
Australian Council for Educational Research (ACER)
Welcome to the Conference

On behalf of the Australian Council for Educational Research, I have pleasure in welcoming you to the 1999 Research Conference.

This year, the theme of the Research Conference is Improving Literacy Learning. Countries throughout the world, including Australia, have identified the improvement of literacy levels as a pressing national priority. Literacy is widely recognised as a foundational skill essential to further learning, and a major determinant of employment prospects and life chances.

This conference brings together many of Australia's leading literacy experts and several internationally renowned researchers to review our current state of knowledge about literacy and literacy learning. Over the two days of the conference, speakers and participants will address the question: What does the research tell us? -- about useful ways of conceptualising and monitoring literacy skills, about the development of early reading, and about literacies and literacy needs arising from advances in information and communication technology.

We have been especially fortunate in bringing keynote speaker Dr Susan Burns to Australia. Dr Burns, Associate Professor in the Graduate School of Education at George Mason University, Virginia, and from the US National Academy of Science, is a co-author of the very influential American report Preventing reading difficulties in young children. As Study Director, Dr Burns led the effort to synthesise the available research on early reading development, and to translate the research evidence into practical advice and guidance for policy makers, teachers and parents.

The conference will also bring together and present for the first time recent international work that will culminate next year in the assessment of reading literacy achievements of 15-year-olds in more than 30 countries. Key research staff in the OECD Programme for International Student Assessment (PISA) will review the research underlying the assessment frameworks to be used in this international program.

The second day of the conference is devoted to a review of our current research-based knowledge about the evolving relationship between literacy and technology. A number of Australia's leading literacy researchers, including keynote speakers Dr Ilana Snyder and Dr Barbara Comber, will outline recent findings in this field.

We are delighted that so many distinguished educators will be contributing to our discussions at this conference, both as presenters and as respondents.

Geoff N Masters
Executive Director, ACER
Program at a glance

All conference sessions will be held in the Grand Ballroom (Ballrooms 1-4) of the Stamford Grand Hotel, with the exception of sessions indicated with an asterisk (*). See full details of sessions for these locations.

Sunday, 17 October

6.00 pm – 8.00 pm
Opening reception

Monday, 18 October

8.15 am
Registration and coffee

9.00 am
Welcome
Opening address

Part 1: Improving literacy learning in the early years

9.30 am
Plenary address and discussion
Preventing Reading Difficulties in Young Children: Synthesising the research

10.45 am
Morning tea

11.15 am
Concurrent sessions: Australian perspectives*

12.15 pm
Panel discussion

12.45 pm
Lunch

Part 2: Assessing reading literacy in an international context

1.45 pm
Plenary address and discussion
Developing a framework for assessing reading literacy

2.30 pm
Plenary address and discussion
Bricks and mortar: Building a test around the PISA Reading framework

3.15 pm
Afternoon tea

3.45 pm
Panel discussion

4.30 pm
Small group discussions: What does the research tell us?

5.00 pm
Plenary session: Overview of day

5.15 pm
Close of discussion

7.00 pm
Conference dinner

Tuesday, 19 October

Part 3: Literacy and technology

9.00 am
Keynote address
Literacy and technology studies: Past, present, future

10.00 am
Concurrent sessions: Australian perspectives*

11.00 am
Morning tea

11.30 am
Panel discussion

12.30 pm
Lunch

1.30 pm
Plenary session
Literacy, information technology and educational disadvantage: Teachers research practice

3.30 pm
Conference summary: What does the research tell us?

4.00 pm
Conference ends
Day 1 – Sessions

Part 1: Improving literacy learning in the early years

An overview of the research on early literacy development: What are the agreed-upon results and conclusions of empirical work in early literacy development? What are the implications of this research for schools and education systems? This component of the conference will draw on the work of the US Committee on the Prevention of Reading Difficulties in Young Children.

9.00 am
Welcome
Dr Geoff Masters, Executive Director, ACER

Opening address
Hon. Malcolm Buckby MP, Minister for Education, Children’s Services and Training, and Member for Light, South Australia

9.30 am
Plenary address and discussion
Preventing reading difficulties in young children: Synthesising the research
Associate Professor M Susan Burns, Graduate School of Education, George Mason University, Virginia, US Chair: Professor Jillian Maling, Deputy Chair and Chair-Elect, ACER Council

The presentation will focus on the National Research Council’s report, Preventing reading difficulties in young children. This report reviews research on early reading and recommends prevention and early intervention. The conclusions concerning normal reading development and the various domains relevant to reading success will be presented. The opportunities young children should receive to prevent reading difficulties will be identified, i.e. opportunities:

- to explore the various uses and functions of written language and to develop appreciation and command of them;
- to grasp and master the use of the alphabetic principle for reading and writing;
- to develop and enhance language and metacognitive skills to meet the demands of understanding printed texts;
- to experience contexts that promote enthusiasm and success in learning to read and write, as well as learning by reading and writing;
- for children likely to experience difficulties in becoming fluent readers to be identified and to participate in effective prevention programs; and
- for children experiencing difficulties in becoming fluent readers to be identified and to participate in effective instruction that is well integrated with ongoing good classroom instruction.

The preschool years, kindergarten through grade 3, and teacher professional development are addressed in terms of these opportunities.

10.45 am
Morning tea
1. The Early Literacy Research Project

Ms Carmel Crecoola, Lecturer, Faculty of Education, University of Melbourne
Chair: Dr Geoff Masters, Executive Director, ACER

* Ballroom 5

Substantial improvements in the literacy achievements of students in the early years of schooling have been achieved in three large-scale improvement projects that have focused on implementing a whole-school design approach to improvement. The first, the Early Literacy Research Project (ELRP), was a three-year project involving 27 trial schools within the Victorian school system. The second, the Children’s Literacy Success Strategy, or CLASS, is ongoing and involves approximately 130 Victorian Catholic primary schools. The third, Balanced Early Literacy, is entering its second year and involves a group of 30 schools in Boston, Chicago and New York. Each of these projects has been informed by a whole-school design approach to improvement, and has involved extensive collection of information in both project schools and in a wider group of reference schools as a means of evaluating the impact of the interventions.

2. Literacy development in the first year of schooling

Associate Professor Susan Hill, University of South Australia, and Associate Professor Bill Louden, Edith Cowan University
Chair: Professor Jillian Maling

* Ballrooms 1-4

This paper draws on the research study 100 children go to school: Connections between literacy development in the prior to school period and the first year of schooling. The paper will discuss the findings of the study, pose questions about universal, sequential linear notions of literacy development, and raise issues to do with literacy pedagogy.

This study explores the connections and disconnections among three distinct social spaces through which young children move – home, pre-school and school. The connections and disconnections children make between home and school are linked to the repertoires and knowledge children already have. The case studies suggest that success in playing the institutional game of schooling is contingent upon students using the social and cultural capital they have acquired from home, and also upon teachers’ ways of building on children’s different resources. Rather than children’s success with literacy being contingent on what children have already experienced prior to schooling, the research team strongly endorses culturally inclusive curriculum and pedagogy. Therefore, the research team advocates a review of current literacy curriculum and pedagogy to examine school practices in terms of cultural inclusivity.

3. The Longitudinal Literacy and Numeracy Study

Ms Marion Meiers and Ms Margaret Forster, ACER, with Mrs Veronica Luck, Teacher, St Elizabeth’s Primary School, Ekkabin, Queensland
Chair: Professor Trevor Cairney, Pro Vice-Chancellor (Research), University of Western Sydney Nepean

* Moseley Room

The ACER Longitudinal Literacy and Numeracy Study is following the literacy and numeracy development of a national sample of 100 children who started school in 1999, and who will finish their primary education in 2005. The key research question for the study is: What is the nature of literacy and numeracy development in Australian schools? This longitudinal study creates the opportunity to investigate development over time, rather than achievement at a particular stage.

The project has been designed to gather a wide range of reliable and valid data. Several aspects of the design of the study are directed towards ensuring the reliability of the data, including the use of...
of sets of common assessment tasks administered by the students’ class teacher. The design of the common assessment tasks is directed towards ensuring the validity of the achievement data which is being collected. Another significant feature of the study is the range of data which is being collected annually, including literacy and numeracy portfolio samples from the students’ normal classroom work, background variable questionnaires for schools, teachers and parents, as well as the responses to common assessment activities.

The baseline information collected from the common tasks undertaken at the beginning of the students’ first year at school provides insights into what children know and can do in literacy and numeracy when they enter school. These findings will be reported in a variety of ways, including representation on a series of scales. This paper will focus on the assessment and reporting of students’ literacy achievements.

12.15 pm
Panel discussion
Associate Professor M Susan Burns, Ms Carmel Crévela, Ms Margaret Forster, Associate Professor Susan Hill, Ms Marion McIers
Chair: Professor Trevor Cairney

12.45 pm
Lunch

Part 2: Assessing reading literacy in an international context

The international reading literacy assessment to be undertaken in the OECD Programme for International Student Assessment (PISA) will create new insights into reading literacy from assessments to be carried out in 2000 with 15-year-olds in around 32 countries.

1.45 pm
Plenary address and discussion
Developing a framework for assessing reading literacy

Mr Stan Jones, Statistics Canada, member, PISA Reading Functional Expert Group
Chair: Dr Ray Adams, ACER

The Programme for International Student Assessment (PISA) will assess 15-year-old students in some 32 countries in reading, mathematics and science. A primary goal of PISA is to provide empirically grounded interpretations to inform policy decisions. The international group of experts charged with developing the framework for the reading assessment that forms the major part of the first cycle of PISA accepted Messick’s argument that in order to meet this purpose, assessments should exhibit three key features – relevance, comparability and interpretability.

- **Relevance** refers to the capability for measuring diverse background and program information to illuminate context effects and treatment or process differences.
- **Comparability** deals with the capacity to provide data or measures that are commensurable across time periods and across populations of interest.
- **Interpretability** focuses on collecting evidence that will enhance the understanding and interpretation of what is being measured.

This presentation will discuss the features of the framework that the developers believe will enable PISA to meet these criteria. As relevance and comparability are achieved in common across the three
assessments, the presentation will focus on the interpretability of the reading assessment. In particular, it will look at the two major components of that interpretation: aspects of the reading process and the format of texts.

The presentation will set the stage for the second part of the session, which will cover how the framework is instantiated in the test tasks developed for the assessment.

2.30 pm
Plenary address and discussion
Bricks and mortar: Building a test around the PISA Reading framework

Ms Joy McQueen and Ms Juliette Mendelovits, ACER
Chair: Dr Ray Adams

At the time of this conference the selection of assessment material for the first OECD Programme for International Student Assessment (PISA) study in the year 2000 will be nearing completion.

In developing the PISA Reading Literacy test, the guiding principle has been to operationalise the Reading Framework which was produced through consultation with an advisory group of international reading experts. The challenge has been to create an instrument representing a specified balance of text types and formats, and consisting of tasks which embody specified aspects of reading such as retrieving information, interpreting and reflecting on text.

A second challenge has been to ensure that all the texts and tasks used in the test be culturally appropriate for the target population, and pedagogically acceptable to the educational establishments of participating countries. Feedback from national project managers and their panels of reading experts has therefore played an essential role in the development of the test instrument.

The presentation will describe in more detail some of the issues involved in the PISA Reading test development, and will outline how the test has been developed in response to the challenges posed thus far.

3.15 pm
Afternoon tea

3.45 pm
Panel discussion

Dr Marilyn Binkley, National Center for Educational Statistics, US Department of Education, Mr Stan Jones, Statistics Canada, and Professor Pirjo Limnäkiä, Institute for Educational Research, University of Jyväskylä, Finland, members, PISA Reading Functional Expert Group
Chair: Dr Ray Adams

4.30 pm
Small group discussions: What does the research tell us?

5.00 pm
Plenary session: Overview of day
Dr Geoff Masters

5.15 pm
Close of discussion

7.00 pm
Conference dinner
Speaker: Mr Peter McFarlane, author and educator
Day 2 – Sessions

Part 3: Literacy and technology

What do we know about the relationships between literacy and technology? What are the possible future directions in relation to technology and literacy? The second day of the conference will be devoted to an exploration of the critical questions, and will draw on a significant body of recent Australian research in this area, including the work of the internationally-known team of Australian researchers who conducted the national research project Digital Rhetorics.

9.00 am

Keynote address

Literacy and technology studies: Past, present, future

Dr Ilana Snyder, Senior Lecturer, Faculty of Education, Monash University
Chair: Ms Jennifer Stein, Associate Director, Curriculum, Department of Education, Training and Employment, South Australia

In this presentation, Dr Snyder will examine what we have learned from research about the complex connections between literacy, technology and learning. The beginnings of literacy research in this area coincided with the introduction of PCs into educational settings in the late 1970s. For the first decade, researchers asked the kinds of questions best explored using quantitative methods. They set out to determine whether the use of computers enhanced writing, but the findings were equivocal. By contrast, sociocultural understandings of literacy, which became more widely accepted in the mid-1980s, provoked different kinds of questions. As a result, studies assumed a different orientation. The Digital Rhetorics (DR) project exemplifies the shift towards more qualitatively based research approaches and is an important example of research informed by the recognition of literacy as social practice. To provide a context for the concurrent sessions that follow, Dr Snyder will present an overview of the DR project. Finally, she will consider future directions for research and practice in this area. We have reached what could be called a maturing of the field of literacy and technology studies. The research agenda is fertile with possibilities. The challenge is to undertake studies that will continue to inform effective practice, mediated by new communication and information technologies, at all levels of education.

10.00 am

Concurrent sessions: Australian perspectives

1. Beyond the rhetoric? Critical literacy visions into practice

Dr Wendy Morgan, Senior Lecturer, School of Cultural and Language Studies in Education, Queensland University of Technology
Chair: Mr Cal Durrant, Lecturer in Media and English Education, Murdoch University

* Ballrooms 1-4

The national research project into literacy and technology practices in schools, Digital Rhetorics, found almost no examples of a critical literacy approach in the field. Volume 3 of the report contains an interview with a Head of English who was then planning to integrate computers into a critical literacy curriculum in a secondary school. In this session, Dr Morgan will discuss a collaborative research project (funded by Language Australia) which she undertook with that teacher and three others at the school, during the first semester of the implementation of the technologies. The aims of the project were to:

- trace the informing ideologies and discourses at work in the teachers’ reflections on their developing practice around information and communication technologies; and
- identify any perceived changes in the teachers’ practices relating to curriculum development and pedagogy which could be attributed to those technologies.
The research yielded signs of uneven practice: of tensions and contradictions, of old alongside new. Dr Morgan will explore these, and discuss their wider implications for schools' integration of information technology into their curricula and classroom, and for the professional development needs of teachers.

2. One state's response to the technology literacy agenda

Ms Joy Murray, Senior Project Officer, Department of Education and Training, New South Wales
Chair: Ms Stephanie Gunn, National Coordinator, Literacy and Numeracy Research Projects,
Commonwealth Department of Education, Training and Youth Affairs

* Moseley Room

This presentation will describe a range of programs (paper based, CDROM and on-line) developed by the New South Wales Department of Education and Training to address the unfolding technology literacy agenda. To illuminate the approach taken towards emerging literacies, the paper will develop a metaphor around travel and the emergence of the horseless carriage. It will also describe the Technology in Learning and Teaching (TILT) program which addresses the "teachers first" principle and provides a starting point and context for subsequent program development. The paper will conclude with a millennium perspective of literacy and technology, briefly looking back over the past millennium and forward towards the next, and will point out the need to provide students with access to life's options which can only be gained through full participation in whatever are the literacies of the time.

3. Teachers first

Mr Andrew Connolly, National Coordinator Professional Development, Primary English Teaching Association, Sydney, and Mr Wesley Field, education consultant
Chair: Ms Marion Meiers

* Ballroom 5

This workshop will summarise the activities, outcomes, recommendations and reflections of a Commonwealth Department of Education, Training and Youth Affairs (DETYA) funded literacy learning and technology professional development project called Teachers First.

This professional development project was undertaken by the Primary English Teaching Association (PETA) with the support of the New South Wales Department of Education and Training. The project involved a small focus group of Year 3 primary teachers learning to use Communication Information Technologies (CITs) and using this technology as a means of engaging in focused purposeful dialogue about their own "personal work". The assessment of student literacy performance formed the "personal work" at the centre of teacher based research.

The name Teachers First refers to the principle "Teachers First" outlined in the DETYA research report, Digital Rhetorics.

11.00 am Morning tea

11.30 am Panel discussion
Mr Andrew Connolly, Mr Cal Durrant, Dr Wendy Morgan, Ms Joy Murray, Dr Ilana Snyder
Chair: Ms Stephanie Gunn

12.30 pm Lunch
1.30 pm
Plenary session
Literacy, information technology and educational disadvantage: Teachers research practice

Associate Professor Barbara Comber, Language and Literacy Research Centre, University of South Australia, and Professor Bill Green, School of Curriculum Studies, University of New England, with Mr Andrew Lord, Forbes Primary School, Ms Denise Squire, Salisbury North Primary School, and Ms Irena Werchola, Windsor Gardens Vocational College
Chair: Ms Jennifer Stehn

In this presentation the research team will discuss the recently completed Literacy, Information Technology and Educational Disadvantage research and development project funded by the Department of Education, Training and Employment, in South Australia. The project was conducted in six schools which serve socio-economically disadvantaged communities in South Australia. The aim of the project was to investigate how communication and information technologies might enhance the literacy learning of socio-economically disadvantaged students. Associate Professor Comber will introduce the project and explain what the team hoped to do and how the project was designed. Three teacher-researchers, Mr Andrew Lord, Ms Denise Squire and Ms Irena Werchola, will offer their perspectives in relation to researching with students, new literacies, educational disadvantage and information and communication technologies. Professor Green will draw out the important lessons and questions which emerged from the project.

3.30 pm
Conference summary: What does the research tell us?
Professor Trevor Cairney

4.00 pm
Conference ends

ACER Research Conference 1999
Improving Literacy Learning: What does the research tell us?
Conference Program
Reading is essential to success in our society. The ability to read is highly valued and important for social and economic advancement. Of course, most children learn to read fairly well. In this report, we are most concerned with the large numbers of children in America whose educational careers are imperiled because they do not read well enough to ensure understanding and to meet the demands of an increasingly competitive economy. Current difficulties in reading largely originate from rising demands for literacy, not from declining absolute levels of literacy. In a technological society, the demands for higher literacy are ever increasing, creating more grievous consequences for those who fall short.

The importance of this problem led the U.S. Department of Education and the U.S. Department of Health and Human Services to ask the National Academy of Sciences to establish a committee to examine the prevention of reading difficulties. Our committee was charged with conducting a study of the effectiveness of interventions for young children who are at risk of having problems learning to read. The goals of the project were three: (1) to comprehend a rich but diverse research base; (2) to translate the research findings into advice and guidance for parents, educators, publishers, and others involved in the care and instruction of the young; and (3) to convey this advice to the targeted audiences through a variety of publications, conferences, and other outreach activities.

THE COMMITTEE'S APPROACH

The committee reviewed research on normal reading development and instruction; on risk factors useful in identifying groups and individuals at risk of reading failure; and on prevention, intervention, and instructional approaches to ensuring optimal reading outcomes.

We found many informative literatures to draw on and have aimed in this report to weave together the insights of many research traditions into clear guidelines for helping children become successful readers. In doing so, we also considered the current state of affairs in education for teachers and others working with young children; policies of federal, state, and local governments impinging on young children's education; the pressures on publishers of curriculum materials, texts, and tests; programs addressed to parents and to community action; and media activities.

Our main emphasis has been on the development of reading and on factors that relate to reading outcomes. We conceptualized our task as cutting through the detail of mostly convergent, but sometimes discrepant, research findings to provide an integrated picture of how reading develops and how its development can be promoted.

Our recommendations extend to all children. Granted, we have focused our lens on children at risk for learning to read. But much of the instructional research we have reviewed encompasses, for a variety of reasons, populations of students with varying degrees of risk. Good instruction seems to transcend characterizations of children's
Literacy and technology studies: past, present, future

Ilana Snyder

Abstract

In this presentation, I examine what we have learned from research about the complex connections between literacy, technology and learning. The beginnings of research in this area coincided with the introduction of PCs into educational settings in the late 1970s. For the first decade, researchers asked the kinds of questions best explored using quantitative methods. They set out to determine whether the use of computers enhanced writing. The findings, however, were equivocal. By contrast, sociocultural understandings of literacy, which became more widely accepted in the mid-80s, provoked a different research orientation and different kinds of questions. The Digital Rhetorics project (Lankshear et al 1997) is an example of research informed by the recognition of literacy as social practice. Further, it exemplifies the shift towards qualitative research approaches in the field of literacy and technology studies. To provide a context for the concurrent sessions and panel discussion that follow mine, I include an overview of the Digital Rhetorics project, giving particular attention to its sociocultural perspective and qualitative methodology. Finally, I consider future directions for research and practice in this area. We have reached what could be called a maturing of the field of literacy and technology studies. The research agenda is fertile with possibilities. The challenge is to undertake studies that will continue to inform effective practice, mediated by new communication and information technologies, at all levels of education.

Bio-details:

Dr Ilana Snyder is a Senior Lecturer in the Faculty of Education, Monash University. Her teaching and research focuses on the new literacies and changes to pedagogical practices associated with the use of digital media and telecommunication technologies. Two books, Hypertext: the electronic labyrinth, (Melbourne University Press 1996) and Page to screen: Taking literacy into the electronic era (Allen & Unwin 1997), explore these changes. She was one of the team of nine investigators in the DEETYA-funded literacy and technology research project, Digital Rhetorics (Lankshear et al 1997). With Colin Lankshear and Bill Green, she has co-authored Teachers and Technoliteracy: Managing literacy, technology and learning in schools, which draws on the final report. It will be published by Allen and Unwin in March 2000.
Literacy and technology studies: past, present, future

Ilana Snyder

The research challenge

We have entered a new era in literacy research. New technologies have radically altered everyday modes of communication. Indeed, they are becoming so fundamental to society that most areas of social practice in day-to-day life are affected by the so-called 'information revolution'. In a world increasingly mediated by communication and information technologies, literacy researchers simply cannot afford to ignore the implications of the use of new technologies for literacy practices.

Much has been written and said about the information revolution, with varying degrees of clarity. Discussions of the impact of the new technologies are often clouded by hype. Enthusiasts openly embrace the technologies, claiming they offer a panacea for educational problems, enhance communication, empower users, and democratisate classrooms. At the opposite extreme, 'demonisers' exude cynicism about the technologies' apparent powers. Some dismiss them simply as new instructional and communication tools. Others reject them outright as yet a further form of social control or enforced consumption, which promotes the interests of state and corporate sectors. Clearly, extreme responses are of limited use, and the need to move beyond them increasingly urgent in education.

The challenge for literacy researchers is to extend and enhance understanding of the ways in which the use of new technologies influences, shapes, perhaps transforms, literacy practices. Whether the changes to the literacy landscape we are witnessing represent an extension of the ways in which we do literacy or something altogether different, changes are happening. We need to investigate the nature of these changes to literacy practices and find illuminating ways to theorise them that are useful for teachers.

The challenge for literacy teachers is to understand the changes and to learn how to use the new technologies efficiently, ethically and responsibly with a view to tapping their educational potential. This means that teachers need to realise that there is not much point in trying to accommodate new technologies to existing classroom approaches to literacy education, as such teaching merely ends up looking much the way it always has except more 'technologised'.

A number of questions quickly arise around the role and significance of new technologies in literacy education. These include:

- How are literacy and technology related?
- What are the emergent literacy practices associated with the use of new communication and information technologies?
- How can literacy researchers make sense of the relationship between literacy and technology to develop sound theoretical understandings that may inform effective pedagogical practice at all levels of education?
These and similar questions are at the heart of the literacy and technology studies research agenda. Such an agenda, however, does not exist in a vacuum. It needs to take account of global, national and local political trends and policy emphases, integral to the environment in which researchers do their work. At a pragmatic level, these trends and emphases go some of the way in determining which research projects and programs receive government and institutional funding and which do not.

The trajectory of the research

Research investigating the connections between literacy, technology and learning began in the late 1970s. The early ‘computer-writing’ studies were most often quantitative, experimental in conception and design. There was a gradual shift in the 1980s to qualitative methods, with an emphasis on the socially constructed nature of reality, the intimate relationship between the researcher and what is studied, and the situational constraints that shape inquiry. More recent studies have adopted multiple perspectives which draw on methods from both quantitative and qualitative traditions, while others examine computer-mediated literacies through a particular ideological lens.

It would be a mistake, however, to represent the three decades of research in this area as a process of evolution. Each of the earlier waves are still operating in the present as a set of practices that researchers follow or argue against. An array of choices now characterises the field with no single approach privileged. Of course, there are no less problems and difficulties, particularly in studies which attempt to blend methods from different paradigms. Inevitable are tensions between traditional, positivist conceptions and relativist, postmodern approaches to research in this area (Snyder 1997a).

There are a number of useful overviews of the research, extending in their coverage, however, only to the mid-1990s (Bangert-Drowns 1993; Snyder 1993a; Hawisher, LeBlanc, Moran & Selfe 1996). As well as establishing what we already know about students, their literacy practices and the use of new technologies and suggesting what we still need to find out, they highlight the difficulties of interpreting studies that reflect contrasting conceptual frameworks and which differ in design, methods of data collection, variables examined and modes of analysis.

What we have learned from research

The first studies coincided with the availability of micro-computers and word processing software in educational settings (Gould 1978). Investigators asked the classic question in educational research: Does this innovation improve things? They chose the traditional method of exploring it – empirical - although case study was also used (Catano 1985). Experimental and quasi-experimental studies assessed whether the quality of texts produced with computers was better than those produced with pens. Chiefly through the perspective of cognitive psychology, early research also examined the effects of the use of computers on composing processes, particularly prewriting and revising. Implicit was the conviction that if students planned carefully and revised more with computers, their texts would be better (Daiute 1986).
By the mid-80s, there emerged a shift in focus from the isolated writer to the writer in context. With this increased sensitivity to the sociocultural setting in which the computers were used, studies became more distinctively ethnographic (Dickinson 1986; Herrmann 1987). This variation in research method was accompanied by a new teaching emphasis. Still interested in the effects of word processing on writing quality, revision and attitudes, studies concentrated on the writing pedagogy, often a process approach, that teachers adopted when introducing the technology. The computer was investigated as a potentially felicitous tool that might both facilitate and enhance a process approach (Sommers 1985).

The research was in transition: some researchers were operating in the current-traditional paradigm, concerned with quality, correctness and error; many were operating in the writing-process paradigm; and a few were beginning to adopt the social view (Hawisher, LeBlanc, Moran & Selfe 1996). Not surprisingly, the results of the quality-focused studies were equivocal. There is probably a short answer to the question: Do students write better with computers? It depends - on the writer's preferred writing and revising strategies, keyboarding skills, prior computer experience, supplementary teaching interventions, the teacher's goals and strategies, the social organisation of the learning context and the school culture (Bangert-Drowns 1993). Studies which examined the effects of word processing on revision strategies reported an increase in the frequency of revision. Studies in which word processing was combined with effective writing pedagogy produced uniformly positive findings: when instruction involved teaching students strategies aimed at improving their writing skills, writers using word processing achieved at a higher level than similar writers not using computers (Sommers 1985; Daiute 1986). When computers were considered by researchers as part of a dynamic, integrated classroom environment (Dickinson 1986; Herrmann 1987), the findings were consistently positive. Computer-produced writing achieved higher ratings (Herrmann 1987); collaboration and writing-focused talk were facilitated (Dickinson 1986); classrooms were less teacher-centred (Herrmann 1987); and writing was transformed from a private to a public activity.

The mid-80s marked the end of the first generation of research and the beginning of a second. The research consolidated but researchers also began to explore the possibilities of the computer as a site for the social construction of knowledge. Shifts in interests and methods can be identified: feminist criticism, cultural criticism and critical pedagogy were all used to frame and inform research; the war between quantitative and qualitative approaches abated; and the researcher was increasingly understood as implicated in research processes.

The contextual approach to computers and their use (Kramarae 1988) made gender issues central to discussion of technology. Early research on computers and gender focused on women’s exclusion from the computer revolution (Gerrard 1999). Women and girls of the 1980s and 1990s were found to be anxious about computers (Collis 1985); unchallenged by the unstimulating assignments and lack of hands-on experience they received in school (Levin & Gordon 1989); discouraged from pursuing a career in technology (Abtan 1993); stereotyped as phobics in advertising (Hawkins 1985).
By contrast with the studies which exposed women’s problems of access to computers and computer culture, there has also been research that has examined gender from a broader perspective. Studies have suggested ways to inform the computer-based classroom with feminist pedagogy (Selfe 1990); considered the computer conference as a medium that promotes or shuts out women’s voices (Flores 1990; Romano 1993); investigated girls’ use of the Internet (Kaplan & Farrell 1994). The most contemporary studies take account of the factors that have alienated women from computer technology, but focus more on ‘how gender influences what men and women are doing with computers and what this technology is doing for them’ (Gerrard 1999, p. 1).

More generally, there was the growing recognition that computers in classrooms appear ‘unlikely to negate the powerful influence of the differential socialisation of students by social class and its effects on their success or failure in school’ (Herrmann 1987, p. 86). In fact, the contrary may be the case. It may be that computers in classrooms make the impact of students’ differential socialisation and enculturation experiences more severe. For example, a Scandinavian study (Staberg 1994) shows that adolescent girls are rejecting computers in disproportionate numbers, presumably because of their lack of sympathy for the control ideology that drives the construction and invention of computers, and because of the obstacle to quality interaction between people that they often erect.

As researchers were no longer simply concerned whether the use of technology makes things better, they asked different kinds of questions which influenced the research methods they used. Researchers argued that we cannot understand how electronic technologies affect students’ literacy practices ‘apart from the ways these are embedded within, and mediated by, the social systems of [particular] classrooms’ over time (Cochran-Smith, Paris & Kahn 1991, p. 107). Qualitative methods, including observation and interviews, seemed the best way to investigate such questions: Cochran-Smith et al (1991) worked with teachers and students in five elementary classrooms over two years to explore how computers made learning to read and write different; in a case study that involved active participant observation, Miller and Olson (1994) found that the existence of innovative practice associated with the introduction of computers in the classroom has less to do with the advent of technology than with the teacher’s pre-existing conception of practice. Slattery and Kowalski (1998) examined the writing processes first year and upper-level college students develop when they compose on screen. Their findings suggested that students can learn and adopt differing types of writing strategies and in doing so begin to conceptualise written text in new ways.

However, at the same time, some researchers continued to investigate the influence of word processing on writing quality and revision strategies, but attempted to avoid problems encountered in earlier studies. The findings were correspondingly more persuasive: when the student subjects were experienced users, papers written on computer were rated higher (Owston, Murphy & Wideman 1992); when students with different writing abilities were observed, the effects of word processing interacted with individual student differences (Joram, Woodruff, Bryson & Lindsay 1992); when genre was taken into account, students using computers were awarded higher scores than those using pen for argument and exposition, but not for narrative (Snyder
1993b); when similar groups of student writers were compared, the group which received unsolicited metacognitive guidance from a specially designed computer tool wrote better essays (Zellermayer, Salomon, Globerson & Givon 1991).

Increasingly, researchers examined what is now widely known as computer-mediated communication (CMC). This form of interaction is made possible when computers are used to create electronic forums on local-area networks (LANs) and wide-area networks (WANs). It has been noted that these electronic spaces in which writers and readers can create, exchange, and comment on texts have the potential for supporting student-centred learning and discursive practices that can be different in form, and, some claim, more engaging and democratic than those in traditional classrooms (Batson 1988).

Most of the studies of CMC are with post-secondary students, however, the findings still have implications for school-based research. Researchers have undertaken comparative observational studies of college students engaged in both face-to-face discussions and electronic exchanges about their writing (Palmquist 1993; Geest & Remmers 1994; Yagelski & Grabill 1998). Palmquist concluded that the use of networked-based communication both shaped and was shaped by the curricula and that the interaction between networked-based communication and face-to-face may lead to better academic performance. By contrast, Geest and Remmers concluded that computer-mediated peer review had many of the drawbacks of ‘distance learning’. Similarly to Palmquist, Yagelski and Grabill identified a complex relationship between online discourse and in-class discourse within the context of a specific course. Their results suggest the importance of understanding course-related online discourse within the context of a university program and undergraduate student experience.

Hypertext, fully electronic non-sequential reading and writing, has also been a focus of research interest. Writing about hypertext was initially dominated by explications of the technology's convergence with contemporary literary theories (Snyder 1996). Claims have also been made for hypertext's educational potential (Snyder 1996; Russell 1998). These include the promotion of more independent and active learning, changes to teaching and curriculum practices, and challenges to our assumptions about literacy and literary education. Theoretical work on the connections between hypertext and postcolonial theory (Odin 1997; McConaghy & Snyder 1999) explores shared characteristics of both discourses: multivocality, multilinearity, open-endedness, active encounter and traversal. Theoretical work on the connections between hypertext and feminist theory (LeCourt & Barnes 1999; Sullivan 1999) argues that writing multivocal hypertexts can help make students more aware of the multiplicity of their subject positions and the ways in which academic contexts try to silence these positions.

The Internet has become a site for research. New literacy practices (Burbules 1997; Sorapure, Inglesy & Yatchisin 1998); issues of identity (Turkle 1995; Alexander 1997); class and access (Castner 1997; Richardson 1997; Grabill 1998); the maleness of the Web (Takayoshi, Huot & Huot 1999) have been the focus of investigations. Research has emphasised the need to teach students how to assess the reliability or value of the information they find on the Web by understanding not only its textual
but also its non-textual features such as images, links and interactivity (Burbules &
Callister in-press).

Analysis of policy trends and emphases has increasingly provided the focus of research in the field of literacy and technology studies. In her examination of the American policy environment, Selfe (1999) points out that many literacy teachers continue to regard technology as antithetical to their work, but argues that they can no longer afford to ignore it. According to Selfe, failure to do so sustains and reproduces an unfair system that ‘ensures continuing illiteracy under the aegis of education’ (Selfe 1999, p. 415). Snyder (in-press-a) highlights an apparent contradiction within the Australian policy environment. At the federal level, literacy policies often reflect reductive and anachronistic approaches to literacy education while at the state level, policies exhort teachers to technologise the curriculum in order to prepare students for the sophisticated literacy demands of a knowledge-based economy and an information-rich society.

The Digital Rhetorics project

The Digital Rhetorics project exemplifies the shift towards more qualitative research approaches that emerged in the mid-1980s. Further, it represents an important example of research informed by the recognition of literacy as social practice. The two-year, national study investigated the relationship between literacy and technology in teaching and learning (Lankshear et al 1997). It focused on three main elements:

1. an investigation of technology and literacy practices in a range of learning contexts, mainly primary and secondary classrooms;
2. a study of selected key policy documents concerned with teaching and learning in relation to literacy, technology and learning; and
3. the development of a theoretical position to inform the approach to the study as a whole and the recommendations resulting from the investigations.

The project was conducted by a research consortium, with members from New South Wales, Queensland, Victoria and Western Australia, under the joint leadership of Colin Lankshear and Chris Bigum. It was funded by the Department of Education, Employment, Training and Youth Affairs through the Children’s Literacy National Projects Program.

The study adopted the stance that in the context of increasing and changing demands for literacy and technology learning worldwide, education must enable students to become proficient in the ‘operational’, ‘cultural’ and ‘critical’ dimensions of literacy and technology. This includes understanding how contemporary economic, social, technological, administrative, organisational and political changes are impacting on social practices of literacy, technology and learning – changing them and the relationships among them. That they are making an impact is undisputed; less clear are the kinds of literacies important in this context of change. They potentially include skills in the visual media associated with most technological applications, together with many new communication and information literacies.
Within the constraints of this paper, it is impossible to do justice to all three aspects of the study. I have decided to elaborate the three-dimensional approach to literacy and technology and to then concentrate on the site studies which represent the empirical core of the project. Readers interested in learning more about the theoretical work of the study, as well as the literacy and technology policy analysis, are referred to the four-volume report (Lankshear et al 1997) and to the book, Teachers and technoliteracy: Managing literacy, technology and learning in schools, which will be published by Allen and Unwin in March 2000 (Lankshear & Snyder, with Green in-press).

The sociocultural approach to literacy that informed the research

Integral to a sociocultural approach to literacy is the understanding that literacy is more than the capacity to encode and decode - to grasp meanings inscribed on a page or a screen, or within an established social practice (Street 1984). Being literate also involves the capacity and disposition to scrutinise the practices and universes of meanings within which texts are embedded. Being literate entails the capability to enter actively into creating, shaping and transforming social practices and universes of meanings in search of the best and most humane of all possible worlds.

In opposition to reductionist and mechanistic views of literacy and learning, a sociocultural perspective argues that technoliteracy, seen as social practice, has three dimensions: the 'operational', 'cultural', and the 'critical' (Green 1988). The 3D model exhorts researchers and practitioners not to focus simply on 'how-to' knowledge, understood as technical competence and 'functional literacy'. Instead, researchers need to build understandings which complement and supplement such knowledge by contextualising it in ways that pay due attention to matters of culture, history and power and recognise that it is counter-productive to start with issues of 'skill' or 'technique', outside of an ‘authentic’ context of situated social practice (Durrant & Green 1998; Lankshear & Snyder, in-press).

The 'operational' dimension of literacy education involving new technologies, focuses on how to operate the language system as well as how to operate the technology system. With respect to the language system, this involves learning how to make it work for individuals' own meaning-making purposes. With respect to the technology system, it involves learning how to make a computer operational, how to 'turn it on' and make it 'work'.

Understanding and being able to draw upon the 'cultural' dimension of literacy involves realising that the ability to operate language and technology systems is always in the service of participating in ‘authentic’ forms of social practice and meaning. People always use texts and technologies to do things in the world, and to achieve their own, and others', purposes, whether in the context of school, work or everyday life. This means putting the emphasis on ‘authentic’ contexts, forms and purposes, of learning along the axes of literacy and technology and text and information.

The 'critical' dimension means that teachers and students need to be able to assess and evaluate software and other technology resources in a spirit of informed scepticism (Snyder 1997b; Durrant & Green 1998; Lankshear & Snyder, in-press). That is, they
need the ability not only to use such resources and to participate effectively and creatively in their associated cultures, but also to critique them, to read and use them against the grain, to appropriate and even re-design them, as well as to be able to actively envisage and contribute to transforming social practices as they judge appropriate.

Understanding the 'operational', 'cultural' and 'critical' dimensions of literacy includes getting a handle on how contemporary economic, social, technological, administrative, organisational, and political changes are affecting the social practices of literacy, technology, and learning. It also includes understanding how these changes are altering literacy, technology and learning and the relationships among them. Further, it incorporates understanding how current changes are placing new 'premiums' on literacy, technology and learning - raising them to new heights of urgency.

Most importantly, understanding the 'operational', 'cultural' and 'critical' dimensions suggested to the Digital Rhetorics research team how to frame research questions about the changes to literacy practices associated with the use of new technologies. The project aimed not to focus just on 'how-to' knowledge, understood as technical competence and 'functional literacy'. Instead, it sought contextualised research knowledge informed by the 3D perspective of technoliteracy as social practice.

The site studies

The aim in the site studies was to research, describe and analyse practices in a range of exemplars. By ‘exemplars’ we did not necessarily mean ‘best practice’ in the sense of ideals to be emulated, although some of the sites did approximate to this meaning of ‘exemplars’. Instead, we approached exemplars in terms of informative and illuminating examples of what was going on in learning on an everyday basis across a range of circumstances, policy and resourcing arrangements, and professional knowledge bases.

The ‘patchwork quilt’ produced describe diverse models and circumstances that colour instances of current practice. The quilt drew on brief, but intensive and highly focused, investigations of eleven research sites - twenty teachers and their classrooms - in three Australian states, who agreed to participate in the project. Selection of sites drew on advice from personnel in state education departments, and on the local knowledge and professional development connections of the investigators. They were located in NSW, Queensland and Victoria. A range of geographical locations were represented: inner city suburbs, outer city suburbs, satellite cites, regional towns and small settlements in rural areas. Classrooms from lower primary to upper secondary were covered. Key learning areas were English, Technology, Studies of Society and the Environment, Science, Maths and the Arts.

We wanted to witness, 'capture' and describe a range of illuminating instances of practice using new technologies in literacy education: looking for telling cases, so to speak. In most cases, data were collected over just three or four days. These data included contextual or background information; artefacts (for example, policy documents and statements, lists of technology resources, descriptions of student
work); audiotapes and transcripts of interviews; and observation notes. Our emphasis was on finding and describing illustrative instances of practice - particular events or episodes that were likely to be similar to other events and episodes, both at that site and at others. The focus of the analysis and interpretation of the data was on what the descriptions could tell us about how to achieve the kinds of practices and outcomes we believe schools should be seeking.

Consequently, our investigations in no way pretend to be exhaustive of all that went on in these sites. Neither do the portraits claim to be representative of practice as a whole in these sites, still less of schools at large. We describe practices as we saw them to illustrate significant points about literacy, technology and learning. This is not the same thing as assigning an essence to what we observed, and it is certainly not to imply that what we did not see in particular instances did not go on elsewhere. The aim was to use portraits of classroom activities for illustrative purposes. The ideas emerging from classroom portraits were then linked to larger patterns and principles which were intended to enhance future practice on a more extensive scale.

So far as possible, we ‘triangulated’ data from different collection sources – policy documents and other artefacts, interview material, observations - and across different episodes within single sites and between different sites. Consistencies across these variables increased our confidence in the data collected. We also checked our data-based descriptions against diverse reports of research provided by other people in other contexts as a test of likely authenticity and reliability.

We did not attempt to provide genuine ethnographic accounts of the site-based practices, but to interpret what we saw by reference to the best available theory and research. The focus in the study was on what the descriptions can tell us about how to achieve the kinds of practices and outcomes we believe schools should be seeking.

A template was developed for writing the sites studies. The components were: the study at a glance; the site; the policy context; the practice; distinctive features; and issues and implications. We produced detailed accounts of each site (Lankshear et al 1997). Our analysis drew on the theoretical, conceptual and policy aspects of literacy and technology. At the same time, we allowed the data from the site studies to inform and enrich this wider work in a reciprocal way. Just as our analysis of the data was influenced by our wider conceptual and theoretical frameworks, so were these frameworks in turn clarified, refined and enriched by our data.

We identified three broad patterns which we called ‘complexity’, ‘fragility’ and ‘continuity’. In addition we analysed the data in terms of four principles: ‘teachers first’, ‘complementarity’, ‘workability’ and ‘equity’. These patterns and principles were useful for making sense of the site studies; making decisions and judgments about various aspects of what we saw; and helping us to formulate concrete recommendations for future actions. We concluded that the site studies could inform all stakeholders in education in at least three domains: inservice teacher professional development; preservice teacher education; and theoretical guidance for changes in practice and school reform.
With respect to inservice teacher professional development, the enthusiasm of colleagues is crucial to successful integration of technologies into the curriculum. However, reliance on a few enthusiastic individuals can lead to fragility. Little short of a major change to a school culture is necessary if teachers are to help students develop technological literacies. The domain of preservice teacher education is crucial – a sound basis in information technologies and their educational implications must become a compulsory and effectively handled feature of teacher education programs. Finally, the patterns and principles are able to serve as guides to handling the very important cultural and critical dimensions of effective literacies. Relatively little critical emphasis was evident in the sessions observed across the entire project. This may indicate the extent to which classroom practices involving new technologies are being exhausted on merely getting to grips with the operational dimensions. If this is what is happening it is perfectly understandable – given the relatively limited prior experience many teachers have with communication and information technologies. But it reinforces the importance of attending to all the patterns and principles identified here within future policy directions, teacher education programs and professional development initiatives.

Difficulties facing researchers in literacy and technology studies

The Digital Rhetorics project represents, perhaps, a watershed in the research literature. Yet, to some extent, knowledge in this area remains incomplete. One explanation is that the field is volatile and the political, social and cultural influences complex. Another is that ‘doing’ literacy with communication and information technologies is so new and dynamic that investigation is difficult.

This field is characterised by rapid change. As new sites for research emerge, ‘sites’ that are virtual and boundless, researchers are faced with the challenge of how to investigate them effectively. To continue to meet the demands of the new research contexts in this chameleon field, researchers need to be wary of nominating as necessarily better or more desirable particular research approaches. Researchers should also avoid naturalising whatever is the current favoured methodological approach as the most progressive. Researchers require flexible, sensitive frameworks for understanding and portraying the complex phenomena of computer-mediated literacy settings.

Future directions

We have reached what could be called a maturing of the field of literacy and technology research. The growth of a multi-method approach has strengthened the understanding that different perspectives offer different ‘truths’ and that future research can be enriched by hearing multiple voices. We are in the process of developing ways of understanding the connections between literacy practices and the uses of the new electronic technologies that are both ‘structured and dynamic’ (Snyder 1995, p. 57).

The research agenda is fertile with possibilities. In the first instance, researchers should build on previous investigations, adding to the growing knowledge base about the connections between literacy, technology, curriculum and culture.
\textit{Rhetorics} project has made important inroads into the systematic investigation of these complex phenomena, but we need to know more. We know that the introduction of computers into literacy curricula is a contextual change that encourages alterations in the political, social and educational structures of systems, but we need to look more closely at how. There needs to be more research into how English departments and individual teachers integrate computers into curricula and how computers interact with the whole school curriculum. How does pedagogy change? Do teachers' expectations alter? What are the implications for teachers' professional development and for the training of preservice teachers?

\textit{Digital Rhetorics} was essentially a qualitative study with the researchers visiting sites, often for just three or four days, and describing, then interpreting what they observed. Schools, classrooms and teachers grappling with literacy, technology and learning, however, also provide a site for practical intervention. A study, based on an action research model, in which teachers and researchers collaborate to implement the recommendations emerging from the project, evaluate what happens, then refine the recommendations for further implementation, could result not only in enhanced administrative and pedagogical practices, but could also provide a rich source of theory.

It would be salutary to concentrate on students who have grown up with the technologies. A longitudinal approach to the study of young people immersed in computer culture will yield new understandings of computer-mediated literacy practices. As students represent a different generation, one with a different relationship to computers and to print text, we must observe them, ask them questions and listen to their responses.

We know that the use of new technologies has significant implications for communication and representation (Snyder in-press-b). It seems that images are becoming more and more dominant. Kress (1997), for example, argues that changes to semiotic practices involve a greater and newer use of visual forms of representation in many domains of public communication and that the turn to the visual represents a significant change to how we make meanings. The connections between verbal and visual modes of representation provoke a number of important questions about the new literacy practices and formations associated with multimodal texts which have important implications for curriculum and pedagogy. Are graphics and video as informative as, or even more informative than, verbal text? Is it possible to determine whether the image, the sound or the word is the principal carrier of meaning in the text? How do the words, pictures and sound interact to make meaning? How do we recognise and interpret ambiguities created by that interaction?

Research projects aimed at investigating the relationships between the verbal and the visual in communication and representation would also provide opportunities to examine at close hand new literacy practices in real contexts: to observe teachers and students, to discuss the emerging technoliteracy practices with them and to apply to those practices understandings which draw on the work of theorists such as Kress (1997), Bolter (1996) and Bolter and Grusin (1999).
We need more research on patterns of resistance to the new technologies. We need to explore further why teachers who work in environments that have computer facilities remain wary of the use of the technology in their classrooms, despite (or perhaps because) of the fact that we face a future dominated by computer culture. We should also be careful in ascribing to the technology powers it does not possess. If we see computers used in innovative ways we want to be cautious about inferring that there is a cause-and-effect relationship between adopting computers and effective teacher practice (Miller & Olson 1994).

Confronted by the largely uncharted territories of cyberspace in which our students are increasingly the navigators, messier, less certain, more reflexive, multivoiced research texts seem to be a useful way to respond. It is likely, however, that the problem of representation will continue to be complicated by the fluid, metamorphosing, unpredictable nature of the electronic spaces themselves.

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Beyond the rhetoric? Critical literacy visions into practice

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BEYOND THE RHETORIC?
CRITICAL LITERACY VISIONS INTO PRACTICE

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Beyond Rhetorics?

“Visual semiotics is one of the really important directions we have to take [as English teachers].”

Lindsay Williams,
Head of English Dept,
Park Ridge State Secondary School

“Once you build up resources [for teaching a unit of study within a particular curriculum] you can change little things, but because it’s such a big change [the incorporation of ICTs] you really have to rethink the whole unit structure, I think. So it’s really hard.”

Belinda Benner,
English teacher,
Park Ridge State Secondary School

“The enclosed character of schooling may limit the influence of outside practice on school-based learning.”

Bigum, Lankshear et al., 1997

These are my texts for today—perhaps for all of us today. They introduce my themes: how a technological saturated environment brings new literacy practices; how these might reshape literacy teaching and learning—or how the technology that is a school might accommodate the new to the known. And what we might need to take into account as we attempt to “improve” literacy teaching for literacy learning in these post-print times.

My thinking about these matters has emerged from some research I undertook to follow up some of the unfinished business of Digital Rhetorics. That is part of what’s implied in my title, “Beyond the Rhetoric?” But the question mark also suggests that there may be no getting beyond the rhetoric, if by that word “rhetoric” we understand the (ideological) discourses about information and communication technologies (ICTs), discourses that shape literacy teachers’ sense of themselves as professionals and their professional practice.
In need to give first a brief explanation of what I understand by the term discourse. Poststructuralist and sociolinguistic writers (Foucault 1972, 1980; Macdonell 1986; Gee 1990; Fairclough 1992, Lemke 1995; Weedon 1987) argue that the ways of talking which are characteristic of a social or cultural group have bearing on more than just the language dimensions of people’s lives. Particular uses of language do not arise just out of an ideology or social practice but help to constitute it. Thus people’s thinking (both their ideologies and their argumentation), their social actions and attitudes and even their very sense of self are shaped by discourses. In the context of the research I will be reporting on today, an example of an ideology would be an instrumentalist and utopian belief about the positive effects of ICTs on information management, instruction in schools, opportunities for employment of a skilled population and ultimately the health of the national economy. Such an optimistic set of beliefs may inhabit a number of discourses—such as that found in educational policy documents directed at schools systems and managers, or in promotional material addressed to parents. To the extent that teachers come to take up such discourses—to talk, for instance, about the “knowledge revolution”—they also take on such ideologies. This has effects on their practice and subjectivity as teachers. In this sense ideologies are discourses are practices.

In my research the ideological and discursive dimensions of teachers’ developing practice around ICTs was a specific focus of attention, since it significantly affects the uptake of those ICTs.

The influence of those ideologies and discourses are why I believe we may need to abandon any simple rhetoric about “improving” literacy learning, if by that is meant bringing about a simple cumulative improvement of standards of achievement. Policy makers, public and media often suggest such improvement can be achieved through wheeling up the latest and shiniest technology, whether this be a piece of hardware or software, or a new technique of intervening in the learning of the “wetware”. Instead, I believe we need to be alert to the complexity of the interactions among teachers, students, classrooms, curricula, schools and ICTs, and we need to identify what encourages stasis or dynamic renegotiation among these agents or “actors” (I include the non-human as well as the human in this term “actor”). That, at least, has been the lesson I have taken from my research.

At this point, let me very briefly introduce that research. In all our field work the Digital Rhetorics team found no instances of a consistent critical literacy approach to ICTs. Therefore, to round out the picture for the Digital Rhetorics report I interviewed Lindsay Williams, the Head of English at Park Ridge State Secondary School. (See “Technology in a Critical Literacy Curriculum”, Bigum, Lankshear, et al., 1997, Vol. 3, pp. 49-54.). I have worked with Lindsay and his staff over several years as he has developed a critical literacy curriculum. Lindsay is familiar with the work of Lankshear and others on critical literacy and ICTs (e.g. Lankshear, Peters and Knobel, 1996) and works intelligently to put it into curricular practice. (Much of our collaboration is reported in Morgan, 1997.)

Even realistic curriculum plans are likely to undergo unforeseen modifications, as teachers’ current beliefs, values and practices about literacy and ICTs condition the forms any innovations actually take. Hence two of my research aims, which I will discuss today, were:

1. to trace informing ideologies and discourses at work in the teachers’ reflections on their developing practice around ICTs; and
2. to identify perceived changes in the teachers’ practices relating to curriculum development and pedagogy attributable to ICTs.

The focus in the first aim on discourses was useful; but it will not do to focus on this as disembodied language or “pure” thought. Hence my second, related, aim, with its focus on practice. It is my belief that we need to see discourses as part of an endlessly negotiated ensemble of institutions and practices, bits and bytes, space and time, flesh and wires, timetabling and down-time—all the elements that work together, each influencing the others.

First, however, I need to set my research in the context of Digital Rhetorics, since I will be taking up some of the key concepts set out there.

1. Digital Rhetorics: Literacies and Technologies in Education: Current Practices and Future Directions

I do not have time today to go into any detail about this national project. (If you want more, see the Project Report at <http://www-business.cowan.edu.au/rhetorics/pdf_DL.htm>.)

1.1 The project’s conceptual framework: a brief overview

**Literacy**

Following much recent theory, we understand literacy, technology and learning as sociocultural practices. Literacy, for a start, cannot be understood as “autonomous”, an all-purpose, one-size-fits-all set of skills for encoding and decoding. Rather, it is a group of literacies, and each kind of literacy develops peculiar forms and uses within particular social practices and cultural communities. And now, in a digitised world, literacy can no longer be defined exclusively in linguistic terms, nor as information stably located in a fixed, bounded text. And as I’ve already suggested, in such social practice the literacy “bits” cannot be separated from the talk, inter/action, values, attitudes, beliefs, knowledge, objects, tools and spaces within which the reading and writing take on their meaning. All of these elements are involved in using language “like a native”.

Learning literacy, like learning technology, ideally involves three dimensions (what we call the 3D model):

<table>
<thead>
<tr>
<th>Operational</th>
<th>Cultural</th>
<th>Critical</th>
</tr>
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<tbody>
<tr>
<td>learning the language, learning to operate the computer</td>
<td>becoming competent within the meaning system</td>
<td>going beyond socialisation to critique and transformation through active production of text</td>
</tr>
</tbody>
</table>

In practice, all of these need to be attended to, more or less at the same time; no one of them takes priority.
Later I will suggest that there are supplementary ways of understanding this triad, by mapping it onto two other, related categories that emerged from my investigations into informing discourses:

- the roles of teachers, students and ICTs in the complex and dynamic networks of practice that are classrooms;
- first, second and third level effects in the introduction of ICTs into literacy classrooms.

**Technology**

As noted, technology too is a sociocultural practice, not just a tool, or a resource, or a body of technical knowledge. Computers therefore cannot ultimately be separated from the interactions and practices which encompass them. In practice, all the components exercise an influence on the others.

We developed the idea of ICTs as simultaneously a resource, and a context for getting things done. This is linked with what Sproull and Kiesler (1991: 1-17) call first and second level effects. First level effects are planned or anticipated benefits which follow from implementing ICTs as a resource. In much policy discourse, for instance, it is claimed that ICTs in classrooms will enable students to become self-paced, independent learners. Second level effects relate to context: they are “changes in the environments of practice, and in the practices themselves, which are contingent upon actually using the technologies” (Bigum, Lankshear et al., 1997, Vol. 1, p. 29). These second level effects cannot be predicted, because the introduction of ICTs affects the social circumstances within which they are used, and hence the ways people talk, think and act around them.

I have inserted a third level too:

<table>
<thead>
<tr>
<th>First Level Effects</th>
<th>Second Level Effects</th>
<th>Third Level Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICTs as (inert) resource</td>
<td>... as conditioning context</td>
<td>... as transformative agent</td>
</tr>
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</table>

... because this has enabled me to identify more clearly what was going on in my site, by reference to Actor-Network Theory (e.g., Bigum, Green, Fitzclarencce and Kenway, 1993; Latour, 1994; Law, 1992; Law and Hassard, 1999). We will follow the implications of this theory in my account of my investigations.

By itself this theory will not help us understand what is going on in cases when little if anything seems to change after computers are set up in classrooms. In such instances of course the ICTs have been “schooled” or “domesticated” (Cuban, 1986; Hodas, 1996)—and schools are a most powerful set of social technologies themselves: the tools and techniques for getting things done socially and culturally: not only transmitting knowledge but also thereby forming individuals and groups as productive social beings. We will see this at work in my research.

**Learning**

This brings us to the third of our terms for conceptual analysis: learning. As before, we think it can only be understood as embedded within forms of social and cultural practice. Those embeddings are not all alike: there is often a vast difference between “school situatedness” and
other situations of literate and technologised practice. The Digital Rhetorics team argued that schools are in many ways a set of “spaces of enclosure” (Bigum, Lankshear et al., 1997, Vol. 1, p. 43): nested Chinese boxes of school site, curriculum, classroom and book. We suggested that “the enclosed character of schooling may limit the influence of outside practice on school-based learning” (Bigum, Lankshear et al., 1997, Vol. 1, p. 44). Indeed, the ensembles that produce the classroom and what goes on within it may be designed to minimise such turbulence from without.

So: what happened to these theoretical conceptions when we went into the field?
1.2 Site studies: themes and findings, patterns and principles

The site studies are published in full in the report, so here I will just mention the three broad patterns we identified across our data. Later I will consider their relevance to my research.

**Complexity**
Classrooms have to organise themselves round the interactions between their various human and non-human components. Add or change one of these components (such as a networked computer), and the effect is compound: it rearranges the other interactions and may introduce new ones: roles and relationships, patterns of work, allocations of space and time and so on. This can be exhilarating or unsettling (or both!) for teachers.

**Fragility**
This is bound up with complexity: effective self-organising systems depend on all the components working together in a good synergy. In classrooms, the technical aspects of fragility often loom large; but there is also the fragility that results from depending on one person’s expertise or understanding of how to integrate ICTs appropriately and effectively into learning activities. And there is the fragility of possible funding cuts.

**Dis/continuity**
Students may learn in a computing-rich environment in one year, and hardly put hand to mouse in the next. Or there may be discontinuities between one subject area and another. Or there may be gaps among the kinds of applications taught: multimedia text, information, programming and games, stand-alone and inter/networked).

This broader context of theory and research situates my findings from the Park Ridge introduction of ICTs into the critical literacy curriculum, to which I now turn.

2. ICTs and Critical Literacy Implementation—Governing Institutions

2.1 Background and rationale

Park Ridge State High School is in a low to middle socioeconomic area and many of the students are alienated from school. The critical literacy program aims to raise these students’ critical consciousness around text and society, while also ensuring that they are competent in the genres that matter in public life. It tries to link their learning with out-of-school literacies and contexts.

(By “critical literacy” I mean a belief that all users of language aim to persuade their hearers or readers; and all texts offer a particular angle on society and human interactions. Moreover, different groups in society have different access to power, status and wealth; this depends largely on the ways they and their worlds are described and defined through language and the values that are promoted by these means. So the work of critical literacy is to investigate how those forms of knowledge, and the power they bring, are created in language and taken up by those who use such texts. It asks how language might be put to different, more equitable uses, and how texts might be (re)created that would tell a different story of other possibilities in a more just world.)
When Lindsay discussed with me his plans to insert ICTs into the critical literacy curriculum in Years 8-12, he focused on radically rethinking whole units of study at a time, in order to integrate the ICTs purposefully and centrally in the learning activities and assessment items. The nature of the planned curriculum changes hinged on his awareness that design principles and designed products ... will need to become more central to English curriculum than in the past, because with multimedia technologies “if you try and communicate clearly then you have to think clearly about the design”.... Language and technology, like words and pictures, are in Lindsay’s view more than merely complementary.

(Bigum, Lankshear, et al., 1997, Vol 3, p. 51)

Thus digitised, multimedia design, as well as the content that is inseparable from it, would be subject to critique in this curriculum.

By mid-1998 the computers and a range of software were in place in classrooms and laboratories. The ICTs comprised:

- one networked computer in each of five staffrooms
- two networked computers in each of the main seven English classrooms
- twelve networked computers in a mini-lab
- a scanner and networked printer in the lab
- a digital camera
- ten laptops
- ten networked computers in the resource centre
- two multi-media projectors.

Through this hardware, access to the internet and a wide variety of software was available from both classrooms and staffrooms. In addition, teachers had the ability to send and receive e-mail.

During 1998 the professional development of the teachers at the school began. An English Faculty Technology Committee had developed a professional development program based on a scan of the teachers’ current computer skills. Issues and topics for whole faculty professional development were generated and teachers developed an individual professional development plan. Assistance towards this was provided by the following:

- opportunities for external professional development
- in-school workshops
- various support materials (e.g. training manuals)
- $250 allotted to each teacher for individual professional development in the mode and time of their choosing
- mentoring (by other teachers, HOD and adjunct staff)
- joint planning of specific units incorporating ICTs.

During 1998 the approach to teachers’ development was deliberately flexible, to give teachers the opportunity to become familiar with both the software and hardware. But the critical literacy dimension was not neglected. The more formal after-school workshops combined hands-on operational learning with reflections about how the cultural and ideological are integrated with the text and the technological medium. Lindsay also circulated articles, engaged in informal talk with fellow teachers, offered resources and practical teaching.
strategies, and used these opportunities to challenge dubious “commonsense” notions about ICTs and their role in literacy and learning.

2.2 The research

Three teachers volunteered to participate in the study. Simon, Bettina and Gwen have various levels of expertise and confidence around ICTs, and various depths of understanding of critical literacy.

The teachers may be categorised as follows, according to their relative knowledge of ICTs and of critical literacy, based on self-reports (from a Technology Competencies scan) and on Lindsay’s professional knowledge:

<table>
<thead>
<tr>
<th>ICTs</th>
<th>Critical Literacy</th>
<th>Teaching Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>high knowledge</strong></td>
<td><strong>high knowledge</strong></td>
<td><strong>very experienced</strong></td>
</tr>
<tr>
<td>Gwen</td>
<td>Lindsay</td>
<td>Lindsay</td>
</tr>
<tr>
<td>Lindsay</td>
<td>Simon</td>
<td>Simon</td>
</tr>
<tr>
<td><strong>medium knowledge</strong></td>
<td><strong>medium knowledge</strong></td>
<td><strong>somewhat experienced</strong></td>
</tr>
<tr>
<td>Bettina</td>
<td>Bettina</td>
<td>Bettina</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gwen</td>
</tr>
<tr>
<td><strong>low knowledge</strong></td>
<td><strong>low knowledge</strong></td>
<td><strong>inexperienced</strong></td>
</tr>
<tr>
<td>Simon</td>
<td>Gwen</td>
<td></td>
</tr>
</tbody>
</table>

The teachers were interviewed about their conceptions of ICTs, literacy, schooling, and society, they discussed their curriculum planning as they integrated technologies into a unit of study, and they reported on the outcome of its implementation. I interviewed Lindsay too during those phases, took part in inservice sessions and had informal conversation with the teachers.

2.3 Informing discourses around ICTs, literacies and learning: discursively constituted roles for teachers and students, classroom and technologies

In this section I describe those ideological discourses as they emerged from the interviews, as
• testimony based on questions that explicitly invited discussion of the participants’ ideologies, or
• testimony where ideologies surface most patently (even when the speaker does not seem to be cognisant of this).

I then analyse them according to the concepts I have introduced so far, relating to first, second and third level effects, and actor-networks. This will eventually lead us to reconsider those dimensions of complexity, fragility and dis/continuity.
2.3.1 Mechanistic metaphors: ICTs as inert resource

Metaphors and analogies can reveal a lot about beliefs and values. Simon, Gwen and Bettina drew on things mechanical for their comparisons: a tool to use, a tap to turn on, a machine like the Gutenberg press. In these analogies the technology is seen as an inert resource—that is, as having first level effects. It is not seen primarily as a context. As a conduit (a tap, a press) which is distinct from its users, it apparently changes neither the content nor the form of information nor the users themselves. Information is “goods” that come to us from elsewhere, not stuff we make or manipulate ourselves—or stuff that makes us either.

Such beliefs are likely to inform the practices that teachers set up in their classrooms around ICTs—and may be in tension with other ways of thinking and acting around them. Indeed, this conception of ICTs as inert resource cannot prepare the teachers for the role of ICTs in their classroom assemblages as an actor or agent. (One might speculate that this conception could derive from a desire, however unconscious, for the domestication of the technology: that is, for its assimilation to the present role of the teacher and relationship with students and information.)

When the teachers spoke of their teaching practice, that same view often emerged, of ICTs as an inert resource for accessing information or for the presentation of text. It was mainly in Lindsay’s talk that there was a focus on a changing world of technologised literacy practice. His image, for instance, was of

“... a more multi-dimensional world, where it’s not just a case of walking down streets or turning corners, it’s a case of being able to drop down into the sewers [underground tunnels] and have a look at what’s underneath and also being able to go up into the sky and look at things from above, or go through the sort of worm hole that takes you somewhere completely and utterly unexpected.”

Here the ICTs provide a context rather than a resource: that is, as a second level effect. More than that, perhaps, the ICTs could even be seen as transformative in a utopian sci-fi mode—what I call third level effects. In Lindsay’s view the technologies lead to a different way of being in a differently multi-dimensional world, and a different way of exploring multilinear text. Elsewhere Lindsay talked of ICTs as enabling us “to develop a much more lateral way of thinking and being able to think more imaginatively about text and about construction of meaning.” It is a more obviously contextual and mutually informing, even transformative, view of ICTs, I think, than we get in those other mechanical images.

2.3.2 Most valued learning in English

Lindsay and Simon have a developed understanding of critical literacy as the end point of education, and regard functional literacy as a necessary adjunct skill to be developed in students. Bettina echoes something of this critical literacy when she identifies her role as making students become

“... more aware of society’s rules and expectations and how we can test the boundaries and go beyond the expectations placed on us. By becoming critical ... we can read and see how we’re being positioned to think this way and that way by all those different sort of angles.”

Gwen however has a more circumscribed view of critical literacy, which she identifies with “critical thinking” and problem solving. Gwen’s belief about the value of English is
correspondingly more instrumental: it is to “expand their [students’] range of usage for various language functions”—an understanding which is congruent with the Queensland English Syllabus.

Bettina and Lindsay also identified their role as preparing students for the workplace. Lindsay argued that

“one of our challenges in schools like ours in terms of equity and social justice is going to be convincing the students that a decent future for them really lies in acquiring the technological skills that will give them at least even entry level into the upper wage levels.”

In other sections of this paper I report the teachers’ mentioning similar values: “basic” literacy skills, including competence in dealing with linguistic structures (genres), information management, and critical reading. These are viewed as being necessary for participation in public life and the workplace.

These various conceptions of valued literacy will affect the teachers’ priorities and practices. On the evidence of the interviews cited elsewhere in this paper, the teachers have not uniformly recognised the way in which ICTs function as a transformative context that will inevitably reshape sociolinguistic practice. How far this technologised social practice will change the literacy that is valued and taught in schools will depend on how far the assemblages of role-relationships also change.

2.3.2 ICTs and literacy: imagining the future

Simon for one, however, did recognise that ICTs will affect the nature of literacy: given the fundamental changes they will bring to society, there will be consequent changes in genres and in the nature of literacy in workplaces. Lindsay also argued for a fundamental shift towards a multimedia textuality, noting that “visual semiotics is one of the really important directions we have to take because we increasingly no longer can separate the visual semiotics from the words and from the texts”. However, to Gwen and Bettina the development of students’ “basic skills” will still be needed, and they seemed to think that these skills would be independent of ICTs.

To some extent Lindsay concurred with the other teachers’ commitment to maintaining standards of literacy in accordance with conservative parental and community expectations about spelling and the like. However, he believed that literacy learning has to take place within a technologised environment: “without that bigger cultural framework, the work that you do with language hasn’t any richness or depth, and I don’t think it has any real meaning in the real world”.

There is apparent disagreement here about whether the ICTs will bring fundamental changes to literacy practices and products, or whether any such practices in a technologised world will be based on an unchanged set of internal, individually possessed “skills”. On that latter view, ICTs will be a presentational medium or resource only. And classroom assemblages can remain “business as usual,” with ICTs viewed as a “mere” resource.

2.3.3 ICTs and schooling: imagining the future
Perhaps significantly, none of the teachers imagined that the introduction of ICTs (as a resource) would bring about any transformation of the “plant” of the school over the next five to ten years. They agree with Lindsay that buildings and equipment, and the organisational structures of timetabling, year-level groupings, discipline areas, staffing and the like are “remarkably stable institutions”. Indeed, Simon offered examples of how the institutional framing of ICTs had been “framed” by the institution of the school within a week of their installation.

So too the discipline areas will persist as distinct entities, according to Simon and Gwen. At most Gwen predicted that English teachers might need to access subject-specific expertise from other areas (eg Art for graphic outlay and presentation). Lindsay envisaged a greater degree of cross-curricular and integrated curriculum work as an indirect result of ICTs in school and society. And he argued, following Kress (1995), that a future emphasis of an English curriculum must be on the visual semiotics of design.

The present realities of school shape teachers’ imaginations and condition their thinking. You could say that this indicates an awareness of second level effects brought about by the context. However, to the extent that these realities are taken to be inevitable and determining, or commonsense, they condition and constrain the kind of rethinking of organisation and curriculum which can take place. The weight of intertia that schools represent makes some things imponderable. And indeed, the institution, with its “Jurassic management”, does outlast any one individual.

Certainly the teachers were sharply aware that the limits of funding available to schools would constrain the nature, number and use of ICTs; they could not see schools keeping up with the advance of ICTs that will occur beyond the school gates. It is an accepted ideology that schools in the public system are “poor cousins” and that teachers will have to “make do”. Lindsay commented subsequently that it may not be necessary for schools to keep up with the latest hardware and software, since these are consumer “needs” carefully cultivated by producers and marketers. Instead, teachers’ proper contribution may be to find strategies and software which will permit them to develop in their students the kinds of skills in literacy and information management, and the kinds of multimedia, hypertextual structuring of texts and the associative, “field” cognition which are promoted by the ICTs.

Of course, even though buildings persist, what takes place within networked classrooms could be quite different “in terms of access to others and conversations that go on”, as Lindsay put it. Bettina painted an optimistic view of such a classroom, opened up to wider sources of information beyond its walls, so that students can become independent learners who undertake research for themselves and access other sources of knowledge than teachers. She conceded however that classroom interaction would still be needed for the development of students’ interpersonal and literacy skills. Lindsay’s vision similarly pointed to a shifting emphasis, with teachers having less control of content in a
classroom networked to the Web, but more focus on the (verbal, visual, auditory) language of those technologically produced texts, and on the asking of “critical literacy questions in a Socratic type dialogue”.

Again one might see a fault line between the teachers’ resignation about the present institutional assemblages, with their conditioning constraints, and their rhetorically driven aspirations for a transformed future with ICTs, which would entail the transformation of the various components of those actor-networks. By and large, however, it is the present realities of school which shape teachers’ imaginations and their thinking—and any possible rethinking. After all, the teachers have achieved their professional subjectivities within that shaping culture. And much effort has gone into stabilising those assemblages and their subjectivities within them.

2.4 Anticipated and perceived changes in socio-cultural practices of curriculum development and pedagogy related to ICTs

2.4.1 Organisation of time, space, interactions

A classroom is also a technology, a “machine” for organising learning, which works with other components in the network, shaping not just the practice but also the practitioners, the actors. The space of the classroom, and the organisation of its furniture, resources and the like embodies the kind of learning which is valued and helps to promote that learning.

The standard size classroom at Park Ridge made it difficult to accommodate the two ICTs. However, a different form of restructuring—the organisation of activities—could be encouraged by those two computers in the classroom. Initially, Lindsay envisaged something “along the lines of workstations”. But after six months he was rather disappointed that most of the teachers had not taken up his preferred approach of “rotating kids through computers, integrating them with laptops and setting up ‘mobile computer labs’”. Instead, many of them still took as their model the computer lab, with all students working on the same task at the same time. Evidently the assemblage of the normative classroom is so well established that it can be hard to think about an alternative, with the renegotiated roles it entails for all the actors.

The participating teachers were certainly aware of the logistical issues of providing access to the ICTs in their classrooms. In a class of thirty students, if students work in pairs and each pair has access for ten to fifteen minutes of a fifty minute lesson, not all students will have a daily opportunity to engage with the ICTs. And so short period of time, according to Bettina, “isn’t very cohesive for them in their learning”.

Gwen had thought through those logistics: her class had a two week period to get through six activities in rotation, in groups of four. In turn, each group of four rotated through the two computers after having planned and drafted their work. Whereas in primary school “you’ve got more time to give them the creative capability of just sitting there and playing for an hour or two or three hours”, according to Gwen, in secondary school a plan “gives your creativity some direction”. She ensured that each group teamed low ability with high ability students and
more with less knowledgeable students, for peer teaching. Gwen argued that the group dynamics can improve higher order thinking skills, while students with learning difficulties or literacy problems can learn from discussion around a computer screen: “they’re able to pick up more words from what’s on there than if they try to read it all themselves”.

Simon was less sanguine about the collaborative potential of such groupings. Those students who have the technical expertise will have a competitive edge, even in groups, while those who are technologically at a disadvantage might become freeloaders by hiding in the group, “so it’s going to be a matter of asking to see everything”—that is, all student products, to ensure that each group member has made a reasonably equal contribution.

At times Gwen and Bettina, like many other teachers in the school, took their students to the computer laboratory. Even here, eleven computers were insufficient for all class members in pairs. The lab was heavily booked, and there were some clashes in the timetabling of classes. Two major reasons were given for seeking access to the labs: the whole class learning of applications, and the completion of assignment tasks.

This is a particularly significant development. Here we see the persistence of a more traditional order of secondary classroom organisation (or network), in which a teacher directs the one activity carried out by all the students as a cohort. It struggles with a newer networked order—or even with that which is more prevalent in primary schools.

Interestingly, matters of organisation loomed largest in the teachers’ talk and thinking. This is in keeping with the emphasis in schools on the imperative to maintain discipline and encourage productive work. In keeping with actor-network theory, one can speculate that a new dynamics in ICT-equipped classrooms could be very unsettling for students and teachers. Some teachers therefore prefer not to contaminate the present (net)working space. Instead, they choose to take the students into a new space, tellingly called a “laboratory” (conjuring up visions of scientific precision), where all can be set the same tasks simultaneously.

It should be noted that there is support for this approach in the Queensland English Syllabus, which sets out as the norm for a unit of work a lock-step progression from “orientating” to “enhancing” to “synthesising”, with all students undergoing the same learning processes together, as they undertake a developmental sequence of activities. So too it is assumed that assignments must be scheduled in the final phase of a unit of work (the “synthesising” phase of the Queensland English Syllabus), and that all students will be carrying out the same or an equivalent task at the same time—individually. For whatever group work may have been undertaken en route, at the end it is the individual student’s performance that must be distinguishable, so that marks and ranking can be allotted on the basis of verified authorship. This syllabus, like others, therefore underwrites the “retarding” effect of current assessment practices.

Overall, during the six months of the study it appeared that no teacher changed to any significant degree his or her normal practice, with its customary assemblage of space, time and bodies, objects and practices, ideologies and discourses. For the most part it was “business as usual”, with computers added to the mix. Such apparent domestication of the ICTs, which would render them inert, might not be permanent, but since change in one “actor” entails change in each of the other components, this is no small matter. At this stage at Park Ridge,
however, the more influential factors are apparently the social technologies of schools and timetabling, classrooms, tasks and assessment as presently organised. And these are geared to perpetuation of their norms.

2.4.2 Control and access

Three of the teachers expressed the often-stated concern about students’ online access to undesirable information and people. Simon put it in terms of freedom (for students to wander on the Net) versus control (by teachers keen to ensure the educational relevance of materials and equal access). Gwen saw it in terms of her legal duty of care. Since it is hard for teachers to screen email coming to students, Gwen would limit them to intramail, since that would make it easier for the teachers to “crack down on the students who aren’t using the equipment properly”.

This is a very different set of beliefs and values from that more optimistic vision of autonomous learners (2.3). The teachers’ concern to sift information and screen it from vulnerable children is a part of the prevailing ideology about teachers’ roles, compounded of discourses of moral authority and legalistic “duty of care”. A classroom has traditionally been a site into which teachers introduce material they control, as expert selectors. The unease of these teachers may have to do with some residual anxiety about letting go such control, though this appears to be less of a motive at Park Ridge than in more conservative contexts. Instead, from their testimony it had rather to do with that moral duty of care. Gwen for instance believed that it was her responsibility to vet and select (and cache) Internet sites. Lindsay however was ruefully aware that the teachers’ preselection of web sites (to meet budgetary restrictions, as well as to shield students from trivial or dangerous sites) would have the potential “to restrict their [students’] access to knowledge rather than actually open it up”.

There are tensions between the positive and the negative role attributed to the ICTs in the different assemblages envisaged here. Insofar as the ICTs are seen as a resource (a first level effect) and as a source of information, they are entailed in particular role-relationships with teachers and students in those different assemblages. Each assemblage brings a different role for the teachers, as either co-facilitator of learning or moral guardian. So too students are to be either autonomous and entrepreneurial, or dependent and docile. In practice, it might be hard to move between these very different kinds of actor-network. This is a point to which we shall return.

2.4.3 Unit planning: content, activities, assignments

Lindsay perhaps underestimated the resilience of the present, normative assemblages when he expressed concern about some limitations in what he called the “technological imaginations” of the English staff in general:

“I suppose I was misled by the enthusiasm of the teachers initially into thinking that they would be wanting to look for different ways of doing things, but what I’ve discovered is that what they’ve been looking for is different ways of delivering the same content and supplementing their strategies. So they still want to use exposition [as the genre for student composition], but—hey!—let’s use Powerpoint to help us in our exposition!”
In their day-to-day lesson planning, according to Lindsay, the English staff generally appeared not to have a large repertoire of strategies within a coherent program of integrated use of ICTs. Many of them utilised the ICTs only for word processing or drill exercises in punctuation and grammar (paradoxically used as a game to reward students)—“so there’s little of that integration at the moment that I maybe naively expected.”

Lindsay had hoped that such integration would occur when, in helping the teachers to reconceptualise their curriculum units, he suggested using ICTs in the development of students’ assessment items. In this way there would be more likelihood of the computers being used for “authentic” purposes, not just as drill masters or “polishing machines” for presentation of assignments. Given the previous discussion about the importance of assessment, it was a strategic decision on Lindsay’s part to encourage rethinking of assignments via newly technologised genres.

This was followed through in several instances. For instance, in her Year 11 Unit on “The Language of Work”, Bettina aimed to give students a choice about the medium in which the students would present their information on such issues as gender equity in the work place. Some might create a web page. And Gwen would have her Year 8 students, undertaking a Unit called “The Language of Family and Friends”, write a children’s story book, then use Storybook Weaver to integrate written text with visuals of backgrounds, objects, and the like on screen.

Lindsay himself intended to invite his Year 12 students to use a hypertext program, Storyspace, to present a novel marketing proposal. After reading a popular novel of their own choice, they were to take on the role of publicist for a publishing company and write to the author with suggestions for a marketing campaign. By this means, students could, with their teacher, explore issues of consumption, the building of textualised images and relationships and so on. The hypertext program would also offer Lindsay an opportunity for further critical literacy work: after the teacher has graded the assignment, another student may read the hypertext in role as the “author” whose book is being marketed and add marginal notes in order to “criticise any particular suggestions, exposing values which they don’t agree with that are coming through in this marketing proposal and providing a counter voice to this marketing person. Once you’ve got the technology there it makes the whole idea of juxtaposed viewpoints much easier and more efficient”.

After implementing the unit, however, Lindsay admitted that his hypertext plans were “a complete and utter failure, because of the conservatism of the kids.... Their challenge lay in having to think differently about how they were going to do their assignment [instead of] in the way they already knew and using a model they already had. They weren’t particularly happy about breaking convention, and they didn’t have particularly risk taking behaviour at all [because] they don’t want to be guinea pigs, these kids. And I can understand that, because it’s their future they have to think about. But it was difficult to convince them that their future might be better served by tackling some of this technological innovation that they could apply to their writing.”
This is a valuable reminder that not all students are “at home” in a computer culture, particularly perhaps in socio-economic strata where neither they nor their parents have computer access or experience of the advantages of ICTs. It is also salutary to remember that textual innovation, experimentation and risk taking are not necessarily equally valued by teachers and students, particularly when students are undertaking assessment that “counts” towards their future prospects of study and work, and when their subjectivities as students have been formed within very different networks of practice.

Despite moves towards expanding the range of student-produced texts, several dubious distinctions can be traced in some teachers’ thinking about the nature of text and literacy in a technologised environment. Gwen, for instance, argued that it was necessary in establishing criteria for students’ assessment items to differentiate presentation (including the degree of technical difficulty) from “basic texts” —

“It doesn’t matter what form you put it in, what has been written will be the same. It’s presentation of that text and visualisation of the text which is going to change how it is done... You can write a rotten story and do brilliant visuals, it is still a rotten story. It doesn’t matter how much you pretty it up....”

There is some truth in Gwen’s claim, in that the grammar, spelling, syntax, and (even to some degree) narrative development of a story can remain the same in handwritten form or hypermedia presentation. And there is a point to be made that “mere” appearance cannot compensate for inaccuracies in verbal expression. But it is also the case that a hypermedia text is the whole package: in composition and comprehension it makes its meaning through all its elements. Form cannot be separated from content as easily as this comment of Gwen’s might suggest. To the extent that teachers do separate form from content, they may communicate to their students the notion that texts are basically and exclusively verbal, and that visual, graphic or auditory elements are decoration or at best an enhancement after the event.

In sum: change to curriculum practice may strategically be mobilised around assessment items, but it needs to be underpinned by a broad understanding on teachers’ part of the changes brought to a sociocultural literacy in technologised environments, and a readiness to revise classroom practice to align it more with those changed environments beyond the school. And that preparedness by teachers, as we have seen, entails adjustments in all the components of the network: no easy matter, when so many of the actors are keen to persuade the others that change is either impossible or (at best) uncomfortable.

### 2.4.4 Students’ skill development

**Information Management**

All the teachers mentioned the importance of teaching students how to locate, skim, sift, select and evaluate online information. Simon noted that the use of such information within a critical literacy framework is a “different sort of task”, and that it would be necessary to deliberately organise activities to maximise the critical literacy aspect of students’ English education. Yet Gwen barred students from the Internet until they had read at least half the leaflets, articles, books and the like she had made available on the topic to be explored. Only then could they go online to “expand or add depth”. (She was conscious of limited school-based access to the Internet and feared that students would waste time searching or accessing non-educational sites.)
Beyond the rhetoric? Critical literacy visions into practice

Dr Wendy Morgan

Gwen intends to teach a useful lesson about not relying on one, easy, source of information: to show how weighing one against another can lead to more sophisticated analysis. These are invaluable lessons; however, this sequencing is a reversal of the tendency of many people outside of classrooms who first seek information via the Internet. It could be inferred that the practice of “print first” derives from a particular valuation, which is being conveyed to the students: the more fundamental information is located in print sources, and the Internet is only a supplement. (In part no doubt this valuation derives from the relative availability of print resources.) Print information can seem more reliable, after all: it has been through the gatekeeping processes en route to authorised publication. And it fits more comfortably within the current-traditional assemblage of actors within the classroom.

Hypermedia and Hyperlinking

Both Gwen and Bettina introduced their Year 8, 9 and 10 students to one of several hypermedia programs: Storybook Weaver, Scala and Web Page Wizard. They valued the development of such skills in their students. Gwen was particularly conscious of needing to introduce junior students to basic multimedia skills (backgrounds, objects, sounds, music—everything except animation) and build on that in subsequent years.

Granted the value of developing such expertise, a question remains: to what extent does such teaching deliberately go beyond using ICTs as presentational medium? That is, how much attention is directed towards the ways in which form and function in cultural contexts condition the various textual elements, including the verbal? As noted already, there are possible inconsistencies between this view of linguistic structures and features “morphing” in digital environments and assumptions about “basic” literacy apparently independent of contexts.

Electronic Genres and Literacy Development

Thus, as we have noted, some of the teachers spoke of their attachment to “literacy” or “basic literacy” as somehow more fundamental: as prior to and separate from the sociocultural practice of reading and writing in an electronic environment. Perhaps contradictorily, Gwen also testified that her students with learning difficulties gained greater control of genre and sentence structure by
means of ICTs: “putting their ideas onto paper now became a visual concept on the screen and they were able to interpret better what they’d typed on the screen than they were able to do in their hen scratch handwriting”, since they did not lose track of where they were coming from and going to.

Gwen and Bettina also concurred with Lindsay in seeing digital texts such as web sites as having their own characteristics in structures and linguistic features. Gwen reported that her students had learned about how to make an impact on a reader on screen according to the message they wanted to “get across”, through the choice and placement of graphics, the “page” layout, use of sub/headings, choice and size of fonts and the like. So too the students learned how to integrate a range of news genres with the visual presentation of web pages, for example by converting the written form of a contents page to an online form with hyperlinks.

2.5 The impact of ICTs on teachers’ current critical literacy theory and practice

Six months is a very short time in which to expect change to become apparent. However, as has already been suggested, this period may be sufficient to trace the persistence of current theories and practices which might have an impact on any subsequent developments. In particular, it has been argued that it may be difficult to introduce an ICT into a stable assemblage of actors and expect it to work wonders without also working up a storm. If teachers attempt to maintain the classroom on an even keel, and the various actors’ roles on board as established by tradition, the course they steer will be guided by older discourses.

2.5.1 Teachers’ self-definitions

The sense of self, or professional subjectivity, that teachers have will be very much bound up with their attitudes towards and interactions with ICTs. During these investigations there were few reported changes of sense of self, although Bettina acknowledged that she was becoming more “computer literate”.

Knowledge navigators and facilitators

All the teachers described themselves in terms of classroom management. Simon called himself a “navigator”—that is, a manager within the constraints of time, technology and the like. More positively, he glossed the teacher as “navigator of a ship”—one who guides students through a process, “giving them a greater sense of discovery, forming learning partnerships between those three players” of teacher, student and ICTs. And he has a role to “democratise” the use of ICTs within the classroom.
Gwen similarly described herself as a “facilitator” instead of content giver in a technologised classroom, which she envisages as being “more student based, more student orientated, [with] more student responsibility”. Her role will be to prepare students for life as “self-motivated learners” who can manage their use of time as they undertake projects, sometimes with the help of external mentors via email. So too Bettina identified herself as a facilitator and “negotiator”. Since she does not define herself as the expert and source of all content, but as an exploratory learner, the introduction of ICTs “hasn’t made me feel incompetent because they [students] know more”. Lindsay agreed with Gwen and Bettina that in a technologised classroom his will be the role of facilitator rather than single source of expertise and information. However, Lindsay also saw his role as in some sense Socratic, provoking rethinking, encouraging critique.

The currently dominant discourse of teachers as “facilitators” rather than experts and authorities surfaces here too. (It is sometimes characterised in the slogan, “From the sage on the stage to the guide at the side”.) And while facilitation is a more appropriate role in a classroom with access to digitised information than is the traditional stance of authorised knowledge-guardian, such a comforting term might be substituted for thinking about how ICTs can, should, do change relations with other actors and relations to knowledge.

Indeed, comfort is an important factor for any of us in maintaining our present identities: Routine is integral both to the continuity of the personality of the agent, as he or she moves along the paths of daily activities, and to the institutions of society, which are such only through their continued reproduction.

Giddens 1984: 60

**Critical pedagogues**

Earlier sections of this report have identified very diverse understandings of the nature of critical literacy and of appropriate classroom strategies. Yet Simon, more knowledgeable and experienced in critical literacy, as well as Gwen and Bettina, who are least expert, pointed to examples in their teaching practice of locating gaps and silences in texts. This is a typical move of critical literacy, to look for the not-said as a way of locating the partiality of a text, the selectiveness of its representation. This enables teachers to ask that characteristic question, “Whose interests are served by this text and its representations?” (This broader political and ideological context has not been a feature of Gwen’s practice, which tends to focus on the linguistic structures and features of texts per se.)

When the teachers were asked what they would identify as “critical literacy” in their intended teaching with ICTs, the four sketched different plans. Initially, Simon saw an expanded scope for critical literacy given a diversity of multimedia text types and forms of communication with other cultures. For him online access enhanced the pedagogical principle of “the more voices you hear in a classroom, the better”. But he was also aware of the need to think critically even about “what the technology is, who has access to it, who controls it, how does it control me as much as I control and produce for it?”. Indeed, Simon continued to focus primarily on the authority and reliability of information, given what he saw as students’ tendency to rely exclusively on the Internet as their store house. Therefore he intended to teach the students to read for the authority of the source of Internet information, utilising the interrogative techniques of history: “what are the sources, who wrote them, are they primary, are they...
secondary, are they reliable, are they valid?” So too, explicitly using the analogy of a law court
with his students, he would examine the evidence for its reliability.

In the event, for various professional and personal reasons, Simon undertook only incidental
critical literacy work with computers, maintaining a stance of scepticism about the vaunted
advantages of ICTs:

“We have the potential now to have kids think more analytically with computers. And
we have the potential to be more critical, downloading a variety of texts and ideologies
from the Net. However, I don’t know whether increased analysis and increased
diversity of texts necessarily translates to increase of critical literacies with
computers”.

When Bettina was asked what she anticipated would be the effect of ICTs on her units of
work, and the focus of her teaching, she stated that she would be involved in “knowing the
strengths and weaknesses of the hardware and software, looking at the authoritative of the
computer, having students critiquing their own work”. And like Simon, Bettina was also
interested in finding opportunities to critique the “truth” on any one web site. However, after
implementing her units, Bettina did not identify any critical component in them.

Gwen’s understanding of critical literacy as critical thinking would mean her helping Year 8
students to enhance their written texts via multimedia software (thus “gaps” would be
filled in not just by imaginative visualisation). Gwen’s Year 9 students would also be presenting
various perspectives on Logan City, including their own, for an online magazine. This
would afford Gwen the opportunity to discuss “how all these different viewpoints then
get linked together and how important it is for us to be
After teaching, Gwen asserted that the availability of more sources of information online provided a richer opportunity for students to develop critical awareness, with her prompting them to assess relevance, quality and adequacy of the information, then asking “Whose viewpoint’s being presented? How is it being presented? And what is trying to be said? Are they covering something up? Do we need to look into it further?”

In these plans and their follow-through, ICTs are evidently conceived as a presentational medium for textual enhancement and as an online source of uncertainly authorised information. However, the teachers also offered some suggestions about critiquing software, analysing the texts that discuss ICTs, or focusing on the form of digitised texts. But on the whole, it is content, whether generated by students or others, and to a limited extent context, which is the focus of critical literacy work as conceived here. And the language / literacy part of the term is rather underplayed—that is, the ways that the (technologised) word constitutes the world. Again it would be possible to see the persistence of older ideologies and discourses of English at work in these networks of practice reported on here. It has been customary in a print-dominated world to divorce “content” from its medium (the technology of the book) and focus only on the words on the page for critique. But there are also signs of the new, even though at this stage they may be (uneasily and unevenly) assimilated within the known.

3. Conclusions

If my interpretations of the evidence can be trusted, what we see here are signs of an uneven practice: of tensions and contradictions, of hesitant beginnings, of assimilations of the new to the known, as well as some accommodations of the known with the new.

Now certainly the institutionalised discourses and practices of schools contribute most powerfully to the assemblages that are classrooms, and they offer teachers a particular subjectivity few can refuse. That is evident in the priority some of the teachers gave to an alphabetic “basic” literacy distinct from (technologised) contexts. It is evident in the conception and use of ICTs as a supplementary resource for literacy operations; in the moral gatekeeping around online information and communication; and in the customary organisation of curriculum sequencing, classroom space and time, and assignments. Each of these gives teachers and students a role in relation to each other, as do the resources of the classroom (including ICTs), the available space and the structuring of curriculum and timetable.

Nonetheless, evidence to the contrary should not be underplayed. In Lindsay’s practice and in Simon’s thinking there is an important sociolinguistic and critical focus. In Gwen’s classroom space and time and tasks are beginning to be reorganised along the lines of workstations. And Bettina continues to define herself as a learner, “clicking here and there, making mistakes....”

For the most part the teachers’ concerns were apparently not primarily curriculum driven. Issues of management—whether of time, space, activities or students, lab bookings and access
to online communication and the like—loomed large for these teachers. It is evidence that ICTs do not function simply as a resource but are prone to affect the contexts of their use. But where teachers are concerned with classroom management, it may be that they will want to maintain “business as usual”: they will hardly be persuaded to encourage transformation of the actor-networks that embrace them.

In times of great and swift change, most of us seek some stability in sameness. As Lindsay put it, “teachers’ identities are threatened by technology and we’re asking them to embrace something that isn’t necessarily a “normal” part of their lives—so why should they be enthusiastic about it? It seems to me it’s a bit like saying that everyone must love cricket and become highly involved in cricket. To take the analogy further, how would teachers react if asked to include cricket in their programs across the curriculum? There is a real challenge in all of this for people trying to integrate technology into the curriculum, especially in an environment where many teachers have seen new ideas come and go and have grown, in many cases, quite sceptical of change and the demands that are constantly made on their time.”

Any teacher may feel that, by comparison with the turbulence of imminent change, the status quo is pretty tolerable. Those who seek to bring about change in schools must be able to provide a satisfactory answer when teachers ask, “What’s in it for me?” Realistically, this means, “What kind of difference will the introduction of ICTs make, not just to student outcomes but also, primarily, to their behaviour?” That is, can I be assured that there will not be destabilisation of the student-actors’ role in their classroom network. But perhaps the question could also be rephrased as, “Where am I in it?” That is, “Can I see a desirable self, a self I like, with real satisfactions, achievements and sense of worth, in this future?” And “Can I imagine myself as an actor whose features resemble those I have assiduously cultivated?” In short, we are in the realm of third level effects, in which the ICTs could play their part in contributing to transformations of learners, teachers and learning contexts.

Any professional development program therefore must ultimately help teachers to imagine and practise a modified subjectivity—a new sense of literate self in a technologically saturated environment. Any such program must encourage the following in teachers:

- a desire for a changed teaching self in a changed teaching practice;
- a willingness to question the common sense of current institutional practice (those actor-networks);
- the development of a three interconnected forms of imagination: sociolinguistic, technological and pedagogical.

And it must offer a number of strategies for accomplishing these, over time and in company with others who are similarly divided in the present between their past and possible futures—until the new assemblages become stable and comfortable—become “business as usual”.

By and large my research has highlighted the tendency of the other actors in a network to maintain the status quo when ICTs are added to the mix. If they are not simply to become “domesticated” to uses peculiar to schools, in the first phase of their implementation administrators, curriculum leaders and teachers should not attend solely to the operational aspects. It may be too late when a practice is already established as normal in schools, to ask
teachers subsequently to engage with the socio-cultural and critical and to change what has become customary and comfortable.

*Digital Rhetorics* concluded that the site studies were marked by complexity, fragility and dis/continuity. This follow-on study suggests a particular “spin” on those terms and a message for teachers’ professional development needs. First, complexity: we need to support teachers in understanding and beginning to feel comfortable amidst the ambiguities and “messiness” of complex interactions among actors in new networks. Second: fragility. If such new assemblages of actors are to endure, they need to be supported until they become habitual. (This is not the same as the stasis of the old pedagogical technologies or domestication of the new.) Third, dis/continuity. There is unlikely to be no simple “improvement” continuous with the present, if by literacy “improvement” we understand the transformed practices of multimodal literacy by ICTs. Those third level effects I have alluded to through this paper are among other things dependent on the discourses which give teachers their priorities and purposes and their sense of self. Nothing less than a reconfiguration of all the elements in those classroom networks, including discourses, will serve to effect significant change in literacy teaching and learning.
REFERENCES


THE ACER LONGITUDINAL LITERACY AND NUMERACY STUDY (LLANS)

Marion Meiers
Margaret Forster
Australian Council for Educational Research

Paper presented at the ACER Research Conference ‘Improving Literacy Learning—What does research tell us?’ Adelaide 18-19 October 1999
PART I: CONTEXT AND BACKGROUND FOR AN AUSTRALIAN LONGITUDINAL LITERACY AND NUMERACY STUDY

ESTABLISHING THE STUDY

Introduction

This paper is structured in three parts. The first part outlines the background to the study, the general methodology, and the scope and nature of the data to be collected. We then move to an oral vignette from Veronica Luck, an early years teacher who will give a teacher’s perspective on this first year of the study. Thirdly, Margaret Forster describes the process by which achievement data will be reported.

Some reference is made to the work on numeracy in the study, but the focus of this paper is on literacy.

The work discussed in this paper represents the collaborative efforts of many people at ACER, as well as the significant contribution to the project which has come from the teachers in the schools participating in the study. Teachers are definitely partners in this research, and for that reason, it is good to have one of the teachers as a co-presenter of this paper.

As project director, I wish to acknowledge the work of a number of ACER staff:

Wendy Bodey, Lynne Darkin, Eve Recht, Prue Anderson, Margaret Forster, Geoff Masters, Andrew Stephanou, John Barnard, and Silvia McCormack.

The work of teachers in nearly 100 Australian schools is also acknowledged.

This ACER national study has been designed to follow the literacy and numeracy development of a national sample of students throughout the years of primary schooling. The study commenced this year with children at the beginning of their school lives.

The study is an Australian Council for Educational Research initiative, funded from the core grant of the ACER.

As a seven-year longitudinal study, the project will generate important insights into patterns of development in literacy and numeracy. Other studies of literacy and numeracy learning in Australia have tended to be cross-sectional rather than longitudinal. The 1996 National School English Literacy Survey, and State and Territory assessment programs, for example, provide detailed information about the achievements of particular cohorts of students, whereas this study will collect data on growth over an extended period of time.

Background

The 1996 National School English Literacy Survey (NSELS) provided a comprehensive mapping of literacy achievement in reading, viewing, writing, speaking, and listening for students in Year 3 and Year 5. The data from the NSELS was reported on a series of scales. A national longitudinal study creates an opportunity to extend the achievement scales developed from the NSELS data, from the early years through to the middle years of schooling, and the transition to secondary school.
The National Literacy and Numeracy Plan, agreed to by Commonwealth, State and Territory Education Ministers in March 1997, emphasises the importance of developing strong foundational literacy and numeracy skills for all Australian children. The goal contained within the Plan, *That every child leaving primary school should be numerate, and be able to read, write and spell at an appropriate level*, focuses attention on the primary school years as a whole. The related sub-goal, *That every child commencing school from 1998 will achieve a minimum acceptable literacy and numeracy standard within four years*, focuses more closely on the crucial early years of schooling. The longitudinal study will report on comprehensive explorations of growth in those early years, and will then continue the investigation throughout primary schooling.

Elements of the National Plan, such as the assessment of all students by their teachers as early as possible in the first years of schooling, and the development of agreed benchmarks in literacy and numeracy for Year 3 and Year 5, have created a context in which it is essential to understand more about the patterns and sequences of growth in literacy and numeracy. A longitudinal study provides a significant means of developing such understandings.

The Children’s Literacy Research Project, *100 Children Go to School* (1998, Hill, S et al, DEETYA) explored in depth the connections between literacy development prior to school and in the first year of formal schooling. The LLANS study will complement this work, and the longitudinal study which is continuing the work of *100 Children go to School*. The LLANS will build up a broad picture of both literacy and numeracy development from 1000 Australian children, form the first year of formal schooling.

**Purposes of the Study**

The primary purpose of the study is to address the key research question: ‘What is the nature of literacy and numeracy development amongst Australian school children?’

The project has been designed to:

- identify and describe typical development of skills in reading, writing, speaking and listening, and viewing;
- identify and describe typical development of skills in number, measurement, space, chance and data;
- investigate and describe background variables which may influence children’s development in literacy and numeracy throughout the years of primary schooling, taking account of their experiences before school entry, and outside school;
- link data on students’ achievements in literacy with the achievement data from the National School English Literacy Survey;
- explore the relationships between literacy and numeracy development; and
- investigate teaching approaches in literacy and numeracy, in a special targeted sample.

**The National Sample**

The national sample of 1000 students was selected from an Australia-wide sample of 100 schools. These schools were selected by two processes: 80 schools were randomly selected from the ACER sampling frame, and a balanced selection of a further 20 schools was made from schools nominated by education authorities because of particular characteristics of their programs. A case study approach will be used for schools in this targeted sample to investigate a range of literacy and numeracy teaching programs.
Ten students were randomly selected from class lists provided at the beginning of the 1999 school year by the 100 schools in the project, and the approval of the parents of these children was obtained. This has created a total sample of 1000 students. As far as possible, students who change schools in Australia will remain in the study. Already, some students have moved to other schools, and where possible, we have negotiated their continuation in the study with the principal of the new school.

The Methodology

Comprehensive data on the literacy and numeracy growth of the participating students will be collected each year, from common tasks developed at ACER, and from work samples selected from the students’ normal classroom work. A range of background data on school, teachers and student variables will also be collected annually from a set of questionnaires. This will enable analyses to be made in relation to age, gender, ESL learners, language background other than English, time spent reading, watching television and using computers at home and so on.

An important aspect of the methodology is the role of teachers as partners in the study. In this first year of the study, the students’ own teachers have administered and recorded students’ responses to the common tasks, and selected the work samples. In the first years of the study, the assessment tasks will need to be undertaken in one-to-one situations with individual students. ACER has provided all the materials, a detailed guide to teachers, and record sheets.

Later in the study, in years 3 and 5, the Development Assessment Resource for Teachers (DART) tasks in reading, writing, speaking, listening and viewing will be used, linking the study with the NSELS.

Portfolios are being used to collect samples of students’ normal classroom work, including writing and numeracy work. The first portfolio samples provide a vivid picture of the range of achievement in writing, in the first few weeks at school. At the completion of the whole study, the collected work of seven years in the portfolios will provide a rich picture of each child’s development.

The first set of common tasks was designed to capture information about what students know and can do in literacy and numeracy when they enter school. This baseline data for the whole study was collected in the first weeks of the 1999 school year.

Common Assessment Tasks

Developing valid and reliable common assessment tasks for school beginners has been a complex process. An extensive review of school entry and baseline assessments was undertaken, and the DEETYA project, Assessment of Literacy and Numeracy in the Early Years of Schooling, undertaken in 1998 by Curriculum Corporation provided a most useful data base. Work by Clay, Wolfendale, and Blatchford and Cline further informed this review. Progress maps relevant to the early years, such as the Early Years Literacy Profile (DECS, SA, 1996), and First Steps helped to identify the range of skills and knowledge which might be investigated through the common tasks. The US report, Preventing Reading Difficulties in Young Children, (Snow, C, Burns, S and Griffin, p, 1998) highlights the significance of attention in all primary classrooms to the full array of early reading accomplishments: the alphabetic principle, reading sight words, reading words by mapping speech sounds to parts.
of words, achieving fluency, and comprehension. (p 6) This helped in the identification of significant aspects of emerging literacy.

These reviews helped to ensure the validity of the tasks, in that they would address an appropriate understanding of early literacy development. Further considerations relating to the validity of the tasks included the development of meaningful tasks, appropriate for different sub-groups of students, and the involvement of teachers in making judgments about students’ responses.

The item writers have designed tasks to be administered by teachers working one-to-one with students. Each set of instructions has been carefully worded to make what is required absolutely clear to both teacher and student, thus ensuring the reliability of the assessments. For example, in the activities relating to book orientation and directionality of text the directions allow the child to explore the provided text, but also take account of the need for the teacher to be able to record the child’s responses clearly and quickly. Questions such as ‘Where does the story begin? Where do I go now? I’m going to start reading the story on this page. Show me where to begin’, are designed to provide insights into how much the child knows about books.

In designing the common tasks it was also important to take account of time, acknowledging the practicalities of managing one-to-one assessments in the classroom. Therefore, the focus was on essential aspects of emerging literacy and numeracy. For literacy, the assessment activities covered five aspects: environmental print, phonemic awareness, book orientation, retelling, and concepts of print. Numeracy activities included tasks on patterns, shapes and counting.

Emphasis has been placed on using everyday materials as the basis for the assessment activities. A set of photos of print on objects and places in the everyday environment, including cereal packets, and service stations provided the basis for one task, drawing from the very interesting environmental print tasks developed for 100 Children go to School. A picture storybook was used to explore the children’s knowledge of print conventions, and for a retelling activity. In the set of tasks children will undertake in November 1999, after several months at school, another picture story book will be used, as well as a reader selected for its appropriateness to the level at which many students will be beginning to read.

Pop sticks, counters, and coloured shapes were used in hands-on numeracy activities designed to investigate what the children know about aspects of numeracy such as patterns, shapes, and counting.

The fist set of tasks was trial tested in both school and pre-school centres, and the data from these trials was used to refine the task, to ensure the validity and reliability of the tasks. Similar processes of trial testing will be followed for all sets of common tasks to be used in the study.

The literacy assessment tasks completed by the students in the first few weeks of school were based around the following five key areas:

| Activity 1 | Environmental print |
| Activity 2 | Phonemic awareness |
| Activity 3 | Book orientation |
| Activity 4 | Retell |
| Activity 5 | Concepts of print |
The numeracy assessment tasks completed by the students in the first few weeks of school were based around the following six key activities:

A  Over and under
B  Patterns
C  Birthdays
D  Shapes
E  Counting
F  Carl’s Cafe

An example of a literacy task

As the assessment tasks have been designed to be administered under standard conditions, in order to maximise reliability the assessment booklets contain:
- instructions for teachers (in italics);
- the text of what the teachers says to the student (in bold); and
- clear, simple marking guides.

The following connected series of small tasks was designed to assess aspects of book orientation and directionality of text:

1. Pick up the book and have a look at it.
2. Now show me the front of the book
3. Look at the story in the book.
   Can you read me some of the story?
4. The name of this book is Precious Eggs.
   Can you show me where it says Precious Eggs?
5. Where does the story begin?
   Where do I go now?
6. I’m going to start reading the story on this page.
   Show me where to begin.
7. Show me which way to go.
8. Where do I go after that?
   Now I’ll read the story to you.

The marking guide enables the teacher to make a judgement and directly record the child’s response. For example, for Activity 4 (see above) the marking guide identifies the following possible responses:

Identifies title
Identifies author or illustrator information
Other answers (includes pointing to both of above)
No attempt.

Portfolio samples
Another set of interesting data is being built up from samples of children’s normal classroom work in literacy and numeracy which teachers select and send to ACER. Two sets have been collected this year, the first from the children’s work in February and March, and the second set from August and September. These samples will be collected into literacy and numeracy portfolios for each child in the study. A panel of Victorian early years teachers involved in LLANS has been convened to assess these portfolio samples, extending the direct involvement of teachers in the study.

A preliminary scan of the writing samples from the students’ normal classroom work in the first term indicates the very wide range of what students can do with writing at the beginning of school, including scribble; strings of carefully formed individual letters; and well-structured sentences, using approximated spelling, such as “wen” for “when” and “holodas” for “holidays”. A marking guide has been developed for assessing these samples.

**Vignette: A Teacher’s Perspective**

--oral presentation by Virginia Luck
PART II: REPORTING LITERACY ACHIEVEMENT DATA FOR THE LONGITUDINAL LITERACY AND NUMERACY STUDY (LLANS) WORK IN PROGRESS

The analysis and reporting of LLANS school-entry data will draw on the conceptual work of a number of people, in particular Wendy Bodey and Eve Recht who designed the tasks which provide the evidence of student achievement, and Andrew Stephanou who is responsible for guiding the data analysis.

During the life of the study, we will investigate and report data from a variety of different perspectives to provide the most informative picture possible of literacy and numeracy growth—although it is literacy growth that we are focusing on in this paper.

A basis for analysis and reporting

The fundamental step in analysing and reporting LLANS literacy data is to construct a literacy, or set of literacy, scales. Once a scale is constructed, it is possible to

♦ describe and illustrate achievement along the scale;
♦ compare and report subgroup performances on the scale;
♦ investigate teacher/school and student characteristics correlated with literacy achievement; perhaps
♦ interpret literacy achievement in terms of levels of state and territory outcomes and/or national benchmarks; and
♦ show growth over time.

The long-term intention of the study is to construct a series of literacy scales against which to report literacy growth across the years of primary school.

Some of this work has been completed already through the National School English Literacy Survey (NSELS). In NSELS we developed reading, writing, spelling, viewing, speaking and listening scales against which to report the literacy achievements of students in Years 3 and 5. Through the LLANS work, we hope to extend these scales down to school entry in order to develop a more complete picture of literacy growth.

This section of the paper focuses on work in progress to construct the beginnings of the literacy scale from evidence of student achievement collected when students first enter school, that is in the first half of the first year of the LLANS study. The paper discusses the methodology we use to describe and illustrate achievement on that scale.

An empirically based continuum of growth

The literacy scale under development is empirically based. That is, it is based on a measure of each participating student’s achievement. Each student’s responses to LLANS tasks are used to construct the scale so that the location of literacy skills along the scale is based on students’ observed performances on the literacy tasks. The method used to construct the scale allows achievement measures to be interpreted in terms of the skills typical of students at various levels of achievement.

The scale represents a continuum of achievement and provides a picture of typical literacy growth.

Step 1: calibrating the literacy tasks
The Longitudinal Literacy and Numeracy Study  
Ms Marion Meiers, Ms Margaret Forste, Mrs Veronica Luck  

The first step in the construction of the literacy scale is to calibrate the complete set of literacy tasks together. The initial calibration of all the school entry literacy tasks is shown in Figure 1.

The Figure 1 map shows the literacy tasks calibrated on the same scale as student ability. The tasks are ordered from the easiest task at the bottom (CP13.1) to the most difficult task at the top (EP10.4). The Xs on the left illustrate numbers of students at particular levels of ability.

Students at the level of ability, shown by the arrow would be likely to answer correctly the tasks below this level of the map. They would be unlikely to answer the tasks above the level of the arrow correctly.

Step 2: investigating ‘fit’

The second step in the construction of the literacy scale is to investigate the ‘fit’ of items. That is, the degree to which the items work together to define the dimension being described. The model we use in developing our scales begins with the intention to focus on just one aspect of growth at a time. Do the tasks work together to support the concept of a progression of learning against which achievement can be reported?

We investigate the fit of items using displays of the kind shown in Figure 2. To be consistent with our model, we expect item fit values (asterisks) to be located in the boxed region. The values on the far right indicate tasks which have relatively low correlations with this literacy dimension. The values on the left indicate tasks which have unusually high correlations with this literacy dimension. Items which fall outside the boxed region (circled) are analysed carefully and a decision made whether or not to include the evidence from these tasks in the scale under construction.

Step 3: Describing growth

The third step is to describe growth along the scale based on the evidence provided by the tasks. To make the work more manageable we look first at the tasks grouped by Activity. Figure 3 shows the item calibrations for Literacy Activity 5 ‘Concepts of Print’.

What can we learn about students’ growth in understanding concepts of print from this map of items? Against which understandings will we be able to report student achievement?
Item Estimates (Thresholds)
all on literacy (N = 904 L = 44 Probability Level= .50)

---

6.0

X

5.0

X

EP10.4
EP09.3

4.0

XX

XXX

3.0

XXX

CP09.2

XXX

CP15.4

XX

EP03.2

XXX

CP09.1

XXX

BT3 .2

2.0

XXX

CP07.2

XXX

CP02.2

XXX

CP15.3

XXXX

BT3 .1 CP08.2

XXXXXXX

PA02 PA09 CP02.1

XXXXXXX

EP02 CP11

1.0

XXXXXXXXXXXXXXXX

EP07.1 PA03 PA06 PA12 RT1 .2 CP01.2

XXXXXXXXXXX

EP03.1 CP10.2

XXXXXXXXXX

EP04.2 CP08.1 CP12

XXXXXXXXX

BT5 .2

XXXXXXXX

PA10 CP01.1 CP10.1 CP15.2

0.0

XXXXXXXXXXXX

PA11 BT5 .1 BT6 .3 CP15.1

XXXXXXXXXXXX

EP09.2 PA05 BT6 .2 RT2 .2

XXXXXXXXXXXX

EP10.3 PA07 BT8 .2 CP07

XXXXXXXX

EP04.1 EP10.2 PA08

XXXXXXXX

EP09.1 EP10.1 BT6 .1 CP13.3

XXX

BT8 .1 CP04

-1.0

XXX

EP05.3 EP06.2 EP08 CP06

XXX

BT4 .2

XXX

EP05.2 EP06.1 RT1 .1 CP13.2

XX

BT7

XX

EP01 PA04 CP05

PA01 BT2 RT2 .1

-2.0

X

EP05.1 BT4 .1

-3.0

CP13.1

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Each X represents 3 students

Figure 1 Calibrated School Entry Literacy Tasks
Item Fit
all on literacy (N = 904 L = 44 Probability Level= .50)

Figure 2 Investigating item ‘fit’
Item Estimates (Thresholds)

all on concprint (N = 904 L = 13 Probability Level= .50)

<table>
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<tr>
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</tr>
<tr>
<td>3.0</td>
<td>XXXXX CP09.2</td>
</tr>
<tr>
<td>2.0</td>
<td>XXXXXXXX CP02.2</td>
</tr>
<tr>
<td>1.0</td>
<td>XXXXXXXX CP01.2 CP11</td>
</tr>
<tr>
<td>0.0</td>
<td>XXXXXXXX CP04 CP06</td>
</tr>
<tr>
<td>-1.0</td>
<td>XXXXXXXX CP05</td>
</tr>
<tr>
<td>-2.0</td>
<td>XX CP13.2</td>
</tr>
<tr>
<td>-3.0</td>
<td>X CP13.1</td>
</tr>
<tr>
<td>-4.0</td>
<td></td>
</tr>
</tbody>
</table>

Each X represents 3 students

Figure 3  Item calibrations for Literacy Activity 5 ‘Concepts of Print’
We begin describing growth by describing the knowledge, skill and understanding addressed by each task. What are the skills that students demonstrate when completing a task correctly. For example, the easiest task in the set is CP13.1. The teacher says to the student, ‘Write your name on the page.’ To score 1 on this task students need to produce a gesture at writing: scribble. The most difficult task of the set is CPO9.2. In this task, the teacher points to the word ‘shade’ and says to the student, ‘Can you read this word?’ To answer this item correctly students need to be able to read the word ‘shade’ without error.

In this way, we look at each task in turn describing what it is the student needs to be know and be able to do. Figure 4 shows the ‘descriptors’ for each of the tasks in the ‘Concepts of Print’ Activity.

<table>
<thead>
<tr>
<th>Task Description</th>
<th>Scale Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reads the word ‘shade’ correctly.</td>
<td>CPO9.2</td>
</tr>
<tr>
<td>Writes a recognisable sentence about a picture.</td>
<td>CP15.4</td>
</tr>
<tr>
<td>Makes a good attempt at reading the word ‘shade’ (eg reads ‘sh’).</td>
<td>CPO9.1</td>
</tr>
<tr>
<td>Identifies a question mark and knows its purpose.</td>
<td>CPO2.2</td>
</tr>
<tr>
<td>Writes a recognisable word in a sentence about a picture.</td>
<td>CPO15.3</td>
</tr>
<tr>
<td>Names all letters in the word ‘shade’.</td>
<td>CPO8.2</td>
</tr>
<tr>
<td>Identifies a question mark.</td>
<td>CPO2.1</td>
</tr>
<tr>
<td>Recognises a full stop and knows its purpose.</td>
<td>CPO1.2</td>
</tr>
<tr>
<td>Recognises a matching lower case letter when shown a capital N.</td>
<td>CP11</td>
</tr>
<tr>
<td>Identifies a capital letter.</td>
<td>CPO10.2</td>
</tr>
<tr>
<td>Names some letters in the word ‘shade’.</td>
<td>CPO8.1</td>
</tr>
<tr>
<td>Recognises a matching lower case letter when shown a capital T.</td>
<td>CP12</td>
</tr>
<tr>
<td>Identifies a full stop.</td>
<td>CPO1.1</td>
</tr>
<tr>
<td>Identifies another capital letter when shown a capital letter.</td>
<td>CP10.1</td>
</tr>
<tr>
<td>Writes recognisable letters in a sentence about a picture.</td>
<td>CP15.2</td>
</tr>
<tr>
<td>Writes scribble in a sentence about a picture.</td>
<td>CP15.1</td>
</tr>
<tr>
<td>Identifies the last letter in the word ‘shade’.</td>
<td>CPO7</td>
</tr>
<tr>
<td>Writes own name correctly.</td>
<td>CP13.3</td>
</tr>
<tr>
<td>Identifies a word.</td>
<td>CPO4</td>
</tr>
<tr>
<td>Identifies the first letter in the word ‘shade’.</td>
<td>CPO6</td>
</tr>
<tr>
<td>Makes a good attempt at writing own name correctly.</td>
<td>CP13.2</td>
</tr>
<tr>
<td>Identifies a letter.</td>
<td>CPO5</td>
</tr>
<tr>
<td>Scribbles for own name.</td>
<td>CP13.1</td>
</tr>
</tbody>
</table>

**Figure 4**  Descriptors for ‘Concepts of Print’ Activity

**Step 4 Refining our understanding of ‘Concepts of Print’**

The fourth step in the process is to refine our understanding of growth along the scale. We approach this step in a number of ways. Three examples are discussed.

**Example 1: look for ‘like’ tasks**

We look for tasks which address similar understandings. For example, four tasks address understanding of punctuation: CPO1.1, CPO1.2, CPO2.1 and CPO2.2 (see Figure 4). These tasks calibrate towards the upper half of the scale, with the items addressing recognition and use of question marks (CPO2.1 and CPO2.2) clustering together at a higher level than those addressing full stops (see Figure 3). We may want to generalise this discovery in our final scale descriptions.
Example 2: look for items demanding increasing skill and understanding

Four tasks relate to ‘reading’ the word ‘shade’ (CPO6, CPO7, CPO8, and CPO9 (see Figure 4). Pointing to the word ‘shade’, the teacher asks: Show me the first letter in the word. Show me the last letter in the word. Can you tell me the letters in this word? Can you read this word?

Looking at these items as a set helps us to understand growth along the scale and also to isolate areas along the scale where we might want to look more closely. For example, the area along the scale where student move from reading elements of a word to reading the whole word is probably of particular interest.

Example 3: look for tasks which cluster along the scale

Two tasks cluster at the top of the scale: CP15.4 and CPO9.2 (see Figure 3). To complete task CPO9.2 students need to read the word ‘shade’. To complete task CP15.4, they need to write a recognisable sentence under a picture. The tasks differ from tasks that calibrate lower on the scale in that they demand more sophisticated reading and writing skills.

Looking at these items as a set again highlights an area of the scale where we might want to look more closely.

Step 5: Putting the pieces together

When work is completed for each of the five Activities we put the pieces together to develop a complete picture of growth—a described scale against which to report achievement.

An example of completed work of the kind we are envisaging for LLANS is the NSELS literacy scales. Figure 5 shows one of the NSELS writing scales against which we reported Year level and subgroup achievement. Figure 6 summarises the distributions of writing measures on this scale as ‘box and whisker’ plots which indicate levels on the writing scale achieved by 10%, 20%, 50%, 80% and 90% of males and females at Year 3 and Year 5.

We posed a difficult question at the beginning of the study: ‘What is the nature of literacy and numeracy development amongst Australian school children?’ The challenge is to answer the question in a way that not only helps us better understand growth but also in a way that provides research evidence which will assist teachers to improve learning.
Figure 5 The NSELS writing scale—content
Figure 6  Distributions of male and female students' estimated writing achievements

Year 5
- Males: 90%
- Females: 80%

Year 3
- Males: 90%
- Females: 80%
- Level 1: 308
- Level 2: 345
- Level 3: 382
- Level 4: 50%
References


Curriculum Corporation, (1999) Assessment of Literacy and Numeracy in the Early Years of Schooling, DETYA, Canberra


Department for Education and Children’s Services South Australia (1996) Early Years Literacy Profile, DECS, Adelaide

Education Department of Western Australia (1994) Reading Developmental Continuum Longman Cheshire Melbourne

Hill, S., Comber, B., Louden, W., Rivalland, J., and Reid, J. (1998) 100 Children Go to School – Connections and Disconnections in Literacy Development in the Year Prior to School and the First year of School, DEETYA, Canberra


Literacy development in the first year of schooling

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Literacy development in the first year of schooling

Susan Hill, University of South Australia
William Louden, Edith Cowan University

This paper draws on the research study 100 children go to school: Connections between literacy development in the prior to school period and the first year of schooling. The study was conducted in 1996-1998 by a research team made up of Susan Hill, Barbara Comber, William Louden, Judith Rivalland and Jo-Anne Reid. The paper will discuss the findings of the study, pose questions about universal, sequential linear notions of literacy development and raise issues to do with literacy pedagogy.

The study 100 hundred children go to school was funded by the Commonwealth government and aimed to provide (1) a short historical summary of preschool, childcare and other prior to school experiences in Australia; (2) a map of the prior to school experiences of a range of children in the year prior to school and the first year of formal schooling; (3) measurable outcomes and qualitative case studies of a sample group of children’s prior to school and first year of school experiences focusing on literacy development. The literacy assessments were undertaken with more than 100 children during the year prior to school and the first year of school. Qualitative case studies were also prepared for a smaller group of 20 children. These case studies included observations of the children at home, in their prior to school contexts and during their first year at school. The case study children were chosen to represent a range of Australian contexts, including family financial resources, home language, ethnicity and geographic location.

Literacy outcomes were collected from a range of theoretical perspectives: The home and community tasks developed especially for this study included a set of everyday print items and a set of environmental print awareness items. The environmental print items were based on photographs of familiar food items, toys and retail signs. The everyday print awareness items were based on a widely available ‘junk mail’ Christmas toy catalogue. All of the items in the everyday and environmental print assessments were familiar to children in the remote, rural and urban locations chosen for this study. Other assessment tasks were based on previously published materials. The prior to school assessments included Concepts About Print (Clay, 1993), Writing Observation (Clay, 1993), Letter Identification (Clay, 1993), Phonemic Segmentation (Yopp-Singer, 1995) and Reading Behaviours on Text Gradients (Fountas & Pinnell, 1996). Some additional items were added to the second round of assessment, in order to reflect children’s increased literacy knowledge after attending school. The additional items included retelling tasks from the School Entry Assessment (Ministry of Education, New Zealand, 1997), Ready to Read (Clay, 1993), and the First Steps spelling and writing levels (Education Department of Western Australia, 1994a, 1994b). A total of 58 assessment items were used in the 1996 prior to school phase and 75 assessment items were used in the 1997 school assessment phase.

Analysis of the assessment tasks revealed that most students made substantial progress in literacy learning during their first year at school. The study also showed clusters of children who were learning at a different pace or in a different order. The quantitative study identifies literacy domains in which children learned most in their first year at school and demonstrated that literacy development for many children is
not a linear sequential developmental continuum. The qualitative case studies of children revealed that what children take up in an early literacy curriculum is inextricably connected to the repertoires of practices and knowledges that children already have. When children moved from their prior to school contexts to the first year of schooling there were differences in the environments, resources, time, dispositions of bodies, social norms and language and literate practices.

**Literacy progress in the first year of school**

To answer the question ‘How much did children learn about literacy during their first year of school?’ the researchers compared the percentage of children able to complete items before school, and after three terms in school. At the time of the pre-school assessment phase, there were eight items that more than 70% of children successfully completed. These eight items demonstrated that most children had some logographic knowledge, understood book orientation, had some knowledge of numbers and were beginning to attend to print. Table 1, below, lists the items and percentages of children scored as correct on these items.

**Table 1. What could children do before school?**

<table>
<thead>
<tr>
<th>Item</th>
<th>% children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Show me the front of this book</td>
<td>95.3</td>
</tr>
<tr>
<td>Point to the writing on this box (LEGO)</td>
<td>92.7</td>
</tr>
<tr>
<td>Inversion of picture</td>
<td>79.4</td>
</tr>
<tr>
<td>Can you tell me what the number is? (calculator key pad)</td>
<td>78.9</td>
</tr>
<tr>
<td>Are there any letters that are the same (Coco pops only)</td>
<td>75.2</td>
</tr>
<tr>
<td>Print carries a message</td>
<td>72.9</td>
</tr>
<tr>
<td>Point to the part that tells it’s McDonald’s</td>
<td>72.5</td>
</tr>
<tr>
<td>Tell me what these numbers are (Coke bottle)</td>
<td>70.6</td>
</tr>
</tbody>
</table>

After three school terms, most of the children had achieved dramatic increases in their literacy knowledge. Compared with eight items in Table 1, there were 37 items scored as correct for more than 70% of the children. That is, more than 70% of the children were scored as correct on about half of the 75 assessment items in 1997. Many of these items represent literacy knowledge and skills that were explicitly part of the teaching learning program in the schools. Almost all children understood the directionality of text and understood the concept of letters and a printed word. Most children learned to identify capital letters and full stops. Their ability to identify sounds increased with school experience. Almost all children learned to identify some letters and numbers in context and most learned to identify them out of context. Most learned to produce a recognisable sentence and could read a simple book and a few familiar sight words. Most children could retell and demonstrate comprehension of a story they had read with an adult. Table 2 below lists the items and percentages of students successfully completing each item.
Literacy development in the first year of schooling
Associate Professor Susan Hill and Associate Professor Bill Louden

Table 2. What almost all (>80%) children could do after seven months of school

<table>
<thead>
<tr>
<th>Item</th>
<th>% children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Point to the writing on this box (LEGO)</td>
<td>100.0</td>
</tr>
<tr>
<td>Show me the front of this book</td>
<td>100.0</td>
</tr>
<tr>
<td>Print carries a message</td>
<td>100.0</td>
</tr>
<tr>
<td>Can you tell me what the number is? (calculator key pad)</td>
<td>99.0</td>
</tr>
<tr>
<td>Show me any letters that are the same (Coco pops words only)</td>
<td>98.0</td>
</tr>
<tr>
<td>Can you tell me any other numbers you know? (Calculator key pad)</td>
<td>98.0</td>
</tr>
<tr>
<td>Can you point to a letter? (calculator key pad)</td>
<td>96.0</td>
</tr>
<tr>
<td>Print starts at top left: &quot;Show me where to start&quot;</td>
<td>96.0</td>
</tr>
<tr>
<td>Left to right orientation of print: Which way do I go?</td>
<td>96.0</td>
</tr>
<tr>
<td>Return sweep: &quot;Where do I go after that?&quot;</td>
<td>94.1</td>
</tr>
<tr>
<td>Point to the part that tells this is McDonald's (sign &amp; logo)</td>
<td>93.1</td>
</tr>
<tr>
<td>Can you tell me what the letter is? (calculator key pad)</td>
<td>93.1</td>
</tr>
<tr>
<td>Left page before right page</td>
<td>92.1</td>
</tr>
<tr>
<td>Tell me what these numbers are (Coke bottle)</td>
<td>92.1</td>
</tr>
<tr>
<td>Can you read this (McDonald's word only)</td>
<td>92.0</td>
</tr>
<tr>
<td>Can you find a number in the picture? (BP)</td>
<td>90.1</td>
</tr>
<tr>
<td>Can you find a number in the picture? (Shell)</td>
<td>89.1</td>
</tr>
<tr>
<td>Response to Inverted Print</td>
<td>88.1</td>
</tr>
<tr>
<td>Letter concepts: just one letter</td>
<td>88.1</td>
</tr>
<tr>
<td>What sound does this letter make? (T)</td>
<td>88.1</td>
</tr>
<tr>
<td>Tell me the name of any letters (Coco Pops)</td>
<td>86.1</td>
</tr>
<tr>
<td>Inversion of picture</td>
<td>85.1</td>
</tr>
<tr>
<td>First &amp; last part of story</td>
<td>84.2</td>
</tr>
<tr>
<td>First &amp; last letter concepts</td>
<td>82.2</td>
</tr>
<tr>
<td>Word concept &quot;Show me one word&quot;</td>
<td>82.2</td>
</tr>
<tr>
<td>Would you read this please? (Coca Cola words only)</td>
<td>78.2</td>
</tr>
<tr>
<td>Can you show me where the page number is?</td>
<td>77.2</td>
</tr>
<tr>
<td>What does this word say? (LEGO)</td>
<td>76.2</td>
</tr>
<tr>
<td>Writing Observation: language level 4 (any recognisable sentence) &amp; above</td>
<td>76.2</td>
</tr>
<tr>
<td>Capital/ lower case correspondence</td>
<td>75.2</td>
</tr>
<tr>
<td>Punctuation: Full stop</td>
<td>75.2</td>
</tr>
<tr>
<td>Book reading behaviours level 5 (reads print)</td>
<td>75.2</td>
</tr>
<tr>
<td>Numbers identified in catalogue</td>
<td>74.3</td>
</tr>
<tr>
<td>Capital letters: show me a capital letter?</td>
<td>73.5</td>
</tr>
<tr>
<td>Word by word pointing</td>
<td>72.3</td>
</tr>
<tr>
<td>What is the name of this letter? (T)</td>
<td>72.3</td>
</tr>
</tbody>
</table>

Second, to explore which literacy assessment items and item groups the children learned most about in their first year of formal schooling, the item and item groups were compared. Figure 1 identifies the item groups and the knowledge and abilities represented in each item group. Before attending school only eight items from three item groups were successfully completed by most children. Three terms later most children completed most of the items in logographic knowledge, attention to print, attention to words, book orientation, directionality of text, number identification and letter concepts. In addition, many children completed most of the items grouped in punctuation, print order and attention to sounds. Many children could identify 40 or more upper and lower case letters, write one or more sentences recording their own
ideas, and could read more than five sight words out of context. Many children could answer three questions on an oral retelling task, using developed sentence structure and including all of the main points.

**Figure 1. Assessment item groups**

<table>
<thead>
<tr>
<th>Item group</th>
<th>What children know and are able to do</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Logographic knowledge</td>
<td>Know that people get messages from printed materials</td>
</tr>
<tr>
<td>B Attention to print</td>
<td>Know what print looks like</td>
</tr>
<tr>
<td>C Attention to words</td>
<td>Know that written words are groups of letters, with spaces in between</td>
</tr>
<tr>
<td>D Book orientation</td>
<td>Know that print in books is organised in certain ways</td>
</tr>
<tr>
<td>E Directionality of Text</td>
<td>Know that there are rules about what to attend to first</td>
</tr>
<tr>
<td>F Number identification</td>
<td>Know that numbers are different from letters and they are to do with counting</td>
</tr>
<tr>
<td>G Letter concepts</td>
<td>Know that the same letter can have variations in appearance, yet it always retains its individuality from other letters</td>
</tr>
<tr>
<td>H Punctuation</td>
<td>Know that there are marks in writing which are not letters, but which provide information about the text</td>
</tr>
<tr>
<td>I Print order</td>
<td>Know that, in order to make sense, all components of print must appear in the right order</td>
</tr>
<tr>
<td>J Attention to sounds</td>
<td>Know that words are made up of a series of sounds, and these can be represented by letters or groups of letters</td>
</tr>
<tr>
<td>K Letter knowledge</td>
<td>Know that letters have names, which always stay the same; they represent sounds, but sometimes these change</td>
</tr>
<tr>
<td>L Writing</td>
<td>Are able to write and spell in conventional ways</td>
</tr>
<tr>
<td>M Reading</td>
<td>Are able to read independently and accurately</td>
</tr>
<tr>
<td>N Retelling</td>
<td>Are able to retell orally a written story read with an adult</td>
</tr>
</tbody>
</table>

Third, to explore what profiles of performance may be distinguished among the 100 children in the study, a hierarchical cluster analysis was conducted. The cluster analysis identified five groups of children with profiles of similar performance. There were statistically significant differences between clusters for all literacy item groups.

**Cluster 1:** Children with a consistent profile of above average performance, rising over time. In 1996, about a quarter (24%) of the children in the study had already achieved a profile of above average performance all item groups. By 1997, the relative advantage of these children had increased, especially in independent reading, writing and retelling (mean z-score +0.9 to +1.2 SD).

**Cluster 2:** Children with a consistent profile of average performance. About a third of the children (32%) in the study made consistent, average progress on all item groups. In 1996 and 1997, none of the scores of this group of these children on any items strayed far from the average (mean z-scores ±0.5 SD).

**Cluster 3:** Children with an inconsistent profile of about average performance. A small group of children (22%) moved from an average performance on all item groups in 1996 to an inconsistent profile of performance in 1997. The 1996 scores of these children were similar to the scores of children in Cluster 2 (mean z-scores ±0.5 SD). In 1997, their scores rose on print order, attention to sound and letter knowledge. Their letter
knowledge score was particularly high (+1 SD) in 1997, but their reading, writing and retelling scores fell below the mean.

**Cluster 4:** Children with an even profile of below average performance, declining over time. A small group of students (10%) shared a common profile of poor performance in 1996. In 1997, their absolute performance increased, but their relative performance decreased. The mean z-scores of children in this group fell on most item groups, but among the most dramatic deterioration was in reading (from -0.5 SD to -1.2 SD) and writing (from -1.2 SD to -1.7 SD).

**Cluster 5:** Children with an uneven profile of below average performance, declining over time. The scores of the small group of children (7%) in Cluster 5 were more varied in 1996 than those of children in Cluster 4. Their 1996 scores on logographic knowledge, attention to print and book knowledge were slightly above average and their scores for letter knowledge, attention to sound and punctuation were below average. In 1997, more of their scores were below average, but their relative performance was inconsistent. Scores fell for attention to print, directionality, letter concepts, reading and writing, but their attention to sound was scored as well above average.

The cluster analysis supports the argument that young children learn literacy in a range of paces and patterns. This conclusion is somewhat at odds with the developmental view implicit in contemporary curriculum documents such as the First Steps developmental continua and the various state versions of the National Statements and Profiles. Differences in pace of learning, such as those shown in clusters with even and rising performance (Cluster 1), or even performance falling in relation to other children (Cluster 4), may be accommodated in a developmental view of learning. These children can be thought of as making slow or fast progress along the same developmental path as the average performing children in Cluster 2. Children in Clusters 3 and 5, however, appear to following different sequences in their leaning. A number of questions arise. Can their differences be explained away by reference to the particular teaching strategies their teachers used? Or are there differences in family circumstances, culture or literacy experience that explain the patterns of similarity and difference shown in these clusters of children?

Differences in performance among clusters appear to have been produced through the interaction of many factors. Recent Australian studies of primary school children’s literacy, such as the National School English Literacy Survey (Masters & Forster, 1997) and the Victorian Quality Schools Project (Hill, Holmes-Smith & Rowe, 1993), have distinguished between student, teacher and school factors in explaining differences in literacy performance. Student factors include age, gender, social class, home language and Aboriginality. Teacher factors include variables such as teachers’ experience or pedagogical style; school factors include variables such as urban, rural or remote location, and qualities of the school culture and leadership.

The differences in student characteristics seem to have contributed in some degree to the cluster in which children were grouped. Age differences might explain the superiority of Cluster 1 children’s performance. On average, they were three and a half months older than the children in Cluster 2, five months older than the children in Cluster 4 and six months older than the children in Clusters 3 and 5 were. But age differences do not explain differences in performance among the similar aged groups of children in Clusters 2, 3, 4 or 5.
Gender differences frequently contribute to differences in performance, but a one-way analysis of variance found no significant gender difference in the performance of the clusters in this study (p<0.05). Social class differences may have contributed to the relatively high performance of children from Hillview, most of whom are in the above average performing group in Cluster 1 or the average group in Cluster 2. However, the influence of social class on membership of Clusters 3, 4 and 5 is much less clear. There are some children from all schools in these three clusters of relatively poor performing students.

Differences in home languages are frequently associated with lower performance in school literacy assessments. Children from Riverside and The Wattles – where the language variation was greatest – were mainly in Cluster 3; a cluster characterised by inconsistent but near average performance.

Cultural differences between home and school may have contributed to the cluster location of the four Aboriginal children from Gibbs Crossing; two of them were in the poor performing Cluster 4 and the scores of another two failed to cluster with the scores of any other children in the study. Children’s home circumstances also appear to have contributed to some differences in performance. Three of the case study children who were in the low performing Cluster 4 missed significant periods of school through lateness, absenteeism or transience. For several other case study children in this cluster, low literacy performance reflected significant difficulty in meeting school expectations about classroom participation and may have been related to difficulties the children were experiencing in their home life.

Teacher- and school-level factors may also have contributed to the cluster in which children were grouped. In Australia, rural location has sometimes been associated with slightly poorer performance, and remote location has frequently been associated with very poor performance. In this study, children from the remote school were located in average or below average clusters, or were not allocated to clusters. Children from the rural school, Sweetwater, were predominantly located in the average or above average performing clusters. This result may have reflected the social class and expectations of parents more than the rural location of the school. The evidence on the impact of teachers’ pedagogical preferences is mixed and – like most of the other factors – conflated with a range of potential causes. Children from Hillview were mostly in the average or above average performing clusters, and they had experienced more explicit teaching of letter names and sounds than other children in the study. Most of the children from Sweetwater were in Cluster 2. What these children had in common pedagogically was teachers working from the Keys to Life program. Most of the children from The Wattles and Riverside were in Cluster 3. The children from these two schools had several things in common: the school-level factor of reception classes with several adults and about fifty children, relatively high proportions of children from families eligible for school cards, and relatively high proportions of children whose home language was not English.

**Questioning literacy development**

The cluster analysis of literacy assessment data opened up some questions about the uniformity of students’ literacy development. To explore some of the differences we
referred to two case studies from the Wattles site in South Australia. These case studies concerned children known by the code names of 'Pete' and 'Christianne'.

Pete

Pete is the middle child in the family with a younger and an older sister. Pete's mother, at the time of the study was a student working part time on a Diploma in Counseling. Pete's father, a fitter and turner by trade, was involved in an accident at work and was home on workcover insurance until his shoulder recovered. Pete's extended family is large, on his mother's side -- there are uncles, aunts and grandparents, living in the same suburb. Pete's father's family lives in Queensland and he has not had much contact with them since he left home at 13 years of age.

Pete's Dad liked building model Harley Davidson bikes and was drawing a mural of a large motor bike on Pete's bedroom wall. They both loved racing fast cars, going to the drag racing and both had motor bikes for 'bush bashing'. Pete rode his motor bike over the nearby paddocks near his house. Pete and his Dad watched lots of television, sports and the Foxtel discovery channel. They had computer games like Nintendo and played these games together.

Pete, at home, was constructed by his family as a boy who liked cars, bikes and toy soldiers and he was encouraged to play outside on his bike and inside in his room with his army men. When he watched his dad make motor bike models or work on the mural in his room, the interactions were demonstrations, not verbal instructions. Pete's dad said he showed Pete how to do things, whether it's drawing or making models of motor bikes. Pete's mum said that Pete has a mind of his own and if you could show him, not tell him what you were trying to say, then he was happy.

The parents did not believe they had a strong tutoring role in this learning: they provided the experiences on which the child drew and they rewarded signs of their successfully coming to know. The parents had a view of 'Let them be kids while they can' and being a kid meant playing outside with wheel toys, or inside playing with computer games or watching TV. Pete's parents claimed that children learned through experience and it didn't matter how much you tell them they had to learn through their mistakes.

Pete attended many family gatherings, barbecues and birthday parties and lots of family stories were told. One family story was about how Pete set fire to his bed when he was playing with a cigarette lighter. The whole house burnt down and the family lost everything, but what was important was that no-one was hurt.

At preschool

Pete attended the Wattles pre-school for two days of the week and took part in an individualised, child-centred curriculum. There was child choice of the range of activities and lots of enjoyable immersion in books, songs and poems, but literacy may have occurred in one or two of the ten activities offered to the students. At this age, Pete did not appear to see many purposes for literacy other than writing and reading his name on his possessions and being entertained by the illustrations in a picture book.
At school

Pete found the transition to school easy because the pre-school and his classroom were on the same site. However, the organisation of time, space and the content of the curriculum were different in school. Time was organised into lesson blocks of twenty to thirty minutes, and instead of a half-day, school went until approximately 3.00pm. The space in the classroom was taken up with tables and chairs and there were few spaces for play or construction. In school, formal literacy instruction began with small groups learning to read caption books and learning the alphabetic principle of letter-sound relationships. The small reading books were taken home to be read to parents (and had to be remembered and brought back each day); there were handwriting lessons, phonics lessons, mathematics, science and more.

Pete brought lots of oral language context to what he read and wrote. When reading unfamiliar decontextualised school literacy, he did not attend to print and instead liked to make up stories. Perhaps school literacy in reading books was too decontextualised for Pete? Perhaps his reading was an attempt to provide the ‘conversational context’ (Snow, 1983) he suspected he was missing, as the following transcript of Pete’s reading and a retelling of a story reveal.

The text: Pete read:
Here is the checkout. Then she went to the counter and she
Here is the bill! showed the man who gave her money.

Pete’s retelling:
Bernie wiggled it that way and that way and it couldn’t it, didn’t come out.
Mum was gonna pull it out with the clicker, but it didn’t come out.
Dad strangled, got his legs and picked it up and it didn’t come out.
Brother roped it up to his teeth and he put the rope on the door
and it didn’t fall out.
He brushed his teeth, it came out and he wiggled it
he brushed his teeth he wiggled he brushed it that way and that way.
He showed Mum and Dad and his brother and he said, “It came out!”

Pete’s retelling of The Lost Tooth, September 1998.

Literacy learning

Assessment after eight months in school showed that Pete had learnt a lot about letters and sounds; he told stories, recreated stories from the illustrations and had a good memory for narrative. He demonstrated that he knew lots about individual parts of the code, but not how to get it all together to make sense. The concept of a neat continuous, linear sequential development in every aspect of literacy was not apparent in Pete’s beginning to read and write. At home and at school Pete had a positive view of himself as a learner and said with bravado, that learning was easy. This view was not shared by his teacher who said he worked at it, but ‘just didn’t get it’. Figure 2 provides a profile of Pete’s literacy learning.
Literacy development in the first year of schooling

Associate Professor Susan Hill and Associate Professor Bill Louden

Figure 2. Pete’s literacy learning profile

Literacy learning for all students may not proceed smoothly and without tension. Power and identity issues are constantly negotiated with every literacy transaction as a moment of self-definition in which people take action within and upon their relations with others. As Solsken (1993) in her study of gender and literacy points out, if literacy is perceived at home and at school as female behaviour this can lead to rebellion against print, mothers and sisters. Literacy is not just a school event, it is embedded within family relations and Pete, a boy with an older and younger sister, perhaps saw literacy a bit like being captured and held in alien gender country.

Christianne

Christianne was 4.9 years old when this case study began and according to her mother, a teacher, she was reading and writing from about 3.0 years of age. Christianne was selected as a focus child because her grandmother, Yaya, who is literate in Greek, not English, cared for Christianne from three months of age. Yaya said:

She likes to be the teacher. When all the kids get together she plays with them in the spare room. Sometimes she puts her dolls out and she is the teacher. She gets paper and writes. I’ve got the books from my son in the drawers and she opens them. She always wants books, books, books to read. But her brother is different. He sits there and watches TV and then plays with toys.
Yaya lived near the school that had a high proportion of low income families, however, Christianne’s family were mid to high income and both parents worked as professionals. Yaya was concerned about not being able to read and write English and said:

I was very sad yesterday because Christianne asked me to spell dog and cat, and I said to her mother I couldn’t tell her. My daughter says d-o-g is dog, Mum. But it’s very hard for me. I speak in Greek, but she answers in English. I transfer all the songs into Greek like Father Christmas comes to town and Jingle Bells and Twinkle Twinkle Little Stars and she sings them.

At about three years of age, Christianne convinced her mother to teach her how to read and write. She chased her mother around the kitchen asking her how to write words like ball and cat and they played ‘I spy’ in the car traveling twenty or so minutes to Yaya’s house and returning home each evening. Christianne’s mother taught her the ‘at’ words and how to use analogy to figure out new words.

Christianne constructed written recounts of family events well before school and was drawing and making cards and letters for friends who lived nearby. Christianne’s mother said that she did not push her and it seemed to occur naturally, and she really only remembered formally teaching Christianne how to write her name because it has eleven letters. Her mother’s method of teaching was a conversations used to build ‘shared histories’ between mother and child (Snow, 1983:185). Here, the mother asks the child questions about past shared events and thus provides help in recounting and building internal representations of those events. This constructed, shared history often follows rules which are similar to a well-written paragraph.

Home was set up for Christianne to acquire a range of literate practices. Her bedroom had books, papers and pencils similar to school. She had several alphabet friezes on the walls and alphabet books and phonics cards. She often played school with her brother, taking on the teacher role.

Christianne spent much of her time coercing her mother, to teach her to write and read. She played at being a teacher, wrote to friends and she engaged in similar activities at the pre-school, which she attended for four sessions of an approximate total of twelve hours each week, and the rest of the day she was at home with Yaya.

At preschool

At the pre-school, Christianne moved about confidently, choosing to write and read rather than play with sand, paint or other construction materials. She regularly requested information and assistance from adults in a self assured manner. This manner is described by Goodnow, (1990, quoting Bourdieu, 1979), as an expression of one’s relationship to the social world where ‘one’s proper place in it is never more clearly expressed than in the space and time one feels entitled to take from others... in the space one claims with one’s body... through bearing and gestures... through the interaction time one appropriates and the self assured or aggressive, careless or unconscious way one appropriates it’ (p. 474).

Christianne’s prior to school experiences allowed her to move between different social spaces modifying her interactions as she went. With her grandmother, she and her
brother were indulged, read to, and they heard of how well they were doing, and would do in the future, and how clever they were whenever they were writing, reading and talking in English. Christianne probably felt very powerful, clever and superior about being able to read and write in English for Yaya.

When Christianne was with her mother she changed (according to the teacher). Christianne argued about the truth and accuracy of events; she debated and tried to persuade her mother to buy things, and tried to convince her mother to do what she wanted, but her mother was not as easy to manipulate as Yaya. Christianne argued with her brother often trying to place him in the role of student as she played school teacher. He resisted the student role and was very uncontrollable which made Christianne cross and she had to draw on different strategies to try to control him.

**Christanne at school**

When Christianne went to school, she was a model, neat, hard working student. She sat attentively, asked questions, read quietly and was independent and self reliant. At the end of the first year of school, she always chose to sit next to older girls, and spent time watching and learning from them. The notion of habitus, combined with social capital brought to the pre-school and school, meant that Christianne became known by the teachers as a bright student.

Christanne knew about the school discourse from her teacher mother. She was familiar with the IRE sequences, initiation-reply-evaluation, repeatedly described as the central structural feature of classroom lessons (Heath, 1994). In the IRE, the teacher asks the students questions which have answers prespecified in the teacher's mind. After the student responds the teacher provides feedback usually in the form of an evaluation. Training in the ways of responding to this pattern begins very early in the labeling activities of mainstream parents and children.

Most children from school oriented homes have learned to listen and wait for appropriate cues, which signal their turn to display school knowledge about literacy. They have learnt the rules for getting certain responses from parents (or teachers) in the reading interaction.

For students like Christianne, the pre-school years have enculturated them into the appropriate interactional styles for displaying what they know about literacy. They have learned the behaviour, which displays that they are paying attention to texts, and have learned how to give definitions and explanations. This learning has been fine-tuned and its habits are highly interdependent. The patterns of behaviours learned in one setting reappear again and again, as children like Christianne learn to use oral and written language in literacy events and to bring their knowledge to bear in school-acceptable ways.

**Literacy learning**

Christanne knew how to do school and what behaviours to use in a group in the classroom, and what behaviours to display when doing the literacy assessment tasks. However, her literacy development raises some questions. On the assessment procedures used in the study, Christianne showed uneven development. She knew lots
about letters and sounds, but was not confident when reading simple texts. Figure 3 identifies Christianne’s literacy learning profile.

**Figure 3. Christianne’s literacy learning profile**

![Christianne Z-Scores 1996-97](image)

At a quick and superficial glance, students like Christianne may appear to be performing at quite a sophisticated level. However, careful analysis of their literacy development reveals many uncertainties, as new information is integrated into existing thought patterns. Christianne’s main strategy was spelling out words using the letter sounds. This means that difficult texts, where there is a lot to decode, made little sense to her.

**Research in early literacy**

The research team decided to take a wide view of literacy to avoid the polarization introduced by any attempt to separate out the technical features of literacy, as though the cultural bits can be added later. This wide lens does not deny technical skills or the cognitive aspects of literacy, but rather understands them as they are encapsulated within cultural wholes and within structures of power. In this view, the concept of ‘literacy practices’ refers to both the behaviour and the social and cultural conceptualisations that give meaning to the uses of reading and/or writing (Street, 1995). Literacy practices incorporate not only ‘literacy events’, which are particular activities where literacy has a role, but the general cultural ways of utilizing literacy that people draw on in a literacy event.
Theories are viewed as tools that shed light on different ways to understand literacy. We took the view that no one theory can be all things to all educators and that admitting to holding an incomplete theory of how children learn can promote dynamic, and ongoing inquiry into the wonder and the complexity of how children learn to read and write.

Taking a wide view does not deny the importance of focussing on technical skills or the cognitive aspects of spoken language, but rather understands them as they are encapsulated within cultural wholes. This approach allows for various theories to be used as tools with inherent advantages and disadvantages. This wide view is based on Foucault’s idea that working from one particular theoretical position, with its particular process and discourse is not bad in itself, but that everything is ‘dangerous’ if we cannot think and understand outside the frames and rules of only one discursive position.

Within this wide view, the research team used a range of theoretical tools such as those provided by the theories of Foucault (1972) and critical sociologist Bourdieu (1986) to understand how school literacy is taken up by different groups of young students learning to read and write. Bourdieu, in particular, provided a way to analyse the cultural and social capital children bring to pre-school and school, and what is taken up by the children in different social spaces. In addition, the study had a strong outcomes component and employed a range of assessment procedures from different theoretical position --- reading everyday environmental print (Purcell-Gates, 1996), phonemic awareness (Yopp, 1995) and Concepts About Print (Clay, 1993) --- were used to understand literacy development prior to school and in the first year of school.

Problems with book levels and measuring literacy development

In the project 100 children go to school, book levels were used as one procedure to measure progress. Reading Recovery levels were used based on the Foundations program. Books were ‘leveled’ using features such as text layout, vocabulary, and sentence structure predictability of text and illustrative support.

The advantages of using book levels are to do with students reading complete texts rather than words out of context of individual letters and sounds. There are some cautions about book levels in that there is no agreed interval between the levels (Iversen & Tunmer 1993). For example the difference between level 1 and 2 is not equal to the difference between level 15 and 16.

Another problem has to do with the selection of texts as benchmark books for assessing reading levels. The benchmark books are not previously read by students, and it rests on the judgement of the teacher or researcher as to what books suit particular communities and localities. In addition, there are issues to do with children’s identities and social worlds, and the way the texts relate to children’s experiences.

Innovative assessment procedures
To tackle the issue of how texts related to children’s social worlds, we developed some innovative text procedures that drew on the children’s everyday literacy practices out of school. We used chip packets and tarzos, Coca cola and Toys R Us catalogues, and so on. We found that many items, such as reading page numbers, working out what toys cost, and items similar to the Concepts about Print test by Clay could be gained from using everyday texts.

We can speculate here for a moment about relating assessment to children’s lives. There is one line of thought that environmental print is primarily logographic and contextualised and prompts children to guess at the words, or worse, read words as pictures and not attend to the letters and sounds within words. Another line of thought is that everyday print is literacies from the community and is part of the student’s world and, therefore, is the place to make connections between what the child knows and school literacy. There are excellent programs operating where teachers ask children to bring texts from the community to school. They use these as a resource for building ABC dictionaries, word walls, and books that are made using pictures and print from catalogues and leaflets. There is potential here to do more and not just dismiss everyday print as logographic, but it depends on skilful pedagogy.

One can’t help but think that if the code meaning text types or genres, and text critic resources used by literacy learners are understood by teachers and the community, then designing assessment procedures using everyday texts may be a useful way to proceed.

**Literacy and ‘development’**

The pedagogy in early childhood education has been plagued by myopic psychological theories that propose universal views of how all children at particular ages learn. The developmental psychology perspective draws on the work of Piaget. First, this perspective states that all children move naturally through developmental stages in learning. Second, no stage can be skipped. The process of acquiring oral language occurs within a sequence of stages. Teachers observe and monitor children as they move through these developmental stages. Age related, developmentally appropriate practices guide the curriculum activities. Formal direct instruction, particularly the teaching of skills, is seen as inappropriate for young children, as they must be encouraged to create their own conceptual frameworks for how language works.

This perspective discourages teacher-directed large group instruction, preferring child initiated play or activity-based settings. The developmental principles reinforce the belief that generic patterns of language learning can be expected from all children, regardless of their sociocultural experiences. If there is a deviation from the series of cognitive developmental stages, this is seen as a deficit. Learning happens best through active and meaningful engagement.

Developmental psychology works to produce a set of practices where the teacher observes the child for ‘normal’ development through ages and stages. Walkerdine (1984) suggests such practices are normalising in that they constitute a mode of observation and surveillance, and a particular construction of children. The great diversity amongst children is discounted while a narrow band of behaviours is searched for and monitored. Walkerdine writes of how teachers monitored the child for normal development:
The observation and monitoring of child development became a pedagogy in its own right because those understandings taken to underlie the acquisition of knowledge were presumed to be based on a ‘natural’ foundation. The new notion of individualized pedagogy depended absolutely on the possibility of the observation and classification of normal development and the use of spontaneous learning (1984:177).

The discourse of developmental psychology has so dominated our experiences that we talk about ourselves and others as slow, advanced, mature, weak in a particular domain, or ready for a particular experience (Cannella 1997). As Cannella warns, the surveillance, measurement of what is judged as normal, and comparison of children (and other human beings) creates the conditions for social control, adult over child, middle-class over the poor, and man over woman. It is difficult to conceive of these practices as any kind of pedagogy that could potentially ‘liberate’ children or celebrate diversity and difference. Developmental psychology can prompt teachers to focus on what children need to do next, rather than what children can do in different contexts. In this way, it can lead us to underestimate and miss out on what different children can do in a variety of situations.

**New models to describe development**

We need new models to describe literacy development. Table 3 allows us to consider the three views of development in literacy — individual, adult-guided and dynamic.

**Table 3. World views of development in literacy**

<table>
<thead>
<tr>
<th></th>
<th>Individual development</th>
<th>Adult-guided development</th>
<th>Dynamic development</th>
</tr>
</thead>
<tbody>
<tr>
<td>'Teachers' worldview</td>
<td>The world is experienced in the same way by each person. Existing knowledge has to be uncovered by each individual.</td>
<td>There is a firm fixed adult view of how the world works for everyone in it.</td>
<td>The world is not experienced in the same way by each person. The world is constantly changing and being recreated.</td>
</tr>
<tr>
<td>Learners</td>
<td>Individual learners must actively construct knowledge.</td>
<td>Learners are apprenticed into existing knowledge.</td>
<td>Teachers and learners are active contributors to evolving knowledge.</td>
</tr>
<tr>
<td>Pedagogy</td>
<td>The teacher immerses children in literature and encourages exploration.</td>
<td>Teachers and older students are experts and guide children who are novices.</td>
<td>The teacher connects the learner’s worlds to school literacies.</td>
</tr>
<tr>
<td>The texts</td>
<td>Texts are for individuals to explore and uncover how</td>
<td>Texts guide students into an adult view of the world.</td>
<td>Written texts are worlds held still for joint reconsideration.</td>
</tr>
</tbody>
</table>
In the individual development view, the child is seen as an inventor of pre-existing knowledge (Piaget, 1955). The peer culture and social world are not emphasized, because children are viewed to move along a predictable and sequential linear pathway of individual development.

In the adult-guided view of development, children are apprenticed into literacy (Vygotsky, 1978; 1987; Rogoff, 1990). In this view, each child functions at a particular level independently and has the potential to attain a higher level with guidance from an adult or a more capable peer(s). The difference between these two levels is called the ‘zone of proximal development’. The more capable partner provides skills and understandings during joint problem solving that are within the child's zone of proximal development, and most importantly, the problem solving would not be present for the child without the social interaction. In this way the zone of proximal development is deeply contextualized and it does not exist independently of the actual interaction process (Tudge, 1992).

In an adult-guided view, children who interact only with adults usually progress developmentally in ways that are consistent with the adult culture. Even when children work with peers on tightly structured tasks, the partners adapt to each other and share purposes and meanings that they would not have created on their own. This approach does not consider the hierarchical and contested nature of power between different groups of people.

In the third view, development is viewed as dynamic. Learners undergo periods of stability, then change occurs and learners reorganise and transform their thinking. We need a dynamic view of learning to explain how novelty occurs, how children think thoughts never thought before and, to explain change and sudden acceleration in reading and writing.

In a dynamic view of development, there are multiple and continuous interactions at all levels of the system from the smallest cell to the wider culture. A dynamic view shifts the focus from a simplistic ‘A causes B’ to focus on how a whole system works, or how a particular child in a particular context is learning. In a dynamic view, ‘[a]ctions done in this moment, in turn, set the stage for behaviours in the next second, minute, week and year ‘(Thelan and Smith 1998: 625).

A dynamic view of development is important because it moves thinking along from ‘either-or’ opposing views such as nature versus nurture, learning versus maturation, continuity versus discontinuity, structure versus process. Only a framework of dynamics can erase the either-or dualities and shift the focus to how development occurs. In a dynamic view of literacy development, the focuses shifts to how learners change and how readers and writers problem-solve with text.

Reading and writing are a joint production of the child and the cultural agenda of the society. There are life long possibilities of change, multiple non-linear developmental pathways, and the emergence of new thinking and new forms of literacy. In a dynamic view, children who follow different pathways may reach similar outcomes. At the same time, very small differences in the beginning of learning to read and write can lead to widely different outcomes.
Using everyday texts

Drawing on the work of Louis Moll and his colleagues (1992), this study drew our attention to the fact that pre-schools and schools in the five sites were surprisingly similar, and the pedagogy was surprisingly the same, whether middle-class Perth or rural Victoria. We wonder why literacy curriculum development does not respond to the literacies in local communities.

Our experience supports the findings reported by Freebody and Ludwig (1995), and also those of McCarthy (1997), who conducted a study with a similar mediation between home and school to the one we had planned. McCarthy (p. 145) notes that school literacy curriculum is more congruent with the literacy experiences of children from middle-class homes than for other children, and that teachers tended to have more pedagogically-useful information about these students than others because of this. Teachers’ own middle-class backgrounds, and what has been produced in equity discourses as a need to treat all students ‘equally’, is another problem for students whose home literacy experience is not ‘equal’ to the middle-class norm of school. Furthermore, and in accordance with other researchers (Christie, 1990) found that many teachers assume that students can make the connections between home and school on their own.

Teachers and researchers need to learn more about how children live in homes and communities. We don’t know enough about the complexity of networks which support families with minimal economic resources, their sophisticated multilingual and/ or multi-modal language use and production, their multiple responsibilities for siblings and elders, the independent negotiation of service encounters, their encyclopaedic knowledge of television and popular culture, and so on.

Our research points to a need to develop conceptual tools for explaining children's lifeworlds. This includes their cultural, linguistic and material resources; their families and households; and the reality of their daily lives without simultaneously assigning them to static categories, or unwittingly attributing deficit associations that accompany membership in particular disadvantaged groups.

For teachers to better understand (1) the complexities of early literacy development (2) children’s lifeworlds and (3) how best to help children achieve their goals in literacy, they require additional professional support, and time allocated for understanding children’s lifeworlds, more culturally relevant resources, and reduced class sizes. These factors are particularly important in communities marked by poverty and other forms of social and material inequities. However, given that, as all teachers are increasingly likely to teach in diverse communities, then all teachers need to reconsider their practices as ‘community’ practices with specific and often differential effects on different groups of children. Rather than ‘outsiders’ to school communities, teachers are key mediators of wider social values, goods and practices. The complexity and significance of their work requires increased public support in order to enhance their community standing.

Summary

In summary, this study explores the connections and disconnections among three distinct social spaces through which young children move -- home, pre-school and school. The
connections and disconnections children make between home and school are linked to the repertoires and knowledge children already have. The case studies suggest that success in playing the institutional game of schooling is contingent upon students using the social and cultural capital they have acquired from home, and also upon teachers’ ways of building on children’s different resources. Rather than children’s success with literacy being contingent on what children already have experienced prior to schooling, the research team strongly endorses culturally inclusive curriculum and pedagogy. Therefore, the research team advocates a review of current literacy curriculum and pedagogy to examine school practices in terms of cultural inclusivity.
References


Key features of a whole-school, design approach to literacy teaching in schools

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Introduction

Over the past four years, we have been involved in two large-scale, longitudinal projects undertaken in partnership with the Department of Education and the Catholic Education Office in Victoria. The aim of both projects has been to refine, implement and evaluate a whole-school, design approach to improving early literacy outcomes. The schools we have worked with have comprised schools serving mainly students from educationally disadvantaged backgrounds. In this paper, we describe the two projects, outline the main features of the approach that we have refined within the these projects and present data indicating the results achieved in the project schools.

The Early Literacy Research Project (ELRP) was a joint initiative with the Victorian Department of Education. The project was initiated towards the end of 1995 to develop a system-wide approach to maximising the literacy achievements of ‘at risk’ students in the early years of schooling (ages 5-8). It involved the refinement, implementation and quasi-experimental evaluation of a whole-school design. The project formally ran for three years (1996-98) with data collected at the beginning and end of each school year in 27 trial schools and 25 reference schools. Intensive professional development was undertaken in each of the 27 trial schools. Findings from the project (Crévola & Hill, 1998a) have been used as the basis for the Department of Education’s Early Years Literacy Program materials and support program for schools (Department of Education, 1997). They were also instrumental in securing additional resources which were made available to all government primary schools at the beginning of 1999 to enable them to implement key components of the design.

The Children’s Literacy Success Strategy, or ClaSS, is a joint initiative of the Catholic Education Office in Melbourne. This project is being supported with funding from the Commonwealth Government through its literacy strategy. ClaSS is the acronym chosen to refer to a systemic approach to maximising the literacy achievements of all children in the first three years of primary schooling (Years P-2), but especially of those children who are at risk of not achieving success. ClaSS builds on work undertaken within the Early Literacy Research Project and is documented in Crévola and Hill (1998b). The project commenced in 1998 with an intake of 39 schools. In 1999, a further 90 schools joined the project.

The significance of a whole-school, design approach

The starting point for our thinking about effective teaching and learning in schools has been a belief in the importance of pursuing a coherent, whole-school approach. Research into school and classroom effectiveness tells us that while there is significant variation among schools in the progress made by students, this variability is not as great as the differences among classes within schools (Monk, 1992; Scheerens, Vermueun & Pelgrum, 1989). Our own research confirms these findings and indicates that while in most schools there are classes in which students make very
rapid progress, there are other classes in which students make little or no progress at all (Hill & Rowe, 1996). If this internal variation could be minimised and all classes brought up to the level of the most effective, dramatic improvements in outcomes could be achieved.

What are the main characteristics of effective teaching? Reviews of many thousands of studies point to a small number of factors as being important. Scheerens and Bosker (1997) conclude on the basis of meta-analyses of findings and best-evidence syntheses that the basic factors are: time on task; closeness of content covered to assessment instrument; a structured approach: specific objectives, frequent assessment and corrective feedback; and types of adaptive instruction that can be managed by teachers (e.g. no more than two within-class ability groups per classroom). We have argued, on the basis of the same evidence, that the literature on effectiveness supports just three factors which closely resemble the four factors of Scheerens and Bosker, namely: high expectations of student achievement; engaged learning time, and focused teaching that maximises learning within each student’s ‘zone of proximal development’ (Vygotsky, 1978).

Using these three factors as a starting point, we have then proceeded to identify the key elements of a school that facilitate effective teaching and to work out how each of these elements should be designed so that they operate effectively and in alignment with each of the other elements. The end result has been what we refer to as a whole-school design. School designs are quite new within the Australian context, although they have become very significant in the USA, particularly in the wake of the work undertaken by the New American School Development Corporation (NASDEC) (Stringfield, Ross & Smith, 1996). At the same time, the details of each design element in our early literacy design are not new at all, but build upon existing good practice. The ‘newness’, as we have articulated elsewhere (Hill & Crévola, 1999) is in:

- the degree of focus and commitment to the goal of meeting challenging performance targets that embody defined standards of performance;
- the coherence and depth of the beliefs and understandings that underpin every element of the design; and
- the rigor and sophistication with which each design element is examined, redesigned and managed to ensure that targets for success are achieved.

Figure 1 summarises in graphical form the general design elements that we have built into our design for early literacy. The following summary of each of the design elements is an abbreviated version of the description given in Crévola and Hill (1998b).

-beliefs and understandings The central element in the design is the set of shared beliefs and understandings of both staff and students. It is important, for example, that there is a belief in the capacity of all students to achieve high standards given sufficient time and support (Heady & Kilgore, 1996). Our experience has indicated that much work has been necessary in most schools to change thinking away from an assumption that many students are incapable, because of background and other
circumstances, of being successful at school. It is also necessary for teachers to have a belief in their own efficacy (Ashton & Webb, 1986; Lee, Dedrick & Smith, 1991; Rosenholz, 1989) and for school administrators to believe that almost all teachers can teach to high standards given the right conditions and assistance. This implies that principals and the school leadership team accept the need for invest in professional development and in providing the conditions under which teachers can seek to continuously improve their classroom teaching.

Beliefs that enable effective teaching to occur need to be accompanied by expert knowledge. Effective teachers are professionals who are able to articulate what they do and why they teach the way they do. That is, they need to be theory-based rather than trade-based in their orientation to teaching.

**Standards and targets**

Typically in curriculum documents one finds detailed information about the kinds of content to be covered and the stage of schooling in which the material is to be covered. This content is typically expressed in the form of statements of expected student outcomes which provide a general indication of the kinds of things students should be able to do. We have found it helpful to go a stage further, to develop performance standards and associated targets. A couple of examples readily indicate the difference between statements of expected student outcomes and performance standards and associated targets. The draft version of the *Curriculum and standards framework II* (Board of Studies, 1999: 111) contains the following statements of expected student outcomes:

2.5(a) Read short texts with familiar topics and vocabulary, predictable text structures and frequent illustrations.

Compare this with the following Minimum Statewide Standards for Reading established by the Department of Education, Victoria as part of its Keys to Life Early Literacy program:

80% of students (deemed as capable) reading unseen texts with a minimum 90% accuracy at or above Reading Recovery level one by the end of their first year of schooling.

100% of students (deemed as capable) reading unseen texts with a minimum 90% accuracy at or above Reading Recovery level five by the end of their second year of schooling.

Within the ELRP and CLaSS projects, we have developed and worked with the performance standards and targets as set out in Table 1. While these have provided an overall framework for the project schools, they do, of course, need to be translated into specific targets for individual schools and indeed for individual students.

**Monitoring and assessment**

Assessment is critical in monitoring progress towards meeting defined targets, but it is even more important as a means of establishing starting points for teaching and
learning. Within both the ELRP and CLaSS projects, extensive assessment has been conducted at the beginning and end of each school year using a series of teacher observation measures, including the six the measures comprising An Observation Survey of Early Literacy Achievement (Clay, 1993a) and the The Record of Oral Language: Biks and Gutches (Clay, Gill, Glynn, McNaughton & Salmon, 1983). These measures were selected for the diagnostic information that they provide, their capacity to reveal students’ strengths and weaknesses and to suggest foci for classroom teaching.

**Classroom teaching strategies**

Effective teaching is structured and focused on the learning needs of each student in the class. This is by no means an easy task. It constitutes one of the greatest challenges faced by teachers, particularly given the wide range of abilities within the typical classroom. Focused literacy teaching requires well-developed understandings of how children learn and of the reading and writing processes. It requires well-developed classroom routines and expert organisation and management related to the teaching of small groups. It also requires teachers who are adept in implementing a range of classroom practices and strategies in response to the needs of individual students.

In the ELRP and CLaSS projects, the emphasis has been on raising the professional competence of teachers so that they are better able to implement effective classroom literacy strategies that are both structured and focused on the learning needs of all students. These strategies are not unknown to many teachers. Particularly through programs such as the Early Literacy In-Service Course (ELIC), a high proportion of Australian teachers have long been familiar with them. ELIC drew upon good first teaching practices that have been widespread in New Zealand classrooms over the past twenty years and that were credited with leading to that country’s pre-eminent ranking in international surveys of reading. These practices incorporate a number of strategies that have been carefully researched and documented (Clay, 1991; Department of Education, New Zealand, 1985; Holdaway, 1979) and continue to be a rich resource to the present day.

In the Victorian context, these teaching strategies have been adopted by many teachers, often in a partial and ad hoc manner without the necessary organisational procedures in place to enable them to be maximally effective. In professional development sessions organised for project schools, the emphasis has been on assisting teachers to combine the following strategies within a daily two-hour literacy block:

- Oral Language
- Reading to children
- Language experience (reading)
- Shared reading
- Guided reading
- Independent reading
- Modelled writing
- Shared writing
- Language experience (writing)
- Interactive writing
- Guided writing
- Independent writing
The structure of the two-hour literacy teaching block is shown in Figure 2. It is within this three-part, whole-class, small-group, whole-class structure that each of the above strategies have been integrated into effective classroom practice.

[Insert Figure 2 about here]

**Professional learning teams**

In order to impact on teachers’ beliefs and understandings and to establish a process for institutionalising a whole-school design approach to early literacy, it has been necessary to consider carefully what constitutes an effective approach to professional development. While the model has varied slightly between the two projects, the following have been common to both. Teachers in the early years have been formed into teams and these teams have attended off-site university-based professional development sessions. The main purpose of these sessions has been to provide the impetus for further thought and discussion. They have been complemented by on-site professional development which has taken place daily within the context of the school. A team co-ordinator has been appointed at each school with a significant time allocation to the role. The co-ordinator has acted as a mentor and lead learner and has organised visits to teams in other schools, demonstration teaching, and classroom observation. The co-ordinator also chairs weekly professional learning team meetings.

The team is the main vehicle for growing professionally. Team members take joint responsibility for all students supervised by all team members and also assume responsibility for each other’s professional growth. The professional learning team is the key strategy for bringing all classes up to the level of the most effective class and for then moving on to become even more effective.

**School and class organisation**

In order for classroom teaching to be effective, key aspects of how the school operates require careful consideration. Thus, attention has been given in systematic ways to issues such as the allocation of time, staffing issues, the provision of resources such as the availability of multiple copies of student texts, class sizes, and so on. Considerable work has been necessary to establish school-level policies to eliminate unnecessary interruptions and to establish classroom routines that minimise disruptions. The latter have involved daily use of within-class mixed ability groups and the aforementioned use of instructional blocks organised according to a whole class/ small group/ whole class structure.

**Intervention and special assistance**

Even with the best teaching, experience indicates that many students will need extra time and support if they are to reach minimum standards. Research indicates that for those students who are most at risk, one-to-one intervention is likely to be the most effective (Wasik & Slavin, 1993). In this context, in both projects Reading Recovery has been used as a mandatory element in each of the project schools to provide an accelerative program for the lowest-achieving students in the second year of schooling (Clay, 1993b). For students who have continued to experience difficulties
beyond their second year, individual learning plans have been developed and ongoing, specialist support has been provided.

Home/school/community partnerships
There is an enormous amount of evidence to indicate that an effective school is one that is proactive and systematic about linking with the home, the previous school, other service providers and the wider community (Cairney, Ruge, Buchanan, Lowe & Munsie, 1995; Epstein, 1991). There is good evidence to indicate that a range of problems such as poor attendance can be tackled successfully when schools are proactive and develop genuine partnerships with the home (Chrispeels, 1996).

In both projects, a critical design feature has been the implementation of training programs for parents and other classroom support personnel to enable them to provide support in the classroom to the teacher, particularly by ensuring on-task behaviour of students working in learning centres thus enabling the teacher to work directly with small groups of students.

Leadership and co-ordination
A critically important understanding to emerge from the two projects has been the importance of investing in professional development for principals to assist them exercise their role as instructional leaders. Whole-school design approaches depend to an extraordinary degree on the leadership provided by the principal and senior administration of the school, since only they are in the position to make sure that each of the design elements is attended to and brought into alignment. On a day-to-day basis, a great deal of vital leadership is exercised by the co-ordinators, whose role was discussed earlier. Teachers selected for this role need professional development that goes beyond gaining a better understanding of literacy and classroom teaching and includes training in being a coach, a mentor and a lead learner.

Evidence of the impact of adopting a whole-school design approach
Two kinds of analyses have been undertaken to evaluate the effectiveness of the designs in both the ELRP and CLaSS projects. The first had focused on the extent of the improvement in the proportions of students meeting the minimum and target standards as set out in Table 1. Figures 3 and 4 summarise relevant information for the ELRP. Figure 3 compares the performance of Year Prep students in the reference schools at the end of 1996 with the performance of Year Prep students in the trial schools at the end of 1998. This comparison assumes that the abilities of students in trial and reference schools are comparable, which is a valid assumption the reference schools were carefully matched with the trial schools using the Department of Education, Victoria’s, six-indicator measure of social and educational disadvantage known as the Student Learning Needs (SLN) Index.

The change from less than half of students underway (level one) to almost three-quarters of students underway represents a substantial improvement. Furthermore, the improvement is reflected in the proportions of students performing at higher levels, particularly the proportion reaching level five. At the same time, it is evident that
even given the high degree of support provided through the ELRP over three years, the trial schools as a whole were unable to improve literacy levels sufficiently to reach the State-wide Minimum Acceptable Standard of 80% of students (deemed as capable) reading unseen texts with 90% accuracy at or above Reading Recovery level one by the end of their first year of schooling. This indicates that while the State-wide Minimum Acceptable Standard is likely to be well within the reach of most primary schools, it represents a very ambitious target for the most disadvantaged primary schools.

Figure 4 presents comparative data for Year 1 students. Once again, the improvement in the proportions meeting the targets are substantial, but the trial schools nonetheless fell short of both the project targets and the State-wide Minimum Acceptable Standard of 100% of students (deemed as capable) reading unseen texts with 90% accuracy at or above Reading Recovery level five by the end of their second year of schooling. Once again, this suggests the need for targets that are specific to and tailored to the demographic characteristics of the students in individual schools.

The second kind of analysis has involved multilevel modeling of the pre- and post-test data from both the trial schools in both projects and a control or reference group of schools. This was undertaken to estimate an effect size for the design in both projects. The results are summarised in Table 2. The first row of the table indicates the sample of schools involved in the analysis of the data for Year 1 students in each project. In the case of the CLaSS project, pre- and post-test data were available from the great majority of Catholic primary schools and so these were used as an unmatched control group. In the case of the ELRP, the reference schools were a matched group of schools.

The remainder of the table gives parameter estimates for a multilevel model that seeks to explain the post-test literacy achievements of students in terms of a number of explanatory variables. The model was estimated using the multilevel modelling software of Rasbash, Goldstein and Woodhouse (1995). The variables used in the two projects differed slightly. In the case of the ELRP, the pre- and post-test measures were composite scores obtained from fitting a one-factor model to ten separate measures of student literacy, namely three of the subtests of the Woodcock Language Proficiency Battery, the six measures comprising the Observation Survey and the record of Oral Language. In the case of the CLaSS project, the pre- and post-test measures were composite scores obtained from fitting a one-factor model to eight separate measures of student literacy, namely the Burt Word Test, the six measures comprising the Observation Survey, and the record of Oral Language.

Different explanatory variables were used to adjust for students background characteristics. It will be noted, however, that by far and away the most important predictor of end-of-year achievement was the students’ achievement levels at the beginning of the year.
In the models fitted to both data sets, the critical explanatory variable is a
dichotomous variable indicating whether the student was in one of the trial schools
implementing the whole-school design approach summarised in Figure 1. In both
cases, parameter estimates are large, positive and statistically significant. The final
row of Table 2 indicates the effect size represented by the parameter estimates, which
were computed using the formula:

\[
\text{Effect Size (Δ) = \frac{\text{dummy coefficient}}{\sigma_e} = \frac{\beta_1}{\sigma_e},}
\]

This yielded almost identical estimates of 0.648 for the ELRP and 0.652 for CLaSS.
An effect size of 0.65 of a standard deviation is typically regarded as a large effect
size and indicates that substantial improvements in literacy outcomes were achieved
in both projects.

Conclusions

The outcomes of the ELRP and CLaSS longitudinal projects indicate that substantial,
measurable improvements in early literacy outcomes can be achieved when schools
adopt a whole-school, design approach. These results have not been achieved through
the implementation of new methods or techniques, since we believe that teachers
already have access to a repertoire of powerful and effective strategies for teaching
students to read. Rather, they have been achieved by attending in a systematic fashion
to all the elements in a school that contribute to improved learning outcomes.

Within the design used in the ELRP and CLaSS projects, probably the most
significant features in promoting change and development have been:

- a two-hour, uninterrupted daily literacy block for all students;
- the setting of rigorous performance standards and associated targets that seek
to have all students performing at a high standard by the end of their second
year of schooling;
- a focus on data-driven instruction with assessment of all students at the
beginning and end of each year on a full range of measures, plus ongoing
monitoring on a regular basis throughout the year;
- the use of Reading Recovery as a one-to-one tutoring program for all students
in Year 1 who are not making adequate progress;
- the appointment and training of an early years literacy co-ordinator with at
least a 0.5 time release in each school.
- ongoing, externally-provided structured professional learning for teams of
teachers to challenge teachers’ thinking, develop their beliefs and
understandings, and help them to understand how they can use a range of
powerful teaching strategies in meeting the needs of the range of students in
their classes;
- on-site professional development through observation, team teaching, weekly
teams meetings and visits, mentoring and coaching as facilitated by the co-
ordinator;
• separate professional development sessions for principals focusing on the principal as an instructional leader and their role in promoting and managing the early literacy program of the school.

Many of these features can be found in most primary schools, but in few schools are all these features in place. We believe the challenge for schools and systems is to ensure that these features become the norm as education systems face the new challenge of high literacy for all.

Authors

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Peter W. Hill is Deputy Dean, Head of the Department of Education Policy and Management, and Professor of Education (Leadership and Management) in the Faculty of Education of The University of Melbourne. He is also Director of the Centre for Applied Educational Research, Chair of the Board of Directors of the Australian Principals Centre and a Trustee of the Washington D.C.-based National Center on Education and the Economy.
The Early Literacy Research Project
Ms Carmel Crévola

References


Table 1. Performance Standards and Associated Targets as used in the ELRP and CLaSS Projects

<table>
<thead>
<tr>
<th></th>
<th>Target %</th>
<th>Minimum Standard</th>
<th>Target Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year P</td>
<td>80%</td>
<td>Level 1 Text</td>
<td>Level 5 Text</td>
</tr>
<tr>
<td>Year 1</td>
<td>98%</td>
<td>Level 15 Text</td>
<td>Level 20 Text</td>
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</tbody>
</table>
### Table 2. Parameter Estimates and Effect Sizes for Two Multilevel Regression Models Fitted to Data for Year 1 Students in the ELRP and CLaSS Projects

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>Parameter</th>
<th>Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed:</strong></td>
<td></td>
<td><strong>Fixed:</strong></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.222*</td>
<td>Intercept</td>
<td>-0.078*</td>
</tr>
<tr>
<td>Gender (female)</td>
<td>0.069</td>
<td>Integration student</td>
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</tr>
<tr>
<td>Educational disadvantage (SLN)</td>
<td>0.003</td>
<td>NESB</td>
<td>0.034*</td>
</tr>
<tr>
<td>Prior achievement (pre-test)</td>
<td>0.881*</td>
<td>Poverty (EMA)</td>
<td>0.024*</td>
</tr>
<tr>
<td>ELRP trial school</td>
<td>0.280*</td>
<td>Prior achievement (pre-test)</td>
<td>0.840*</td>
</tr>
<tr>
<td><strong>Random:</strong></td>
<td></td>
<td><strong>Random:</strong></td>
<td></td>
</tr>
<tr>
<td>School</td>
<td>0.029*</td>
<td>School</td>
<td>0.037*</td>
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<tr>
<td>Class (intercepts)</td>
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<td>Class (intercept)</td>
<td>0.037*</td>
</tr>
<tr>
<td>Class (intercept/slope covariance)</td>
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<td>Class (intercept/slope covariance)</td>
<td>-0.000</td>
</tr>
<tr>
<td>Class (slopes)</td>
<td>0.015*</td>
<td>Class (slopes)</td>
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</tr>
<tr>
<td>Student</td>
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<td>Student</td>
<td>0.208*</td>
</tr>
<tr>
<td><strong>Effect size</strong></td>
<td>0.648</td>
<td><strong>Effect size</strong></td>
<td>0.652</td>
</tr>
</tbody>
</table>

* Statistically significant parameters (95% confidence level)
Figure 1. General design for improving learning outcomes
(Hill & Crévola, 1997)
WHOLE CLASS FOCUS
The daily reading workshop begins with a ‘whole class’ focus which is based on the Shared reading strategy. Shared reading can consist of books, charts, poems, songs etc. The daily writing workshop begins with a 'whole class' focus which consists of either Modelled writing or Shared writing. This element of the classroom program sets the scene for the workshop, providing an initial teaching focus and a specific teaching of the visual information of print, including direct instruction in phonics. This is a teacher-directed time.

SMALL GROUP TEACHING FOCUS
This section of the reading and writing workshop focuses on the explicit teaching of small groups of students. During the reading workshop the strategies of reading to children, language experience and guided reading take place at the same time that learning centres are in operation for the remainder of the class. During the writing workshop the teaching strategies of language experience, interactive writing and guided writing take place while the remainder of the class are engaged in independent writing and various other activities included to extend the students' understandings of grammar and spelling. This is a time for students to take responsibility for large sections of their learning time.

WHOLE CLASS FOCUS: SHARING
This is the concluding section of both the reading and writing workshops and it is a time for reflection when students articulate what they have learnt. During this time the teacher encourages the development of the students’ oral language. This share time draws the workshop to a close and the teacher concludes the formal reading and writing components for the day. This also is a teacher-directed time.

Figure 2. Structure of the daily two-hour literacy teaching block
Figure 3. Comparison of the performance of Year Prep students in reference schools at the end of 1996 with that of Year Prep students in trial schools at the end of 1998
Figure 4. Comparison of the performance of Year 1 students in reference schools at the end of 1996 with that of Year 1 students in trial schools at the end of 1998.
This report summarises the activities, outcomes and recommendations of a small Commonwealth Department of Education, Training and Youth Affairs (DETYA) funded teacher professional development project *Teachers First*. The project delivered a program of professional development, informed by the recommendations of the DETYA research project *Digital Rhetorics*. The project was managed by Primary English Teaching Association with cooperation and assistance from the New South Wales Department of Education and Training (NSWDET). The project commenced in August 1998 and concluded in March 1999.

*Teachers First* trialed a framework for professional learning placing the real work of the teacher, in this case literacy assessment and teaching, at the centre of the project and provided an authentic context for learning about and using Communication Information Technology (CIT) as an enactment medium.

*Teachers First* provided sixteen primary teachers with professional development in the use of CITs, and English literacy assessment. Each teacher used this knowledge to undertake a short term classroom based literacy assessment project. CITs were used to communicate with project leaders and fellow participants, access relevant information and resources from the Internet, and record project work digitally on the *Teachers First* website. These case studies are included with this report and will be available on the PETA website.

**Teachers First Objectives**

- To explore the opportunities afforded by Communication Information Technology as a tool for professional learning for a small group of primary teachers, guided by the ‘Teachers First’ and ‘Workability’ Principles identified in the Children’s Literacy National Projects (CLP), *Digital Rhetorics*.
- To identify a successful framework for using CITs for the delivery of online professional learning to primary teachers.
- To identify appropriate assessment strategies used by primary teachers of year three classrooms and how this information can be used to plan and support year three students achieve identified English Literacy outcomes.
- To promote primary teachers’ awareness of the education networking and information services available on the Education Network Australia Directory.
- To promote Primary Connections online learning facility situated on the PETA website.

1. The Workability Principal as defined in *Digital Rhetorics* refers to the need to analyse the introduction of new technologies into the classroom with respect to expected improvements in teaching and learning and the associated costs of acquisition and introduction.

**Teachers First Deliverables**

- Professional Development to a level of competence and confidence in the use of CITs to enable full participation of those teachers engaged in the project.
- Documentation of Professional Development Materials and Procedures for use when training teachers to use CITs in their own ‘personal work’, in this case English Literacy outcomes.
- Report Documenting the development and critique of an online professional learning framework informed by the recommendations of the CLP research project, documented in *Digital Rhetorics* leading to a succinct set of recommendations arising from the project.
- Financial Accountability Statement. This statement will provide a comprehensive record of expended funds along with documentation as evidence of expenditure.
Teachers First
Mr Andrew Connolly and Mr Westley Field

Teachers First Research Context

The Children’s Literacy National Projects research Digital Rhetorics, funded by DETYA, investigated links between literacy, technology and learning with particular emphasis on the use of new communication information technologies in classrooms. The study was undertaken between September 1995 and December 1997 and had three main components:

• a study of practices in a range of learning contexts, mainly primary and secondary classrooms;
• an examination of some key policy documents concerned with teaching and learning in relation to literacy and technology; and,
• a theoretical and conceptual position which informed the study as a whole and the recommendations based on it.

Implications for Teachers First

Digital Rhetorics provided a comprehensive picture and analysis of the professional development context in which Teachers First operated. The research brought together literacy and CITs and examined the connections and impact each has on the other. In doing so traditional definitions of literacy were challenged and a broader definition emerged.

From a sociocultural perspective, literacy must be seen in “3D”, as having three interlocking dimensions - the operational, the cultural and the critical - which bring together language, meaning and context (Green, 1988, pp. 160–163). An integrated view of literacy in practice and in pedagogy addresses all three dimensions simultaneously; none has any necessary priority over the others. DEETYA 1997, Digital Rhetorics Executive Summary page 16.

The Operational dimension of literacy refers to competence with language. That is the ability to read and write in a range of contexts appropriately and adequately.

The Cultural dimension of literacy refers to competence with regard to the meaning system. That is the ability to understand texts in relation to context.

The Critical dimension of literacy refers to the socially constructed nature of all human practices and meaning systems. It refers to the need for individuals to not only be able to participate and make meaning within these systems but also be able to recognise how to actively produce and transform these practices.

Implications and recommendations for teacher professional development arising from Digital Rhetorics were interpreted as fitting into two overlapping categories. The first category relates to the delivery of teacher professional development and the second relates to content.

The title of the project Teachers First, refers to one of the key principles identified and defined by Digital Rhetorics. The principle focuses on the need to provide teachers with opportunities to learn about new technologies and their relationship to language and literacy in the curriculum before being asked to incorporate them into teaching and learning programs. It states that professional learning of teachers in the use of CITs should be ongoing, commencing at the preservice phase and be continuing throughout the teachers’ professional life. Delivery of teacher professional development should address the practical use and application of CITs at the same time as focusing on theory and research related to the use of CITs in learning.
Teachers need support in making use of new technologies to enhance their personal work before learning to use it in their teaching. For teachers to make sound educational choices about using new technologies in classroom practice, they must first know how to use them (and any benefits of doing so) for their own purposes. DEETYA 1997, Digital Rhetorics Executive Summary page 12.

Digital Rhetorics reported that the content of teacher professional development should address the following:

• teachers need to understand, and address, the operational, cultural and critical dimensions of literacy;
• professional development needs to enable teachers to deal with learning in the information age;
• teachers need professional development that will enable them to deal appropriately with new technologies as learning media;
• teachers need to be able to find ways to harness ‘native’ skills, perspective, and capacities to learning;
• professional development should familiarise teachers with cultural apprenticeship models of pedagogy along the lines developed by people like Barbara Rogoff (1990, 1995), Jean Lave (1991) Shirley Brice Heath and Milbrey McLaughlin (1994).

Understandably many of these recommendations were beyond the scope and timeline of a program such as Teachers First to address in a comprehensive way, however project implementation took all recommendations into account and each will be highlighted and discussed in the context of this report.

Professional Development Context

All teachers participating in Teachers First were full-time employees of the NSW Department of Education and Training (NSWDET). The context in which the project operated therefore necessitated an acknowledgment of local policy initiatives. Teachers First was informed by the following NSW Department of Education and Training initiatives:

• State Literacy Strategy
• Basic Skills Test
• Cross Sectorial Assessment and Reporting Project
• English K - 6 Syllabus implementation
• Computers in schools Policy
• Technology in Teaching and Learning implementation and hub group support network.

Teachers First Implementation

Sixteen teachers were invited to participate in Teachers First. These teachers were from urban and rural NSW DET schools. At the outset it was intended to include only teachers working with students at stage 2 of the NSW English K - 6 Syllabus however due to time constraints two teachers, one working across K - 6 and another teaching at Stage 3 were included. All teachers were identified using the following criteria:

• Full time employee (term 3) of the NSWDET
• Teaching a Stage 2 class
• Interest and expertise in English literacy teaching and learning
• No specific interest or expertise in Communication Information Technology
• Teaching in a school that has email access and Internet access available to teachers
• Access to onsite CIT expertise
• Senior staff supportive of teacher participation
Teachers interested, and specifically skilled in English literacy were targeted as the CLP research project found evidence in site studies, supported by other research in this area, that English teachers are sometimes among the most resistant to using new technologies. Bigum et al, 1987; Durant & Hargraves, 1994; Snyder, 1995 have documented aspects of resistance or “refusal” as it has been labelled. To generalise, there is a tendency to protect what is traditionally regarded as the territory of English, the book and the spoken word.

An explicit identification process was required by the NSWDET. Target Districts were identified jointly by DET Officers and PETA Project Manager. This process was undertaken using combined knowledge (of all DETNSW technology and literacy programs) was to ensure equity across schools and districts. District Superintendents were formally approached by letter. This letter included a program description, a draft professional development agenda and a request to identify teachers.

The following NSWDET districts were approached:

- Wollongong District
- Lismore District
- Bathurst District
- Orange District
- Port Macquarie District
- Fairfield District
- Port Jackson District

Schools nominated by District Superintendents were then contacted by Officers of the Training and Development Directorate and requested to nominate two teachers. The eight schools approached all agreed to participate and are listed below.

- Orange Public School Orange District Office
- Goonellabah Public School Lismore District Office
- Port Macquarie Public School, Port Macquarie District Office
- Cabramatta West Public School, Fairfield District Office
- Woonona East Public School, Wollongong District Office
- Waterloo Public School, Port Jackson District Office
- Narrabri West Public School, Moree District Office
- Cameray Public School, Northern Beaches District Office

NSW DET Technology in Learning and Teaching (TILT) program, funded District based TILT hub group facilitators to attend and participate in the two day face to face professional development held in Sydney. This contribution included two days teacher release, travel and a per diem allowance for each hub group facilitator.

Two TILT hub groups operate in each district to support TILT graduates in on going learning with and about computer and information technology. Hub groups are coordinated by a teacher who has volunteered to facilitate after school meetings across a number of schools. A small amount of funding is allocated to the coordinator’s school to support hub group meetings. The NSW DET suggested using the hub group infrastructure to provide support to participants in the Teachers First project.
All travel accommodation and meals for teachers travelling from outside of Sydney to attend the program were funded by *Teachers First*. Each teacher was provided four days teacher release, two days to be used within the induction program and two days to be used to undertake project work at the school site.

**Teachers First Induction**

The two day induction program took place on Thursday 10th of September and Friday 11th of September 1998 at Sydney University.

**Induction Content**

The first day of the professional development induction program provided teachers with an overview of the project including context, expectations and outcomes. An overview of the literacy initiatives of the New South Wales Department of Education and Training were provided along with a comprehensive examination of the 1998 English K - 6 Syllabus. Teachers were provided with professional development informed by the teacher training processes used within the 1996 National School English Literacy Survey. Teacher professional development focused specifically on:

- the development of an assessment task based on an English literacy Outcome;
- implementation of an assessment task;
- analysis, interpretation and moderation of data obtained from the implementation of an assessment task.

The program included the following components:

- overview of the English Literacy assessment and reporting initiatives of the New South Wales Department of Education and Training with particular emphasis on the Basic Skills Test. Robyn Mamouney, NSW Department of Education and Training, Assessment and Reporting Unit.
- creating and implementing an authentic assessment task based on the materials and processes of the National Schools English Literacy Survey. Marion Meiers, Australian Council for Educational Research.
- outline of the English literacy assessment task to be undertaken during the course of the project. Andrew Connolly, Primary English Teaching Association.

**Assessment Task Outline:**

- Choose two linked English literacy outcomes (English K - 6 uses an organising framework of outcomes in the categories of learning to and learning about. The NSW DET recommends teachers link outcomes from the two strands) relevant to a student or group of students in their class.
- Construct an authentic assessment task and marking framework to be used in the classroom.
- Analyse the data collected in this process and use information gained to develop a teaching and learning program to address the needs of the student/s.
- Record work using the online Proforma on the Teachers First website.
- Communicate with other teachers and project leaders using CITs, participate in discussions and search for appropriate teaching and learning resources on the Internet to support your teaching and learning focus. These resources might include those available at the NSW Board of studies online syllabus and support materials collection.
Teachers first
Mr Andrew Connolly and Mr Westley Field

The second day of the professional development induction program provided teachers with an overview of Digital Rhetorics including implications for schools and teachers connecting literacy, learning and technology. An overview of the technology policy and initiatives of the New South Wales Department of Education and Training linking these relate to the recommendations of Digital Rhetorics. Professional Development also provided examples of practical classroom based strategies for using CITs, led by one of the teachers included within the Digital Rhetorics research.

The Teachers First area housed on the PETA website was introduced and used as the focus to provide teachers with training in the use of specific CITs that would be used during the project. Included on the password protected Teachers First area of the PETA website were the teachers’ case study proformas, a discussion area, and a participant contact list.

The program included the following components:

• overview of Digital Rhetorics implications and recommendations for schools and teachers. This included an explicit focus on the operational, cultural and critical aspects of both literacy and technology. The session also included information about the NSW DET policy response to support learning in the ‘information age’ Joy Murray Senior Project Officer, New South Wales Department of Education and Training, Training and Development Directorate (Digital Rhetorics co-researcher).

• practical CIT skills including searching, locating, critiquing and using information from the Internet; creating and sending emails; participating in synchronous and asynchronous discussions; registering and creating a personalised online project case study proforma. Westley Field, PETA CIT consultant, Greg Ramsay and Cathy Nielsen NSW Department of Education and Training, Training and Development Directorate.

• CIT as a learning media to be used in the classroom. Focusing on practical teaching and learning strategies that utilise CIT in the classroom. David Smith, NSW Department of Education and Training, Literacy Consultant (Teacher from original Digital Rhetorics research case study).

• commencement of online case study records for Teachers First. Teachers created a case study proforma and completed the first four categories of information. Each school was allocated a partner school responsible for responding to emails or discussions posted by their partner. This protocol was established to ensure that all emails and discussions received a response. Andrew Connolly, Primary English Teaching Association.
**Teachers First Teacher Timeline**

On return to school teachers commenced work on their individual case studies. A timeline was provided outlining the tasks and timeframes to help teachers plan their time effectively.

**Week 1**

**Website Action**
Visit the Teachers First area on the PETA website and identify the proforma that you wish to continue using. Send this information to Westley via email. Complete online proforma sections: Context, Teacher Story, English Literacy Outcomes, Assessment Task.

**Planning & Classroom Action**
Design Assessment Task and prepare for implementation.

**Week 2**

**Website Action**
Visit discussion site and respond to any questions or requests posted by other teachers. Post any questions that you may have related to project. Email partner school. Search for resources appropriate to project.

**Planning & Classroom Action**
Implement Assessment Task with student/s.

**Week 3**

**Website Action**
Visit discussion site and respond to any questions or requests posted by other teachers. Post any questions that you may have related to your project. Specifically about the data you have collected. Email partner school. Search for resources appropriate to project.

Commence online proforma sections: Programming Based on this Data & Ongoing Assessment Task. Remember if this is to be useful for another teacher be explicit, detailed, even procedural in writing. Include management strategies, teaching strategies, resources.

**Planning & Classroom Action**
Analyse data obtained from the implementation of Assessment Task. Use this information to program for Teaching and Learning. Keep in mind the need to establish ongoing assessment information.

**Week 4**

**Website Action**
Visit discussion site and respond to any questions or requests posted by other teachers. Post any questions that you may have in relation to your project specifically at this point about programming and assessment. Email partner school. Search for resources appropriate to your project.

Continue online proforma sections: Programming Based on this Data & Ongoing Assessment Task

**Planning & Classroom Action**
Implement and continued development of Teaching for Learning program. Gather data via ongoing assessment strategies identified. Use this data to inform Teaching Program.

**Week 5**

**Website Action**
Visit the discussion site and respond to any questions or requests posted by other teachers. Post any questions that you may have in relation to your project specifically at this point about programming and assessment. Email partner school. Search for resources appropriate to your project. Continue online proforma sections: Programming Based on this Data & Ongoing Assessment Task.
PLANNING & CLASSROOM ACTION
Implement and continued development of Teaching for Learning program. Gather data via ongoing assessment strategies identified. Use this data to inform Teaching Program.

WEEK 6
WEBSITE ACTION
Visit the discussion site and respond to any questions or requests posted by other teachers. Post any questions that you may have in relation to your project specifically at this point about programming and assessment. Email partner school. Search for resources appropriate to your project. Continue online proforma sections: Programming Based on this Data & Ongoing Assessment Task.

PLANNING & CLASSROOM ACTION
Implement and continued development of Teaching for Learning program. Gather data via ongoing assessment strategies identified. Use this data to inform Teaching Program.

WEEK 7
WEBSITE ACTION
Visit the discussion site and respond to any questions or requests posted by other teachers. Post any questions that you may have in relation to your project specifically at this point about programming and assessment. Email partner school. Search for resources appropriate to your project. Continue online proforma sections: Programming Based on this Data & Ongoing Assessment Task.

PLANNING & CLASSROOM ACTION
Implement and continued development of Teaching for Learning program. Gather data via ongoing assessment strategies identified. Use this data to inform Teaching Program.

WEEK 8
WEBSITE ACTION
Revise online proforma sections: Context, Teacher Story, English Literacy Outcomes, Assessment Task, Programming Based on this Data & Ongoing Assessment Task ready for publication.

PLANNING & CLASSROOM ACTION
Complete Teaching for Learning programme. Gather data via ongoing assessment strategies identified for completion of project.

WEEK 9
WEBSITE ACTION
Revise online proforma sections: Context, Teacher Story, English Literacy Outcomes, Assessment Task, Programming Based on this Data & Ongoing Assessment Task ready for publication.

WEEK 10
WEBSITE ACTION
Completed online proforma available for final edit before hardcopy and online publication.

Work undertaken on classroom based projects was recorded digitally by teachers via a case study proformas. All proformas were available within a password protected area of the Teachers First area on the PETA website.

These proformas were published and available to other project teachers via the use of the password ‘teachers first’. This allowed progress to be monitored by all involved in the project. Feedback via individual direct email or contribution to the asynchronous Teachers First Discussion was possible. It was also possible for project
Teachers First
Mr Andrew Connolly and Mr Westley Field

teachers to include requests for help or suggestions on the Teachers First Discussion. A second password was required to edit or write on the proforma; this was known only by the owner and the project leaders.

During this time it was also expected that Project teachers would use the CIT knowledge and skills gained during the induction program to search, locate, critique and use information gained from the Internet to support them to complete their classroom based project.

Insufficient funds were available to ensure a site visit to each teacher however communication was maintained via email, telephone, and facsimile. The project team of Cathy Nielsen, Westley Field, Greg Ramsay and Andrew Connolly were on call to help. Further support was also provided by TILT Hub Group facilitators in each district. Site visits to Cabramatta West and Waterloo Public Schools were undertaken by Stephanie Gunn, National Coordinator CLP, Beth Whiting (DETYA) and Andrew Connolly (PETA).

**Teachers First Outcomes**

- To explore the opportunities afforded by Communication Information Technology as a tool for professional learning for a small group of primary teachers, guided by the ‘Teachers First’ and Workability’ Principles identified in the NCLP Research Project, *Digital Rhetorics*.

All objectives and deliverables outlined in the original submission to the Commonwealth were successfully completed by this project. CITs were successfully used as a tool for professional learning with the small group of primary teachers. The delivery of the professional development was guided by the implications of *Digital Rhetorics* within the context of the Teachers First Principle. The content component of the professional development and individual teacher case studies were guided by recommendations of *Digital Rhetorics*.

Sixteen teachers commenced the project and eleven teachers completed each stage. Three teachers failed to complete their written case study but maintained participation throughout; one teacher took leave in week three and one teacher left the project in week 5 due to illness.

- To identify appropriate assessment strategies used by primary teachers of year three classrooms and how this information can be used to plan and support year three students achieve identified English Literacy outcomes.

A range of assessment strategies and tasks were designed, implemented and trialed within the context of this project and most have been documented in the teacher case study section of this report. It must be noted that the critical dimension of literacy teaching and learning is not explicitly evidenced within these case studies as most focus on the operational and to a lesser extent the cultural dimensions of literacy.

This aspect of the teacher case studies has important implications for professional development programs that are informed by or follow Teachers First. Within the face to face professional development component of Teachers First teachers were provided explicit information about the operational, cultural and critical dimensions of literacy. This information was included on both day one, in the context of sessions on literacy and literacy assessment and in day two in information about *Digital Rhetorics* and the connections between CITs and
associated literacy practices. It is apparent from this project that significantly more explicit direction and support is needed to transfer these understandings into practice.

An examination of teacher case studies reveal that English literacy outcomes identified by teachers as the basis of classroom work directly related to concerns about student acquisition of basic literacy skills ie spelling. Context is an important factor influencing the decisions made by teachers within this project. The majority of teachers were explicitly aware of their student performance on the New South Wales Basic Skills Test and on the first day of face to face professional development a session was devoted to the implications and future directions of this test within the NSW DET.

It emerged that whilst teachers were able to critique the testing instrument and the use to which stakeholders made of the information it supplied, as a group they recognised the need to respond to this information particularly in relation to individual student and school performance. This had important implications on teaching and learning practices and decisions made by these teachers.

The case study work of teachers raised important issues related to the use of “outcome based assessment frameworks” such as the NSW English K - 6 Syllabus. Central to the successful use of these frameworks by teachers are issues of individual teacher judgements. It is not the intention of this project to indicate that teachers are not able to make these judgements but to indicate that many teachers recognise that a process is required to ensure that these judgements are validated within a broader context.

Individual teacher judgement was identified by teachers as they are required to:

• determine the dimension of learning outcomes identified within these frameworks;
• develop reliable and relevant common assessment tasks to provide information about student performance with respect to identified outcomes; and,
• interpret student performance on these tasks with respect to achievement in relation to identified outcomes.

At the outset of this project it was the intended to attempt to address these issues using the successful model developed by the National Schools English Literacy Survey (NSELS). The moderation process central to NSELS was to commence during the face to face professional development program and then transfer into the digital environment using the Discussion area of Teachers First. This transfer was not successful and the possible reasons for this are discussed in the following section of this report.

• To identify a successful framework for using CITs for the delivery of online professional learning to primary teachers.

The project provided teachers with a combination of face to face professional development and a school site context to continue learning about and using information technology in an ongoing way as an authentic part of their work. In this respect the professional development framework successfully engaged teachers in learning about and using CITs within the context of their own learning and work.

Face to face professional development provided teachers with training and support to read and write in the digital environment in order to: construct and send emails; participate in discussion groups; complete an online record of their classroom project; use browser software to search, locate and retrieve information from the Internet to use
in their own work. Back at school they were provided with an authentic and engaging project which required them to practice and consolidate the skills developed in the face to face training. They were supported to understand text and information to the real life contexts in which it was created and received.

The use of CITs following the face to face professional development component of the project was problematic at times. Problem solving and compromise by teachers and project leaders was required to ensure the successful completion of the project. Fragility as outlined in Digital Rhetorics impacts and will continue to impact on the use of CITs in the education environment.

In the context of Digital Rhetorics, Fragility refers to the complex and integrated nature of classrooms as systems. Points of Fragility in the classroom occur around technical and non-technical aspects of technology. Aspects of technical Fragility include: “...difficulties accessing the internet via the modem; difficulties getting technical support to ensure that things run smoothly.” (DETYA Digital Rhetorics, Executive Summary p. 12) Aspects of non-technical Fragility include things such as; “...knowledge and understanding of how to integrate new technologies meaningfully and transparently into learning activities.” (DETYA Digital Rhetorics, Executive Summary p. 12)

A basic communication problem emerged in relation to the email addresses provided by the NSW DET for use during the project. Some teachers had problems accessing and sending email via these addresses resulting in teachers using established school email accounts or personal accounts as an alternative. This both frustrated these teachers and influenced the exchange of information.

On many occasions older technologies such as the telephone and facsimile were used either to solve problems or as an alternative means of communication. Many minor problems were able to be solved offsite by providing teachers with step by step instructions over the telephone whilst they operated the computer, others involved simple reminders about procedures, passwords or even in one incident to locate a comma substituted for a stop in a web address.

Teachers and the project manager found it difficult to solve more complex CIT problems without the intervention of a knowledgeable expert at the school site. When such a person was present problems were identified and solved quickly. Problems with hardware including servers and software were not able to be solved offsite and teachers and the project were at the mercy of repair schedules which for many country schools caused lengthy delays.

A CIT problem related to editing and writing on the case study proformas housed on the PETA website. The problem occurred just prior to the completion of the project and had a major impact on many participants. The cause of the problem related to the purpose written software program designed to manage each proforma. It was found that the actual program was corrupted when teachers included a letter in combination with a number without using a separating space or marker ie A3.

It emerged that the alpha numeric combinations by chance duplicated aspects of the programming language or code. This alpha numeric combination was commonly used in case studies as teachers attempted to report student information in confidence. Despite attempts to remedy this situation several incidents continued to occur
resulting in many teachers completing their project case studies off line and either emailed or sending them in hard copy format to the project manager.

The discussion area established for this project was not successfully used. The comments received by teachers via evaluations would indicate that important implications about teachers access to CIT hardware, and the allocation of teacher time to do this. Professional development programs following Teacher First using a similar framework will need to be mindful of this aspect although the resourcing context continues to change as education systems upgrade CITs to teachers and schools. This outcome of the project therefore has important implications for future delivery but should be informed by the operational context.

The provision of a face to face professional development program at the commencement of the project was valued by participating teachers as evidenced in their evaluations.

*When people actually interacted on the discussion site it was great because we knew each other through the face to face session in Sydney.*

*The hands-on help was great in the face to face. I do think that an extra day half way through the project may have ironed out problems with the technology and helped encourage individuals to complete their projects.*

*The session focused on uses of technology in the classroom program was excellent.*

Training in the use of CIT's was valued by participating teachers as evidenced in their evaluations.

*Internet training provided me with new skills and understandings. I now feel very comfortable with the Internet- it was a great catalyst to get us going.*

*Made me use email, Internet and writing documents for the Internet.*

*It has been a real start for me and I understand the rationale behind the project.*

*Communicating with all other participants via email was beneficial.*

*More confidence on the Internet and away from pure word processing which is where I have been for years.*

*I am now developing a better classroom learning area on computers because I have had my own confidence lifted.*

*My skills on Internet have improved and I can see ways of using it in the classroom.*

*It was interesting using the Internet. Maybe the proforma could be improved eg. We couldn’t set it out the way we wanted. However all things need to be continuously revised.*

*Moved us further along the continuum of understanding and use..*
The inclusion of an authentic task that interested teachers required a practical application of skill and lead to a practical outcome related to their work was valued by participating teachers as evidenced in their evaluations.

The project provided time to effectively implement an assessment task which is informative but time consuming.

To have the time to design and implement the task was valuable and programming information was gained. It was great to link into other consultancy support from ELI and Reading Project with this project. The project Officer was always available with required.

I’ve really enjoyed tackling the task that I undertook. The professional development provided me a good grounding to work from.

Good. My focus and understanding at this stage has increased.

I am far more familiar with the syllabus and have clear understanding of its purpose and rationale.

I used the assessment task that I was developing.

A specific question was included within teacher evaluation to related to the failure of the Teachers First Discussion site to achieve its intended purpose. The following comments were representative of those received from all teachers.

Time constraints at school made it difficult to utilise. Not having access to the Internet in our own classroom was restrictive. Doing this in term four was the wrong time of the year. It should have been done in term one.

One problem was accessing the computer at school and the time to do this. Questions on the discussion were not always answered quickly.

I feel that the discussion site was not effective in part because of the powerful workloads that we experience.

There is no luxury of free time to go to the computer for a chat on spec. Pre set times and dates where we could all meet at once would be far more attractive. This could be done once a fortnight or three weeks.

It is a time factor. Most people were involved in annual reports, DSP etc. Not all being available at the same time was a problem.

It’s hard when as a staff member you don’t have an Internet computer on your desk in your classroom.

Many of the teacher comments relate to Principles of Equity identified by Digital Rhetorics. Equity in this case refers to equitable distribution of resources and expertise between and within schools. Many of the teachers
Teachers first
Mr Andrew Connolly and Mr Westley Field

participating in Teachers First did not have a networked computer in their class to access the Teachers First website, discussion area, and other digital resources.

- To promote primary teachers’ awareness of the education networking and information services available on the Education Network Australia Directory.
- To promote Primary Connections online learning facility situated on the PETA website.

Within the face to face professional development program for Teachers First the Primary English Teaching Association website and the facilities it offers were used. Access to the Teachers First project site was also via the Primary English Teaching Association website. Within the face to face professional development program the Education Network Australia Directory was used as a primary site for teachers to search and locate educational resources on the Internet.

TEACHERS FIRST RECOMMENDATIONS

1. That teacher professional development in communication information technology be authentically linked to the work and interests of the teacher.

2. That teacher professional development in communication information technology not be limited to programs that focus on skill delivery or operational aspects of technology in isolation from the cultural and critical aspects of the teachers work.

3. That teacher professional development in communication information technology be transferred into the teacher’s professional context to ensure learning continues after face to face delivery ceases.

4. That teacher professional development in communication information technology be planned and implemented with reference to issues of Complementarity and Equity. Complementarity referring to the need to introduce new technology tools alongside skills for use. In Teachers First new CITs were introduced alongside uses that were an authentic part of their work with students. Equity referring to the need for equal access to resources and expertise. In Teachers First many teachers indicated via evaluation their frustration at not being able to easily access CITs to carry out their work. Other teachers indicated via their evaluations their frustration at not having adequate expertise onsite.

5. That teacher professional development in communication information technology focus on ensuring that teachers develop understandings and pedagogy that enable them to include the operational, cultural and critical dimensions of technology and associated literacy practices into the classrooms in which they teach.

TEACHERS FIRST BIBLIOGRAPHY


Teachers first
Mr Andrew Connolly and Mr Westley Field


ONE STATE’S RESPONSE TO THE TECHNOLOGY LITERACY AGENDA

Joy Murray
NSW Department of Education and Training

This paper describes a range of programs (paper based, CDROM and On-Line) developed by the NSW Department of Education and Training to address the unfolding technology literacy agenda. To illuminate the approach taken towards emerging literacies the paper develops a metaphor around travel and the emergence of the horseless carriage. The paper also describes the Technology in Learning and Teaching (TILT) program which addresses the ‘teachers first’ principle and provides a starting point and context for subsequent program development. The paper concludes with a millennium perspective of literacy and technology briefly looking back over the past millennium and forward towards the next. It concludes with the need to provide students with access to life’s options which can only be gained through full participation in whatever are the literacies of the time.

Introduction
My dad is 93, his Uncle David had the first car in Hunmanby (our village in North East Yorkshire). It had the power of several horses and was open topped like the horse drawn carriages it was modelled on. Also like them it had high back to back seats so that the coachmen could ride shotgun. Its brake was mounted on the running board. As my dad tells it Uncle David climbed into the driver’s seat and two of his workmen got into the back guarding the rear from the mob of children that followed them round the village. After two or three circuits Uncle David had had enough and called ‘whoa’ only to find that the thing didn’t stop. He had to endure the obscenities of the men as they bailed out and the cheers of the villagers as he made yet another round of the main streets before the car finally ran out of petrol and came to a halt. But he wasn’t short of hands to help push it triumphantly back to his house (Smith, 1992). My dad still laughs when he tells that story and we speculate on what Uncle David would make of the power, speed and design of today’s cars. And how the skills of car driving have changed, as well as who can drive them. And the changes to society’s infrastructure, mobility, dangers, employment; changes to family life and global power structures measured in steel, engineering, oil......

The new technology of car brought with it new language and concepts, leaving behind the language and concepts of carriage with their accompanying connotations of a particular (slower) society and cultural groups isolated in their villages. But Uncle David didn’t get it - this car. How could he? He was of the carriage generation. He jumped into this new kind of horseless carriage but he
didn’t ever jump into a car. Car came later and gradually as each new generation of people interacting with each new generation of car defined it for themselves.

And so, it seems to me, it is with computer and information technologies and new literacies. Like Uncle David we are defining concepts in terms of what we know now: books on wheels; dictionaries with running boards, walking in front of the Internet with a red flag and riding shotgun on the e-mail coach; reading, writing, listening and looking in a newfangled car. And the kids running along side are the ones who will define this car when it finally sloughs off its ties with current literacy practices because it will be their car and they will appropriate and invent the language to define it out of their shared life experiences.

But again like Uncle David we want to be in there driving now, with colleagues pushing the possibilities along. Because it’s exciting, we’re having fun and whenever we find that ‘whoa’ doesn’t work we’ll improvise, we’ll ask around and find out what does, we’ll learn something new. This is why we have a whole range of horseless carriages on offer, some closer to cars than others. But then there’s a whole range of needs out there. And we’re definitely going to be in the right place to help the process along, with teachers and students influencing and being influenced by the unfolding drama of life in the age of computer and information technologies.

Of Horseless Carriages and Cars
So what are these horseless carriages and cars designed to carry us some way along the technological highway? Before I talk about the ways in which we have addressed the technology literacy agenda in NSW I must mention the Technology in Learning and Teaching (TILT) program because it provides a starting point and context for subsequent program development. And in the spirit of the metaphor a colleague suggests it also makes ready the road for horseless carriages and cars.

TILT
The Technology in Learning and Teaching (TILT) program was developed in 1995/6 in response to a State Labor Government promise to provide training in the classroom use of computer and information technology for teachers who were not already using technology in the classroom. It was part of an overall whole of government strategy to upgrade technological infrastructure and make the increasing use of computer and information technology a priority. In particular TILT was part of the government’s Computers in Schools Program (CISP) which included: providing all schools with an Internet machine and if necessary an additional telephone line; linking all schools to the Internet;

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1 My thanks to Bronwyn Stafford who read and commented on the draft paper.
providing advice to teachers on the use of computer and information technology in the primary school classroom and in each secondary school learning area; the rollout of computers to schools; and the creation of a Department web site to include online curriculum based activities for students as well as information (and eventually training programs) for teachers. Following Labor’s success in the 1999 NSW state election the Computers in Schools Program is being expanded. Over the next four years a further 10000 teachers will be trained in $TILT$ and 15000 teachers will receive training in a wide range of programs to be collectively known as $TILT$ Plus (the technology literacy programs described below fit under this umbrella).

$TILT$ is a 30 hour (one semester) program designed to accommodate the needs of teachers Kindergarten to Year 12 and across all subject areas. Its six workshop components deal with: word processing; the internet and email; using a digital camera and manipulating images; databases; software; and multimedia. The final component, multimedia, allows participants to use the skills built throughout the program to construct a multimedia text.

Participants are supported by a trained facilitator who conducts workshops and on whom they may call during their three days of relief time. During the relief time teachers may follow up their learning in whatever way suits their particular needs and level of expertise.

Feedback indicates that $TILT$ has been well received by teachers. For example 97% of respondents to the 1997 participant evaluation affirmed the high quality of their $TILT$ facilitator. In Semester 1, 1998, 91% of survey respondents were completely satisfied with the delivery of the program; 87% were satisfied with the follow up activities and support; 92% of respondents indicated that $TILT$ had been successful in assisting them to meet their professional needs in computer technology. Sixty six per cent of respondents indicated that as a result of having participated in $TILT$ they did things differently in administration and 74% ‘did things differently in the classroom’.

The vast majority of all respondents throughout the seven semesters of the current program (1996 - mid 1999) reported an increased confidence and a growing use of computer and information technology both for professional and classroom purposes. Some of their comments follow.

“Excellent support. Facilitator very patient and knowledgeable. Always willing to help and always made himself available to assist with our questions and

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2 Between 1995 and 1999 15500 teachers were trained in $TILT$. This is approximately one third of every school’s full time equivalent teaching service staff.

3 For a full description of the program see Murray (in press).
One state's response to the technology literacy agenda
Ms Joy Murray

computer work." PE/Photography teacher, non-metropolitan secondary school, 1996.

“The materials were outstanding. Great to have them to look back to. The videos were marvellous. A couple of them I watched more than once.” Teacher, metropolitan primary school, 1997.

“The support was very good. We were able to access the TILT facilitator’s time for consultation, demonstration, etc as required using days from the TILT relief. Activities were completed by all participants in our particular group and shared (very beneficial!).” Executive teacher, metropolitan primary school, 1997.

“This course has been one of the best and most enjoyable I’ve ever been to. A whole new world has opened up and I am endeavouring to provide the same enlightenment for my student.” K-2 teacher, country school, 1998.

“Overcome a real reluctance to use a computer and now feel confident to tackle computer based problems ... feel able to implement classroom units as required in curriculum.” Head-teacher Mathematics, country high school, 1999.

In addressing the ‘teachers first principle’ (Bigum, Durrant, Green, Honan, Lankshear, Morgan, Murray, Snyder, & Wild, 1997) TILT has prepared the way for other programs, in particular technology literacy programs.

Technology Literacy Programs 1995-1999
At the same time as TILT was being developed (1995 - 1996) the state received National Professional Development Program (NPDP) funding to develop a range of programs to address the use of information and computer technology in teaching and learning. Some of this funding was used for cross sectoral programs (NSW Department of School Education; NSW Catholic Education Commission; NSW Association of Independent Schools) such as the program developed to introduce parents to classroom uses of technology\(^4\) and a program to address the issue of values in technology and learning (VITAL\(^5\)). Some of the funding was used by individual school sectors. The Department of School Education used NPDP funding to complement the work already begun in TILT. The 30 hour TILT program was only a beginning, important areas like new literacies were not able to be covered. NPDP provided the perfect opportunity to investigate the role of critical literacy and the use of information skills in the context of multimedia and internet texts. The NSW Department of School Education (DSE) (now the Department of Education and Training (DET)) developed an NPDP program to address these areas. Was this to be our first horseless carriage?

One state's response to the technology literacy agenda
Ms Joy Murray

*Making the Net Returns Worthwhile*⁶ (MNRW) was produced in 1996 as a self-paced program for individuals or groups. It was produced as a booklet⁷ and referred participants to the internet in order to complete activities. *Making the Net Returns Worthwhile* focuses on the use of the internet as an information resource in the school context. It presents a process for teaching students how to identify and use information from the internet to complete learning tasks. The program has been written as a self-directed tutorial containing information, practical activities and opportunities for reflection and collegial discussion.

*Making the Net Returns Worthwhile* was structured around the NSW DSE publication *Information Skills in the school* (1989) which offered a framework for defining a research task, locating information, collecting and synthesising information and constructing and evaluating a new text. *MNRW* also included an article on critical literacy by Luke, O’Brien and Comber (1994) and suggested ways of applying the questions of critical literacy to internet texts. It was extremely popular with teachers. Groups of TILT graduates used it as a way of following up their learning, the DSE ran one day courses throughout NSW and requests for the publication came from interstate and overseas. Our horseless carriage was on the right track.

Two new programs developed out of *Making the Net Returns Worthwhile* (MNRW). One was a CDROM *New Technologies New Literacies*⁸ developed by a cross sector team using NPDP funding. The other was a series of programs called *Net Returns On-Line* (NRO-L) developed by the Department of Education and Training⁹. Was this our first Model T (although it did come in a range of colours)?

Unlike *Making the Net Returns Worthwhile* *Net Returns On-Line* is an internet based program. Teachers who enrol in the course gain access to the *Net Returns On-Line* website¹⁰ and also receive a copy of the self-paced program *Making the Net Returns Worthwhile* & the booklet *Information Skills in the school*.

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⁶ Written for the Dept of School Education by Hazel Vickers with cartoons by Mark David.
⁷ It was envisaged as a booklet and CDROM, however the booklet alone became extremely popular with teachers during the pilot phase and there were technical difficulties in producing a CDROM which would do the things we wanted it to do. We therefore issued the booklet as a stand alone module. With the following year’s NPDP funding we began work on a cross sectoral project to produce the CDROM incorporating into it the whole school development perspective addressed by the Association of Independent Schools. The technical difficulties were gradually overcome over the following 3 years.
⁸ Text written by Hazel Vickers, production and instructional design Eleanor Igoe.
⁹ Adapted for the internet by Georgia Phillips.
¹⁰ *Net Returns On-Line* runs within the Top Class program which provides a course administration structure and framework to support participant learning, including facilities such as a bulletin board, discussion area and access to the online tutor.
Like *MNRW* the program, for teachers K-12, is aimed at developing information literacy skills in an internet environment. Participants are also asked to interrogate internet texts using the questions of critical literacy. *Net Returns On-Line (Science)* uses examples from the Secondary Science curriculum and *Net Returns On-Line (Careers)* uses sites relevant to Careers teachers. In addition to relevant classroom applications of computer and information technology the programs also encourage accessing and using the internet for professional development purposes. However, an important aspect of the new programs deals with developing effective search strategies and an understanding of web addresses, page construction and links (including the politics of links (Burbules, 1997).

It is interesting to note that what began as a simple task to transfer the original program to an online environment proved far from simple. The medium itself forced changes. The language changed to fit into the new space (for example research was indicating that people are reluctant to scroll down, so important points needed to fit into one screen). The kinds of activities suitable for a group of colleagues meeting together were no longer appropriate. Instead activities which made use of the online medium itself had to be devised. Another factor that implied its own set of changes was the software environment in which the program was constructed. It had facilities for participants to submit work to the online tutor and receive comments. It had facilities to calculate the percentage of the program accessed by each participant and the ‘marks’ gained on quizzes and ‘assignments’. It had an hierarchical access structure so that the administrator had access rights that were not available to the tutor and tutors had access rights not available to participants. Contrast this with a booklet issued to all members of a collegial group who worked through the suggested activities together. Attempting to translate from a paper medium to online was our first real jolt of understanding of McLuhan’s famous line ‘the medium is the message’, our first flash of recognition that this new technology brought with it a new kind of literacy constructed in new social cultural and political contexts (reading the research and coming face to face with the reality are two different things). The program’s success is a tribute to the online tutors whose sense of humour shines through their online communications and whose ability to build a community of learners across time and space is wonderful to watch.

The *Net Returns On-Line* trial program was conducted in Semester 2, 1998 with 92 participants in 44 schools targeting the teacher librarian and a nominated learning partner in each school. Participants were organised into three classes of primary school teachers and one class of secondary Science teachers each with an online tutor. The programs (including *Net Returns (Careers)*) were
offered statewide in semester 1, 1999\textsuperscript{11}. All three programs were well received by participants. Some of their comments follow.

“Having to think about the steps in the information skills process did make me realise what I sometimes must put my students through when I set a task. It has made me think more clearly about how I will go about devising work for them in the future, especially if it incorporates the internet.”
Secondary teacher

“As newcomers to web use and searching we found this task very overwhelming, but pressed on and achieved results slowly – and certainly learnt lots! We realised as we progressed, that the unit which had seemed so complex was guiding us through refining our search and getting us to try a variety of search engines.”
Primary teacher

“Critical literacy skills focus was also extremely helpful. The case study was revealing.”
Primary teacher

I really can’t believe how valuable this course has proved to be especially the exercise in planning a unit of work finally it has all come together and I feel as though I am on the road to becoming or rather having a technological aspect to my teaching.... my appetite has been wetted! I feel much more confident and happy to pursue further study.
Teacher, country High School

\textit{Net Returns On-Line} enabled participants to access course material and participate in activities such as trying out search strategies and communicating with colleagues and tutor all from within the online course framework. There was no longer any need to read the course material in a book and then find a machine and internet link in order to engage in the activities. In the majority of classes this generated a high level of discussion among participants as they tried out the activities and shared online their successes and (sometimes heroic) failures. For better or worse our Model T was picking up speed.

However something was still missing from \textit{MNRW} and \textit{NRO-L}. We had not yet constructed an environment in which participants were able to take the final steps in our information skills process. They so far had not been able to construct and evaluate their own multimedia texts. Our second generation car was about to be born....

The \textit{New Technologies, New Literacies} CDROM builds on the DSE NPDP project \textit{Making the Net Returns Worthwhile} and incorporates the whole school perspective of the 1996 Association of Independent Schools NPDP project which

\textsuperscript{11} A \textit{Net Returns On-Line} program for parents is currently being developed.
also looked at the application of critical literacy and information skills to electronic texts. It allows participants to practise their search strategies in a simulated internet environment and provides sound, text and graphic resources and a process for the creation of multimedia texts. It allows participants to evaluate the multimedia texts they have created applying information skills and a critical literacy approach to the understanding of how texts work. It supports collaborative work between teacher librarian and classroom teacher.

Early trials of the CDROM indicate that it will be received with enthusiasm by teachers. All who have explored it have provided valuable and positive feedback. It seems it is just what many have been waiting for.

The CDROM along with the programs described above are all part of *TILT* Plus (1999 - 2003) which provides the infrastructure in which teachers are able to access them. In addition they can be accessed by school leaders through the NSW DET Leadership Strategy (a recognition that horseless carriages may soon need power steering.....).

**Leadership Strategy**

In the Preparation for Leadership Program that is part of the DET Leadership Strategy participants undertake a series of eight hour modules chosen from a large range of materials prepared within the DET and by university personnel. A number of these address the area of information and computer technology, and in the context of school leadership direct participants towards the programs outlined above. *Preparing for Quality Leadership in Technology* is a module which provides sample technology skills audits and a framework to assist schools in planning for the needs of staff training in the area of new technologies. *Identifying and Building Computer Technology Skills, Knowledge and Understanding in the Whole School Community* asks participants to locate and become familiar with the Parent Package; VITAL; *Computing Quickstart*; *Making the Net Returns Worthwhile*; and *Using the Internet* (for School Support and Administrative Staff). Participants are asked to present one of these programs to parents or colleagues. *Continuity in Learning with Computer and Information Technology* provides samples of schools’ attempts to map the scope and sequence of computer and information technology related skills across the school and between primary and high schools addressing the issue of continuity identified in *Digital Rhetorics* (Bigum, Durrant, Green, Honan, Lankshear, Morgan, Murray, Snyder, & Wild, 1997). It requires participants to convene a group to investigate local issues of continuity and report on their investigations to a staff meeting with recommendations for action. *Developing

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12 Cross sectoral NPDP package aimed at providing basic computer concepts to absolute beginners (used as a pre-*TILT* program for any participant who expresses a need for it).
One state's response to the technology literacy agenda
Ms Joy Murray

*Information Literacy Skills Across the School* points participants to the *Net Returns* series and the CDROM *New Technologies, New Literacies*. It suggests participants familiarise themselves with the programs and introduce them to colleagues at a staff meeting with a view to participation by staff members.

Over the next four years it is envisaged that all schools will have access to one or more of the above programs according to school and teacher need. Our aim is for all students to have access to computer and information technologies supported by teachers who have a knowledge of, skills in, curiosity about and a framework for questioning new ways of interacting with the world made possible by new technologies - students and teachers together constructing and defining what it is to be literate in the year 2000.

**So Much for Current Models of Carriages and Cars but What's the Millennium Perspective?**

In the late sixteenth century Francis Bacon said that our hope for a better future lay in science. Three hundred years later geneticist JBS Haldane wrote “there is no hope save in science..... Physics and chemistry have made us rich, biology healthy, and the application of scientific thought to ethics ...... has done more than a dozen saints to make us good. The process can only continue if science continues” (quoted in Wertheim, 1997:161). So what of science and technology? Will their future development make us good? Will we share ideas on ethics in a spiritual world as well as a scientific one as Davies and Hawking take up Einstein’s search for God in the Theory of Everything? Will the essential questions of good, beauty and truth remain with us for the next millennium as they have stayed with us for this one throughout all of its scientific and technological upheavals?

Or is it possible for science and technology not to continue? In the 1960s McLuhan (1964:79) wrote that the ‘power of technology to create its own world of demand is not independent of technology being first an extension of our own bodies and senses.’ In accepting new technologies he says, ‘we’ve surrendered our central nervous systems to private manipulation.’ How much more does this apply today in the era of wearable technology and the even less visible (potentially gene manipulating) nanotechnology, not to mention virtual reality which some see as the way to immortality. With an annual doubling of speed and power and a halving of size some see machines not only repairing but creating and recreating themselves in the near future. Not only that but with nanocomputers fast approaching quark size, able to be inserted into a cell nucleus, we will see the emergence of a more subtle technohuman hybrid than the present pacemaker reliant, cochlear implanted, hipjoint repaired version of

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13 I think that ‘science’ can be read as ‘science and technology’.
human-machine being. And then the Lamarckians and the Darwinians will have a field day proving and disproving the inheritance of acquired gadgetry.

Was McLuhan right? Have we surrendered? Or is it more like a coevolution of technology and living things? The technology of lenses extended the possibilities of our eyes, bicycles extended the possibilities of our legs and the technology of money made it possible to store the energy of our labour for a rainy day. I don't think there is a choice to be made about the continuation of science and technology. We are our technologies. The choice is to go on talking about and fighting for the things we passionately believe in because our conversations are as much a part of the environment in which evolution takes place as our natural and constructed surroundings. Indeed it is out of our conversations conducted in a myriad forms and media that the particular world we inhabit comes to be. What more central place is there for literacy and how could it ever be extricated from the technology we surrender it to, that holds it, shapes it, specifies it and is in turn shaped and specified in an eternal dance of reciprocity?

So will we become better communicators as we coevolve with our email, Internet and their progeny. At the moment there are equity issues involved in access to this kind of technology but this will change as more of the world’s economy is reliant on global communication. The players will not want to lose such a huge potential market as the poor (for commerce or propaganda purposes). And then as we stand in the middle of the field, shopping centre or desert with our wearable mobile phone communicating with our wearable computer raiding the world’s information stores, how long will it be before we can throw away the plastic and metal and perform brain to brain and brain to machine information dumps. The constructivists and the positivists will have a whole new and fruitful field for debate. What is knowledge? How do you get it? What constitutes wisdom and how do you become wise? But these are old questions. Like truth and beauty they have been with us through changing modes of communication for all of the current millennium and beyond. Maybe it is the questions that will survive the next millennium unchanged despite the technology and if it is then we can all have faith in humanity.

Throughout this address are threaded the twin strands of human and technology. Jaynes (1976) suggests that internal narration was the first technology – that voice inside the head which must have emerged at some stage in our evolution and is now taken for granted as the nature and consequence of consciousness. McLuhan suggests it was speech. Others cite extensions to human possibilities outside of the human body such as fire and the wheel. Whatever the technology it seems from a millennia perspective that we and our technologies co-evolve in mutual dependence. And the literacy theorisers of the
future will understand in the scheme of things the rise of the dominance of print for fulfilling our need to record our history-culture-and-knowledge-of-everything (and how, in so doing, we constructed a particular history, culture and knowledge). And from where they sit they’ll see its gradual fall as other ways of constructing and recording reality emerge and become common place. Just as we can smile indulgently at the multimedia text of the Bayeux Tapestry and with the arrogance of our Age, as we embroider our internet texts, assume that literacy has come a long way since then. So too will our techno-hybrid descendants look back at our quaint (and of course sometimes very beautiful if limited) ways of recording and reciting who we are and why we’re here and theorise about how our literacy practices came to construct this particular ‘we’ and this particular ‘here’.

From such a perspective we can see also that different knowledge has counted at different times – philosophy, mathematics, religion and science have all taken the stage. In all ages there have been ways of inducting the young into the group’s particular culture and passing on the means of survival – whether it has been sitting next to Nelly, sitting at the feet of the master or sitting in front of the telly – somehow we have muddled through defining and redefining what it is to be a literate person. This is encouraging. It bodes well for the next one thousand years and suggests to the optimist in me that our descendants (hybrid or otherwise) may look back to here and point to the issues we have in common and the familiar questions we are asking - like today’s questions around technology and literacy. The most important thing is to keep on asking.

But it’s time to return the car that we borrowed from Uncle David for our jaunt along the unfolding technological highway. How will we thank him? What gift could we take him from now - this man who could sing by heart any hymn in the Methodist Hymn Book and recite the best part of the Bible as he drove the country byways? Would he thank us for our idea of literacy or would he consider much of it to be noise? He lived a long and satisfying life. He had a strong sense of community and a responsibility towards others. Within the bounds of his beliefs he felt in control of his life (except for the occasional technological hitch). This is his gift to us. We can give him nothing better in return than a promise to never give up wanting and striving for these things for all of the thousands of students in our care. To achieve this we need to provide students with access to life’s options, access that can only be gained through full participation in whatever are the literacies of the time.

Reference List
One state's response to the technology literacy agenda
Ms Joy Murray


vulnerability for failure; the same good early literacy environment and patterns of effective instruction are required for children who might fail for different reasons.

Does this mean that the identical mix of instructional materials and strategies will work for each and every child? Of course not. If we have learned anything from this effort, it is that effective teachers are able to craft a special mix of instructional ingredients for every child they work with. But it does mean that there is a common menu of materials, strategies, and environments from which effective teachers make choices. This in turn means that, as a society, our most important challenge is to make sure that our teachers have access to those tools and the knowledge required to use them well. In other words, there is little evidence that children experiencing difficulties learning to read, even those with identifiable learning disabilities, need radically different sorts of supports than children at low risk, although they may need much more intensive support. Childhood environments that support early literacy development and excellent instruction are important for all children. Excellent instruction is the best intervention for children who demonstrate problems learning to read.

CONCEPTUALIZING READING AND READING INSTRUCTION

Effective reading instruction is built on a foundation that recognizes that reading ability is determined by multiple factors: many factors that correlate with reading fail to explain it; many experiences contribute to reading development without being prerequisite to it; and although there are many prerequisites, none by itself is considered sufficient.

Adequate initial reading instruction requires that children:

- use reading to obtain meaning from print,
- have frequent and intensive opportunities to read,
- be exposed to frequent, regular spelling-sound relationships,
- learn about the nature of the alphabetic writing system, and
- understand the structure of spoken words.

Adequate progress in learning to read English (or any alphabetic language) beyond the initial level depends on:

- having a working understanding of how sounds are represented alphabetically,
- sufficient practice in reading to achieve fluency with different kinds of texts,
- sufficient background knowledge and vocabulary to render written texts meaningful and interesting,
control over procedures for monitoring comprehension and repairing misunderstandings, and

continued interest and motivation to read for a variety of purposes.

Reading skill is acquired in a relatively predictable way by children who have normal or above-average language skills; have had experiences in early childhood that fostered motivation and provided exposure to literacy in use; get information about the nature of print through opportunities to learn letters and to recognize the internal structure of spoken words, as well as explanations about the contrasting nature of spoken and written language; and attend schools that provide effective reading instruction and opportunities to practice reading.

Disruption of any of these developments increases the possibility that reading will be delayed or impeded. The association of poor reading outcomes with poverty and minority status no doubt reflects the accumulated effects of several of these risk factors, including lack of access to literacy-stimulating preschool experiences and to excellent, coherent reading instruction. In addition, a number of children without any obvious risk factors also develop reading difficulties. These children may require intensive efforts at intervention and extra help in reading and accommodations for their disability throughout their lives.

There are three potential stumbling blocks that are known to throw children off course on the journey to skilled reading. The first obstacle, which arises at the outset of reading acquisition, is difficulty understanding and using the alphabetic principle—the idea that written spellings systematically represent spoken words. It is hard to comprehend connected text if word recognition is inaccurate or laborious. The second obstacle is a failure to transfer the comprehension skills of spoken language to reading and to acquire new strategies that may be specifically needed for reading. The third obstacle to reading will magnify the first two: the absence or loss of an initial motivation to read or failure to develop a mature appreciation of the rewards of reading.

As in every domain of learning, motivation is crucial. Although most children begin school with positive attitudes and expectations for success, by the end of the primary grades and increasingly thereafter, some children become disaffected. The majority of reading problems faced by today's adolescents and adults are the result of problems that might have been avoided or resolved in their early childhood years. It is imperative that steps be taken to ensure that children overcome these obstacles during the primary grades.

Reducing the number of children who enter school with inadequate literacy-related knowledge and skill is an important primary step toward preventing reading difficulties. Although not a panacea, this would serve to reduce considerably the magnitude of the problem currently facing schools. Children who are particularly likely to have difficulty with learning to read in the primary grades are those who begin school with less prior knowledge and skill in relevant domains, most notably general verbal abilities, the ability to attend to the sounds of language as distinct from its meaning, familiarity with the basic purposes and mechanisms of reading, and letter
knowledge. Children from poor neighborhoods, children with limited proficiency in English, children with hearing impairments, children with preschool language impairments, and children whose parents had difficulty learning to read are particularly at risk of arriving at school with weaknesses in these areas and hence of falling behind from the outset.

RECOMMENDATIONS

The critical importance of providing excellent reading instruction to all children is at the heart of the committee's recommendations. Accordingly, our central recommendation characterizes the nature of good primary reading instruction. We also recognize that excellent instruction is most effective when children arrive in first grade motivated for literacy and with the necessary linguistic, cognitive, and early literacy skills. We therefore recommend attention to ensuring high-quality preschool and kindergarten environments as well. We acknowledge that excellent instruction in the primary grades and optimal environments in preschool and kindergarten require teachers who are well prepared, highly knowledgeable, and receiving ongoing support. Excellent instruction may be possible only if schools are organized in optimal ways; if facilities, curriculum materials, and support services function adequately; and if children's home languages are taken into account in designing instruction. We therefore make recommendations addressing these issues. (The complete text of all the committee's recommendations appears in Chapter 10.)

Literacy Instruction in First Through Third Grades

Given the centrality of excellent instruction to the prevention of reading difficulties, the committee strongly recommends attention in every primary-grade classroom to the full array of early reading accomplishments: the alphabetic principle, reading sight words, reading words by mapping speech sounds to parts of words, achieving fluency, and comprehension. Getting started in alphabetic reading depends critically on mapping the letters and spellings of words onto the speech units that they represent; failure to master word recognition can impede text comprehension. Explicit instruction that directs children's attention to the sound structure of oral language and to the connections between speech sounds and spellings assists children who have not grasped the alphabetic principle or who do not apply it productively when they encounter unfamiliar printed words.

Comprehension difficulties can be prevented by actively building comprehension skills as well as linguistic and conceptual knowledge, beginning in the earliest grades. Comprehension can be enhanced through instruction focused on concept and vocabulary growth and background knowledge, instruction about the syntax and rhetorical structures of written language, and direct instruction about comprehension strategies such as summarizing, predicting, and monitoring. Comprehension also takes practice, which is gained by reading independently, by reading in pairs or groups, and by being read aloud to.

We recommend that first through third grade curricula include the following components:
Beginning readers need explicit instruction and practice that lead to an appreciation that spoken words are made up of smaller units of sounds, familiarity with spelling-sound correspondences and common spelling conventions and their use in identifying printed words, "sight" recognition of frequent words, and independent reading, including reading aloud. Fluency should be promoted through practice with a wide variety of well-written and engaging texts at the child's own comfortable reading level.

Children who have started to read independently, typically second graders and above, should be encouraged to sound out and confirm the identities of visually unfamiliar words they encounter in the course of reading meaningful texts, recognizing words primarily through attention to their letter-sound relationships. Although context and pictures can be used as a tool to monitor word recognition, children should not be taught to use them to substitute for information provided by the letters in the word.

Because the ability to obtain meaning from print depends so strongly on the development of word recognition accuracy and reading fluency, both of the latter should be regularly assessed in the classroom, permitting timely and effective instructional response when difficulty or delay is apparent.

Beginning in the earliest grades, instruction should promote comprehension by actively building linguistic and conceptual knowledge in a rich variety of domains, as well as through direct instruction about comprehension strategies such as summarizing the main idea, predicting events and outcomes of upcoming text, drawing inferences, and monitoring for coherence and misunderstandings. This instruction can take place while adults read to students or when students read themselves.

Once children learn some letters, they should be encouraged to write them, to use them to begin writing words or parts of words, and to use words to begin writing sentences. Instruction should be designed with the understanding that the use of invented spelling is not in conflict with teaching correct spelling. Beginning writing with invented spelling can be helpful for developing understanding of the identity and segmentation of speech sounds and sound-spelling relationships. Conventionally correct spelling should be developed through focused instruction and practice. Primary-grade children should be expected to spell previously studied words and spelling patterns correctly in their final writing products. Writing should take place regularly and frequently to encourage children to become more comfortable and familiar with it.

Throughout the early grades, time, materials, and resources should be provided with two goals: (a) to support daily independent reading of texts selected to be of particular interest for the individual student, and beneath the individual student's frustration level, in order to consolidate the student's capacity for independent reading and (b) to support daily assisted or supported reading and rereading of texts that are slightly more difficult in wording or in linguistic, rhetorical, or conceptual structure in order to promote advances in the student's capabilities.
Throughout the early grades, schools should promote independent reading outside school by such means as daily at-home reading assignments and expectations, summer reading lists, encouraging parent involvement, and by working with community groups, including public librarians, who share this goal.

Promoting Literacy Development in Preschool and Kindergarten

It is clear from the research that the process of learning to read is a lengthy one that begins very early in life. Given the importance identified in the research literature of starting school motivated to read and with the prerequisite language and early literacy skills, the committee recommends that all children, especially those at risk for reading difficulties, should have access to early childhood environments that promote language and literacy growth and that address a variety of skills that have been identified as predictors of later reading achievement. Preschools and other group care settings for young children often provide relatively impoverished language and literacy environments, in particular those available to families with limited economic resources. As ever more young children are entering group care settings pursuant to expectations that their mothers will join the work force, it becomes critical that the preschool opportunities available to lower-income families be designed in ways that support language and literacy development.

Preschool programs, even those designed specifically as interventions for children at risk of reading difficulties, should be designed to provide optimal support for cognitive, language, and social development, within this broad focus. However, ample attention should be paid to skills that are known to predict future reading achievement, especially those for which a causal role has been demonstrated. Similarly, and for the same reasons, kindergarten instruction should be designed to stimulate verbal interaction; to enrich children's vocabularies; to encourage talk about books; to provide practice with the sound structure of words; to develop knowledge about print, including the production and recognition of letters; and to generate familiarity with the basic purposes and mechanisms of reading.

Children who will probably need additional support for early language and literacy development should receive it as early as possible. Pediatricians, social workers, speech-language therapists, and other preschool practitioners should receive research-based guidelines to assist them to be alert for signs that children are having difficulties acquiring early language and literacy skills. Parents, relatives, neighbors, and friends can also play a role in identifying children who need assistance. Through adult education programs, public service media, instructional videos provided by pediatricians, and other means, parents can be informed about what skills and knowledge children should be acquiring at young ages, and about what to do and where to turn if there is concern that a child's development may be lagging behind in some respects.

Education and Professional Development for All Involved in Literacy Instruction

The critical importance of the teacher in the prevention of reading difficulties must be recognized, and efforts should be made to provide all teachers with adequate
knowledge about reading and the knowledge and skill to teach reading or its
developmental precursors. It is imperative that teachers at all grade levels understand
the course of literacy development and the role of instruction in optimizing literacy
development.

Preschool teachers represent an important, and largely under-utilized, resource in
promoting literacy by supporting rich language and emergent literacy skills. Early
childhood educators should not try to replicate the formal reading instruction provided
in schools.

The preschool and primary school teacher's knowledge and experience, as well as the
support provided to the teacher, are central to achieving the goal of primary
prevention of reading difficulties. Each of these may vary according to where the
teacher is in his or her professional development. A critical component in the
preparation of pre-service teachers is supervised, relevant, clinical experience
providing ongoing guidance and feedback, so they develop the ability to integrate and
apply their knowledge in practice.

Teachers need to be knowledgeable about the research foundations of reading.
Collaborative support by the teacher preparation institution and the field placement is
essential. A critical component for novice teachers is the support of mentors who have
demonstrated records of success in teaching reading.

Professional development should not be conceived as something that ends with
graduation from a teacher preparation program, nor as something that happens
primarily in graduate classrooms or even during in-service activities. Rather, ongoing
support from colleagues and specialists, as well as regular opportunities for self-
examination and reflection, are critical components of the career-long development of
excellent teachers.

Teaching Reading to Speakers of Other Languages

Schools have the responsibility to accommodate the linguistic needs of students with
limited proficiency in English. Precisely how to do this is difficult to prescribe,
because students' abilities and needs vary greatly, as do the capacities of different
communities to support their literacy development. The committee recommends the
following guidelines for decision making:

If language-minority children arrive at school with no proficiency in English but
speaking a language for which there are instructional guides, learning materials, and
locally available proficient teachers, these children should be taught how to read in
their native language while acquiring proficiency in spoken English and then
subsequently taught to extend their skills to reading in English.

If language-minority children arrive at school with no proficiency in English but
speak a language for which the above conditions cannot be met and for which there
are insufficient numbers of children to justify the development of the local capacity to
meet such conditions, the instructional priority should be to develop the children's
proficiency in spoken English. Although print materials may be used to develop
understanding of English speech sounds, vocabulary, and syntax, the postponement of formal reading instruction is appropriate until an adequate level of proficiency in spoken English has been achieved.

Ensuring Adequate Resources to Meet Children's Needs

To be effective, schools with large numbers of children at risk for reading difficulties need rich resources--manageable class sizes and student-teacher ratios, high-quality instructional materials in sufficient quantity, good school libraries, and pleasant physical environments. Achieving this may require extra resources for schools that serve a disproportionate number of high-risk children.

Even in schools in which a large percentage of the students are not achieving at a satisfactory level, a well-designed classroom reading program, delivered by an experienced and competent teacher, may be successful in bringing most students to grade level or above during the primary grades. However, achieving and sustaining radical gains is often difficult when improvements are introduced on a classroom-by-classroom basis. In a situation of school-wide poor performance, school restructuring should be considered as a vehicle for preventing reading difficulties. Ongoing professional development for teachers is typically a component of successful school restructuring efforts.

Addressing the Needs of Children with Persistent Reading Difficulties

Even with excellent instruction in the early grades, some children fail to make satisfactory progress in reading. Such children will require supplementary services, ideally from a reading specialist who provides individual or small-group intensive instruction that is coordinated with high-quality instruction from the classroom teacher. Children who are having difficulty learning to read do not, as a rule, require qualitatively different instruction from children who are "getting it." Instead, they more often need application of the same principles by someone who can apply them expertly to individual children who are having difficulty for one reason or another.

Schools that lack or have abandoned reading specialist positions need to reexamine their needs for such specialists to ensure that well-trained staff are available for intervention with children and for ongoing support to classroom teachers. Reading specialists and other specialist roles need to be defined so that two-way communication is required between specialists and classroom teachers about the needs of all children at risk of or experiencing reading difficulties. Coordination is needed at the instructional level so that intervention from specialists coordinates with and supports classroom instruction. Schools that have reading specialists as well as special educators need to coordinate the roles of these specialists. Schools need to ensure that all the specialists engaged in child study or individualized educational program (IEP) meetings for special education placement, early childhood intervention, out-of-classroom interventions, or in-classroom support are well informed about research in reading development and the prevention of reading difficulties.
Although volunteer tutors can provide valuable practice and motivational support for children learning to read, they should not be expected either to provide primary reading instruction or to instruct children with serious reading problems.

CONCLUSION

Most reading difficulties can be prevented. There is much work to be done, however, that requires the aggressive deployment of the information currently available, which is distilled in this report. In addition, many questions remain unanswered concerning reading development, some of which we address in our recommendations for research. While science continues to discover more about how children learn to read and how teachers and others can help them, the knowledge currently available can equip our society to promote higher levels of literacy for large numbers of American schoolchildren. The committee's hope is that the recommendations contained in this report will provide direction for the first important steps.