel noted that there are too few definitive studies to draw firm conclusions, but the available information indicates that it is possible to use computer technology for reading instruction. The use of hypertext (highlighted text that links to definitions or related text) was noted as one possible teaching strategy. It was also noted that the use of computers as word processors might help students learn to read, as reading instruction is most effective when combined with writing instruction.

¹¹ Synthetic phonics involves teaching students explicitly to convert letters into phonemes and to blend phonemes to form words.

¹² Such as clusters of letters forming a subpart of the word, as in onsets, rimes, phonograms, and spelling patterns.

This 800 page report of the National Reading Panel is the most comprehensive review yet of the research evidence relating to the factors underlying the acquisition of reading and the effectiveness of different approaches to the teaching of reading. But whether or not it will finally resolve the debate between proponents of the whole language approach to the teaching of reading versus the phonics approach, or the debate between those who view reading as essentially a social process as against those who view reading as a process of mapping the sounds of words to their written symbol, remains to be seen.

A possible criticism of the Report is that it fails to address many other issues that are of concern to teachers, educational administrators and the public. These concerns include the social factors related to the development of literacy, including the early development of literacy in the home and preschool environment, and the importance of home-school partnership in developing children's literacy skills and attitudes to literacy. Broader school factors associated with literacy development are also not addressed in the Report. Such factors would include the effects of class size and class grouping; the effectiveness of various intervention strategies such as Reading Recovery for children identified as having difficulty in learning to read; and what makes teachers and schools effective. Other issues not covered in the Report are the role of assessment and reporting in the improvement of student outcomes, and the setting of targets or benchmarks for student achievement.

While these are important issues to be considered, there are two lines of argument in defence of the stand taken by the Reading Panel.

It could be argued that the task of considering all of these issues was beyond the scope of a single Committee, which was appointed for the specific purpose of seeking answers to what was seen as the major source of debate and dispute within the educational community with regard to the effectiveness of different approaches to the teaching of reading. Resolving this debate could then open the way to considering other issues in a more objective and dispassionate way.

It could also be argued that the research evidence relating to these broader issues has not yet reached a state of consensus in which implications for teaching practice could be put into immediate effect. One of the main findings arising from the report of the National Research Committee on Preventing Reading Difficulties in Young Children¹³, which provided the basis for the work of the National Reading Panel, was that a sufficient degree of consensus had been reached by the members of this diverse Committee to provide an integrated picture of how reading develops and how reading instruction should proceed. However, the limitations of this report, as noted by the Reading Panel, was that it was a consensus document based on best judgement rather than a rigorous analysis of the research evidence. It did not specifically address how critical reading skills are most effectively taught and what instructional methods, materials and approaches are most beneficial for students of varying abilities.

¹³ See Snow, Burns and Griffin (1998).

This was the issue that the Reading Panel sought to address in their Report.

Summary of US Reports on Research Evidence Relating to Effective Instructional Practices

Over the period 1967 to 2000 a series of reports addressing the issue of effective instructional practices for the teaching of reading were undertaken in the United States. All of these reports came up with the same conclusion; that systematic teaching of phonics was a necessary and essential component of any program for the teaching of beginning readers. Despite the range of programs studied and the various other factors associated with reading achievement, there was a consistent finding of higher achievement being associated with programs that included systematic teaching of phonics.

However, all these reports recognised that systematic teaching of phonics was only one aspect of a comprehensive program for the teaching of reading, and that a successful teaching program needed to include a variety of other components, including exposure to a rich language and print environment with opportunities to develop listening and oral language skills through story reading and discussion, particularly in the early stages of learning to read; exposure to interesting picture and story books to encourage early reading and to develop children's motivation to read; and the provision of stimulating and challenging reading material matched to

their level of ability to ensure growth in reading development throughout the years of schooling. The phonics versus whole language debate was not therefore a debate about two opposing and mutually exclusive approaches to the teaching of reading. It was rather a debate about whether or not systematic teaching of phonics should be included as one aspect of the teaching of reading, in a broader program including both phonics approaches and the literacy-based approaches favoured by whole language teachers.

While in recent years there has been a recognition of the need for more balanced approaches to the teaching of reading¹⁴, there remains a significant number of teachers whose approach is based on the theoretical assumptions that underlie the whole language approach, including the assumption that reading is acquired through a process of exposure to written language, in the same way that learning to speak is acquired through exposure to the spoken language, and that no formal teaching of reading is therefore required. Such teachers continue to oppose formal systematic teaching of phonics, in the belief that reading for meaning does not depend on the ability to decode text, and that the recognition of letter/sound relationships is only one of several different ways of deriving meaning from text, and of equal or even lesser importance than other strategies that can be applied, such as guessing from context.¹⁵

¹⁴ See, for example, Pressley (1998), and Beard (1993).

¹⁵ As a postscript to this section, it should be noted that new legislation recently introduced in the United States (the *No Child Left Behind Act of 2001*, which was signed into law on 8 January 2002), places particular emphasis on the improvement of reading instruction, with one billion dollars allocated to *Reading First*, a program designed to improve reading achievement through the adoption of effective teaching practices based on scientific research, as documented in the report of the National Reading Panel.

CURRENT APPROACHES TO THE TEACHING OF READING IN AUSTRALIA

The evidence relating to the factors underlying the acquisition of reading skills is based on research in a number of English-speaking countries, including Australia and New Zealand, as well as various other non-English speaking countries. It can therefore be assumed that the findings based on this international body of research are applicable to the Australian context.

In view of this it would seem appropriate to examine current practices in Australia to determine the extent to which these practices reflect current understandings of the processes underlying the acquisition of reading, and what is known about instructional strategies that are most effective in developing reading skills.

Historical Overview

Over the past 30 years, literacy teaching in Australia has been based mainly on the principles and practices underlying the whole language approach to the teaching of reading. As noted by the House of Representatives Committee on Employment Education and Training (1992), whole language has Australia-wide support and virtually all curriculum guidelines on primary school literacy teaching are based on this approach. It has provided the theoretical basis for the literacy instruction of teachers in both their preservice and inservice training, including the influential Early Literacy Inservice Course (ELIC), which, as noted in the House of Representatives Report,

was undertaken by virtually all teachers of early literacy throughout Australia.¹⁶

In their review of literacy instruction in Australian primary schools, van Kraayenoord and Paris (1994) trace the historical developments that have influenced literacy education in Australia, and the emergence of the holistic approaches to literacy that have led to a common approach to the teaching of literacy in classrooms across Australia. The essential characteristic of a holistic approach to language learning, as identified by van Kraayenoord and Paris, is that it does not focus instruction on component skills or delay introduction of literacy uses until subskills have been mastered. According to van Kraayenoord and Paris, 'communication of meaning is the main goal, and Australian educators believe that invented spelling, incomplete decoding, text memorisation and other 'errors' in performance should be accepted in the child's developmental uses of literacy' (van Kraayenoord and Paris, 1994, page 219). It is this belief that distinguishes holistic and whole language approaches to the teaching of reading from approaches based on skill-based or direct teaching models.

The dominance of a single approach to the teaching of reading in Australia is attributed by van Kraayenoord and Paris to two main influences. First, the preservice and inservice training of teachers, which in Australia tends to be very uniform because the same sources

¹⁶ A more detailed analysis of the philosophy and practice of whole language teaching in Australia and New Zealand is provided by Hemenstall (1996), and Tunmer and Chapman (2002).

of ideas and exemplary models are used by most institutions. And second, the influence of a few key individuals, who, as a result of the relatively small population and vast distances, have had a powerful influence in promoting particular models of literacy instruction. Among those mentioned by van Kraayenoord and Paris as having had a key role in influencing approaches to the teaching of literacy in Australia are Marie Clay (1972), Brian Cambourne (1988), Don Holdaway (1979), Donald Graves (1983), and Michael Halliday (1975), all of whom espoused holistic and whole language approaches to the teaching of reading.

While there seems to be an increasing recognition in Australia of the importance of phonemic awareness and the need for more balanced approaches to the teaching of reading, there is as yet little evidence of a major shift from the holistic and whole language approaches that continue to dominate literacy teaching practices in Australia. While the terms 'balanced' and 'structured' have been applied to describe some of the new literacy programs and initiatives that have been developed to address the literacy needs of children in the early years of schooling, these programs do not generally include direct systematic or explicit teaching of phonics. These programs would therefore correspond to what Foorman et al (1998), in their study of the role of instruction in learning to read, describe as the implicit or indirect approach, in which instruction in the alphabetic code is seen as incidental to the act of making meaning from print (see also, Pressley, 1998, for a description of whole language versus balanced programs of literacy instruction).

Evidence Relating to the Use of Phonics in Australian Programs of Reading Instruction

Precise information on the extent to which systematic teaching of phonics is included as a part of the regular teaching program in Australian schools is difficult to locate. In the case of New South Wales, Center, Freeman and Robertson (1998) note the lack of uniformity in early literacy instructional practices in the kindergarten year, and the fact that more recently trained teachers tend to use a whole language approach, because this is the philosophy that has been adopted by most teacher training institutions over the past 15 years. They observe that more experienced teachers are more likely to use a more phonically based approach, but because early literacy teaching does not occupy a large part of a teacher's preservice training, many recently graduated teachers tend to learn on the job, adopting the methods that are characteristic of the specific school to which they are appointed.

Some evidence on the literacy programs provided to support students with learning difficulties is available from the survey of schools undertaken as a part of the DETYA funded study on primary students with learning difficulties in literacy and numeracy (Rohl, Milton and Brady, in Loudon et al, 2000). While the focus of the study was on students with learning difficulties, the results of this survey do provide some information that is indicative of the nature of the teaching programs provided by schools.

Data from the 377 schools that responded to this survey indicated that the most widely used programs to support the literacy learning of students with learning difficulties are *First Steps*

(49 per cent), *Reading Recovery* (46 per cent), and the Victorian *Early Years Literacy Program* (19 per cent). In addition, 32 per cent of schools indicated that they were using some form of direct instruction. The direct instruction programs listed included some phonics-based programs such as THRASS; the Macquarie University Reading Program, SWELL; and the Heather Harvey Intensive Reading Program. However these programs were mentioned by less than one per cent of the schools that responded to the survey.

From these responses it is clear that the preferred approach to the support of students with reading difficulties are classroom and intervention programs which are based essentially on a whole language approach to the teaching of reading (that is, meaning emphasis as opposed to code emphasis approaches, where the teaching of phonics is implicit rather than explicit). This includes Reading Recovery, which is based on a more intensive one-to-one version of whole language teaching strategies.¹⁷ Given that students with learning difficulties are the group most likely to require direct instruction in reading skills, the overall total of 32 per cent of schools providing this form of teaching for students who have been identified as having a learning difficulty is likely to provide an overestimate of the extent to which direct instruction is used in regular classroom teaching. It should also be noted that the kinds of programs included under the general term 'direct instruction' are not further specified, and that this term probably covers a wide range of different teaching strategies with

varying degrees and types of instruction, which may not necessarily include direct teaching of the alphabetic code.

In addition to the data from the school survey, the DETYA funded study on primary students with learning difficulties also collected information from systems across all states and sectors on the programs and strategies that were being implemented in each system to assist students with learning difficulties. A listing of the main programs and strategies mentioned by systems is provided by Rivalland and House (in Louden et al, 2000, pages 138–140). While not exhaustive, this listing is said to provide a general picture of the patterns of support provided throughout Australia.

A total of 164 programs and strategies were listed. Of these, 27 (16 per cent) referred to programs which had a focus on phonics. An analysis of this listing indicated that phonics-based programs were more likely to be included among the programs and strategies listed by the independent sector (30 per cent of the 50 programs listed), as compared with the Catholic sector (14 per cent of the 51 programs listed) or the Government sector (8 per cent of the 63 programs listed).

These results, while indicative only, are nevertheless consistent with the evidence from other sources that whole language approaches to the teaching of reading still dominate the Australian scene, and while specific programs based on alphabetic code instruction are beginning to be used, particularly in independent schools, these remain the exception rather than the rule.

¹⁷ See, for example, Chapman, Tunmer and Prochnow (1999), and Chan and Dally, in Louden et al, (2000), page 214–215).

AUSTRALIAN RESEARCH ON EFFECTS OF PHONICS VERSUS WHOLE LANGUAGE INSTRUCTION

There have been few studies in Australia which have been designed specifically to look at the effectiveness of a phonics-based versus a whole language approach to the teaching of early reading. Some relatively small school-based studies of the effects of direct instruction programs that include specific teaching of phonics have been reported, but these have generally been based on very small samples, and results are generally reported in terms of actual gains versus expected gains based on norm-referenced measures, without any control to serve as a comparison group (Lockery and Maggs, 1982). However, some data relating to the effectiveness of more structured programs including some explicit teaching of phonics is available from the ACER research-based evaluation of the Victorian pilot project on multi-age grouping (de Lemos, 1999), while a longitudinal study of the effectiveness of training in phonemic awareness at the preschool level has been reported by Byrne and Fielding-Barnsley (Byrne, 1998). Further information on the effectiveness of a program which includes specific instruction in sound/symbol correspondences and phonemic awareness is also provided by the evaluation of the Schoolwide Early Language and Literacy Program (SWELL), which was developed by a group of Macquarie University researchers in collaboration with researchers at the John Hopkins University in the United States (Center, Freeman and Robertson, 1998).

Data from the Victorian Multi-age Project

The ACER research-based evaluation of the Victorian pilot project on multi-age grouping was designed to examine the impact of multi-age grouping in the first three years of schooling on children's social development and academic achievement. For the purposes of this study teachers in both the pilot sample (with multi-age classes) and in the control sample (with predominantly single-grade classes) were asked to complete a questionnaire on various teaching and class grouping practices adopted in their teaching program. Two of the questions in this questionnaire related to the teaching of literacy.

The first of these questions asked teachers of Prep to Year 2 children to indicate whether their approach to the teaching of literacy was based on a whole language approach or a structured approach. Of the 272 teachers who responded to this question 77 per cent indicated that their teaching of literacy was based on a whole language approach, 17 per cent indicated that their program was based on a balanced or a mixed approach, incorporating elements of both the whole language approach and a structured approach, while 6 per cent indicated that they followed a structured program, based on the identification and systematic teaching of the subskills underlying the development of reading and writing. There were some differences between the teachers in the pilot and control schools in terms of the proportion who followed a whole language approach (87 per cent in the

multi-age group and 69 per cent in the control group) and the proportion who followed a structured approach (3 per cent in the multi-age group and 9 per cent in the control group).

The second of the two literacy questions asked teachers about their approach to the teaching of phonics. In response to this question, 51 per cent of the teachers indicated that there was no specific teaching of phonics in their program, 22 per cent indicated that they included teaching of phonics as and when necessary (implicit phonics), while 27 per cent of teachers indicated that they included systematic teaching of phonics as a part of their teaching program. Again there was a difference between the pilot and the control schools in terms of the proportion of teachers who indicated that their program did not include any specific teaching of phonics (70 per cent in the case of the pilot schools as compared with 36 per cent in the case of the control schools).

Data from this project also provided information on the relationship between teaching program and student outcomes in reading, since all the children in the evaluation study were assessed in their first year of school, and again at the end of their first, second and third years of schooling, on various measures of early literacy and reading skills.

In order to examine the effect of teaching program on student outcomes, a school measure based on overall teacher responses to these two questions was created, distinguishing between schools which in general adopted a whole language approach to the teaching of literacy with little or no emphasis on the teaching of phonics, and schools which adopted a more

structured approach to the teaching of literacy with some emphasis on phonics. Comparisons of student outcomes in these two groups indicated little or no differences in the first year of school on the measures of early literacy, with the whole language group scoring higher on the Language Profile of the AGS Early Screening Profiles administered in the second term of school (effect size of $-.12$), and the structured program group scoring higher on the teacher assessment of reading skills at the end of the first year of school (effect size of $.07$). There was also little or no difference between these two groups on the measures administered in the second year of schooling, with the whole language group scoring higher on a Word Recognition test administered in the third term of school (effect size of $-.05$), and the structured program group scoring higher on the teacher assessment of progress in reading at the end of the school year (effect size of $.04$). However, in the third and fourth years of schooling the structured program group scored higher than the whole language group on the standardised measures of reading comprehension administered in the third and fourth years of schooling (with an effect size of $.38$ in Year 2 and an effect size $.30$ in Year 3). These findings of a long term positive effect for a more structured program and systematic teaching of phonics in the early years of schooling are consistent with the overseas evidence.

While not nationally representative, the data from this sample of schools provide some indication of the relative emphasis on whole language versus structured approaches to the teaching of reading in what is probably a fairly typical sample of Australian schools, and the extent to

which explicit teaching of phonics is included as a part of the regular class program. It also provides some data on the effects of more structured versus less structured programs on student outcomes. These data were collected in 1995, so it is possible that there might have been some shift in emphasis as a consequence of the increasing recognition of the role of phonics and phonemic awareness in the early stages of learning to read. However, this study does provide a basis for examining changes in attitude to the systematic teaching of phonics over the last half decade.

Data on the effects of training in phonemic awareness at the preschool level

Australian data on the effectiveness of training in phonemic awareness at the preschool level is available from the series of studies by Byrne and Fielding-Barnsley (Byrne, 1998; Byrne and Fielding-Barnsley, 1991a, 1991b, 1993, 1995; Byrne, Fielding-Barnsley and Ashley, 2000). In this carefully designed longitudinal study samples of children in four preschools were randomly allocated to two groups, one of which underwent training in phonemic awareness, using the Sound Foundations program (Byrne and Fielding-Barnsley, 1992). A control group was exposed to the same set of materials for the same amount of time, but instead of training in phonemic awareness they were given practice in classifying items from the set of materials on attributes such as shape, colour, animacy, and edibility. The experimental group comprised a total of 64 children, with 62 children in the control group (after two children in the initial control sample left the region). There were some differences between the two groups on

the various measures administered prior to the training sessions. The control group scored marginally higher on the PPVT (effect size of $-.10$), the ability to name letters (effect size of $-.04$) and the recognition of common signs such as McDonald's (effect size of $-.08$). The experimental group scored marginally higher on the rhyming task (effect size of $.14$) and the identification of letters corresponding to a given sound (effect size of $.16$). There was no difference between the two groups on the Clay *Concepts of Print* test. At the conclusion of the program the children in the experimental group were found to perform better on measures of phonemic awareness (effect sizes of $.43$ and $.39$ on measures of phoneme identity and phoneme elision) and on a structured test of printed word decoding.

At the end of their first year of schooling (Kindergarten) the children in the experimental and control groups were assessed again on the measures of phonemic awareness, and also on measures of alphabet knowledge, word identification, pseudo-word identification and spelling. The children in the experimental group again performed better on the measures of phonemic awareness (effect sizes of $.81$ and $.71$ on measures of phoneme identity and phoneme elision), and also on a measure of pseudo-word identification (effect size of 1.1). The experimental group also scored higher on the measures of real word identification (effect size of $.18$) and spelling (effect size of $.29$), although these differences were not statistically significant. There was however no difference on the measure of alphabet knowledge (effect size of 0).

The superior performance of the experimental group on various measures of word reading, spelling, reading comprehension and listening comprehension was still evident at the end of Year 1 and at the end of Year 2. At the end of Year 1 the differences between the experimental and control groups were significant on the pseudo-word reading task (effect size of 1.27), and were substantially higher (but not statistically significant) on the measure of real word reading (effect size of .67). The differences were however less marked on the measures of spelling (effect sizes of .03 to .15). At the end of Year 2 the differences between the experimental and control group were significant on the pseudo-word reading task (effect sizes of .98 and .95), and substantially higher (but not statistically significant) on the measures of reading real words, both regular and irregular (effect sizes of .55, .46 and .60), and on the measures of reading comprehension and listening comprehension (effect sizes of .69 and .40).

A further follow-up of these children was undertaken at the end of Year 3 (Byrne, 1998) and again at the end of Year 5 (Byrne, Fielding-Barnsley and Ashley, 2000). The Year 3 follow-up was based on 105 of the original 126 children (57 in the experimental group and 48 in the control group), while the Year 5 follow-up was based on 103 children, one less in each of the groups.

At the end of Year 3 the differences were significant on the pseudo-word reading test, but not on the other tests including measures of irregular word reading, reading comprehension and listening comprehension, and a measure of print exposure (the Title Recognition Test, adapted from Cunningham and

Stanovich, 1990). Standard deviations are not reported for these results, so effect sizes cannot be calculated for these differences.

At the end of Grade 5, the experimental group scored significantly higher than the control group on three of the eight measures administered: the Word Attack subtest from the Woodcock Reading Mastery Tests – Revised (Woodcock, 1987), the Castles irregular word reading list (Castles, 1993), and the combined measure on the three word reading lists (nonwords, regular words and irregular words). The effect sizes for these differences were .34, .39 and .33. Although the experimental group also scored higher on the other tests administered (word identification; non word and regular word reading; Spelling; and Title Recognition), these differences were not statistically significant.

These results have been quoted at some length because they indicate substantial and lasting effects of phonemic training at preschool level on subsequent reading skills, without any further differential training between the experimental and control groups at school level. This finding is consistent with the findings reported by the US National Reading Panel, and support the accumulating evidence that phonemic awareness is one of the critical factors that underlie children's success in learning to read.

Evaluation of the Schoolwide Early Language and Literacy Program (SWELL)

The only other Australian evaluation of a program that includes systematic instruction in phonics that could be located is the evaluation of the SWELL program in NSW (Center et al, 1998,

2001a; 2001b). This evaluation was undertaken in 1995 to 1996, and was based on a sample of six schools, all of which qualified for Disadvantaged Schools funding on the basis of parental occupation. Two of these schools had started implementing the SWELL program in Kindergarten and Year 1 the previous year (1994), and four started implementing the SWELL program at the beginning of 1995.

The SWELL program is based on Stanovich's interactive-compensatory model of reading acquisition (Stanovich, 1980, 1984), and comprises three phases. The first phase, the Emergent Literacy Program, is designed to develop early concepts of literacy in the first three to six months of the kindergarten year through traditional top-down processes: that is, through exposure to a literature rich environment, including story-telling and retelling; Big Book activities (reading together); development of expressive and receptive language abilities; activities designed to develop sensitivity to phonological and syntactic awareness; and other early writing activities (such as using symbolic representation as in drawing, scribble, letters and words (with invented and conventional spelling) for communication of ideas. The second phase of the program, Becoming Literate, is introduced from about the middle of the second term of school, and comprises a formal literacy instruction program which supplements the ongoing emergent literacy activities, and focuses mainly on bottom-up processes, including sound/symbol correspondences (phonological recoding); phonological and phonemic awareness; and specific instruction in spelling and recognition of irregular words. This phase continues to about the

end of Year 1, by which time most children would be expected to have mastered the grapheme-phoneme correspondences that are necessary for independent reading, and the 'learning to read' stage, as defined by Chall (1983), has therefore been completed. The third phase of the program, Towards Literacy Competence, then returns to a top-down orientation, with a focus on developing listening and reading comprehension strategies as children move into the next stage of 'reading to learn'.

For the purposes of the evaluation, the children in Year 1 in the year preceding the introduction of the SWELL program formed the control group. These children, who had not had any exposure to the SWELL program in their kindergarten year, were assessed at the beginning of Year 1. Children who had participated in the SWELL program in the kindergarten year were then assessed at the beginning of Year 1 in the following year. This provided a control sample of 249 children and an experimental sample of 366 children. The comparison between these two groups was then used as the basis for evaluating the effectiveness of the SWELL program. The measures used for this purpose included the *Burt Word Test*, a standardised word recognition test, the *Passage Reading Test*, a measure of reading accuracy developed by Deno, Mirkin and Chiang (1982), and the *Expressive Word Attack Skills Test*, a criterion-referenced test of phonological recoding developed at the Special Education Centre at Macquarie University (1991). The results of this evaluation indicated that the children in the experimental group, after 12 months in the SWELL program, scored higher than the control group from the previous year on all three measures, with these

differences being statistically significant on the *Passage Reading Test* and the *Expressive Word Attack Skills Test*, but not on the *Burt Word Test*. Using the data on mean scores and standard deviations (adjusted for school effects) as reported by Center et al, the differences in terms of effect sizes were .08 on the *Burt Word Test*, .24 on the *Passage Reading Test* and .40 on the *Expressive Word Attack Skills Test*. A further evaluation was undertaken six months later, at the beginning of the third school term, at which point the experimental group of children had spent 18 months in the SWELL Program. By this time two schools had dropped out of the study, so this second evaluation was based only on those children in the initial control and experimental samples who remained at the schools that were still participating in the evaluation study, providing a sample of 47 children in the control group and 84 children in the experimental group. This second evaluation included the *Passage Reading Test*; the *Expressive Word Attack Skills Test*; the *Developmental Spelling Test*, developed by Tangel and Blachman (1992) to measure spelling proficiency by taking into account the number of phonemes represented and the level of orthographic representation; and the *Diagnostic Reading Test* (Waddington, 1988), which is a standardised test recommended for classroom use by the NSW Department of School Education. This latter covers word decoding, sight-word knowledge, understanding of words, comprehension of sentences, the use of indirect cues, and obtaining meaning from direct speech. The results of this second evaluation at 18 months indicated that the children in the experimental group continued to score at a higher level than the control group

on all the measures used, and that these differences were statistically significant on all tests except the *Passage Reading Test*. Effects sizes calculated on the basis of the mean scores and standard deviations provided (adjusted for effects of school and 12 month measures) indicated an effect size of .24 on the *Passage Reading Test*, .58 on the *Expressive Word Attack Skills Test*, .40 on the *Diagnostic Reading Test* and .52 on the *Developmental Spelling Test*.

While this study was based on a relatively small sample of schools and students, and encountered some difficulties in implementation, the results are nevertheless consistent with the overseas research evidence which indicates that explicit instruction in the alphabetic code leads to improved outcomes in reading achievement, with the effect sizes obtained in this study generally comparable to those reported in the United States literature.

Limitations of Training in Phonemic Awareness and Phonics-based Instruction

While the evidence indicates that phonemic awareness is a strong predictor of success in learning to read, and that explicit instruction in phonics is a more effective teaching strategy than programs which provide little or no systematic instruction in phonics, this does not mean that all children will succeed in reading provided that they have acquired an understanding of the phonetic structure of words and have received explicit instruction in phonics. There will always be some children who will have difficulty in learning to read, whatever instructional strategy is adopted.

In discussing the results of their six year follow up at Grade 5, Byrne et al (2000) point out that early training in phonemic awareness at the preschool level is not in itself sufficient to prevent subsequent reading difficulties. That is to say, it does not have a vaccination effect in terms of preventing reading difficulties. They identified a small number of children (nine out of 56) in their experimental sample who were successful on the phonemic awareness training (that is, they achieved the pass criterion on the post intervention measures of phoneme identity and decoding), but nevertheless experienced difficulties in learning to read, and by Grade 5 were performing below the 5 per cent cut-off used to define children with a reading difficulty on one or more of the five reading tests administered at the end of Grade 5.

On the basis of a more detailed examination of this group of children, they identified what they termed a 'rate of responsiveness' or 'learning rate parameter', measured in terms of the time it took the children to reach a stable understanding of phoneme understanding in the initial training sessions, as indicated by the Session of Last Error measure (that is, the number of sessions it took before the child made no errors in the activities following the initial training on the target phoneme). This measure was found to be a strong predictor of subsequent reading progress over and above the final outcome measure of phoneme identity.

On the basis of these findings Byrne et al postulate a more general learning parameter, which determines not only the rate of responsiveness to the original instruction, but also the acquisition of higher level orthographic coding. That is, children who are slow to grasp ideas early in reading development, even though they finally grasp them, are also slow to acquire other principles that determine their rate of progress in learning to read.¹⁸ Training in phonemic awareness or direct teaching of phonics is therefore not in itself sufficient to overcome reading difficulties in the case of children who are slow to respond or who have underlying problems in cognitive processing.

¹⁸ It would seem likely that this general learning parameter is also related to speed of processing, which is assumed to be the main factor underlying individual differences in general reasoning ability or the *g* factor in intelligence, see for example Anderson (1992) and Jensen (1998).

RELEVANCE OF RESEARCH FINDINGS FOR TEACHING PRACTICE

This review has focused specifically on the research findings relating to the processes underlying the acquisition of reading and the evidence of instructional practices that are effective in improving reading outcomes. It has not addressed a range of other factors that are associated with literacy development.

This focus has been adopted for two reasons.

The first reason is that it is seen as providing a balance to the prevailing Australian literature on literacy development, in which the dominant emphasis has been on the social and cultural factors associated with literacy development. This emphasis has led to the assumption that in order to effect changes in children's literacy development it is necessary either to change the social and cultural environment of the child, or to adapt the school environment to more closely reflect the values and experiences of the child's home environment.

There would seem to be two major flaws in this approach.

One is that there is little evidence to indicate that any changes in the child's social and cultural environment, of the kind that might be brought about in the short term, would have any measurable effect on literacy outcomes.

The second is that there would seem to be a logical flaw in arguing that poor literacy outcomes, as measured in conventional terms, are associated with discrepancies between the values and expectations of the school as compared with the values and expectations of the

home, and at the same time to argue that the way of improving literacy skills is to adapt the school environment to make it more like the home environment. While this might be seen as a misrepresentation of this argument, there is nevertheless an element of truth in it which needs to be addressed. At what point does one distinguish between respect for different cultural attitudes and practices, as well as the obvious need to make the school environment as friendly, accepting and supportive as possible, and the need to ensure that children are exposed to the kinds of learning experiences that are most likely to develop the skills and concepts that are necessary to achieve literacy and numeracy?

The second reason for focusing on evidence relating to the instructional strategies that might improve achievement in literacy learning is that this is more directly relevant to the issue of how literacy outcomes might be improved.

The teaching of reading is the specific responsibility of the school. While home factors clearly play a part in developing the language skills that form the basis for learning to read, and children enter school with varying levels of skills and from varying kinds of background, the research evidence tells us that it is possible to provide children with experiences that will develop the kind of skills that they need to be able to read, regardless of their current level of skill and their home background. While some flexibility in teaching approach is needed to cater for children who are at different

levels, and whose rates of progress may differ, the research evidence indicates that the kinds of skill that underlie the reading process are universal, and apply to all children regardless of their particular cultural, language, or socio-economic background.

While parental values and attitudes may vary, and while these do need to be recognised and accommodated in the school program, most parents want their children to learn how to read, and expect that the school will teach them how to read.

Learning to read is only one aspect of the broader educational program. It is nevertheless an important and crucial part of the program, and failure to learn how to read can have long term negative consequences.

In reviewing the research evidence relating to the effectiveness of different instructional practices on learning outcomes, it is of interest to note that the effect sizes associated with effective class teaching practices are in general higher than the effect sizes of broader school-related initiatives designed to improve school effectiveness or to assist students who are having difficulty in learning to read. For example, effect sizes associated with the reduction of class size are generally substantially lower than the effect sizes associated with effective teaching practices, while the effectiveness (in terms of effect sizes) of one-to-one intervention programs such as *Reading Recovery* have yet to be established on the basis of well designed studies meeting rigorous scientific criteria.

At the same time, it should be noted that the adoption of effective classroom practices is, in comparison with other

strategies such as the reduction of class size or the implementation of intervention programs such as *Reading Recovery*, much more cost effective.

Teachers have to be trained and employed. It costs no more to train teachers to use effective teaching practices than to train them to use ineffective teaching practices. And it costs no more to employ effective teachers than it costs to employ ineffective teachers.

From this point of view, the research evidence relating to the extent to which the introduction of effective instructional practices can improve student outcomes is encouraging. While time and resources might be required to ensure the implementation and ongoing evaluation of the impact of the teaching practices that have been identified as effective, there is good reason to believe that the outcomes will be positive.

At the same time, the evidence indicates that in some cases reading difficulties are associated with underlying cognitive deficits, and that in such cases students will require ongoing intensive intervention and support to achieve satisfactory outcomes.

THE WAY FORWARD

There is increasing recognition in the educational community that it is time to move away from policies and practices based on philosophical beliefs about what should work, to evidence-based policies and practices based on the research evidence as to what does work (see, for example, Masters, 1999).

In the area of reading literacy, there appears to be a discrepancy between the research evidence as to 'what works', and the teaching strategies that form the basis of most current teaching programs.

In order to improve standards of literacy, it would seem that there is a need to rethink current approaches to the teaching of reading literacy in Australia, and to implement an ongoing program of research to evaluate the effectiveness of different approaches and strategies designed to improve student outcomes.

As noted at the beginning of this review, a range of new initiatives designed to improve literacy learning has been implemented in Australia over the past decade. However, no systematic mechanism has been set in place to evaluate the effectiveness of these programs in terms of improving student outcomes.

The adoption of evidence-based policies and practices in the area of literacy development implies a greater emphasis on the evaluation of programs designed to improve literacy outcomes, using soundly based research designs and valid and reliable research tools. In this way it would be possible to evaluate the extent to which the various educational initiatives introduced are meeting their stated objectives, and whether alternative (and possibly less costly) strategies might be equally if not more effective than those currently in place.

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