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Prepared to teach : an investigation into the preparation of teachers to teach literacy and numeracy

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Prepared to Teach

An investigation into the preparation
of teachers to teach literacy and
numeracy



William Loudon
Mary Rohl
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Australian Government
**Department of Education,
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Executive Summary

Context

Teacher education in Australia is a large and diverse enterprise. There are more than 400 programs in 36 universities, enrolling a total of about 35,000 preservice teachers (DEST, 2003).

The labour market for newly graduating teachers, patterns of entry to teacher education, the range of courses offered, the place of literacy and numeracy in those courses, and the provision of school experience influence the quality of beginning teachers' literacy and numeracy teaching.

- The labour market conditions are encouraging for potential teachers and for teacher education. Demand for graduates and demand for places in courses are both rising (MCEETYA, 2001).
- Although university entrance scores are rising with demand, cut-off scores vary. The lowest cut-off scores are in regional universities, and the highest scores are for secondary programs in research-intensive universities (AVCC, 2003).
- The programs preservice teachers enter may be as long as five years or as short as one academic year (Louden et al., 2000).
- Previous graduate ratings of these courses vary widely, and more often reflect overall satisfaction with the course than satisfaction with the quality of teaching or the development of their generic skills (AVCC, 2003).
- New entrants to the profession are most likely to be women, are likely to over-represent low socio-economic groups, and to include a small proportion of Indigenous people (DETYA, 2000).
- Within four-year programs, preservice teachers will typically take two or more units with a literacy focus and two units with a numeracy focus, as well as a number of units in cognate areas such as special needs.
- Preservice teachers in four-year programs will have about 17 weeks of school experience.

- Students in graduate programs typically have less literacy and numeracy coursework and less school experience.

The research consensus on program reform in teacher education

Teacher education is a matter of enduring scholarly and public interest. The vast majority of literature that addresses directly the question of effective practice in preservice teacher education in the areas of literacy and numeracy focuses on structural characteristics of teacher education programs. The following arguments about the structure of programs are commonly made:

- that programs need to be enhanced in terms of length and status (see for example, International Commission on Education for the Twenty First Century, 1996, pp. 199-200);
- that more time needs to be devoted to explicitly preparing teachers to teach literacy and numeracy (see for example, Watts, 1991);
- that the professional experience component of programs needs to be enhanced in terms of length, structure and quality (see for example, Hargreaves, 2000);
- that links between teacher education institutions and schools/early childhood centres, and their communities, need to be enhanced (see for example, Grimmert, 1995); and
- that accreditation of teacher education programs and system-wide teacher registration need to be further developed nationally (see for example, NBPTS, 1996).

Underlying these structural arguments is a series of substantive issues, issues that are important in shorter or longer programs, in programs with weaker or stronger school and community links, and programs that are free from or subject to external regulation. The most common of these substantive issues concern:

- preservice teachers' own competence and dispositions (see for example, NBEET and ALLC, 1995);

- the breadth, relevance, and nature of knowledge addressed in preservice programs (see for example, ACDE, 1998, Christie et al., 1991);
- the ways in which preservice teachers are prepared to deal with diversity (see for example, Luke, 2003; Rosen & Abt-Perkins, 2000); and
- the extent to which critical reflection is fostered in preservice programs (see for example, Rosen & Abt-Perkins, 2000).

The consensus about which structural and substantive issues in teacher education require attention obscures the tensions among these issues. More time for content knowledge, for example, may mean less time for school experience.

Too much of the literature on which the reform consensus is built is descriptive, speculative or based on small-scale local innovations. Too little of the teacher education research is focussed on empirical studies that link program characteristics with beginning teachers' classroom practice and their students' literacy and numeracy learning outcomes.

Perceptions of the quality of preparation for teaching literacy and numeracy

The definition of literacy given by the Australian Government draws attention to the range of purposes and contexts for language use, to the modes of language, and to the importance of language in developing knowledge and understanding:

Effective literacy is intrinsically purposeful, flexible and dynamic and involves the integration of speaking, listening and critical thinking with reading and writing. (DEETYA, 1998, p. 7)

The following definition, proposed by the Australian Association of Mathematics Teachers represents the consensus view of numeracy:

To be numerate is to use mathematics effectively to meet the demands of life at home, in paid work, and for participation in community and civic life. (AAMT, 1997, p. 13)

In school education, numeracy is a fundamental component of learning, performance, discourse

and critique across all areas of the curriculum. It involves the disposition to use, in context, a combination of:

- underpinning mathematical concepts and skills from across the discipline (numerical, spatial, graphical, statistical and algebraic);
- mathematical thinking and strategies;
- general thinking skills; and
- grounded appreciation of context. (AAMT, 1997, p. 15)

More than 1,400 teachers participated in three national questionnaire surveys and 21 focus groups in four States. We drew the following conclusions from these qualitative and quantitative studies of teachers' perceptions of the quality of teacher preparation in Australia.

- Most primary beginning teachers were confident about their personal literacy and numeracy skills (Figure 4.1), their conceptual understandings of literacy and numeracy (Tables 4.1 & 4.2), their understanding of curriculum documents (Figure 4.2) and assessment strategies (Table 4.9), and their broad preparation to teach (Figure 4.2).
- More primary teachers were confident about numeracy than literacy teaching (Figure 4.2).
- Fewer secondary than primary beginning teachers were confident about their capacity to teach numeracy (Figures 4.2 & 4.3). Generally, secondary beginning teachers who identified more strongly as subject specialists were not confident about their conceptual understandings of numeracy (Table 4.2) or their capacity to teach it (Figure 4.3).
- On the whole, primary and secondary beginning teachers were not confident about teaching some specific aspects of literacy, namely, viewing, spelling, grammar and phonics (Table 4.3), nor about their capacity to meet the challenges of student diversity (Table 4.11).
- Generally, senior school staff were not as confident as the beginning teachers about the quality of teacher preparation for teaching numeracy and literacy (Figures 4.2, 4.3 & 4.4).
- Barely one-third of senior staff thought beginning teachers were well prepared to teach literacy (Figure 4.4) or to assess literacy (Table 4.10); less than half thought they were well prepared to teach numeracy (Figure 4.4) or to assess numeracy (Table 4.10). Even fewer were satisfied with the preparation of

beginning teachers in the area of diversity (Table 4.11).

- Some differences of emphasis were observed between teacher educators and teachers working in schools. Whilst teacher educators saw critical reflection as being an important issue, this view was not shared by experienced and beginning teachers (Figure 4.7).

Effective teacher education for literacy and numeracy

Six university teacher education programs in four States were selected for intensive qualitative site studies. The six programs represented the range of student intake characteristics, program types and locations. They demonstrated to a greater or lesser degree the following common characteristics:

1. Clarity of purpose,
2. Active engagement of preservice teachers in literacy and numeracy learning,
3. Comprehensive literacy and numeracy knowledge,
4. Linkage with schools, and
5. Strategies for dealing with student and preservice teacher diversity.

1. Clarity of purpose

The site study programs were characterised by coherence of vision about what constitutes good teaching and good teacher preparation, rather than by similarity of vision between programs. At one university, for example, the two-year graduate program was characterised by an inquiry-based approach. This shared purpose was reflected in extensive use of pedagogical cases, by a commitment to authentic tasks with students in schools and in the university setting, and by strongly scaffolded reflection on practice. Other programs with different student intakes or graduate destinations were characterised by a clear focus on partnerships with schools, by intensive instruction and culturally appropriate support, by agreed graduate attributes, or by a commitment to improving teachers' mathematical content knowledge. On the basis of this evidence we draw the conclusion that a strong sense of purpose, or a vision, is important in preservice teacher education programs. It should:

- include desired graduate attributes,
- be shared by staff in the program, and
- be operationalised throughout the program.

2. Active engagement in literacy and numeracy learning

A second quality that characterised many of the site study literacy and numeracy programs was commitment to preservice teacher engagement, to drawing preservice teachers in as active learners engaged in worthwhile educational experiences. For some, engagement was secured by responsive and adaptive teaching that reflected the needs of particular student groups. Beyond the needs of diversity, the accessibility, enthusiasm and expertise of lecturers and tutors also secured engagement.

On the basis of this evidence we draw the conclusion that engagement is an important precondition for professional preparation. It may be promoted by:

- professional – as well as academic – selection criteria for preservice programs;
- problem-based and other collaborative learning strategies;
- social and cultural structures that support students' capacity to continue in the program; and
- staff accessibility, interest and enthusiasm for literacy and numeracy.

3. Comprehensive literacy and numeracy knowledge

Most of the substantive issues identified in the project literature review concerned forms of knowledge. Approaches to the development of literacy and numeracy knowledge in the site study programs reflected preservice teacher intake characteristics as well as program designers' critiques of current literacy and numeracy teaching in schools. We have drawn three kinds of conclusions about literacy and numeracy knowledge.

3.1 Personal literacy and numeracy

- Where preservice teachers possess adequate entry-level literacy and numeracy skills, general monitoring of literacy and numeracy competence appears to be sufficient.

- Where entry-level literacy and numeracy skills are not adequate, teacher education course builders need to formulate explicit procedures to directly target the personal competence of preservice teachers.

3.2 Knowledge about literacy learning

- A substantial proportion of time and resources should be devoted to preparing beginning teachers for literacy teaching and learning.
- Preservice teachers need to be exposed to a comprehensive literacy curriculum in which they have extended opportunities to engage in authentic experiences where they can apply and question both theoretical and practical knowledge about literacy learning and teaching.
- This comprehensive curriculum should include a balance between fundamental knowledge of specific skill areas and higher order knowledge.

3.3 Knowledge about numeracy learning

- A substantial proportion of time and resources should be devoted to preparing beginning teachers for numeracy teaching and learning, especially primary teachers, almost all of whom will have direct responsibility for mathematics and numeracy.
- Preservice teachers need to be exposed to a comprehensive mathematics curriculum including a numeracy focus on problem setting and solving.
- This comprehensive curriculum should be additional to any upgrading of skills for preservice teachers who do not have a strong content background in mathematics.

4. Linkage with schools

All of the site study programs had a commitment to the development of practical knowledge through school experience. They were not, however, equally successful in developing and sustaining links with schools. In some programs, student numbers and the timing of school experience programs were cited as impediments to good school linkages. In other programs, innovative strategies to build the link between university classes and school experience included clinical supervision of preservice teachers' work with individual children, extended internships and two-way partnership programs with schools. On the basis of the site study

evidence we draw the following conclusions about linkage:

- Intensive clinical programs, extended internships, and partnership programs can all underpin effective school-university links.
- Links are fragile and maintenance of links is resource intensive. Innovative programs depend on very high levels of academic staff commitment.
- More widespread adoption of the innovative partnership approaches would require higher levels of financial commitment or cost reduction in other aspects of preservice teacher education.

5. Strategies for dealing with student and preservice teacher diversity

Diversity is an important issue in teacher education, both in terms of preservice teacher intake and in terms of preparation to teach diverse groups of school students. Results of the surveys undertaken for this project showed that teaching literacy and numeracy to students with special learning needs was a particular problem for beginning teachers. Their senior school staff colleagues were even more concerned about beginning teachers' capacity to work with diverse student groups. The successes that several of the site study programs had in dealing with diversity led us to the following conclusions:

- Culturally appropriate support facilities and extended partnerships with schools are required to support the progress of preservice teachers from second language, Indigenous and other diverse communities;
- A structured approach that explicitly addresses the assessment and teaching of numeracy and literacy to educationally disadvantaged students is needed to ensure that preservice teachers are prepared to teach these students effectively;
- Intensive teaching programs (such as clinical units) seem to be particularly effective in preparing preservice teachers for the practical teaching demands of diverse school populations;
- Such program elements, however, are resource hungry and either require cross subsidisation from other program elements or lead to the intensification of teacher educators' work.

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The research underpinning Prepared to Teach was made possible by the generous participation of teachers and teacher educators across Australia. Fifteen hundred beginning and experienced teachers participated in focus group interviews or completed questionnaire surveys. Dozens of teacher educators participated in focus groups, and dozens more welcomed researchers during week-long site visits to universities and collaborating schools. We thank them all for their interest and commitment, and acknowledge that the program of research could not have been undertaken without their generous support.

The research, which was commissioned by the Australian Government Department of Education, Science and Training, sought to find out how effectively teacher education programs prepared beginning teachers to teach literacy and numeracy. The team commissioned to do the work involved researchers from six universities. Jennifer Gore and Tom Griffiths (The University of Newcastle) produced a literature review that guided the empirical phases of the research program. Daryl Greaves (The University of Melbourne), Alistair McIntosh (The University of Tasmania), Di Siemon (RMIT University), Robert Wright (Southern Cross University), and William Loudon and Mary Rohl (Edith Cowan University) undertook teacher education site visits. Helen House and Anna Wildy (Edith Cowan University) conducted focus group interviews in six states. Anna Wildy conducted a national desk audit of teacher education programs. Three questionnaire surveys were designed and analysed by a team of Edith Cowan University researchers led by Mary Rohl and including Marion Milton, Danielle Brady, Anna Wildy, Gillian Setchell and Sarah Hopkins. Helen House – without whom none of this work would have been possible – managed the project over three years with a blend of subtlety, style, good humour and persistence.

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William Loudon
Project Director
Perth, December 2004



Context







Teacher education in Australia is a large and diverse enterprise. How well beginning teachers are prepared in literacy and numeracy depends on the broader circumstances of teaching and teacher education. These circumstances include the labour market for newly graduating teachers, patterns of entry to teacher education, the range of courses offered, the place of literacy and numeracy in those courses, and the provision of school experience.

The purpose of this study was to find out how well prepared beginning teachers are to teach in the areas of literacy and numeracy. The years of schooling considered in the study span the period from pre-school to junior secondary education. A particular focus of the study was on the effectiveness of preparation for teaching those who have the most difficulty in literacy and numeracy learning.

Teacher supply and demand

Although accurate projections of the labour market for teachers are notoriously difficult to make, there is a broad consensus that Australia has moved from a period of over-supply in the 1990s to a period of balance between supply and demand (MCEETYA, 2001; Victoria, 2001; Vinson, 2002). In the next few years the total supply of teachers is expected to be adequate to meet a slightly rising pattern of demand, with shortages growing in some secondary specialist areas (such as science and mathematics) and with increased pressure on appointments in hard-to-staff schools.

Nationally, the supply of graduates available for employment is rising to meet the demand. From 2000 to 2003, the annual number of teacher education graduates was expected to increase from 8,300 to 9,800 (MCEETYA, 2001, p. 8). In NSW,

primary teacher education completions are expected to increase by 8% and secondary completions to increase by 6% between 2001 to 2005 (Vinson, 2002, p. 92). Similar increases in enrolment have also been reported in Victoria (Auditor General, Victoria, 2001, p. 40). Between 2005 and 2010, however, more dramatic increases in demand are expected. Modest increases in demand from enrolment growth will be overshadowed by rapid increases in the number of teachers leaving the profession as the baby boomer generation reaches retirement age (MCEETYA, 2001). By the end of 2005, for example, the supply of secondary teachers in NSW is likely to meet only 80% of demand (Preston, in Vinson, 2002, p. 94) leading to the prospect of significant teacher supply shortages between 2005 and 2010.

Labour market changes have already had an impact on teacher education. Demand for places has outstripped supply, leading to significant increases in un-met demand for teacher education places. The percentage of applicants for undergraduate courses in the broad field of education not receiving offers grew from 29.1% in 2001 to 34.5% in 2002 and 40.9% in 2003 (AVCC, 2001; 2002; 2003). During this period the number of unsuccessful applicants increased by two-thirds, from 5,770 to 9,610 applicants. As a consequence, there has also been a pattern of increasing university entrance scores for undergraduate teacher education programs. In Victoria for example, university entrance scores in teacher education have increased by ten percentile points in primary and secondary education courses between 1997 and 2001 (Auditor General, Victoria, 2001, p.40).

While growth in enrolment numbers and the opportunity to recruit from a more academically able pool of applicants are welcomed by teacher educators, it seems unlikely that the current trends will be sufficient to meet the rise in demand in the second half of this decade. The pattern of shared responsibility for teacher education – the Australian Government funds universities, individual universities determine the number of teacher education places, and state governments are the largest employers – makes policy action complex. Without significant policy action,

demand may soon outstrip supply. As the Victorian Auditor-General has argued, 'unless there is an increase in the number of teacher education positions at universities, it is unlikely that the current supply will be able to meet the expected demand' (Victoria, 2001, p.5). State action to increase supply includes the New South Wales Government's commitment of \$8.5 million over four years for a range of teacher supply and quality initiatives (Phillips et al., 2003, p. 58). While the Australian Government's Backing Australia's Future reforms (DEST, 2003) do not specifically identify the number of new teacher education places to be funded, the Commonwealth Grant Scheme will provide the opportunity to increase the number of teacher education places through load mix negotiations with individual universities.

Teacher education courses

At the time of the study more than 400 separate teacher education courses were offered in 36 universities nation-wide, with a total enrolment of more than 35,000 students each year. Some six percent of all undergraduate students were enrolled in teacher education programs. Most teacher education students were concentrated in a small number of programs. In 2001, there were 44 programs recording completion of more than 100 students, and 43% of these completions were in eight institutions (Ballantyne, Bain & Preston, 2003).

Although there is some experimentation with alternative course structures such as two-year graduate Master of Teaching programs, the most common programs continue to be four-year Bachelor of Education or one-year Graduate Diploma courses. According to an audit of university web-sites undertaken for this project about two-thirds of Australian universities offered undergraduate early childhood courses, most of these in the four-year B.Ed. mode. All but one of the 36 universities with teacher education programs offered undergraduate primary courses, and two-thirds of these were four-year B.Ed. courses. Almost all universities also offered undergraduate secondary education courses, about half of these as four-year B.Ed. programs and a substantial minority as four- or five-year

combined degrees. Graduate teacher education courses were rarer in early childhood education than in primary education, and very common in secondary education. At the time of the web-site audit, 58 of the 82 preservice graduate programs were one-year courses.

Preservice teacher education programs were widely available in part-time and external course modes, but full-time enrolment in preservice education was much more common than the average for all undergraduate degrees. Female students were consistently and substantially over-represented, especially in the largest preservice education programs, and constituted over 75% of the undergraduate education students between 1997 and 2000 (DETYA, 2000). Students from lower socio-economic backgrounds were also over-represented, although the proportion of students from this group varied from almost none in a small program in a research intensive university to half of all students in a rural, decentralised university. The proportion of Indigenous students in preservice teacher education courses was slightly higher than the total proportion of Indigenous students enrolled in university courses.

Entry to teacher education

Vinson (2002) has shown that there are many routes of entry to teacher education courses. In some universities, more than 15% of students enrol on the basis of experience in TAFE courses, assistant teacher programs or mature age entry tests. Nationally, 26% enrol in some form of graduate course, and 70% of students enrol in an undergraduate Bachelor's course (DETYA, 2000, p. 20). Most often, though, entry to undergraduate courses is on the basis of Year 12 school performance. In just a few cases, school performance is considered in conjunction with qualitative evidence about suitability for teaching. School leavers – or students with minimal work experience since leaving school – constitute about half of the group entering preservice education, and about a third are career changers with work and life experience outside of education (Vinson, 2002, p. 92).

The web audit for this study showed that against a national pattern of rising undergraduate entry scores, there continue to be significant differences in entry cut-offs among universities and between early childhood, primary and secondary programs. Although one university set a Year 12 tertiary entrance percentile ranking cut-off score of more than 80 for its undergraduate early childhood program, half of the courses set cut-off scores of less than 70. Among primary programs, one-third had cut-off scores less than 70 and half had cut-off scores between 70 and 80. The undergraduate secondary programs had more universities with minimum scores over 80 with nearly one-third (30%) of secondary programs requiring scores of 80 or more. A similar proportion accepted students with scores less than 70. Although there was no particular relationship between cut-off score and university type for early childhood and primary programs, most of the high cut-off undergraduate secondary courses were in research-intensive universities and most of the low cut-off courses were in regional universities.

Student ratings of course experience

National student ratings of university course experience are provided through the Course Experience Questionnaire (CEQ) (AVCC, 2003). Typically, graduates rate education courses much more highly in terms of overall satisfaction and for the contribution they make to the development of generic skills than for the quality of teaching. Smaller courses, courses with fewer sessional staff and courses with strong integration between taught program and school experience are thought to rate more highly with students. Notwithstanding these individual, course and discipline characteristics of the CEQ, there are differences in course ratings within and between universities. Table 1.1 provides a summary of students' perceptions of course quality in preservice teacher education for 2002. Student responses are for pass bachelor degrees in early childhood, primary or secondary education. The data represent the percentage of students agreeing with three groups of questions on their course experience. These questions ask students to rate quality of teaching, generic skills learned and overall satisfaction with their course.

Table 1.1. University CEQ ratings for Teacher Education courses

	<60%	60-80%	>80%
Good teaching	29	2	0
Good generic skills	15	16	0
Good overall satisfaction	9	17	5

N = 31 universities

More students agreed their course provided good generic skills and good overall satisfaction than agreed that it offered good teaching. No institutions had a high proportion (over 80%) of students who thought their course provided good teaching or good generic skills. Despite this lower rating for teaching quality, students in more than half the institutions thought that they had developed good generic skills as most reported medium and high levels of overall satisfaction.

Literacy, numeracy and practice

Rising demand, rising undergraduate entry scores, continued program diversity, students whose course satisfaction varies widely, and a predominantly female work force: these are the broad circumstances of teacher education. But what sort of experience do these preservice teachers have that prepares them for the demands of literacy and numeracy teaching in schools?

The definition of literacy favoured by the Australian Government draws attention to the range of purposes and contexts for language use, to the modes of language, and to the importance of language in developing knowledge and understanding:

Effective literacy is intrinsically purposeful, flexible and dynamic and involves the integration of speaking, listening and critical thinking with reading and writing. (DEETYA, 1998, p. 7)

This broad and cross-curricular understanding of literacy is widely used in unit titles and unit descriptions appearing in university handbooks. Across the sector the nomenclature of specialist curriculum units involving English language studies sometimes reflects a single key learning area,

usually labelled as 'English', and sometimes reflects a cross-curricular sense of language capacity, such as 'language and literacy'. The words 'literacy' or 'language and literacy' are more frequently used in units and courses focussing on the early years of education or primary schooling, whilst the learning area descriptor is more frequently used in units and courses focussing on secondary education.

Numeracy is typically used in Australian education to signify using 'mathematics to achieve some purpose in a particular context' (AAMT, 1997, p. 13). This capacity is broader than number sense, and includes the application of other mathematical capacities such as measurement, data sense and spatial sense. The following description, proposed by the Australian Association of Mathematics Teachers represents the consensus view:

To be numerate is to use mathematics effectively to meet the demands of life at home, in paid work, and for participation in community and civic life. (AAMT, 1997, p.13)

In school education, numeracy is a fundamental component of learning, performance, discourse and critique across all areas of the curriculum. It involves the disposition to use, in context, a combination of:

- underpinning mathematical concepts and skills from across the discipline (numerical, spatial, graphical, statistical and algebraic);
- mathematical thinking and strategies;
- general thinking skills; and
- grounded appreciation of context (AAMT, 1997, p. 15)

This understanding of numeracy, in parallel to the understanding of literacy in schools and teacher education, draws attention to the cross-curricular application of skills most often developed in a single curriculum area. Similarly, the word numeracy often occurs in unit titles and unit descriptions in teacher education courses, sometimes as the key word in the unit title and sometimes in the amplification of the approach to be taken in units associated with the key learning area of mathematics. 'Numeracy' is more often used in early years and primary courses and 'mathematics' is more often used in secondary courses.

The focus of this report is not the preparedness

of mathematics specialists to teach mathematics. It investigates the preparedness of all beginning teachers to teach numeracy (but not classroom mathematics) and their perceptions about their own competence with basic numeracy skills.

Local circumstances and histories, as well as phases of schooling, determine whether particular teacher education institutions use the cross-curricular terms literacy and numeracy or the key learning area terms of English and mathematics. In this study, which was framed by the Australian Government's interest in literacy and numeracy preparation in teacher education, the more inclusive and cross-curricular terms are most often used. Literacy and numeracy are broader than, but also include, studies in the key learning areas of English and mathematics.

Among the courses surveyed in the audit of teacher education web-sites, coverage of literacy and numeracy varied widely. In undergraduate early childhood and primary courses, the average minimum number of explicitly named literacy and numeracy units to be taken over four years was two literacy and two numeracy units. Around these averages, however, there was substantial variation. As many as five literacy units and four numeracy units were compulsory in some programs. About a third of early childhood and primary courses required two literacy units. Half of early childhood courses and a third of primary courses required two numeracy units.

Compulsory units in literacy and numeracy were not universal in undergraduate secondary courses. About two-thirds of secondary courses had a compulsory literacy unit and about a half had a compulsory numeracy unit. For specialist mathematics and English teachers, the average number of compulsory units rose to 3.4 and 4.5 units respectively.

Beyond literacy and numeracy, there was also some variation in levels of compulsory course work in other cognate areas. Almost all of the undergraduate early childhood courses had a special needs component (81%), about half had a technology component (54%), fewer than half had an Indigenous studies component (36%) and none identified specific compulsory TESOL content. Slightly fewer primary courses

had a compulsory special needs component (63%) and more had compulsory technology (76%), Indigenous studies (45%) and TESOL components (13%). Many secondary courses had a special needs component (70%), about half had a technology component (48%), fewer than half had an Indigenous studies component (32%), and only a few had a compulsory TESOL component (5%).

Coverage of literacy and numeracy content in the group of 82 graduate programs audited typically involved fewer units but a higher proportion of time than the much longer undergraduate courses. Out of an average of 10 units, it was typical for early childhood and primary graduate courses to allocate one unit each to literacy and numeracy, and fewer than one unit each in secondary courses. The average number of compulsory cognate units in technology, special needs, Indigenous studies and TESOL was fewer than one unit each in early childhood, primary and secondary courses.

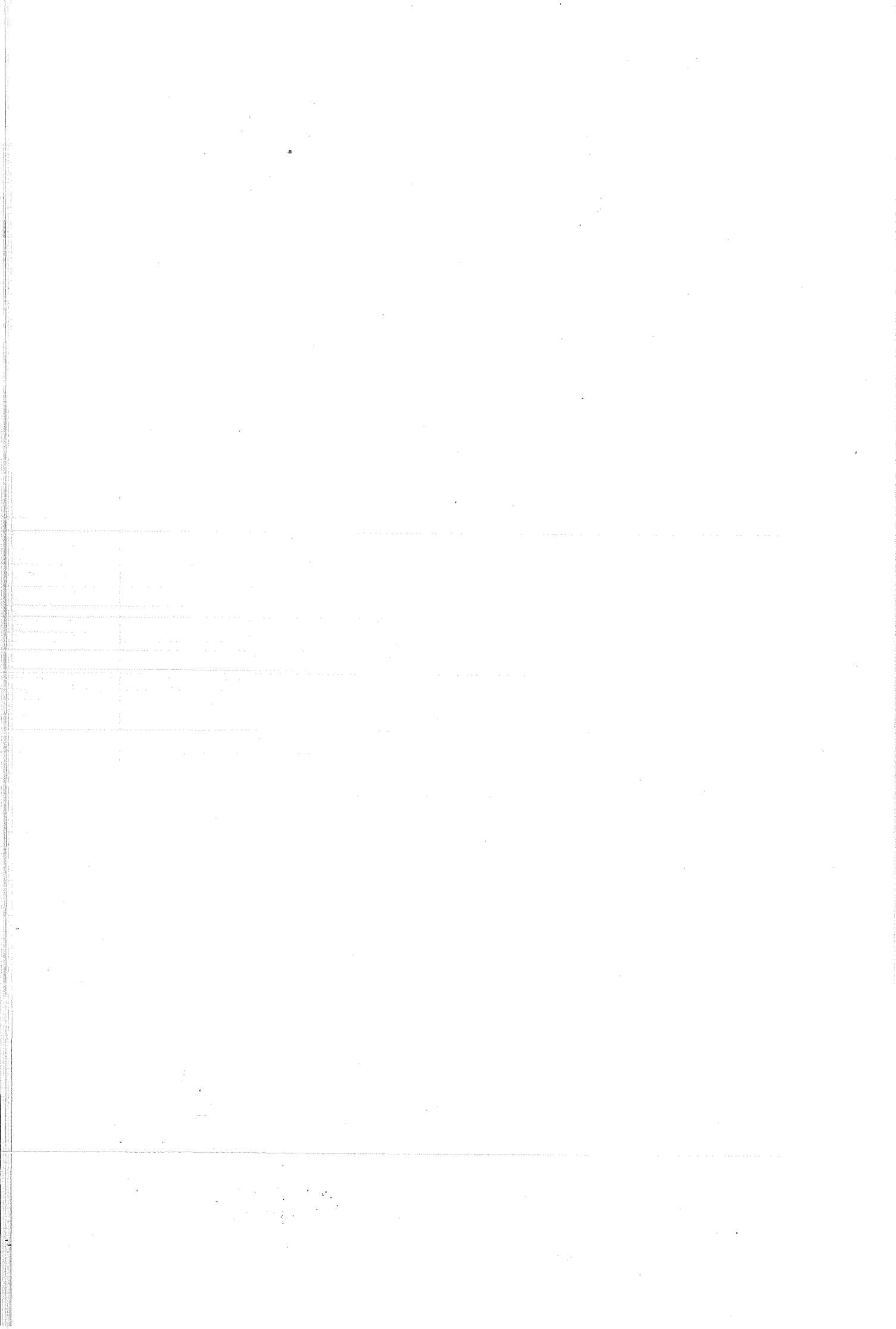
Opportunities to practise what was learned in the university academic program are available through a range of school experience strategies including classroom observation, one-day distributed experience, block practice and long-term internships. At the time of the web-site audit, the 62 four-year undergraduate programs analysed in detail committed an average of 12% of time to structured school experiences. This constitutes an average of about four units or 17 full-time weeks. The average number of weeks rose from two weeks in the first year to four weeks in the second and third years and six weeks in the fourth year. Among the 32 one-year graduate programs analysed in detail, the average total commitment to school experience ranged between 12-15 weeks for all graduate programs and an average of 10 weeks in one-year graduate programs. The number of school experience blocks ranged from one to five, with an average of about half of these experiences being scheduled for a two-week block. These averages, however, obscure a comprehensive pattern of diversity in time allocation and in strategies for building connections between taught courses and school experience.

Outline of the report

The labour-market conditions are encouraging for potential teachers and for teacher education.

Demand for graduates and demand for places in courses are both rising. Although university entrance scores are rising with demand, cut-off scores vary. The lowest cut-off scores are in regional universities, and the highest scores are for secondary programs in research-intensive universities. Programs may be as long as five years or as short as one academic year. Previous graduate ratings of these courses vary widely, and more often reflect overall satisfaction with the course than satisfaction with the quality of teaching or the development of generic skills. New entrants to the profession are most likely to be women, are likely to over-represent low socio-economic groups, and to include only a few Indigenous people. Within four-year programs, they will typically take two or more units with a literacy focus and two units with a numeracy focus, as well as a number of units in cognate areas such as special needs, and will have about 17 weeks of school experience. Students in graduate programs will typically have less literacy and numeracy coursework and less school experience.

Against the background of this snapshot of Australian teacher education, the conceptual and empirical work undertaken in this study is presented in five chapters. Chapter 2 provides a summary of the project literature review. The literature review distinguishes between structural and substantive issues in teacher education reform. Among the substantive issues, the common focus is on the forms of knowledge required in successful teacher preparation. Chapter 3 outlines the methodology and introduces the empirical argument. Chapter 4 summarises the results from questionnaire surveys and focus group interviews of opinion among beginning teachers, the senior school staff who work with beginning teachers, and teacher educators. Chapters 5 and 6 marshal the evidence to present some arguments about effective preservice teacher education for teaching numeracy and literacy in schools. These arguments concern the knowledge issues developed in the literature review and followed up in the surveys and focus groups, as well as the issues of purpose, engagement, linkage and diversity that emerged in the site studies. In Chapter 7, conclusions from the range of data sources are drawn together in an account of strategies likely to improve the effectiveness of teacher education with regard to literacy and numeracy.

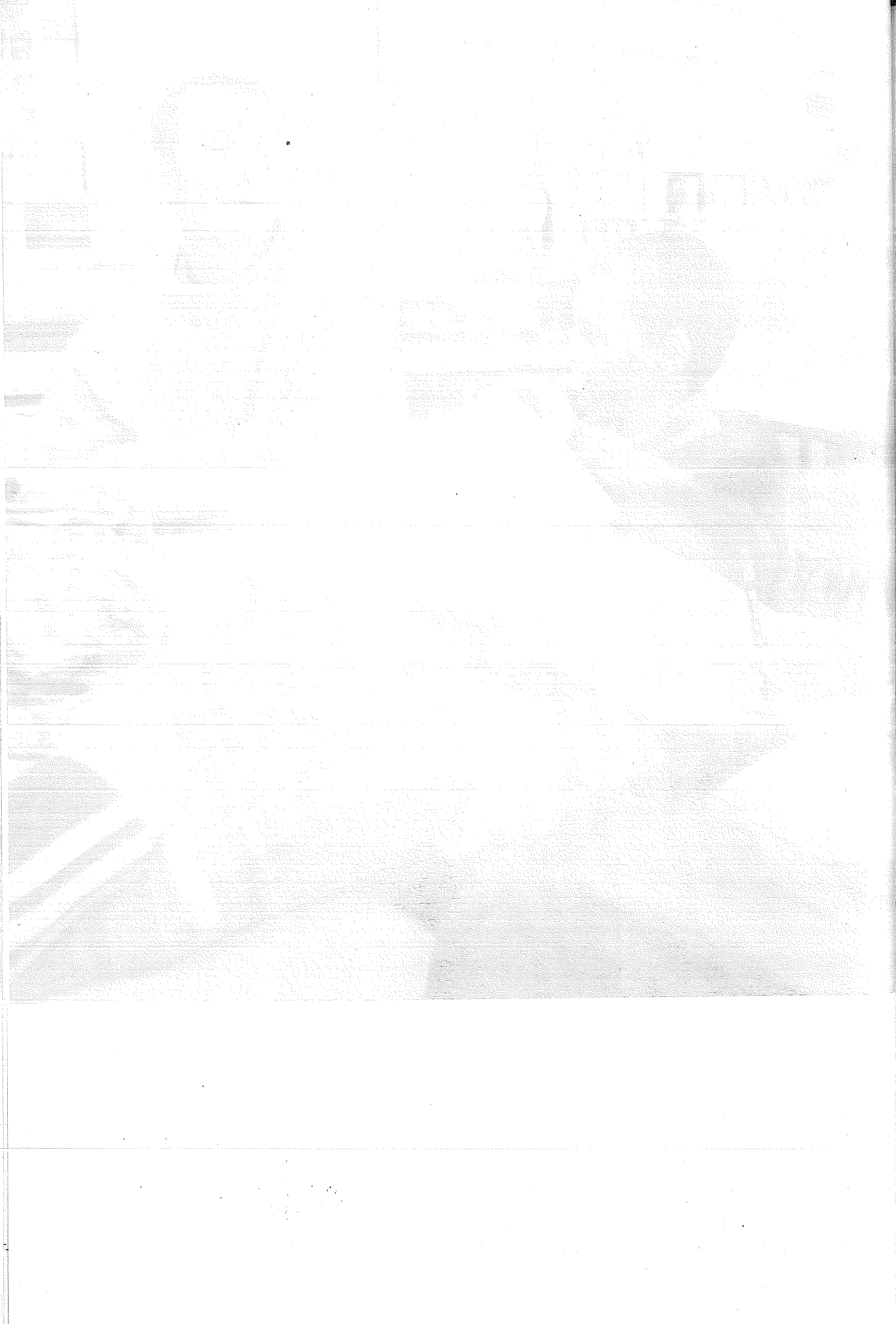




Positives of Literature



Chapter 2



2 Perspectives from the Literature



Teacher education is a matter of enduring scholarly and public interest. In addition to the substantial international research literature, at least 20 major public reports and reviews have been commissioned in Australia during the last 20 years (Brock, 1999). The vast majority of literature that addresses directly the question of effective practice in preservice teacher education in the areas of literacy and numeracy focuses on structural characteristics of teacher education programs. The following arguments about the structure of programs are commonly made:

- that programs need to be enhanced in terms of length and status;
- that more time needs to be devoted to explicitly preparing teachers to teach literacy and numeracy;
- that the professional experience component of programs needs to be enhanced in terms of length, structure and quality;
- that links between teacher education institutions and schools/early childhood centres, and their communities, need to be enhanced; and
- that accreditation of teacher education programs and system-wide teacher registration need to be further developed nationally.

Underlying these structural arguments is a series of substantive issues, issues that are important in shorter or longer programs, in programs with weaker or stronger school and community links, and programs that are free from or subject to external regulation. The most common of these substantive issues concern:

- preservice teachers' own competence and dispositions;
- the breadth, relevance, and nature of knowledge addressed in preservice programs;

- the ways in which preservice teachers are prepared to deal with diversity; and
- the extent to which critical reflection is fostered in preservice programs.

Although the literature on effective teacher education provides a broad consensus on the importance of these issues, much is descriptive rather than empirical. Where general claims are made about strategies for improved teacher education, they tend to relate to structural rather than substantive issues, and rely on theoretical argument rather than empirical data. Furthermore, where empirical work is reported, it tends to involve small-scale case studies based on individual programs and initiatives, and to generate specific claims for local changes. The weakness in the empirical base of teacher education research has frequently been noted in recent years. Wilson, Floden and Ferrini-Mundy (2001), in a major US report on Teacher Preparation, concluded that 'opinions and exhortations about [what it means for teachers to be well qualified and about what it takes to prepare teachers well] abound, and decisions about teacher preparation are made on a variety of bases' (p.i) but 'overall, the research base concerning teacher preparation is relatively thin' (p.i).

Similar comments have been made in several recent reviews of research on effective teacher preparation in literacy. Snow, Burns and Griffin (1998) and the National Reading Panel (2000) both lamented the lack of research that linked program characteristics with teacher and student outcomes. Among the very few research projects to attempt this task is the International Reading Association's Commission of Excellence in Teacher Preparation in Reading (Hoffman, Roller & the National Commission for Excellence in Elementary Teacher Preparation for Reading Instruction, 2003a; Maloch, Fine & Flint, 2002). This study, which demonstrated links between program characteristics, teacher behaviour in the first three years of teaching and student

learning outcomes, was released during 2003 (Hoffman, Roller, Maloch, Beretvas & the National Commission for Excellence in Elementary Teacher Preparation for Reading Instruction, 2003b).

In the absence of a strong evidence-based literature on program effectiveness in teacher education for literacy and numeracy teaching, this review provides a survey of the structural and substantive issues identified in the descriptive literature.

Structural issues

Calls for structural changes are not unique to the area of literacy and numeracy teaching, but have been a consistent response to identified problems in the field of preservice teacher education. Knight, Lingard and Bartlett (1993) summarise as key concerns of teacher education reform, '[the] need to recruit applicants of high academic quality, the content and length of preservice education, the importance of the practicum, and the need for improved practice teaching supervision' (p. 26). From another perspective, Darling-Hammond (2000) cites, as major problems for teacher education, time constraints on adequate learning of subject matter and pedagogy, the divide between university and school-based approaches, and inadequate resources. Typical arguments for structural change cover the length, sequence and general organisation of programs, including the relative weight given to areas of content or to professional experience components.

Competing traditions of teacher education inform the range of structural changes proposed for teacher education (see, for example, Feiman-Nemser, 1990; Gore, 2001; Kirk, 1986; Liston & Zeichner, 1991). The debate over school-based versus university-based approaches, for instance, shapes views about the length of programs, the amount of professional experience, and the balance of time spent in universities and schools (see for example Gill, 1993; Hargreaves, 2000; Loewenberg Ball, 2000; O'Neill, 2000; Schuck, 1996). Similarly, the debate over the balance between a liberal education and practical teaching skills impacts

on arguments about the balance given to discipline content and pedagogy. While these and other debates continue, there are five areas of broad consensus about structural reforms for teacher education in literacy and numeracy.

Longer programs, higher status

An historical move towards four year, university degree teacher education programs for all levels of teaching can be seen across the national and international literature. The general argument is that longer programs at this level are required to accommodate the necessary knowledge-base for teachers, including courses in subject disciplines, pedagogical and educational studies, and professional experience. This trend relates to all levels of teacher preparation, as well as to replacing end-on style programs with the four-year model (see Bobis, 2000; Christie et al., 1991; Hatton, 1996; NBEET & ALLC, 1995; Ramsey, 2000).

Not unique to Australia, similar concerns are evident in a UNESCO commissioned report on teacher education in the Asia Pacific region (APEID, 1990), and a more recent report to UNESCO making the general call for higher quality teachers through longer and higher status preservice teacher education (International Commission on Education for the Twenty First Century, 1996, pp. 199-200). The report also links university-level bachelor degrees for all teachers with improvements in the public status of teachers and conditions of their work, and with capacity to attract and retain higher quality candidates. Other commentators document similar concerns and trends across Australia, the US, the UK and Portugal (Ramsey, 2000; Senate Employment, 1998; Wideen & Grimmett, 1995).

More content knowledge

Arguments for devoting a greater proportion of preservice teacher education program time to literacy and numeracy content are typically developed around two strands of thinking. The first strand advocates more content for all teachers, usually based on cross-curricular approaches to literacy and numeracy. The second advocates more specialised content for teachers of English and mathematics.

A typical argument of the first kind appears in the NBEET and ALLC (1995) report advocating that, under the endorsed four-year model of teacher preparation, all preservice teachers undertake at least one core unit in language and literacy. More generally, it is argued that preservice teachers must have subject content knowledge, applied knowledge making the content accessible to school students, and curriculum knowledge that situates the content in the broader curriculum framework (MACQT, 1998, pp. 43-44). If all teachers are to teach literacy and numeracy, it follows that there would need to be an expansion of teacher education content in these areas. Such an expansion is difficult to achieve, however, especially when others are vying as strongly for additional content in other areas such as Aboriginal studies, special education, information technology, and behaviour management.

Calls for additional content for specialist English and mathematics teachers are connected to issues of students' basic skills in literacy and numeracy, claims of falling standards of teachers and students in these areas, and the need for deeper knowledge to meet the challenges of contemporary literacy and numeracy demands. For example, McGuire (2001) argues that a significant number of current specialist mathematics teachers lack adequate mathematics training. Similarly, Watts (1991) claims that primary English teachers acquire inadequate knowledge of language and literacy in their teacher education programs. More recently, the Queensland Board of Teacher Registration (2001) requires a portfolio of core language and literacy content for preservice teachers to ensure their critical understanding of multiliteracies in contemporary contexts.

More and better professional experience

A considerable body of literature on professional experience in teacher education programs debates the resurgence of school-based approaches in recent times (see Becher, 1992; Burstein, Kretschmer, Smith & Gudoski, 1999; Hargreaves, 2000; Linek, Nelson, Sampson, Zeek, Mohr & Hughes, 1999). There is broad consensus around the argument that more and better quality professional experience is needed

for preservice teachers (Hatton, 1996; Howe, 1991; MACQT, 1997) and continuing debate on the most appropriate length, frequency and scheduling of professional experience. Even critics of school-based approaches, concerned about the potential for the uncritical socialisation of preservice teachers into conventional teaching practices, argue for improvements to professional experience rather than its abolition (see for example McIntyre & Byrd, 1996).

Calls to lengthen professional experience often centre on an internship model involving preservice teachers' extended placement in a school with a significant proportion of a full teaching load. For example, Howe (1991) cites inadequate time devoted to 'practical experience,' to argue for increased time under an internship model, with an associated lengthening of the entire preservice program. Ramsey (2000) takes this to another level by arguing that professional experience should be seen as the 'central component of teacher education programs' (p. 207), contingent on the provision of adequate resources, improved partnership arrangements between schools and preservice teacher education institutions, and sufficient practising teachers able to effectively supervise preservice teachers.

Stronger links

Enhanced links between teacher education institutions and schools are advocated both to improve the professional experience component of teacher education programs, and to increase the role of the profession in the preparation of teachers. Areas for enhanced collaboration thus cover models of supervision and mentoring for preservice and beginning teachers (for example DEET, 2000; MACQT, 1997; 1998; 1999), and extend into areas like the development of professional standards for teachers and teacher education programs (AAMT, 2000a; b; c). Similarly, depending on the underlying tradition of teacher education, calls for stronger links range from more professional input into university programs through to locating significant parts of teacher preparation in schools (Grimmett, 1995; Burstein et al.; 1999).

There are multiple arguments in favour of stronger links. Grimmer (1995) articulates the argument for active partnerships between universities and schools, teachers and school communities, as part of the broader project of reconceptualising and improving teacher education. Similarly, Burstein and colleagues (1999) cast preservice teacher education as the joint responsibility of schools and universities, and argue that any restructuring and reform be based on improved links. Also, Cox, Fang, Carriveau, Dillon, Hopkins and Nierstheimer (1998) argue for better links in terms of structuring and better articulating the preservice, induction and inservice teacher education continuum. Bobis (2000) calls for improved links in order to lessen the potential clash between new teachers who may have acquired the knowledge and skills to implement initiatives like the National Literacy and Numeracy Plan, and the everyday realities, culture and practices of the school:

Initial teacher education and the ongoing professional development of teachers should not occur in isolation, but be viewed as integral components. A suggested strategy to achieve this is to encourage more collaboration between educational systems and faculties of education, such as school-university partnerships. (p. 37)

The argument here is that stronger school-university partnerships 'have the potential of enhancing numeracy at all levels of education' (p. 37) by directly involving schools and practising teachers in numeracy strategies and approaches brought to the school by beginning teachers. In relation to literacy, the NBEET and ALLC (1995) report argues for strengthened links between teacher education programs and sites that focus on teaching literacy and ESL across subject areas, as part of the process of preparing all teachers to effectively teach literacy.

Many arguments for stronger links centre on professional experience. For instance, in relation to the social and cultural dimensions of literacy learning and teaching, better links with schools and school communities are proposed as the way in which preservice teachers can gain a deeper understanding of diversity and the

necessary practices to teach effectively in these settings (for example Rosen & Abt-Perkins, 2000). In relation to numeracy teaching, Cumming (2000) argues that preservice teachers should have experience in 'non-school work environments' (p. 41) to enhance their understanding of the numeracy demands of these settings and how to connect these with numeracy teaching in school. Other proposed strategies to enhance the capacity of all teachers to effectively teach literacy and numeracy include the establishment of professional development schools (Burstein et al., 1999), and preservice teachers working directly with school communities as part of their preparation (McCaleb, 1998; Patton, Silva & Myers, 1999).

In a related way, some literature focuses on the use of multiple professional development components and settings to improve the knowledge-base of teaching in general, and literacy and numeracy teaching in particular (e.g., Grossman, Smagorinsky & Valencia, 1999; Marshall, 1999; Thiessen, 2000). These links are not limited to conventional practicum or internship models, but extend to alternative strategies like preservice teachers working with students in schools or universities in multiple arrangements.

Attempts to improve linkage are not, however, without their practical difficulties. There is a substantial body of literature that addresses failed partnerships between schools and universities (and other groups) (Berry & Catoe, 1994; Clark, 1988; Goodlad, 1990; Grossman, 1994; Williams, 1994). These failures often relate to the fact that more effort goes into the conception of the partnership than its implementation, to the idea rather than the reality.

Stronger accreditation

Another point of general agreement is the importance of professional accreditation standards for teacher education programs and preservice teachers. The broad argument here is for external accreditation authorities to monitor preservice teacher education programs and register teachers. Significant variation exists across states and territories in Australia.

For example, Queensland has a well established Board of Teacher Registration and detailed requirements for the content of preservice teacher education programs (Queensland Board of Teacher Registration, 1999), while the NSW Department of Education and Training (1998) is yet to settle on a system for accreditation of teachers or teacher education programs, following the review of teacher education in that state (see Ramsey, 2000). More recently the Victorian Institute of Teaching has been established as a statutory authority for the regulation and promotion of the teaching profession in Victoria. It has adopted guidelines developed by the Standards Council of the Teaching Profession to assess and approve teacher education courses.

Internationally, the issue of professional standards for teachers and teacher education is significantly developed in some countries. In the United States, for example, long-standing efforts to elaborate detailed standards are seen in the work of the National Board for Professional Teaching Standards (NBPTS), the National Council for Accreditation of Teacher Education (NCATE), and the Interstate New Teacher Assessment and Support Consortium (INTASC) (see for example NBPTS, 1989; 1996; NCATE, 2002a). As in Australia, however, the process in the US continues to be the subject of critique and questioning (e.g., Johnston & Ross, 2001; Petrosky & Delandshere, 2001).

While there appears to be increasing momentum toward the development of standards, there is substantial debate about the nature of the standards. That is, there is much more agreement about standards as a mechanism for guiding the quality of teaching than about the detail of any such standards. In Australia there have been two waves of standards development (Louden, 2000). The second of these waves has been led by subject associations, leading to specialist teaching standards in English and literacy (Doecke & Gill, 2001), mathematics (AAMT, 2002) and science (ASTA, 2002). Further work is continuing through the Ministerial Council for Education, Employment and Youth Affairs and various State registration agencies (see, for example, Ingvarson, 2002). The

current consensus, represented by the National Statement from the Teaching Profession on Teacher Standards, Quality and Professionalism (ACE, 2003), is that it is possible to 'identify common and agreed understandings about professional teaching standards and their relationship to teacher quality and teacher professionalism' (ACE, 2003, p. 1) but that 'many questions and issues remain to be addressed' (p. 4).

Initiatives like the Queensland Board of Teacher Registration's (2001) recent specification of standards for preservice preparation in literacy and the ACDE's (1998) guidelines for graduates of teacher education programs in literacy and numeracy do advance the teacher standards agenda at the preservice level. Further, during 2004 and 2005, the Victorian Institute of Teaching is using its Future Teachers Project to develop its own standards, guidelines and processes for the accreditation of preservice teacher education courses. Nevertheless, whilst such statements of standards are based on comprehensive reviews of the literature and on extensive consultation within the profession, they are not evidenced-based in the sense that there is a demonstrated link between teachers' achievement of these standards and students' superior achievement in literacy and numeracy.

Substantive issues

Substantive arguments for the effective preparation of teachers to teach literacy and numeracy tend to have as their central focus the content of, or approaches to, courses that deal directly with literacy and numeracy. The task of separating substantive argument from structural arrangements has proved to be conceptually difficult, given the strong tendency in the literature to fall back on established categories like the balance of discipline content, pedagogy, and professional experience in teacher education. For this reason, the discussion that follows is organised, in no particular order, around a set of headings that summarise positions articulated in the descriptive literature.

Personal competence

It is consistently argued that teachers need to be

sufficiently literate and numerate themselves as a prerequisite for their effective teaching in schools. The Adey Report, for example, makes the general call for teachers who 'have high levels of competence in literacy and linguistic awareness' and are 'adequately and confidently numerate' (ACDE, 1998, p. 13). Such understandings of personal competence in literacy and numeracy go beyond simply speaking English as a first language, for example, and/or assumed levels of competence based on the completion of school or university programs (AATE, 1999b). The broad consensus is that explicit preparation in literacy and numeracy is required to guarantee that preservice teachers have an adequate level of personal competence in these areas.

The competence of preservice teachers in literacy and numeracy is addressed in the literature in terms of both entry standards for teacher education programs, usually expressed as levels of mathematics and English completed in school, and exit standards on completion of the teacher education program. In terms of entry standards, for instance, Perry (2000) expresses concern about the preparedness in numeracy of most early childhood student teachers, in terms of their level of achievement in mathematics in school. He argues that, in general, preservice teacher education programs 'do not alleviate this deficiency in experience' (p. 32). Furthermore, Perry attributes this shortcoming of teacher education programs, in part, to a failure to implement recommendations (like those of the 1989 Speedy Review) to increase the amount of time devoted to mathematics content in teacher education programs.

Similar claims are made with respect to primary teachers, and secondary teachers of English and mathematics. Kaminski (1997), for example, focuses on a specific aspect of numeracy competence, citing preservice primary teachers' 'underdeveloped sense of number' (p. 233), and calls for core mathematics courses that address this deficiency within preservice teacher education programs. More broadly, an Australian Government report cited the lack of uniformity across teacher education programs in setting the required 'literacy competence of students entering teacher training,' and recommended

that a 'minimum level of mathematics and English for entrants to teaching faculties' be established (House of Representatives Standing Committee on Employment, 1993, p. 31).

The common response to such concerns is to raise or standardise literacy and numeracy prerequisites for entry into preservice teacher education programs. Bobis (2000) cites some initiatives in the area of mathematics, such as the need for all primary teachers in Tasmania to have completed Year 12 mathematics or, in NSW, at least 2 units of mathematics. The NBEET and ALLC (1995) report on English language and literacy argued for preservice teachers who are 'effective practitioners of literacy themselves' (p. 68) and made the recommendation that a 'satisfactory Year 12 English result' be required for all entrants into teacher education programs (p. 65).

In a critique of initiatives centred on entry standards, Bobis (2000) argues that such efforts are, on their own, insufficient to raise the quality or effectiveness of teachers of numeracy. Part of the problem identified by Bobis is the simple equating of mathematics with numeracy that is inherent in such initiatives, thus failing to address preservice teachers' understanding of the nature of mathematics and numeracy knowledge that is required for effective teaching:

Simply undertaking more mathematics courses is not going to be sufficient for preservice teachers if long-term problems in numeracy exist. It must be remembered that 'mathematics' does not equate to 'numeracy' and that while numeracy involves aspects of mathematics, mandates that require preservice teachers to undertake more mathematics content-based subjects, will not necessarily address the wider dimension inherent in our understanding of what it means to be numerate (p. 30).

Hence, in addition to entry standards in literacy and numeracy, most arguments for enhancing the personal competence of preservice teachers emphasise the attention given within teacher education programs to personal levels of literacy and numeracy. Typically, this attention manifests

itself in the form of statements of exit standards. For instance, the NBEET and ALLC (1995) report argues for national competency statements for teachers of English literacy, including specialist and non-specialist teachers of English and ESL.

Personal dispositions

Preservice teachers' dispositions towards literacy and numeracy, towards teaching in these areas and towards learning in general are also identified as issues in teacher education. The most common concern raised about dispositions relates to preservice teachers' attitudes towards the subject areas, particularly mathematics. Bobis (2000), for example, cites literature arguing that:

a large proportion of preservice primary teachers not only hold negative attitudes towards mathematics and possess poor attitudes towards the teaching of it, but lack the knowledge and confidence to teach mathematics effectively (pp. 28-29).

On the other hand, she identified 'a positive attitude towards mathematics' (p. 8) as a key characteristic of effective teachers of numeracy. Similarly, Perry (2000) argues that many early childhood preservice teachers 'have quite negative attitudes' (p. 32) to mathematics. The concern is that preservice teachers' own lack of enthusiasm for the subject can interfere with their expressed desire as teachers to develop students' enthusiasm for literacy and numeracy.

Bobis (2000) endorses the importance of mathematics content to prepare teachers to teach numeracy, but emphasises that any strategy to achieve the numeracy education agenda must do more than just increase mathematics content knowledge. She draws on research by Askew et al. (1997) that identified 'a particular set of coherent beliefs and understandings which underpinned a particular array of teaching practices' as the most significant distinguishing feature of 'effective teachers' of numeracy at the primary school level. Bobis notes that the Askew study did not identify mathematics qualifications and/or attendance at professional development activities as

characteristic of 'effective' teachers of numeracy, leading her to conclude:

What does seem certain, is that while having an extended knowledge base of mathematics is helpful, it is not necessarily enough to ensure a teacher is effective. What matters more is the nature of the knowledge (p. 8).

The emphasis here is on preservice teachers' underlying beliefs and attitudes towards teaching and learning in numeracy. Similarly, Stephens (2000) stresses the importance of preservice teachers' beliefs in relation to the capacity of all students to become numerate.

In a review of dilemmas and tensions in mathematics teacher education, Schuck (1996) identifies other dispositions of preservice teachers that can impact on their effectiveness in teaching numeracy. She outlines the tension between preservice teachers' lack of confidence in their knowledge of mathematics and ability to respond to students' questions, and their expressed belief that effective mathematics teachers have high levels of competence in these areas. She also demonstrates that preservice teachers recognise mathematics and its teaching as 'complex and uncertain,' but are reluctant to accept such a problematic approach in the pedagogy of their mathematics teacher educators.

In a similar vein, Ensor (2000) identifies the contradiction between preservice teachers' expressed preference for student-centred, problem-solving, discovery approaches to the teaching of mathematics, and their subsequent practice in which they revert to a teacher-centred approach with closed questions and limited interaction with students. Such dispositions among preservice teachers are posited as barriers to their effective preparation for teaching literacy and numeracy.

This literature is stronger on critique than it is on the articulation of strategies to overcome such dispositions. While Christie et al. (1991) argue that 'English literacy is optimally taught by critical, innovative, intellectually curious teachers' (p. 27) and the same could be said for numeracy, it is unlikely that preservice teacher education

can produce such teachers without greater attention to strategies designed to address dispositions. Aldridge and Bobis (2001) make some explicit recommendations about the need to develop multiple contexts and situations for teacher education components to better link the knowledge base of numeracy to teaching practices. By developing and changing these settings, they argue, teacher education can influence preservice teachers' beliefs about mathematics, and themselves as teachers of mathematics.

Broad knowledge

The most common critique of teacher education in the literature is that teachers lack the breadth and depth of content knowledge required to teach literacy and numeracy effectively. More specific claims about precisely what knowledge and understanding are needed vary in form and substance. There are lists of competencies, such as those identified in the Adey Report (ACDE, 1998); areas of knowledge to be addressed, such as provided by Victoria's Standards Council of the Teaching Profession (1998) or the Queensland Board of Teacher Registration (2001), and arguments about the nature of knowledge and the importance of critical reflection (e.g., Bobis, 2000; Willis, 1998a).

At a minimal level, there is concern that teachers have the necessary knowledge and understanding that will allow them to work effectively with a wide range of students (see for example ACDE, 1998). Work articulating the details of such knowledge and understanding is extensive, covering multiple aspects of literacy and numeracy and their effective teaching in schools. Major areas identified in the literature include preservice teachers' knowledge of literacy and numeracy and their ability to apply this knowledge to specific problems faced by students, including the use of appropriate intervention strategies; their knowledge of contemporary policy issues around literacy and numeracy teaching; and their understanding of the role of literacy and numeracy in other learning areas.

Given national literacy and numeracy agendas

to ensure basic levels of literacy and numeracy for all, preservice teachers' competence with intervention strategies receives major attention in the literature. Layton and Deeny (1995) in the UK, for example, argue for content that directly prepares preservice teachers to identify the need for, and provide, early intervention in literacy:

With improved initial training, primary teachers could be better equipped, not only to address manifest reading and spelling difficulties but to predict where problems can arise (p. 20).

A federal report in Australia similarly contains a focus on preservice teachers' knowledge of early intervention strategies and their effective use, citing the 'First Steps' and 'Reading Recovery' programs in particular (House of Representatives Standing Committee on Employment, 1993).

Layton and Deeny (1995) are critical of teacher education programs in the UK for not adequately preparing teachers with the knowledge and strategies required to address students' reading and spelling difficulties. They also call for teachers of literacy to have a deeper understanding of linguistics and language acquisition, and the processes of written and spoken languages and links between them, as a part of the required preparation. Hence, the recommendation is for teacher education programs to include 'detailed consideration of the skills underpinning reading and spelling, of how these skills should develop, and of what might interrupt the developmental progression' (p. 22).

Nolen, McCutchen and Berninger (1990) recommend that programs spend more time developing preservice teachers' specialist literacy preparation, specified as: language development, the psychology of reading and writing, children's literature, methods of developmental reading and writing instruction, clinical diagnosis of reading and writing disabilities, and the remediation of reading and writing disabilities. The Australian Association for the Teaching of English (AATE, 1999b) similarly outlines some of the 'essential background' and training and development needs of English teachers, including: the development of language skills; how students

acquire and develop language, including speaking, listening, reading and viewing; the process and development of reading skills; how texts are created; the range of texts and how to refine and further develop them; English language including linguistic structures and grammar; and how to develop the speaking, reading and writing of native English speaking and NESB students.

In the US, Snow, Burns and Griffin's (1998) research synthesis on children's literacy development lists content areas that ought to be included in early childhood and primary teacher education programs. For early childhood these content areas include: lexical development; listening comprehension skills; sense of story; sensitivity to the sounds of language; developmental conceptions of written language; fine motor development; and inspiring motivation to read. For primary teacher preparation, they add: linguistic and psycholinguistic studies dealing with the features of written and oral language; rhetorical, sociological, sociolinguistic, and anthropological studies dealing with the genres, registers, functions and contexts of texts; and pedagogy of reading.

Similar areas of knowledge are addressed with respect to numeracy, dealing with preservice teachers' knowledge and understanding of the interconnected skills of mathematical reasoning, and the application of these to contemporary mathematical and real-life problems (Bobis, 2000; Goos, 1999; Taplin, 1998). Willis (1998a) elaborates the need for preservice teachers to develop a deep understanding of mathematics and numeracy content in ways that are connected to multiple school and social contexts, and involve the strategic knowledge required to make judgements about when and how to use this content.

In addition to knowledge of specific aspects of literacy and numeracy, there is consistent reference to preparing teachers who understand literacy and numeracy as fundamental components of all learning. The Adey Report, for example, cites a range of understandings for teacher education graduates in the area of literacy that emphasise its integral connection to 'learning in all areas of the curriculum' (ACDE,

1998, p. 13). In particular the report lists connections between literacy and students' learning in technology, their communicative and learning capacities generally, and between literacy in first and subsequent languages. Christie et al., (1991) broaden this point to include the 'fundamental role of language and literacy in the social organisation of experience and meaning' (Preface).

The Christie Report (Christie et al., 1991) included as important aspects of preservice preparation: an academically rigorous understanding of language and its role in constructing knowledge; functional grammar and the relationship between text and context; theories on the social character of literacy; and how to teach English language and literacy to NESB and Aboriginal and Torres Strait Islander students. Similar arguments are made by the Numeracy Education Strategy Development Conference (1997) with respect to numeracy on the premise that numeracy is 'more than a capacity to work with numbers' (p. 1). Such an approach emphasises that:

an appropriate level of numeracy underpins learning and progress in other learning areas. Students without appropriate levels of numeracy are 'at risk' in their learning and general progress at school. Like literacy, numeracy is therefore 'everyone's business' (p. 2).

A further aspect of knowledge to be addressed in preservice programs is the nature of literacy and numeracy in contemporary contexts (for example ACDE, 1998). In order to teach literacy and numeracy effectively, it is argued that teachers need to understand current policy issues like the recurrent claims of 'crises' in literacy and numeracy in Australia, and the subsequent politicised national benchmarks agenda that has been developed. With respect to preservice teachers' knowledge and competence, politicians and officials have argued that teachers need to understand the benchmark tests and their diagnostic value in identifying students in need of intervention (see Ellison, 1998; MCEETYA, 1998).

Christie et al. (1991) explicitly recommended that teacher education programs for teachers of English include the study of the 'history and current construction of the discipline of 'English', including some examination of changing government policies and priorities in English teaching' (p. 153). There is also literature that, in the name of deep understanding, requires preparation of preservice teachers who recognise the potential misuse of benchmarks, and hence use them in more critical ways in their teaching (see Luke & van Kraayenoord, 1998; Willis, 1998a).

Given the emphasis in the literature on the need for all teachers (at all levels, and in all subject areas), to be prepared for literacy and numeracy teaching, another key aspect of knowledge to be covered in preservice programs is a cross-curricular approach to the teaching of literacy and numeracy (e.g., ACDE, 1998; Standards Council of the Teaching Profession, 1998). This concern to make clear the links between literacy and numeracy and all other subject disciplines is based on long-standing initiatives to approach the teaching of literacy on a cross-curriculum basis, and more recently to apply a similar approach to the teaching of numeracy (for example Numeracy Education Strategy Development Conference, 1997).

A recurring criticism in the literature is that teacher education programs fail to meet this goal of preparing all teachers, instead tending to focus on preparation to teach literacy and numeracy for teachers of mathematics and English. This reality of many programs often works in practice to reinforce the erroneous tendency to equate literacy and numeracy with English and mathematics (see for example NBEET & ALLC, 1995). An additional point of critique argues that narrow definitions of literacy and numeracy, tied to benchmark measures for national testing, work against cross-curricular practices in schools (Willis, 1998b).

More generally, Cumming (2000) notes as problematic the fact that important recommendations, such as cross-curriculum approaches to literacy and numeracy, are frequently not incorporated into teachers' beliefs

or teacher education programs. She cites recommendations from the Christie Report (Christie et al., 1991) for changes to literacy education in preservice teacher education 'that may still not be being met by most institutions' (p. 41).

Relevant knowledge

Ensuring the relevance of propositional knowledge in preservice programs for literacy and numeracy teaching is another substantive issue in the literature. The focus here is on the extent to which knowledge in preservice programs includes current developments and effective practice in literacy and numeracy teaching, in ways that directly connect with meaningful contexts and situations both in and outside schools. Three main features of relevant knowledge identified in the literature are: information that is both current and relevant to contemporary needs in, and issues surrounding, literacy and numeracy and their teaching; providing preservice teachers with access to real students, including professional experience activities that enable them to engage meaningfully with the teaching of literacy and numeracy, linking their developing knowledge base with teaching practice; and including knowledge of contemporary, out-of-school experiences and applications in relation to literacy and numeracy.

A common criticism of teacher education programs points to the lack of currency of the content knowledge presented to preservice teachers, and hence the need for up-to-date knowledge of issues and developments in literacy and numeracy teaching. For example, Nolen et al. (1990) claimed that both programs and state registration requirements were failing to keep up with changes in language and literacy. They argued that more current content on reading and writing should be included in programs and as criteria for certification, as a way of ensuring that 'all teachers have the knowledge and experience they need to become effective teachers of reading and writing' (p. 68).

Thiessen (2000) reports on work in the US and UK to argue for combinations of practical and propositional knowledge in teacher education programs as the basis for effective teaching. A

Schools Council (1990) report articulated the issue in terms of teacher educators not being up to date with the contemporary needs of schools and their students. Along similar lines, an AATE (1999a) position paper emphasised the need for teacher education programs, and teacher educators, to 'maintain an informed, relevant awareness of current practice in schools' (p. 2). The argument here is that the inclusion of current information can more effectively prepare teachers for schools as they are, or might be, rather than for schools of the past. Such statements connect with broader critiques of teacher education as out-dated or out of touch (e.g., Ramsey, 2000), and with concerns about the quality of teacher education offerings in preparing teachers for their literacy and numeracy responsibilities.

Professional experience and other specific initiatives and programs are identified in the literature as critical aspects of preservice teacher preparation through which relevance can be enhanced. One approach advocated in the literature centres on connecting preservice teachers with 'real' students in schools. Marshall and Davis (1999), for example, report on a study involving a 'pen-pal exchange' between early childhood preservice teachers in a University program, and 'first-grade emergent writers' (p. 53). They argue that this type of course, involving preservice teachers in direct contact with emergent writers, helps them to construct their own knowledge about literacy through experimentation and exploration. Like more conventional professional experiences, the emphasis here is on the potential contribution of this type of practice to the identified lack of work on 'how university preservice teachers can best be helped to understand how a young child's literacy develops' (p. 53). Further, they report that it helps preservice teachers to effectively connect 'important theory and research with actual classroom practice' (p. 53).

This emphasis on connecting preservice teachers with students, and providing opportunities for them to apply their developing knowledge base in a variety of contexts with students, is seen as an essential feature of effective preparation (e.g., Marshall, 1999; Snow, Burns, & Griffin, 1998; National Institute

of Child Health and Human Development, 2000; Grossman, Smagorinsky & Valencia, 1999; Thiessen, 2000). These strategies are not limited to conventional practicum and internship models, but include multiple alternative settings that bring students and preservice teachers together.

Similarly, field experience components of teacher education programs are seen as potential sites for connecting preservice preparation with real-life contexts and situations. It is argued that this component of teacher education can help preservice teachers to understand the actual needs of students and their communities, including contemporary issues around the teaching of literacy and numeracy. Such experiences are seen as foundational to preparing teachers to deal with these issues in their teaching. As expressed by Linek et al. (1999):

a connection to the field appears to provide the concrete experience preservice teachers need to test their new knowledge and anchor their developing beliefs about literacy teaching and learning (pp. 382-83).

The arguments here are not just about more professional experience but about the nature and quality of that experience. The supervision of preservice teachers during their professional experience is a related issue, with specialist literacy and numeracy assistance seen as necessary to make the experience relevant. Christie et al. (1991), for example, called explicitly for the placement of preservice teachers with high quality and innovative language teachers. Brown and McGannon (1999) also called for the placement of preservice teachers with highly credentialed specialist language teachers. They supported this call by interviewing preservice teachers who attested to the importance of such support, both in terms of being provided with quality role models to observe, and receiving specialist support for their own practice. Similarly, Rosen and Abt-Perkins (2000) emphasise the importance of the professional experience placement and supervising teacher. In the name of deeper and more authentic understanding, relevant knowledge in the preparation of teachers is also characterised

in terms of explicit connections between content knowledge in literacy and numeracy and out-of-school, real life situations and applications. Cumming (2000), for example, highlights connections between mathematics and numeracy and out-of-school applications, in terms of links with technological changes in the world of work. She foreshadows 'dramatic change' for numeracy education in the future, in response to technological changes and transitions, and argues that this change is dependent on the 'responsiveness of teacher education institutions to prepare graduates for the future' (p. 41). In this context, she cites work by Cumming, Wyatt-Smith, Ryan and Doig (1998) that called for a 'changed focus of curriculum and closer integration of in-school and out-of-school activities' with direct implications for preservice teacher education (p. 41). A specific recommendation was that:

all teachers should be able to participate in non-school work environments in order to have more effective knowledge of the demands, in this case numeracy demands, of such environments and better ways of linking with school learning (p. 41).

A clear implication is that the teaching of numeracy should be connected to multiple, relevant applications. This extends to the issue of teacher education preparing all preservice teachers to understand and make these connections, given that 'all teachers have responsibility for numeracy' (p. 41).

Problematic knowledge

There is a substantial body of literature that emphasises the need for preservice teachers to develop an understanding of the uncertain nature of literacy and numeracy if they are to teach effectively in these areas (for example Bobis, 2000; Christie et al., 1991; NBEET & ALLC, 1995; Nicol, 1999; Willis, 1998a). The idea of uncertainty in literacy and numeracy is directly linked to the notion of multiple literacies and numeracies, dependent on changing sociocultural contexts. Luke (1998), for example, argues that the teaching of English literacy ought to focus squarely on the content of multiple and changing literacies in

both contemporary and future society. From this same perspective, Green (1999) emphasises the rapidly changing substance of literacies linked to new technologies (p. 39). Similarly, the Queensland Board of Teacher Registration (2001) acknowledges the changed and changing character of multiliteracies in new times.

With respect to numeracy, Willis (1998b) outlines a similar approach in arguing for 'the literacy view of numeracy' (p. 35), involving more complex and problematic understandings of numeracy in context. Here she outlines the idea of communicative competence in numeracy across different contexts, so that 'we are more or less numerate with respect to particular settings or circumstances' (p. 35). She adds that such an understanding of the concept of numeracy must include its relationship to mathematics and/or numeracy, and definitions of what constitute the 'new basics' in numeracy, all having implications for numeracy practice in schools.

Extending the ideas of the 'basic skills notion of numeracy' (p. 33) which equates numeracy with mathematics, and different numeracies in context, Willis (1998b) advocates an understanding of numeracy that incorporates mathematical, situational and strategic skills and competencies. As with literacy, the argument is that problematic understandings of multiple numeracies ought to be the basis on which any national numeracy plans are developed.

Nicol (1999) advocates that preservice teachers learn to accept mathematics and its teaching as a 'complex and ill-structured activity... [with] ... an emphasis on discussion, critique, and investigation of pedagogical problems as they might arise in the context of practice' (p. 47). She reports on a teacher education course in mathematics curriculum and instruction that develops preservice teachers' use of questioning, listening and responding, in part, by having them critically reflect on the contradictions between their own practice and stated goals. Preservice teachers who had developed such understandings were found to take these into their teaching:

They were listening to students' thinking as well as to their own goals and directions of instruction. And they were attempting to respond in ways which build upon and respect student ideas. And with this, teaching became more complex, difficult, uncertain, and risky (Nicol, 1999, p. 63).

While the idea of developing preservice teachers' critical understanding emerges strongly in the literature, examples of specific recommendations detailing how this can be achieved are less frequent. Knobel (1998) outlines activities, resources and questions to be used with primary teacher education students for their preparation in 'the meaning and application of critical literacy in primary classrooms' (p. 89). In the process she advances the use of key questions and related activities to develop preservice teachers' understanding of critical literacy and approaches to its teaching in schools, as strategies to prepare critical teachers of literacy in primary schools.

Addressing diversity

The need to prepare teachers to deal with diversity in their teaching is a dominant theme in the literature, cutting across multiple aspects of programs. However, there is no systematic accounting of each recognised form of diversity as it applies to preparing teachers to teach literacy and numeracy. Rather, the literature either argues for general principles applicable to all groups, or focuses on teacher preparation implications in relation to one or other specific group. Christie et al. (1991) articulate the issue in terms of multiple 'communities of learners' for whom preservice teachers needed to be prepared to teach English language and literacy. Communities listed by Christie included those identified by ethnicity, gender, social class, generation, NESB and other special needs relating to disability and geographical location. The explicit call here was not only to recognise and meet the specific literacy needs of these groups, but to use this diversity 'as a productive resource for language and literacy teaching' (p. 111).

A related, overarching aspect of preparing teachers to effectively address diversity in their teaching practice is raised by Luke (1998) in a critique of the tendency of teacher education programs to focus on a single or best teaching method to achieve literacy and numeracy outcomes. Luke (1998) highlights the need to prepare teachers to accept and use multiple methods and approaches, for different contexts and with different students.

Rosen and Abt-Perkins (2000) put forward some detailed proposals related to preservice teachers' knowledge and experience of multicultural and multi-linguistic settings as an essential part of their preparation to teach literacy. They outline four principles as a 'framework for teacher education programs that address the literacy needs of classroom diversity' (p. 252). These principles cover preservice teachers' awareness and understanding of: their own cultural values (through critical self-reflection); the inherent sociocultural values in literacy materials and practices; the impact of cultural identities on reading and writing choices; and the impact of linguistic and cultural differences on literacy learning, as well as the need for sensitivity and strategies to meet the needs of this diversity. They endorse some specific course components that contribute to preservice teachers' understanding of these issues, such as preservice teachers completing fieldwork seminars on value orientations and autobiographical reflection on the cultural influences over their personal literacy development.

Such professional experience is part of a broader approach to teacher preparation that centres on developing preservice teachers' understandings of the content, and themselves as teachers, in critical and problematic terms. Wiggins and Follo (1999) point to the limitations of such professional experiences in isolation, noting the potential for reinforcing negative stereotypes held by preservice teachers about disadvantaged groups, without associated coursework to support the experiences. They argue for 'some combination of multicultural coursework, field experience, and modelling by successful practicing teachers' (p. 103).

The issue of site selection for professional experience is similarly raised by Xu (2000), who cites some different approaches to increasing the effectiveness of teacher education programs. These strategies include: immersing preservice teachers in 'cultural communities different from theirs' (p. 135) and placing them in schools for professional experience with a diverse student population. The benefits of multicultural and multi-linguistic settings are thus argued in terms of providing preservice teachers with opportunities to address in practice the specific literacy and numeracy needs of diverse groups of students (Brown & McGannon, 1999; Rosen & Abt-Perkins, 2000).

The emphasis here is on teacher education programs that explicitly develop preservice teachers' understanding of diversity and their ability to use this understanding for more effective teaching of literacy and numeracy, through a focus on critical reflection and practice. In this sense, it is a question of going beyond the inclusion of more content knowledge about diversity, towards targeted courses, placements, and links to diverse settings on the one hand, and an underlying critical approach that simultaneously develops preservice teachers' capacity for self-reflection on the other.

Critical reflection

The issue of critical reflection is developed in the literature in several ways that impact on the substance of effective practice in preservice teacher education. Broadly, the issue deals with the approach taken to the content of teacher education programs and how that content is presented to preservice teachers, and the capacity of preservice teachers to engage in critical reflection in relation to their own beliefs and practice, the content of the teacher education programs, and school curricula. As such, critical reflection intersects with issues addressed earlier such as personal dispositions, making knowledge problematic, and addressing diversity, thus adding to the substantive nature of these issues.

One level of argument in the literature focuses on preservice teacher education programs, and teacher educators within them, adopting a critically reflective approach to the preparation of teachers. Brown and McGannon (1999), for example, use data from interviews with preservice ESL and LOTE teachers, following their professional experience placements, to support the concept of a reflective approach to teacher education in which teacher education institutions 'develop an understanding of student teachers' knowledge' (p. 2). They argue that the process of preservice teachers reflecting on their experience and practice can help institutions to 'design teacher education strategies and to specify the content of teacher education in ways which can develop that existing knowledge more effectively' (p. 2).

The need to challenge preservice teachers' beliefs in general, and beliefs about teaching literacy and numeracy in particular, is a strong theme in the literature. O'Neill (2000), for example, reports on a single year Graduate Diploma of Education program 'modelling integration and reflective practices' (p. 616) for language, literacy and learning. She articulates the argument that teacher education must challenge preservice teachers' assumptions and beliefs, and develop 'critically reflective practitioners' (p. 616), as an integral requirement of preparing effective teachers. Results from the study suggest that as a consequence of the program, preservice teachers were able to critique their previously held positions on literacy, their preferred orientation to English, their own teaching practices (from a theoretical perspective), and the resource materials available for their teaching.

Malette et al. (2000) explore the meanings constructed by preservice teachers about students with reading difficulties, with some consequential recommendations about coursework in preservice teacher education that focuses on students exploring 'their developing stances and self-constructed meanings about reading' (p. 593). The argument here is that teacher education programs can and ought to challenge preservice teachers' assumptions and understandings of literacy and numeracy, and

how to teach them. Implicit in this argument is the idea that such programs can contribute to preservice teachers' development of deeper and more critical understandings of literacy and numeracy, and their teaching. These authors (Mallette et al., 2000) provide an example of how this process might work by reporting on a case study in which preservice teachers work with a student experiencing reading difficulties and articulate their stance towards the identified difficulty and the pedagogy required to address it.

Similarly Stuart and Thurlow (2000) report on a program that shifts the focus from instructional and motivational strategies, to preservice teachers examining the relationship between their beliefs and their classroom practice. Using a study of preservice mathematics teachers' attitudes and beliefs towards the teaching of mathematics, they conclude that by making explicit and challenging preservice teachers' beliefs and attitudes they came to understand 'the critical role their beliefs may have on the many decisions they will make as teachers' and preservice teachers 'came to consciously understand and re-examine the effects of these beliefs on their decision making about classroom practice' (p. 119).

Linek et al. (1999) claim that programs like these can lead teachers to develop a 'complex, student-centred, meaning-based philosophy in which the child actively constructs knowledge' (p. 380). In this way, critical reflection leads to qualitatively new approaches to the teaching of literacy by preservice teachers. Bobis (2000) takes the issue further by arguing for models of teacher education that focus on preparing critically reflective teachers as a strategy to overcome problems experienced by them in applying principles of good teaching practice learned in programs. She cites research showing that:

graduates of 'critically reflective' teacher education programs retain their progressive, student-centred attitudes and ideals in spite of the pressures and constraints encountered in the classroom (p. 28, referring to Ballantyne, Hansford & Packer, 1995).

On an additional level, there are arguments for the explicit preparation of preservice teachers to critically reflect on the official curricula of schools in the areas of literacy and numeracy and, as a consequence, respond appropriately so as to maximise students' learning. The approach advocated is that critical self-reflection contributes to teachers' deeper understanding of literacy and numeracy in relation to student needs, thus building on their knowledge of official curriculum frameworks (see Bobis, 2000). For example, the AAMT (2000a) argues that any professional standards need to include both the expectation that teachers will be prepared to 'fully implement the aims and objectives of the relevant school curriculum,' and the simultaneous standard that, as professionals, teachers will 'ask questions of the prescribed curriculum and point out the weaknesses' (p. 4) as part of their critical thought and practice.

It should be noted that while there is considerable consensus around the issue of critical reflection, it is not without critique. Klein (2000), for example, highlights the potential for preservice teacher education to simply reproduce existing power relations and negative attitudes towards mathematics, which in turn impact on the formation of teachers. She argues against the common premise that preservice teachers will collectively construct knowledge through rational and critical reflection, and consequently implement this knowledge in classrooms in ways that produce progressive change in teaching. Rather, Klein calls for a more problematic and less linear view of 'agency for preservice teachers' as the basis for enhancing the potential impact of preservice teacher education on teaching in schools.

Summary and conclusions

The purpose of this literature review is to establish a platform for the empirical phases of the research project. Which issues have been regarded as important, and what evidence is there that these issues influence the quality of teacher preparation?

This review has distinguished between structural and substantive issues. The consensus view of the important structural issues is that:

- **length and status** of preservice programs need to be enhanced;
- **more time** needs to be devoted to explicitly preparing teachers to teach literacy and numeracy;
- the **professional experience** component of programs needs to be enhanced in terms of length, structure and quality;
- **links** between teacher education institutions, schools and their communities need to be enhanced; and
- **accreditation** of teacher education programs and system-wide teacher registration need to be further developed nationally.

Considered together, it may be argued that the structural issues identified in the literature review have the character of ambit claims. They frequently lack either detailed specification or empirical justification. In addition, they rely on resource shifts that are easier to argue for than to achieve in practice. Programs are unlikely to be lengthened, particularly in the context of foreshadowed teacher shortages. The crowded teacher education curriculum limits providers' capacity to increase the proportion of time devoted to literacy and numeracy content. The high cost of school experience, too, limits providers' capacity to re-shape and extend the amount of professional experience in literacy and numeracy. Improved linkages imply dramatic re-ordering of schools' and universities' priorities. Improved accreditation has its attraction as a policy device, but is a reform that stands at some distance from the day-to-day operation of teaching and learning programs in teacher

education. And besides, any accreditation is only as good as its capacity to regulate issues of substance.

Beside these structural prescriptions stand a set of substantive issues concerning preservice teachers' own competence and dispositions, the nature of the knowledge addressed in preservice programs and the way in which preservice teachers are prepared to deal with diversity.

- **Personal competence:** Commentators have argued for higher levels of personal competence in literacy and numeracy, typically achieved through more demanding coursework as well as higher entry and exit standards. Personal numeracy is regarded as an especially pressing problem among preservice primary teachers.
- **Personal dispositions:** Positive attitudes towards mathematics are regarded as particularly important. In addition to personal confidence in mathematics it is argued that effective numeracy teaching requires belief in students' capacity to become numerate, as well as an understanding of the complexity and uncertainty of mathematics.
- **Broad knowledge:** Breadth and depth of knowledge in the content areas are most commonly regarded as a weakness in preservice teachers' preparation. The literature includes many sets of specifications for the knowledge required to teach literacy and numeracy, including specifications for teaching in the different phases of schooling and for specialist and non-specialist literacy and numeracy teachers.
- **Relevant knowledge:** Preservice teachers' knowledge of effective literacy and numeracy practices is a widespread concern. Commentators have argued the importance of current propositional knowledge about teaching, of programs that allow preservice teachers to develop

their knowledge base through links with teaching practice, and for the value of non-school educational encounters with students.

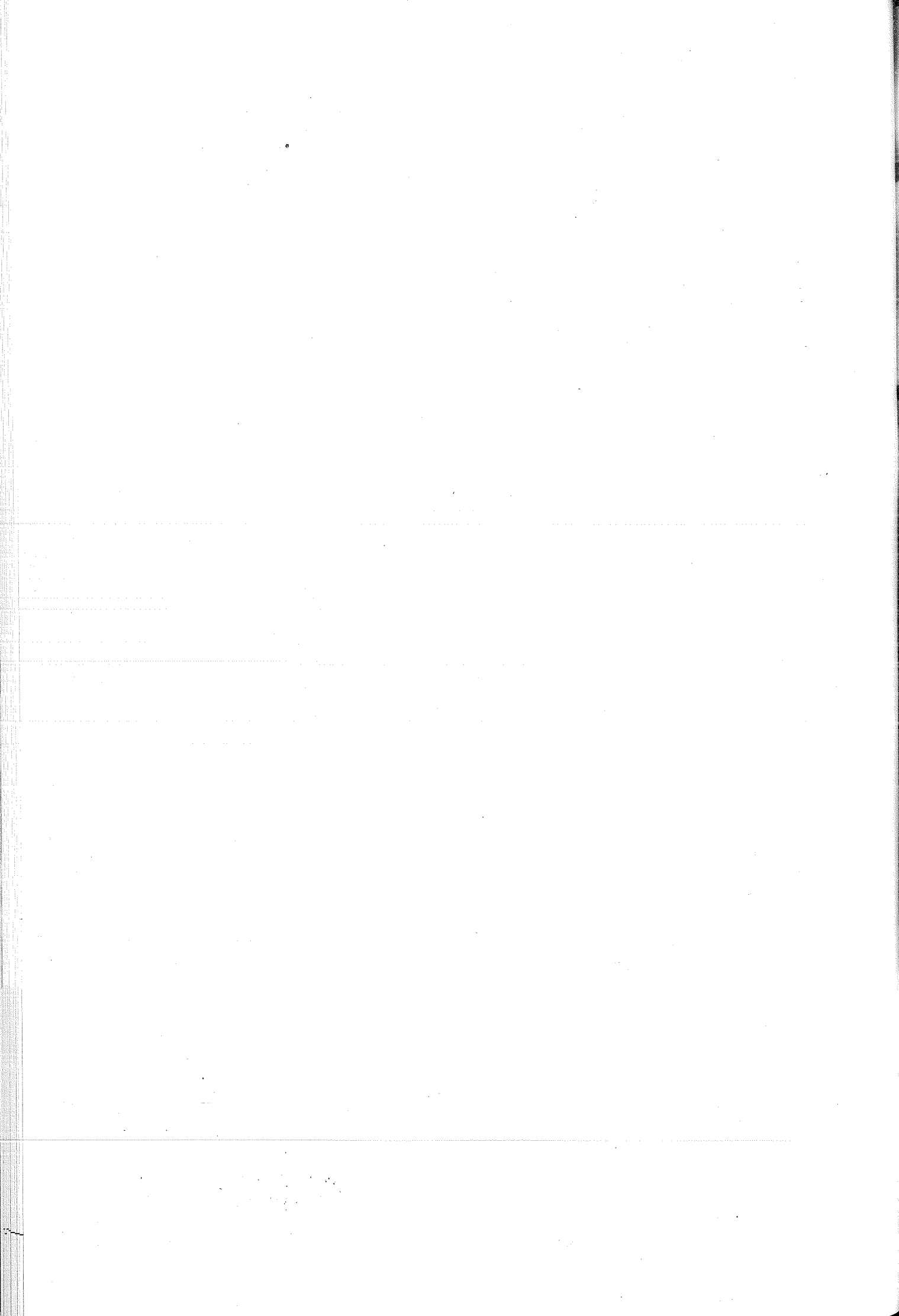
- **Problematic knowledge:** Literacy and numeracy researchers lay particular stress on the importance of developing a sense of the uncertain and contingent nature of knowledge of literacy and numeracy teaching alongside the learning of propositional knowledge about effective teaching. Among the uncertainties are the impact of socio-cultural contexts on literacy and numeracy and the effects of new technologies.
- **Addressing diversity:** Teacher educators have strong commitments to the need to prepare preservice teachers for diversity. Strategies proposed include increased awareness of preservice teachers' own cultural values, understanding of socio-cultural values in teaching resource materials, the impact of socio-cultural differences on learning, and the importance of practical teaching experience in diverse cultural communities.
- **Critical reflection:** Among the areas for critical reflection developed in the literature are preservice teachers' inquiry into their own beliefs and into the content of school curriculum and syllabus documents, as well as the development of a disposition towards reflection and critique of their own and others' teaching practice.

Personal dispositions are probably a more important influence than personal competence on preservice teachers' preparation for literacy and numeracy teaching. Understanding and embracing the problematic nature of knowledge and developing the capacity to reflect critically appear to be important factors in influencing the dispositions of preservice teachers. On the other hand, the general teacher education literature confirms how difficult it is to change the beliefs and assumptions of preservice teachers (e.g., Zeichner & Tabachnick, 1985).

The importance of breadth and relevance of preservice teachers' knowledge is axiomatic, and there are many lists of the specific knowledge required for literacy and numeracy learning at each phase of schooling. There remains some uncertainty, however, about the balance between breadth and depth, and between the propositional aspects of teachers' knowledge and the capacity for reflection and critique.

Similarly, in relation to professional experience there is a need for greater clarity about how placements interact with student teacher learning, about what constitutes high quality supervision, and about the impact of professional experience on preparation for teaching diverse student populations. In this matter, like so many others in teacher education, there is an urgent need for empirical inquiry that links program characteristics with beginning teachers' practice and their students' literacy and numeracy learning.

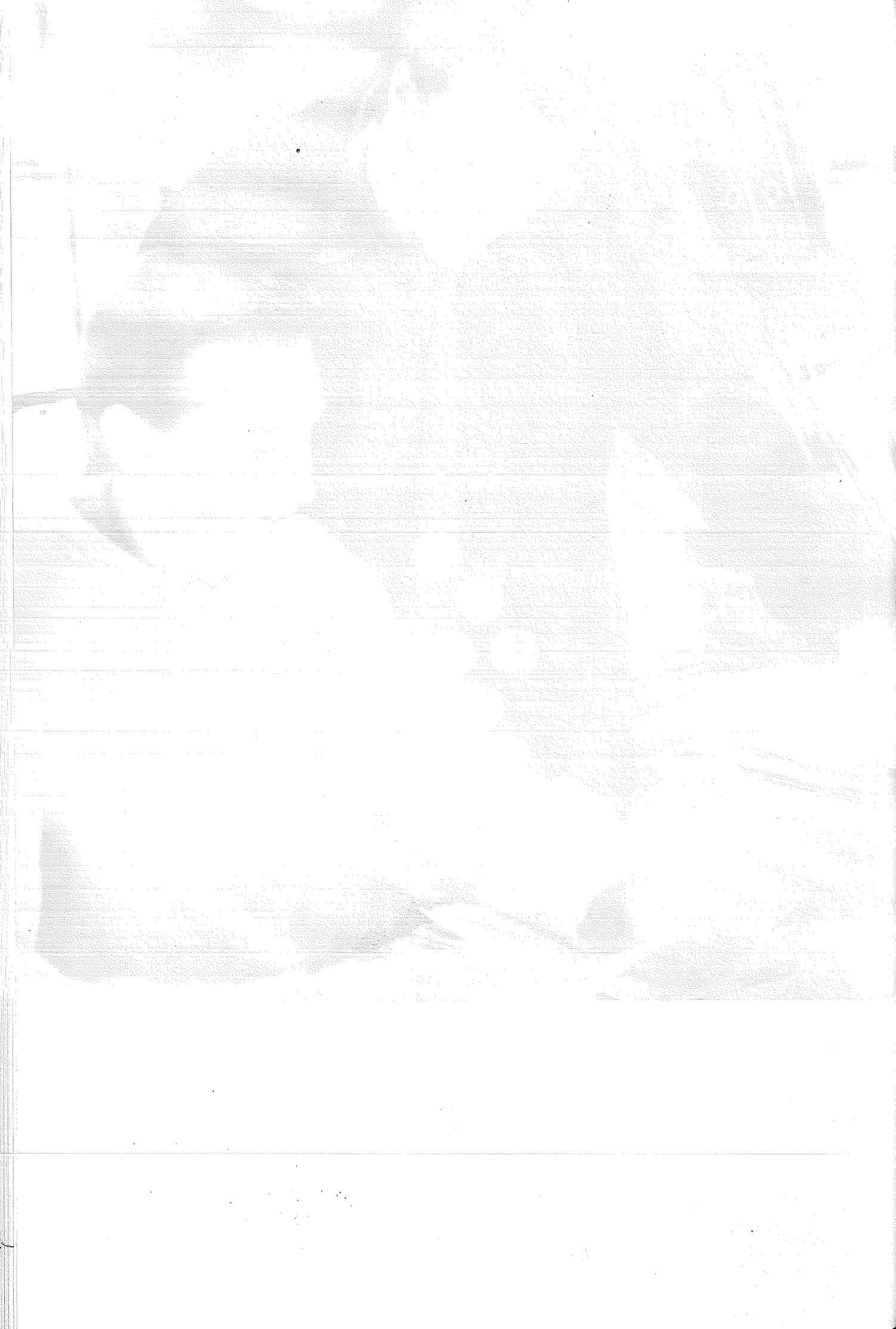
The consensus about which substantive issues in teacher education require attention obscures the tensions between these issues, and the weak empirical basis for many of these claims to attention. Personal competence is an important issue, especially in terms of public and educational credibility. There may be relationships among personal competence and achievement, confidence and dispositions toward the teaching of literacy and numeracy, but these relationships have not been investigated.





Research Design and Methods

Chapter 3



3 Research Design and Methods



The research design combined qualitative and quantitative techniques and involved five related phases of inquiry.

The first of these, a desk audit, reviewed teacher education program characteristics. This phase of inquiry, the results of which were reported in Chapter 1, explored web-site descriptions of literacy and numeracy in 170 Australian teacher education programs.

The second phase of the study (see Fig 3.1) was an international literature review, described in Chapter 2. This review drew on literature published in English in the last few decades. It concluded that the literature was typically descriptive rather than empirical. Where claims were made about strategies for improvement they tended to relate more to structural than to substantive issues, and to rely more on theoretical argument than empirical data.

Structural and substantive issues identified in the literature review guided the construction of the third phase of the study, a set of 21 national focus groups. Almost 150 teachers and teacher educators in six States were involved. The teachers' focus groups were assembled with the assistance of school system and sector officials, typically in districts with relatively large numbers of new graduates. The groups were mixed, involving early years, primary and secondary teachers.

Phase four of the study involved three nationally representative questionnaire surveys involving 1,300 beginning teachers and senior school staff. Content for the surveys drew on the results of the literature review, information gathered in the focus group interviews and issues identified in the research project brief. The two beginning teacher surveys were mail-out surveys, one for primary teachers and one for secondary teachers. The principal difference between these surveys was the content of four questions that

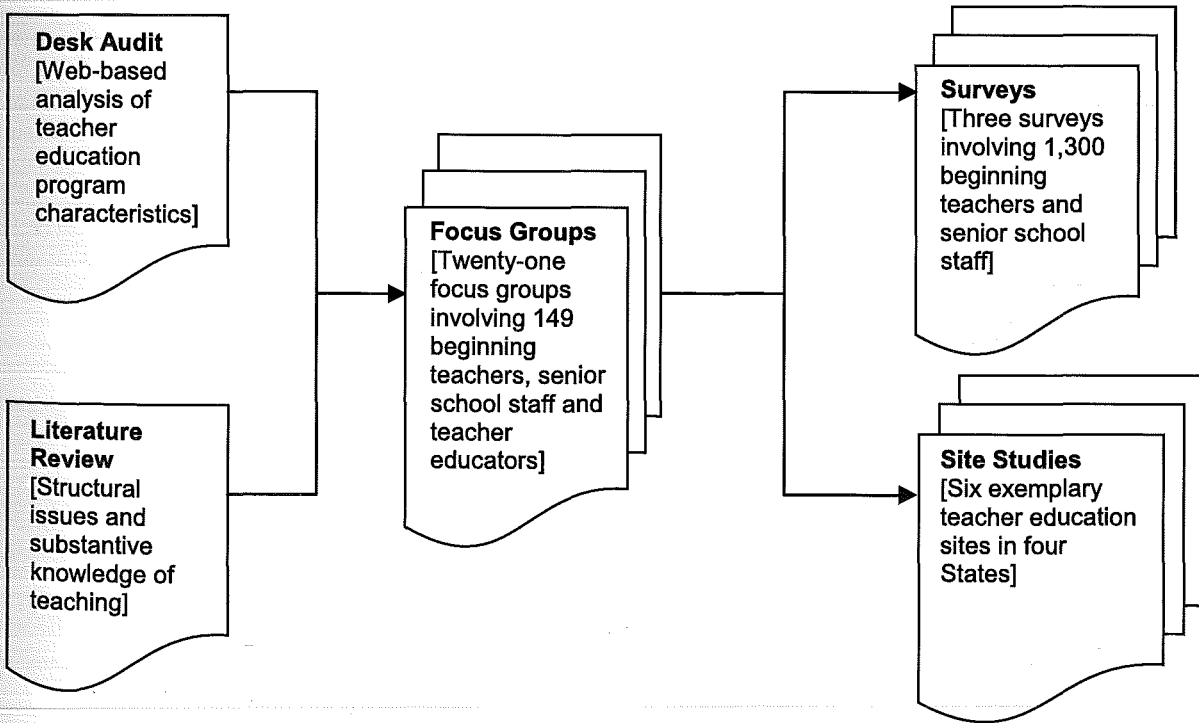


Figure 3.1. Phases of the research program

asked them to comment on the quality of their preparation with respect to specific literacy and numeracy teaching strategies and activities. The web-based survey for experienced teachers focused on the same range of issues as the pen-and-paper surveys, but did not provide different questions for teachers working in primary or secondary school contexts.

The fifth and final phase of research was a set of six site visits to teacher education programs in four Australian States. The six programs were selected to represent the range of student intake characteristics, program types and geographical locations. Although no graduate performance data were collected on these programs, they were all recommended for their exemplary work in preparation for literacy and numeracy teaching in schools. The site visits were structured around the substantive and structural characteristics identified in the literature review. The analysis of these site studies, which appears in Chapters 5 and 6, is organised around the headings of knowledge, linkage and diversity, which emerged from the literature review, as well as the headings of purpose and engagement.

Figure 3.1 provides a graphical representation and summary of these research phases.

Focus group interviews

The first empirical phase of this project was a series of focus group interviews (House & Loudon, 2002). Like other interview techniques, focus groups provide opportunities for rich insights into the views of well-informed people. In addition, the group dynamics of focus groups also provide an opportunity for participants to respond to the views of others, building consensus or identifying differences in point of view. As is often the case in multi-layered research projects, the range of views identified in the focus groups was used to structure the quantitative questionnaire surveys that followed the focus groups (Australian Bureau of Statistics, 1998).

The first round of focus groups were conducted during September, October and November

2001, and involved more than a hundred participants. Senior school staff attending the focus groups included principals, assistant and deputy principals, heads of department and other teachers with recent experience of beginning teachers. Beginning teachers included those teachers who had one- to three-years' experience since their preservice preparation. School system and sector personnel across Australia assisted with the identification of participants to join the focus groups, which were conducted in the six Australian States. A second round of teacher educator focus group interviews was conducted during June and July 2002.

Beginning teacher and senior staff focus groups

Ten focus groups were organised with senior school staff (78 participants) and six with beginning teachers (38 participants). Attendance at the focus groups ranged from two to fifteen participants. In order to increase researchers' access to beginning teachers, a disproportionate number of focus groups were scheduled in areas with relatively high numbers of beginning teachers. Thirteen of the focus groups were held in regional Australia and three focus groups were in capital cities. The focus group discussions were audiotaped and transcribed. Participants were also asked to complete a summary sheet at the conclusion of each focus group. The summary sheet included a set of nine structural and substantive issues that had emerged from the project's literature review. Quantitative feedback about the relative importance of each of these issues was sought, as were written comments on preparation for teaching.

At each focus group prospective participants were provided with information about the project, an outline of the issues to be discussed, and an invitation to explore these issues with their colleagues at school prior to the focus group. For senior staff, the questions concerned contemporary challenges in teaching literacy and numeracy, the quality of preparation of beginning teachers to teach literacy and numeracy, and school and university roles in preservice education.

Beginning teachers were provided with the same opportunity to confer with colleagues, but the questions focused more on their recent university experience and their view of their preparedness to teach. Their questions concerned reasons for choosing the teaching profession, perceptions of the quality of their preparation for teaching literacy and numeracy, and whether there had been any changes in their perceptions of the quality of their teacher education programs since beginning teaching.

Teacher educator focus groups

Five teacher educator focus groups were arranged in three States. A total of 33 participants in New South Wales, Victoria and Western Australia offered their perspectives on the literacy and numeracy preparation of beginning teachers. Participants were selected from a pool of possible participants suggested by members of the research team or members of the project advisory committee. All had a strong background in teacher education, particularly in the areas of literacy and numeracy. Like the recent graduate and senior staff focus groups, the teacher educator focus group data included transcripts as well as a quantitative survey completed by participants at the conclusion of the interview.

As in the school-based focus groups, prospective teacher educator participants were provided with information about the project, an outline of the issues to be discussed, and an invitation to explore these issues with their colleagues in their university prior to the focus group. For teacher educators, the questions concerned the university role in preservice education in literacy and numeracy, challenges in preparing new teachers in literacy and numeracy, and perceptions on structural issues in program design and substantive issues in the kinds of knowledge to be developed in teacher education programs.

Questionnaire surveys

Three quantitative surveys were designed, taking up the issues identified in the literature review, desk audit and focus group interviews. The surveys included a mail-out survey of beginning

teachers in primary schools (Rohl et al., 2003a, see Appendix A) and beginning teachers in secondary schools (Rohl et al., 2003b, see Appendix B). In addition, an e-mail survey was designed and circulated to experienced teachers and school administrators with recent experience of beginning teachers (Rohl et al., 2003c, see Appendix C).

Beginning teacher surveys

The purpose of the national beginning teachers' surveys was to examine perceptions of their preservice teacher education programs in terms of their preparedness to teach literacy and numeracy to a range of students. Survey participants were in their first or second year of teaching in primary schools.

The primary and secondary beginning teacher surveys were developed in 2002, piloted in 20 schools in four states, and circulated to the advisory committee and research team for comment. The questionnaires were designed in a 'tick a box' format, for ease of completion by teachers and later data analysis. Respondents were also asked to identify their state and school sector, in order to allow the researchers to check whether the returning sample accurately reflected the population of Australian schools.

The beginning teacher surveys contained 32 questions (Appendices A and B). Questions 1-8 addressed current teaching and demographic information. Questions 9-12 related to the type of teacher education course undertaken. Questions 13-16 were related to literacy education and teaching, and questions 17-28 were related to numeracy education and teaching. The final questions 28-32 asked about more general teacher preparation issues. Three questions required the respondents to write in a response. Question 32 was open ended and invited beginning teachers' to give suggestions as to how their teacher education course could have better prepared them for teaching literacy and numeracy. Questions 16 and 24 were 'write in' questions in which respondents were asked to list the five most important literacy and numeracy teaching strategies they had learnt during their teacher education course. Most of the questions

from Question 13 to Question 32 were Likert-type questions of the form 'How well did your preservice teacher education course prepare you ...?' in a range of literacy and numeracy domains. Four response options were provided for most questions: 'not at all well', 'not very well', 'fairly well', 'very well'. A fifth option 'not applicable' was added for Questions 14 and 22. In Chapter 4, the two responses 'fairly well' and 'very well' are usually combined to give the proportion of beginning teachers who provided positive responses in the range of literacy and numeracy issues canvassed in the surveys.

Slightly different survey forms were developed for primary beginning teachers and secondary beginning teachers. The principal difference was in the item list provided in Questions 14, 15, 22 and 23, which asked teachers how well their course had prepared them to teach specific literacy and numeracy strategies and activities.

Beginning teachers sample

The Department of Education Science and Training provided a national database of 9724 schools that contained school-aged children. Of these schools 205 were identified as special schools and removed from the database, as the focus of the project was beginning teachers teaching in mainstream schools. Questionnaires, with a covering letter and reply-paid envelope were mailed to the principals of a random sample of 2979 schools from the modified database in late July 2002, half-way through the school year. The number of questionnaires mailed to principals of primary schools was 2434 and the number to secondary schools was 1432.

Three hundred and six schools indicated that they had no beginning teachers on staff, 688 questionnaires were returned by primary schools and 309 were returned by secondary schools. A very small proportion of these questionnaires were excluded from the analysis for reasons such as that the respondent was in his or her first year of teaching in their current context, but had previously taught in another state. Accordingly, the responses from 684 primary and 303 secondary questionnaires were analysed.

Together, the beginning teacher surveys resulted in a total of almost 1000 valid survey forms returned from a sample of almost 3000 schools. Some schools had no beginning teachers; in other schools more than one beginning teacher responded. This level of response is consistent with expected return rates in large-scale randomly selected mail surveys. The sample was broadly representative of the national school database in terms of State and school sector (see Table 3.1). New South Wales was relatively under-represented in both the primary and secondary surveys, Victoria was relatively over-represented in the primary survey, and Queensland was relatively over-represented in the secondary survey. Survey responses were also broadly representative of the proportions of schools in the government and non-government sectors (see Table 3.2 for distribution of survey respondents across systems and sectors). Since the attributes of the survey sample closely correspond with the whole database, generalisation from the sample to the Australian population of beginning teachers in primary and secondary schools is possible.

Senior staff survey

The purpose of this Australia-wide survey was to examine senior staffs' perceptions of beginning teachers' preservice teacher education courses in terms of their preparedness to teach literacy and numeracy to a range of students. The participants in the survey were senior staff in schools, such as principals, deputy or assistant principals and heads of departments.

The questionnaire was developed in consultation with the research team and other colleagues in 2002. It was then sent to strategic personnel throughout Australia for comment, including the advisory committee and senior staff colleagues. On the basis of the comments from colleagues, a revised version of the questionnaire was developed.

The senior staff survey was designed as an e-mail survey. In order to maximise the possibility that busy school executive staff would take the time to respond, there were fewer questions in the senior staff survey than in the beginning

Table 3.1. National school database and beginning teacher survey sample by State and Territory

	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
National database	2.4%	31.5%	2.6%	17.6%	8.4%	3.0%	23.8%	10.6%
Primary survey	1.8%	24.6%	1.9%	20.3%	8.3%	4.7%	30.3%	8.2%
Secondary survey	2.6%	21.5%	0.7%	28.4%	7.9%	5.9%	21.1%	11.9%

Table 3.2. Beginning teacher survey sample by system and sector

	Government	Catholic	Other non-government
Primary survey	76.8%	16.3%	6.9%
Secondary survey	70.6%	19.5%	9.9%

teacher surveys. The questionnaire was designed in a 'click a box' format both for ease of completion by senior staff and for later analysis. Each question had a comments section where respondents had an opportunity to write a comment of not more than 250 characters.

This questionnaire (Appendix C) contained 28 items of which 19 were Likert-type questions of the form 'How well prepared are teachers...?', in a range of literacy and numeracy domains. Four response options were provided: 'not at all well', 'not very well', 'fairly well', and 'very well'. Eight questions addressed perceptions of beginning teachers' literacy education and teaching and a further eight questions addressed perceptions of beginning teachers' numeracy education and teaching. The remaining three Likert-type questions addressed student behaviour, professional competence and use of Information Computer Technologies (ICT). The two open ended questions asked senior staff to comment on any changes that should be made in teacher education courses to better equip beginning teachers with the knowledge to improve literacy and numeracy outcomes for students. The final seven questions addressed current teaching and demographic information.

Senior staff sample

A stratified sample of 1000 schools was drawn from the Department of Education, Science and Training database used in the beginning teacher sample. The questionnaire was sent by email to the Principal of the school, or if this email address was not available, the email was sent to a generic school address with a request to

forward it to experienced classroom practitioners, principals, assistant principals and heads of departments. There were 244 responses from the initial mailout. To increase the response rate the questionnaire was sent again after one month to the 1000 schools and a further 75 staff then submitted the questionnaire. Researchers endeavoured to increase the response rate by sending the questionnaire to contacts who were asked either to distribute it through their own networks, or if appropriate, to post the survey on their website.

In total there were 319 responses to the email survey. This level of response is consistent with expected return rates in large-scale randomly selected email surveys. The sample was broadly representative of the national school database in terms of state and school sector (see Table 3.3). Survey responses were also broadly representative of the proportions of schools in the government and non-government sectors (see Table 3.4 for the distribution of survey respondents across systems and sectors).

Site visits

Six teacher education programs in four States were visited in 2001 and 2002. The sites were chosen to represent the range of contexts in which Australian teacher education takes place. Sites included two four-year undergraduate programs, three two-year graduate programs, and one site where both types of program were studied. The four-year programs included a pre-school to Year 12 program, two primary programs and one secondary program. The two-year programs included both primary and

Table 3.3. National school database and senior staff survey sample by State and Territory

	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
National database	2.4%	31.5%	2.6%	17.6%	8.4%	3.0%	23.8%	10.6%
Senior staff survey	0.6%	36.0%	1.9%	18.2%	8.4%	4.2%	23.1%	7.5%

Table 3.4. Senior staff survey sample by system and sector

	Government	Catholic	Other non-government
Senior staff survey	81%	9.5%	9.5%

secondary teacher education sites. Two sites were in research-intensive inner-city universities, one was in a rural university, one in a university of technology, and two in new generation universities. In terms of student intake characteristics, the programs included a rural enclave program predominantly serving Indigenous students, a program focussing on the needs of first generation university students, a program focussing on students with learning difficulties, and a program with a focus on discipline knowledge in mathematics. All sites provided school experience through teaching rounds and internships but, in addition, one program provided extended school experience in the context of a well-developed program of school-university linkages, and another provided an intensive supervision in the context of a learning difficulties clinic. Potential sites were recommended by members of the research team or the project advisory committee on the basis of their reputation for excellence.

In order to ensure that each of the site studies would collect comparable data, a pilot site study was prepared (Rohl, 2001). Data collected in the pilot study included documents, artefacts, interviews and observations made at the site. The university web-site, the faculty and program handbook and published papers written by staff involved in the literacy and numeracy components of the course were the main documents consulted. Artefacts included course materials and student assignments. Face-to-face semi-structured interviews were carried out with lecturers and a number of students from the course. Several classes were also observed,

including the clinical supervision program and a post-internship conference.

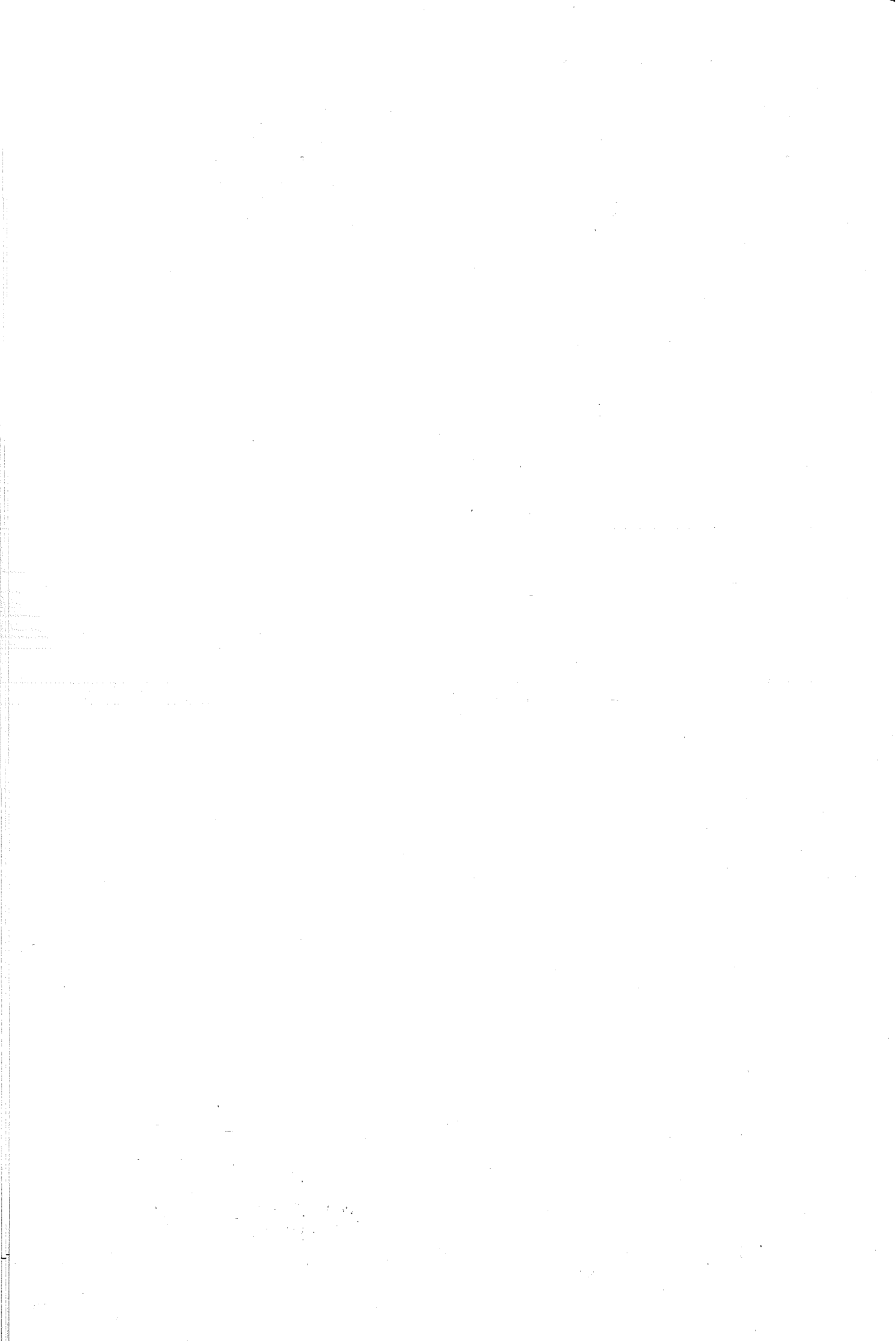
Subsequent site studies used similar research methods. In each case, approximately one week was spent in face-to-face data collection. Although the opportunities presented at each site led to small variations in data collection (school visits to interview collaborating teachers, travel to observe beginning teachers, or more intensive classroom observations, for example) a standardised format was adopted for the site studies. The remaining site studies (Greaves, 2002; Loudon, 2002; McIntosh, 2002; Siemon, 2002; Wright, 2002) were undertaken in the first semester of 2002.

Issues of anonymity and privacy framed the research project's ethical review process, and led to the decision to refer to all sites and participants by code names. In a small community such as Australian teacher education, however, it was acknowledged that this strategy might not be sufficient to guarantee anonymity. For this reason, all site studies were returned to the principal informants for comment and correction.

Summary

The Prepared to Teach research team collected a range of empirical data over more than two years. More than 1600 teacher education students, teachers and teacher educators participated in the project. Sixteen focus groups were conducted, involving 38 beginning teachers and 78 senior staff in six States, supplemented by five focus groups involving 33 teacher educators in three States.

A representative national sample of 987 beginning teachers and a convenience sample of 309 senior staff contributed to three questionnaire surveys. Six site visits were undertaken in four States, involving more than 160 teacher education students, school staff and teacher educators. Together the three empirical phases of the project provide a rich range of qualitative and quantitative data. These data provide the basis for the analysis of the degree to which beginning teachers are prepared to teach literacy and numeracy.





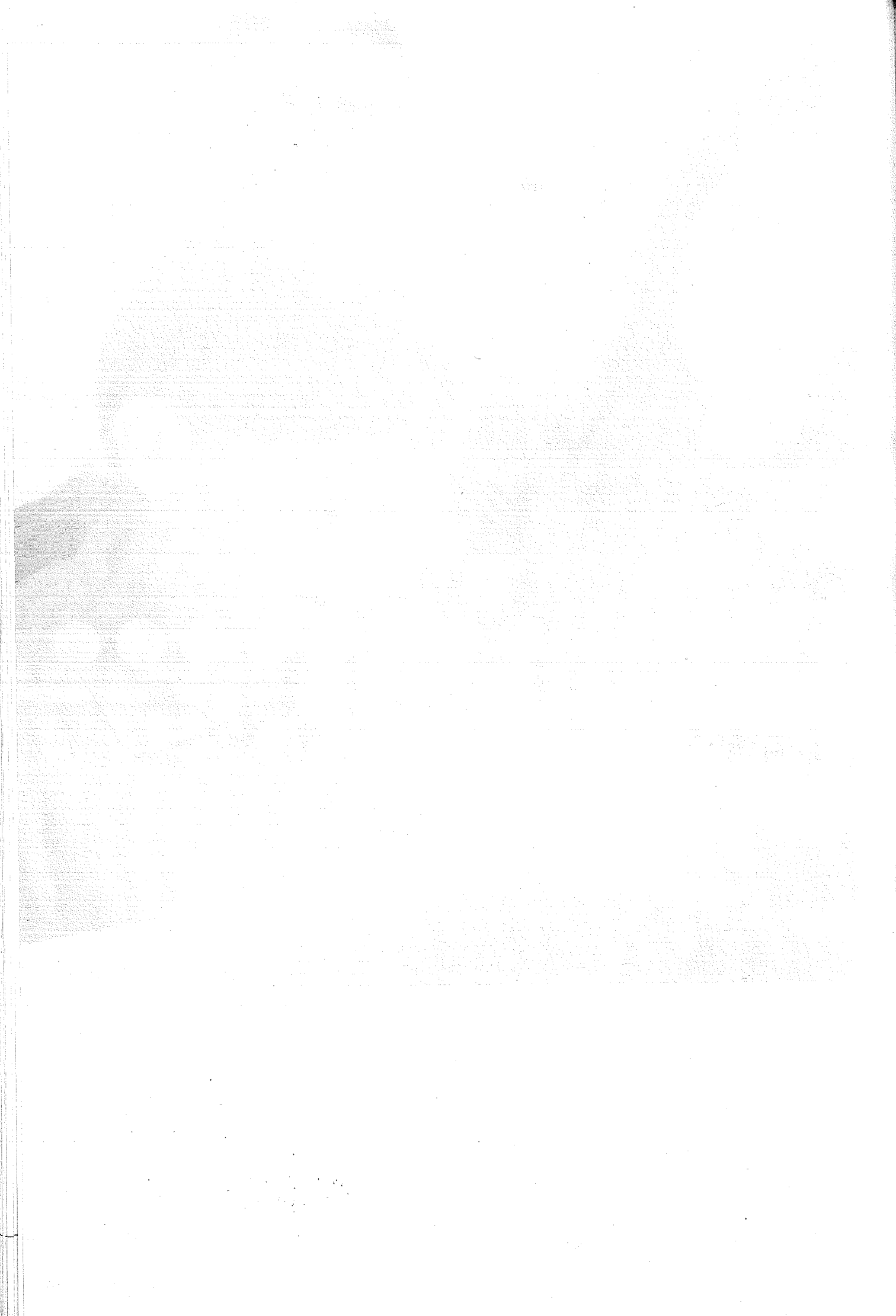
Research on the quality of preparation

for teaching

Literacy and Numeracy



Chapter 4



4 Prepared to Teach



Perceptions of the quality of preparation for teaching Literacy and Numeracy

Most beginning teachers were confident about their personal literacy and numeracy skills, their conceptual understandings of literacy and numeracy, their understanding of curriculum documents and assessment strategies, and their broad preparation to teach. Fewer beginning teachers were confident about their capacity to teach specific aspects of literacy such as viewing, spelling, grammar and phonics, or about their capacity to meet the challenges of student diversity. More primary teachers were confident about numeracy than literacy teaching. Fewer secondary teachers, who identified more strongly as subject specialists, were confident about their capacity to teach literacy and even fewer were confident about their capacity to teach numeracy.

Senior staff working with beginning teachers were generally sceptical about the quality of teacher preparation for teaching numeracy and literacy and were less confident than the beginning teachers about personal literacy and numeracy skills. Barely one-third thought beginning teachers were well prepared to teach and assess literacy, less than half thought they were well prepared to teach and assess numeracy and even fewer were satisfied with their preparation in the area of diversity.

Some differences of emphasis were observed between teacher educators and teachers working in schools. Whilst teacher educators saw critical reflection as being an important issue, this view was not shared by experienced teachers and beginning teachers.

How well prepared are beginning teachers to teach literacy and numeracy? In short, the answer to this question depends on who is asked, and which aspects of preparation are

asked about. In the discussion that follows, judgements about quality and characteristics of preservice education are drawn from two of the three empirical phases of the project – focus group interviews (House & Loudon, 2002) and questionnaire surveys (Rohi et al., 2003a; b; c). The discussion is framed by the project literature review (Gore & Griffiths, 2002) which distinguishes between substantive issues and structural issues in teacher education. Structural issues, which are frequently the focus of reform initiatives, include claims for longer teacher education programs, higher professional status, more content knowledge, more and better professional experience, stronger links with schools, and stronger accreditation procedures for teachers and programs. Such structural changes alone, we have argued, cannot deliver major improvements in the quality of graduates 'without concomitant attention to the substance of teacher education offerings' (Gore & Griffiths, 2002, p. 2). This conclusion was reflected in the survey and interview data, which focussed primarily on the personal dispositions, knowledge and skills required to support children's learning in literacy and numeracy.

Personal competence

One of the strong themes to emerge from the literature review undertaken for this project was that beginning teachers need sufficient personal competence themselves in literacy and numeracy if they are to support the growth of students' literacy and numeracy (ACDE, 1998). Beginning teachers' competence in literacy cannot be presumed, even if they are native speakers of English and have completed a tertiary education credential (AATE, 1999b). Similarly, concerns have been expressed about the personal numeracy of early childhood teachers (Perry, 2000) and primary teachers (Kaminski, 1997).

Personal competence in literacy and numeracy was an issue for some senior staff and beginning teachers and teacher educators participating in the focus group interviews. In the senior staff focus groups some were critical of the personal literacy of beginning teachers. These concerns were reflected to some extent in the senior staff survey, where 56% of senior staff who responded, rated beginning teachers as 'fairly well' prepared in terms of personal literacy competence, but only 4% indicated that they felt beginning teachers were 'well prepared' in this area. Similarly, teacher educators in the focus groups commented on the weaknesses in personal literacy and numeracy of preservice teachers. These weaknesses were often attributed to intake characteristics of undergraduate teacher education programs, and were sharply contrasted with the personal literacy and numeracy of students entering graduate teacher education programs.

Nevertheless, these concerns were not reflected in the beginning teacher surveys, where 97% of primary and 95% of secondary beginning teachers reported that their personal literacy skills were adequate for their work as a teacher. This can be seen in Figure 4.1, where the percentage of positive responses reported combines the 'fairly adequate' and 'very adequate' responses to the beginning teacher question, 'How adequate do you feel your own literacy skills are for your work as a teacher?', and the senior staff question, 'How prepared are teachers in their own literacy competence?'

With regard to personal numeracy skills, almost all the primary beginning teachers and more than three-quarters of the secondary beginning teachers rated their personal numeracy skills as adequate for teaching. More than two-thirds of senior staff thought that beginning teachers were prepared in the area of personal numeracy (see Figure 4.1).

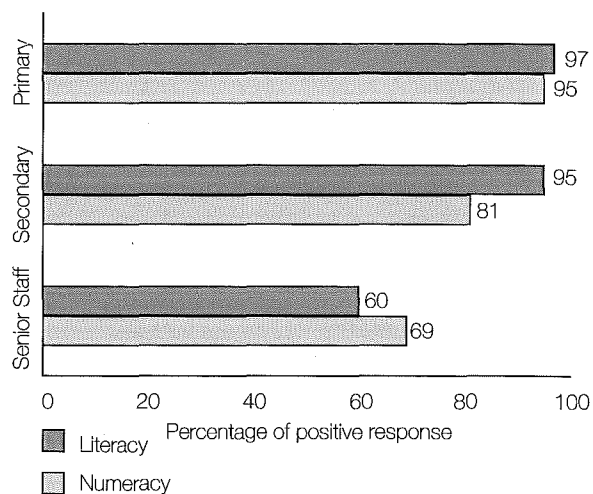


Figure 4.1. Personal literacy and numeracy skills of beginning teachers: Percentage of positive responses by primary beginning teachers, secondary beginning teachers and senior staff

Personal dispositions

In addition to concerns about personal competence, the literature review identified concerns about personal dispositions towards literacy and numeracy. Some have argued, for example, that preservice early childhood and primary teachers have negative attitudes towards mathematics (Bobis, 2000; Perry, 2000), and that personal dispositions such as intellectual curiosity are necessary for effective English and literacy teaching (Christie et al., 1991). Among teachers participating in the focus groups, concerns about dispositions towards literacy and numeracy were overshadowed by other personal dispositions. Teachers talked, for example, about essential qualities such as 'enthusiasm for your subject', but were more concerned about beginning teachers being 'fair and just' and 'knowing the students well'. For many new teachers the personal disposition of most importance was a commitment to 'make a difference' (see also Hoffman et al., 2003a).

Broad knowledge

Perhaps the most common critique of teacher education in the literature is that teachers lack the breadth and depth of content knowledge required to teach literacy and numeracy well (Layton & Deeny, 1995; Nolen, McCutchen & Berninger, 1990; Willis, 1998). Teachers responding to the senior staff survey shared this concern, with only

around half of the senior staff agreeing that beginning teachers were 'fairly well' or 'very well' prepared regarding the theories that inform current literacy and numeracy practices.

Most of the primary and secondary beginning teachers who responded to the surveys, however, reported that their courses had developed their conceptual understanding of literacy, especially with regard to the language modes of reading, writing and speaking and listening (see Table 4.1). About three-quarters of these beginning teachers regarded their course as adequate in developing understanding of these language modes. Fewer beginning teachers regarded their courses as adequate in developing understanding of spelling, viewing, phonics and grammar. Secondary beginning teachers were particularly concerned about their preparation for teaching phonics.

Table 4.1. Conceptual understanding of literacy: Percentage of positive responses by primary and secondary beginning teachers

	Primary	Secondary
Reading	75	73
Writing	75	76
Speaking and listening	70	77
Viewing	57	62
Grammar	53	46
Phonics	52	37
Spelling	51	49

Approximately three quarters of the primary beginning teachers reported that their course had developed adequately their conceptual understanding and skills in numeracy, in terms of number, measurement, space, and chance and data. Among secondary teachers less than half thought that they had developed adequately their understanding of these concepts (see Table 4.2). Although only a quarter indicated they had conceptual understanding of algebra this is commensurate with the proportion of secondary teachers who had a mathematics specialisation.

It would not be expected that non-mathematics specialists would as group would feel that they had conceptual understanding of algebra. It is noted that the definition of numeracy used for

this study is referring to numeracy across the curriculum and not to classroom mathematics.

Table 4.2. Conceptual understanding of numeracy: Percentage of positive responses by primary and secondary beginning teachers

	Primary	Secondary
Number	79	43
Measurement	79	43
Space	77	41
Chance and data	73	36
Algebra	N/A	26

Among teachers participating in the focus groups, concern about breadth of knowledge was more often expressed in the context of preparation for secondary teaching. Some participants working in primary school contexts expressed a preference for four-year undergraduate education programs on the grounds that these more vocational courses 'prepare staff who are keen to be teachers' and produce teachers who have 'a much stronger knowledge than the person who does the Arts degree'. Participants working in secondary contexts indicated, however, that depth of knowledge in a particular discipline was important. As one experienced teacher argued, beginning teachers with an Arts degree were preferable to people with a four-year B.Ed. who 'do not have the subject knowledge of literature that is expected of a secondary English teacher.'

Members of focus groups recruited through the mathematics and English professional associations were particularly concerned about the level of content knowledge among new secondary school teachers. As one of these teachers put it, teachers need 'formal learning in plural literacies', which is 'not just a simple matter of teaching them how to spell or a reading level'. Many senior secondary school staff reflected on their own preparation for teaching literacy and numeracy skills and concluded that their preparation had been inadequate.

For teacher educators in the focus groups these concerns about breadth of preparation were moderated by a sense that in the crowded curriculum of teacher education,

literacy and numeracy have to compete for time with other learning areas, and with other course components. As one teacher educator commented, years of competition for space in the program had meant that students 'don't get the preparation we used to give them in literacy.'

Relevant knowledge

Another substantive issue identified in the literature is the relevance of preservice programs for literacy and numeracy teaching. It has often been argued that preservice programs are outdated (Ramsey, 2000) or out of touch with current practice in schools (Schools Council, 1990). The surveys explored this issue in depth, providing insights into teachers' overall preparation to teach literacy and numeracy, links between theory and practice, their preparation to teach in specific skill areas, and their preparation in the area of assessment.

Perhaps the most telling evidence from the beginning teacher surveys came from the final open-ended question, where more than two-thirds of respondents chose to add some written comments. Almost half of the respondents to the primary survey (43%) and a quarter of the respondents to the secondary survey commented on the need for more practical ideas and strategies in teacher education. Less than 4% of beginning primary teachers and 6% of beginning secondary teachers volunteered the opinion that their course had prepared them well for teaching literacy and numeracy.

Three issues that emerged in the focus group discussions of relevant knowledge were subsequently taken up in the surveys:

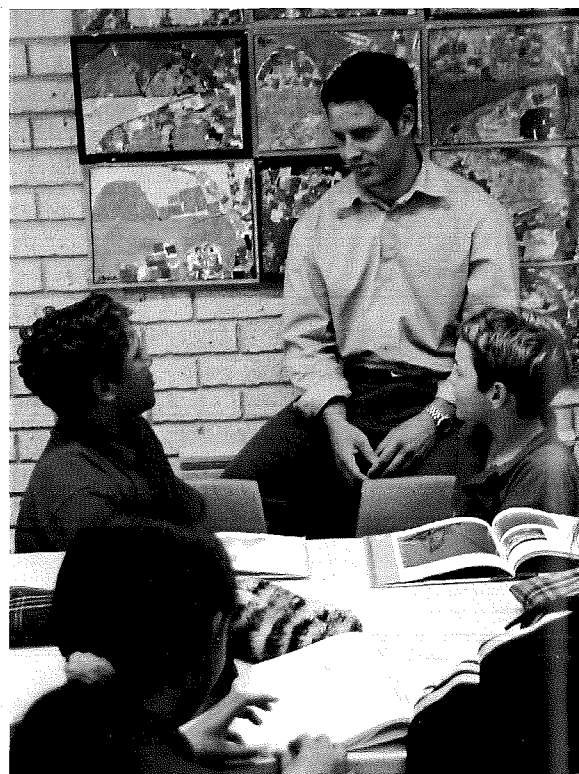
- preparation for teaching, including theoretical and practical preparation,
- preparation to teach specific domains and skills, and
- preparation for assessment of students.

Preparation for teaching

Survey data indicated that most beginning primary teachers reported they had been adequately prepared to teach numeracy but were not quite as confident about their preparation to teach literacy. More than half of all secondary beginning teachers felt prepared to teach literacy

but were far less convinced about numeracy. On a range of issues, one-half or fewer of their senior staff colleagues were satisfied with the quality of beginning teachers' preparation in literacy and numeracy.

Almost two-thirds of primary teachers identified themselves as generalist teachers with responsibility for both literacy and numeracy. Two-thirds of these teachers thought that, overall, they had been 'fairly well' or 'very well' prepared to teach literacy and four-fifths thought they were well prepared to teach numeracy. Of the secondary beginning teachers, 34% indicated that they had English as an area of specialisation and 25% indicated mathematics as a specialist area. The great majority of the whole group of secondary beginning teachers characterised themselves as teachers of literacy (90%), while just over half saw themselves as teachers of numeracy (55%). More than half of these beginning teachers judged that they were adequately prepared to teach literacy but only one-third judged they were adequately prepared to teach numeracy. Figure 4.2 provides a summary of beginning primary teachers' judgements about preparation for teaching literacy and numeracy, and Figure 4.3 provides comparative data for beginning secondary teachers.



The majority of beginning teachers reported that they were adequately prepared to use mandated curriculum documents in literacy (primary 80%, secondary 60%). There was, however, great disparity between the proportions of primary and secondary beginning teachers reporting that they were adequately prepared to use numeracy curriculum documents (primary 85%, secondary 35%). It would not be expected that non-mathematics specialists as a group feel that they had conceptual understanding of algebra. It is noted that the definition of numeracy used for this study is referring to numeracy across the curriculum and not to classroom mathematics.

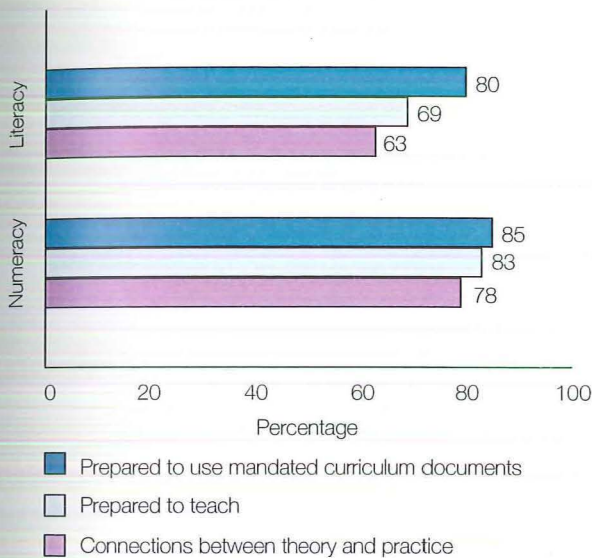


Figure 4.2. Prepared to teach: Percentage of positive responses by primary beginning teachers

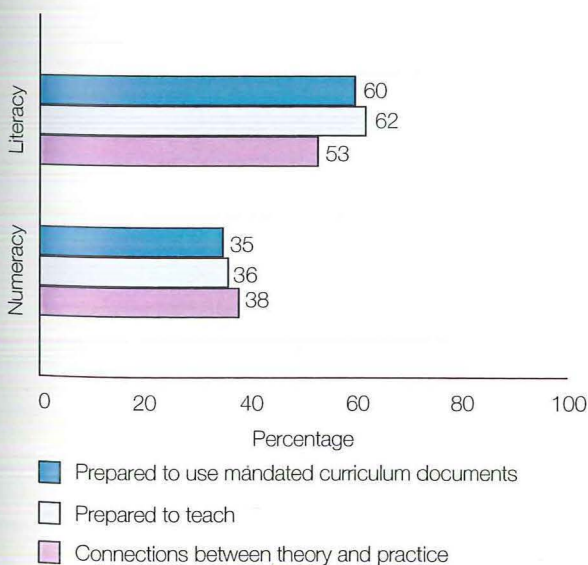


Figure 4.3. Prepared to teach: Percentage of positive responses by secondary beginning teachers.

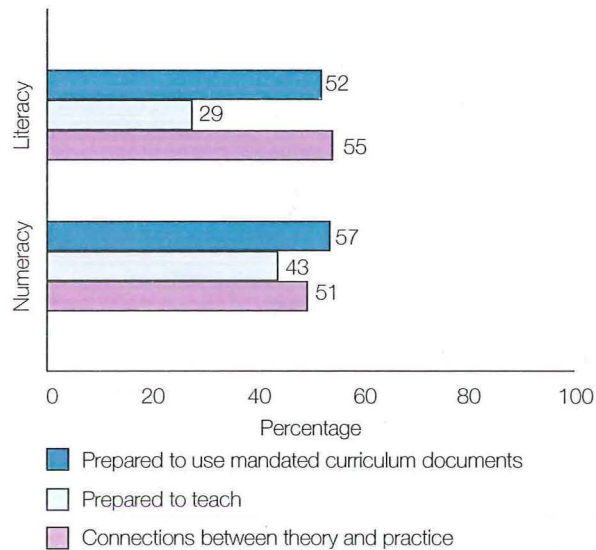


Figure 4.4. Prepared to teach: Percentage of positive responses by senior staff

Among senior staff, whose shorter survey did not ask them to discriminate between primary and secondary, about half reported that beginning teachers were 'fairly well' or 'very well' prepared to use mandated curriculum documents in literacy and numeracy (see Figure 4.4).

Less than one half of senior staff thought that beginning teachers were adequately prepared to teach numeracy and around one quarter thought that beginning teachers were adequately prepared to teach literacy (see Figure 4.4).

Survey data summarised in Figures 4.2 and 4.3 showed that more than half of the beginning teachers agreed that their course made adequate connections between theory and practice in literacy (primary 63%, secondary 53%). Again in numeracy there was a great disparity between primary and secondary beginning teachers in that most primary teachers agreed with the positive nexus between theory and practice whilst, as a group, the secondary teachers did not see this connection (primary 78%, secondary 38%). About half of the senior staff reported that beginning teachers were knowledgeable about theories that inform current teaching and learning practices in literacy (55%) and numeracy (51%).

Almost half of the primary beginning teachers (43%) and a quarter of the secondary beginning teachers (25%) who volunteered responses to the open-ended final question in the surveys called for more practical ideas and strategies. The tenor of the survey responses is reflected in the following comments from focus group participants:

Less on theory and more on practical components that actually work. Most of my literacy and numeracy knowledge was learnt through my own extra study and volunteer time at various schools. I am very disappointed with my preservice program, as I believe it failed to prepare me for many aspects of teaching, not only literacy and numeracy. (Recent graduate, QLD)

Through University, the literacy component was not at all practical. Numeracy was much more hands on and I felt much more confident in this area.... Literacy was too many theories and not enough instruction on how to actually teach students. (Recent graduate, NSW)

I felt my four-year degree lacked hands-on learning. It was very much theory based. I don't ever recall learning about Early Years strategies, classroom management and discipline and program planning and assessment. These things I have taught myself in my own classroom and teaching experience. I do not believe my teaching degree equipped me adequately for future employment. (Recent graduate, VIC)

Substantial minorities of the primary beginning teachers (22%) and secondary beginning teachers (15%) who wrote responses in the surveys also argued that there should be less attention to theory. Focus group comments reflecting these views include the following:

Rather than writing an essay paper on 'What is literacy, what is language' we could have been putting together programs on how to teach guided reading etc. One graduate was asked in an interview, 'How would you set up your literacy program?', and she didn't know how to answer or where to begin. (Recent graduate, SA)

[There were] so many complaints from language education. We were getting plenty of theory but no practical experience on which we could hang any strategies. A lot of people had abject terror at the thought of going out and trying to teach children to read when we had no practical experience. We would ask in tutorial 'How do you teach children to read?' [The reply], 'Oh well go and read Marie Clay and go and get Freebody's four roles of the reader'. The theory is wonderful. Running records are great but where do you go to from there? (Recent graduate, QLD)

Although some senior staff indicated that their own preservice training had been 'pretty awful', there were both senior staff and recent beginning teachers who had more positive views of the role of preservice teacher education courses in the development of literacy skills and strategies:

At [a particular university] I can tell you that surreptitiously there are a lot of lecturers who are intent on teaching classroom management and literacy even if it is not within the guidelines of the subject. I do seminars with third and fourth year students. I have to say that there is a really strong literacy component in every course that they do, every assessment task that they do they have to have all the sections of literacies – written, visual, computer, critical. We are explicit about literacy skills. (Senior staff, NSW)

We had [a prominent national literacy researcher] for literacy and that was covered really well. Things like rhyming, alliteration and running records. (Recent graduate, SA)

I think I did have it at my fingertips. I was lucky to take an elective that looked at literacy difficulties. If I hadn't done that I would have been lost. I chose it because it was the only thing that I was interested in. (Recent graduate, NSW)

Within the focus groups, there was less discussion of numeracy than literacy. Beginning teachers expressed concern that numeracy education could have been 'more practical' and that 'strategies which you could employ to assist students' were not covered by students who were not English or mathematics specialists. As was the case when they discussed literacy, there were some beginning teachers who had been satisfied with their preservice preparation. In their words:

We did two numeracy units. In the tutorial we did lots of different things -- the addition method for subtraction, calculators, fractions and number lines. Showed things that you could do with the kids. That was with one tutor and the others did nothing so once again it depended on the tutor that you got. (Recent graduate, VIC)

Most people would agree that it was covered in terms of how you go about teaching it. [Our lecturer] would always start with what understandings does this child have? I think the grounding was much better. Maths games every week, I have still got them. I do not use those but I have made better ones (Recent graduate, QLD).

Our school is an early numeracy research school. I had a good maths base at uni and this has been carried on. [I had] a very strong numeracy lecturer. The coordinator had only been recently out of the school. There is a connection between the university and the schools through the numeracy research projects. (Recent graduate, VIC)

Preparation to teach specific domains

Survey data indicated that in terms of literacy, primary beginning teachers reported that they were somewhat better prepared to teach reading, writing, and speaking and listening than viewing, spelling, phonics or grammar. For the most part the responses of secondary beginning teachers followed a similar pattern although they felt somewhat less prepared in most areas. Less than two-thirds of both primary and secondary beginning teachers thought they were 'fairly well' or 'very well' prepared to teach reading; writing

and speaking and listening. Less than a half of these beginning teachers reported that they were adequately prepared to teach spelling, viewing, phonics and grammar, with secondary beginning teachers feeling particularly unprepared to teach phonics, spelling and grammar (see Table 4.3). Although the project focus is on the cross-curricular and applied concerns of literacy and numeracy teaching, the disparity between primary and secondary graduates' judgments about their preparation may be influenced by the number of secondary teachers in the sample from the English and mathematics key learning areas. Among secondary teachers, detailed preparation in literacy may be more common among English teachers, and detailed preparation in numeracy may be more common among mathematics teachers. In general, more primary than secondary teachers may have had extensive course work exposure to literacy and numeracy strategies.

Senior staff shared beginning teachers' perception that they were better prepared in the language modes of reading and writing than in the skill areas of spelling, phonics and grammar but were generally more critical of their preparation to teach literacy skills. About half of the senior staff agreed that beginning teachers were adequately prepared in the language modes. Fewer reported that beginning teachers were adequately prepared in viewing (42%), spelling (36%), phonics (35%) and grammar (22%). Table 4.3 provides a comparison of graduate and senior staff judgements about preparation to teach specific areas of literacy.

Primary beginning teachers were more confident about their preparation to teach specific aspects of numeracy than specific aspects of literacy, and senior staff agreed with this assessment for some aspects of numeracy (see Table 4.4). About three-quarters of primary beginning teachers reported that they were 'fairly well' or 'very well' prepared to teach number, measurement, space and chance and data. All of these ratings exceed the ratings for specific aspects of literacy, which ranged between 64% and 43%. For secondary beginning teachers the picture was different. Only 23%-38% reported that they were adequately prepared to teach specific aspects of numeracy.

Table 4.3. Prepared to teach aspects of literacy: Percentage of positive responses by primary beginning teachers, secondary beginning teachers and senior staff

	Primary	Secondary	Senior staff
Reading	64	49	51
Writing	64	55	54
Speaking and listening	58	59	43
Viewing	46	46	42
Spelling	43	34	36
Phonics	43	25	35
Grammar	42	35	22

Table 4.4. Prepared to teach aspects of numeracy: Percentage of positive responses by primary beginning teachers, secondary beginning teachers and senior staff

Aspects	Primary	Secondary	Senior staff
Number	84	37	78
Measurement	81	38	61
Space	78	36	54
Chance and data	73	33	44
Algebra	NA	23	34

More than half of the senior staff reported that beginning teachers were adequately prepared to teach number, measurement and space, but they were less convinced about chance and data and algebra.

Preparation in the use of specific strategies

The beginning teachers who responded to the surveys indicated that they had learnt a number of strategies for teaching literacy and numeracy. Tables 4.5 and 4.6 show the five most nominated literacy and numeracy strategies which the primary beginning teachers indicated they felt best prepared to teach, and also the five strategies most nominated by these teachers as being the most important they had learnt for literacy and numeracy teaching. Tables 4.7 and 4.8 provide the same categories of information for beginning secondary teachers.

When presented with a list of commonly used literacy and numeracy strategies, most of the primary beginning teachers (around three quarters) indicated that their course had prepared them to use the literacy strategies of reading to children and shared book/modelled reading,

and the numeracy strategies of group work, games, problem solving, modelling and exploring connections. More than half of these teachers also felt prepared to use the literacy strategies of modelled writing, hearing children read and independent writing. In the open-ended question that followed, the beginning teachers were asked to nominate the five most important strategies which their preservice education course had prepared them to use. As they nominated a wide range of strategies that they saw as important, the percentages of teachers nominating individual strategies are much lower than those in the 'preparation for use' category. Nevertheless, there is some commonality between the categories, with the literacy strategies of shared book/modelled reading and modelled writing, and the numeracy strategies of group work, games and problem solving all appearing in both categories. It is noted that the literacy strategies of guided reading and phonics activities, which have been shown by previous research (National Reading Panel, 2000) to be particularly important, were strategies that many beginning primary teachers also saw as important, although as a group they did not feel particularly well prepared to teach them.

Table 4.5. Perceptions of literacy teaching strategies: Percentage of responses by primary beginning teachers

Preparation to use the strategy	% of teachers	Importance of the strategy	% of teachers
Reading to children	78	Shared book/Modelled reading	48
Shared book/Modelled reading	72	Guided reading	35
Modelled writing	61	Modelled writing	30
Hearing children read	61	Overarching literacy strategies	29
Independent writing	59	Phonics/Graphophonics	27

Table 4.6. Perceptions of numeracy teaching strategies: Percentage of responses by primary beginning teachers

Preparation to use the strategy	% of teachers	Importance of the strategy	% of teachers
Group work	80	Manipulatives	48
Games	79	Group work	35
Problem solving	77	Games	32
Modelling	76	Problem solving	29
Exploring connections	74	Open-ended tasks	23

Table 4.7. Perceptions of literacy teaching strategies: Percentage of responses by secondary beginning teachers

Preparation to use the strategy	% of teachers	Importance of the strategy	% of teachers
Metacognitive strategies	58	Reading comprehension	40
Strategies linking Reading/writing	52	Reading and writing genres	21
Independent writing	49	Modelled writing	20
Modelled writing	49	Critical literacy	18
Computers in literacy	46	Oral language	27

Table 4.8. Perceptions of numeracy teaching strategies: Percentage of responses by secondary beginning teachers

Preparation to use the strategy	% of teachers	Importance of the strategy	% of teachers
Group work	72	Group work	45
High order questioning	62	Problem solving	35
Computers in numeracy	59	Modelling	32
Problem solving	58	Guided discovery	23
Guided discovery	57	Games	16

It can be seen in Tables 4.7 and 4.8 that as a group the beginning secondary teachers were not so positive as the beginning primary teachers about their preparation to use specific literacy and numeracy strategies. Around one half felt prepared to teach metacognitive strategies, strategies for linking reading and writing, independent writing, modelled writing and computer literacy-related activities. For numeracy strategies, response rates were slightly higher in that the strategies of higher order questioning, computer numeracy-related activities, problem solving and guided discovery were nominated by just over half of respondents, with group work nominated by nearly three quarters. Given that on the whole the beginning secondary teachers felt less well prepared for numeracy than for literacy teaching these results may appear surprising. However, the numeracy strategies nominated in the questionnaire, whilst they are important in numeracy teaching, are also strategies widely used in other areas of the secondary school curriculum so that the secondary beginning teachers may have encountered them at a general level in their preservice course.

As with the primary beginning teachers, there was some commonality between the categories of 'prepared to use' and 'important' strategies. For literacy, modelled writing appears in both categories and there is overlap between the strategies of metacognitive strategies/reading comprehension, and linking reading and writing/reading and writing genres. For numeracy the strategies of group work, problem solving and

guided discovery appear in both categories. It is noted that beginning secondary teachers nominated preparation to use computers in teaching literacy and numeracy in the five strategies for which they felt best prepared, although it was not seen as a top five strategy in terms of importance.

Assessment

Tables 4.9 and 4.10 provide a summary of the survey data regarding perceptions of beginning teachers and senior staff about understanding and use of literacy and numeracy assessment.

A large proportion of beginning teachers reported that their courses had developed their conceptual understanding of assessment in literacy (primary 73%, secondary 80%) and their preparation to use assessment in literacy teaching (primary 65%, secondary 70%). In numeracy, three-quarters of beginning primary teachers reported that their courses had developed their conceptual understanding of assessment in numeracy (76%) and had prepared them to use assessment in numeracy teaching (70%). Beginning secondary teachers, however, were far less confident that their courses had developed their conceptual understanding of assessment in numeracy (49%) or had prepared them to use numeracy assessment (44%).

Table 4.9. Prepared to assess: Percentage of positive responses by primary and secondary beginning teachers

	Literacy		Numeracy	
	Primary	Secondary	Primary	Secondary
Developed conceptual understanding of assessment	73	80	76	49
Able to use assessment in teaching	65	70	70	44

Table 4.10. Prepared to assess: Percentage of positive responses by senior staff

	Literacy	Numeracy
Prepared to assess	28	41
Prepared to use assessment information in teaching individual students	27	35

In contrast to the generally high level of confidence among beginning teachers, only about a quarter of senior staff reported that beginning teachers were 'fairly well' or 'very well' prepared to assess the literacy development of students (28%), and to use this information in teaching individual students (27%). Slightly more positive results were reported in numeracy, where 41% of senior staff reported that beginning teachers were adequately prepared to assess the numeracy development of students, and 35% reported that they were adequately prepared to use numeracy assessment information to inform their teaching of individual students.

Problematic knowledge

A further issue identified in the literature review is the extent to which knowledge is understood and presented as problematic. Researchers in literacy (Green, 1999; Luke, Luke & Mayer 2000) and numeracy (Bobis 2000; Nicol 1999; Willis 1998) have argued that it is essential for preservice programs to explicitly present knowledge as problematic, uncertain and contested.

When discussion in the teacher focus groups touched on problematic knowledge it was frequently with a negative evaluation by senior staff participants. The consensus among this group was that teacher education was now less vocational than it had been 20 and 30 years ago. Instead of what they recalled as an emphasis on skills for classroom practice in their own teacher education, recent preservice programs were thought to focus more on abstract ideas. This in turn often led senior school staff to express frustration at the level of support they needed to provide to beginning teachers in their classroom practice during their first years of teaching.

Participants recognised, however, that there was at times a tension between the role of the university in providing a rigorous intellectual program and that of providing preservice teachers with teaching strategies. Some focus groups emphasised the importance of learning what schools are teaching at present and others indicated that because the curriculum is constantly changing it is important for preservice courses to focus on more fundamental

understandings. As one recent graduate put it:

Universities allow teachers to graduate with their high ideals intact which enables schools to continually receive new ideas, enthusiasm and trial new ideals. If universities were to stifle these ideals, the teaching profession would become stagnant. For all their faults, including not having enough practicum placements, university still does a lot to prepare teachers for their chosen career. (Recent graduate, VIC)

Among teacher educators, there was strong support for the role of universities in promoting a sense of knowledge as problematic and conditional. In the focus groups the enterprise of teaching was characterised as 'problematic', in the sense that teaching is complex, context-dependent and contingent on a range of educational and social forces. In contrast State mandated curriculum programs were characterised as 'unproblematic', providing context-free procedural solutions to complex problems. One mandated literacy program was characterised as encouraging passivity in teachers: 'Everything is set. You turn the page over and you do what the book says.' Teacher educators did acknowledge, however, that many preservice teachers valued procedural knowledge over problematic knowledge. The following comments illustrate the tension:

[Students] want procedural knowledge, whereas many times in universities we are trying to talk about problematic knowledge and perhaps depth of knowledge and to get them to start to think like a teacher. That's going to carry them through in the long term. (Teacher educator, NSW)

Our students go out and they go into a two hour literacy block where everything is set and the bell rings and you move onto the next group and the bell rings and you move onto the next group. By the time we've had the two hour literacy block and a one hour numeracy block it's play time and so why would you want problem solving in a situation like that? (Teacher educator, VIC)

I think we do go through the whole theoretical stuff a lot better than we do the skills and the strategies that match that theory. So we perhaps problematise knowledge more than we provide hands-on strategies. (Teacher educator, WA)

Addressing diversity

The literature also emphasises the need to prepare new teachers to deal with diversity, including working with multicultural and multilingual communities (Rosen & Abt-Perkins, 2000). In the terms of the Christie Report (Christie et al., 1991) teachers need also to be prepared for communities of learners characterised by difference in gender, social class, generation, disability and geographical location. Responses from the surveys and focus groups focussed on both the categories of diversity and preparation for teaching in rural and remote schools.

Preparation for diversity

Table 4.11 shows the judgements of senior staff and beginning teachers about preparation for teaching numeracy and literacy to a diverse range of students.

Beginning teachers were not convinced that they had been prepared to meet the literacy and numeracy needs of educationally disadvantaged students. At best, about a half of the beginning teachers felt prepared to deal with the literacy learning needs of such students, but this depended on the nature of students' educational disadvantage. About half of the beginning

teachers felt 'fairly well' or 'very well' prepared to teach students with literacy learning difficulties; fewer felt prepared to teach students with disabilities and from low SES backgrounds, and even fewer felt prepared to teach Indigenous and second language learners. Less than a half of beginning teachers felt prepared to deal with the numeracy learning needs of educationally disadvantaged students, with only 17% of secondary beginning teachers feeling prepared to teach numeracy to second language learners and 21% of these graduates prepared for teaching numeracy to Indigenous students.

Senior staff took a particularly gloomy view about preparation for diversity. Only a small proportion of senior staff reported that beginning teachers were adequately prepared to teach students with learning difficulties or disabilities, or from second language, Indigenous or lower socio-economic status backgrounds.

Focus group participants acknowledged the need for beginning teachers to know how to modify programs for children with learning difficulties at both the primary and secondary level. There was some support for the idea that this should be covered at university in core units rather than, as one participant commented, 'just being touched on in specific subject areas.' Beginning teachers were also concerned about their capacity to support students with learning difficulties and disabilities. Perhaps the most profound disappointment among beginning teachers was with their preparation in Indigenous education. Although some participants had the opportunity for practicum visits to Kimberley and Northern Territory schools, focus group

Table 4.11. Prepared for diversity: Percentage of positive responses by primary beginning teachers, secondary beginning teachers and senior staff

	Literacy			Numeracy		
	Primary	Secondary	Senior staff	Primary	Secondary	Senior staff
ESL	33	26	15	23	17	23
Indigenous	38	41	12	27	21	20
Low SES	45	43	22	37	23	26
Disabilities	43	45	11	34	30	18
Learning difficulties	54	53	17	45	28	18

participants who were working in regional and remote communities indicated that preservice teachers were not well prepared for their work with Indigenous students. For at least one of these beginning teachers, the specifics of second language learning might have been more generally useful in dealing with diversity:

I did some language units and now I feel that we should have had more ESL training, a lot more, because then at least we would know right from the start how to teach a child to read, basically read, and we weren't taught that in our language units. The great thing about it is that what applies to ESL can be transferred to any students... especially up here because a lot of the kids are ESL or ESD, about 70% of the class, fit the category and so strategies in that work a lot better. (Recent graduate, WA)

Rural and remote teaching

About half of the beginning teachers participating in the surveys reported that they were prepared to teach in rural and remote areas, with proportions varying slightly between the primary (48%) and secondary (56%). In the focus groups, both the senior staff and beginning teachers stressed the importance of preservice teachers experiencing a range of contexts and locations. In particular, there was strong support for preservice experience in 'difficult to staff' schools:

I was in middle class schools for ten years and enjoyed that and I then went to disadvantaged schools and really learnt to teach. Because I could not be complacent there or they would eat me alive. If you really want to skill people put them in settings with a range of abilities, you do have behaviour management problems, you do learn the skills of differentiating programs and everyone can be successful. (Senior staff, SA)

I think that if they [the University] are really serious about getting teachers ready then they need to put them into difficult to staff schools. Over the four years you [should] have to visit at least one difficult to staff school. (Recent graduate, WA)

It is really important to have plenty of practical experience with a diverse range of students because as a graduate you are not going to get a cushy job in the suburbs. You go to remote hard to staff schools where there may not be as many students but the range is more diverse. (Recent graduate, SA)

Critical reflection

The literature review identified a broad stream of commentary on the need for preservice teacher education to encourage a disposition towards critical reflection. Some researchers have stressed the need for preservice teachers to engage in critical reflection on their own beliefs about literacy and numeracy (O'Neill, 2000; Stuart & Thurlow, 2000). Others have argued that critical reflection is necessary if teacher education programs are not to reproduce existing negative attitudes towards mathematics (Klein, 2000), and that programs that build a stronger capacity for critical reflection produce teachers who retain their progressive, student-centred attitudes and ideals (Bobis, 2000). There was some support for this point of view in the focus groups. As one teacher put it:

We need to be able to take on a whole raft of pedagogies and take them on board and apply them at different times and that can only happen when you are working collaboratively in a working professional environment and reflect on your own practice. (Senior staff, WA)

In both senior staff and recent graduate focus groups there was also an acknowledgment that teaching is a skill that is 'learnt over time' and 'takes a number of years'. There were many comments that emphasised the need for teachers, at all levels and stages, to be lifelong learners. Some senior staff participants commented that expectations of beginning teachers were very high and that when they (the senior staff) first started teaching they still had 'had much to learn'. As one participant said:

We do expect graduates to come out and have a number of skills and go straight into the classroom and the adage of sink or swim really is real and alive in schools today because we

are all so busy. Yes, we do expect so much. (Senior staff, QLD)

I consider universities are doing an adequate job in preparing preservice teachers for wider education. Teaching is a complex occupation whereby individuals are asked to take on many roles (some never experienced before). Some things just need to be experienced. I value my work now because I have experienced diversity and learnt from it. (Recent graduate, SA)

Teacher educators emphasised the importance of developing a disposition towards reflective practice. This commitment was evident in approaches to teaching strategies and in selection of assignment tasks. Despite the pressure from students for more procedural knowledge, and notwithstanding the certainty that the first year of teaching would focus on developing classroom management strategies, teacher educators argued that the skills of reflection and critique were vital for long-term professional development. In their words:

I think we can give them models for reflection. We get them to practise reflection on certain issues and if we can get them to articulate that process I think they will gradually get to it in their own practice. We have always said one of the things that we need to do is make sure they all understand that they have to be responsible for their ongoing professional development. (Teacher educator, VIC)

In most of our subjects we try to force them to reflect, to force them into situations where they have to reflect. It's often built into their assessment tasks and for some students it's very, very difficult to get them to reflect with

any depth... about their learning and how it connects with teaching. (Teacher educator, NSW)

We're training teachers to teach in our State [for] vastly different contexts, and one set of strategies will not work in another context. So we actually have to train them to say 'Right, that's not what I need for here. Where do I go and find it and how do I go about it?' (Teacher educator, WA)

Structural issues

In addition to the seven substantive issues identified in the literature review, the surveys and focus group interviews explored several of the structural issues identified in the literature review. These included stronger links between schools and universities, more content, and better induction and mentoring.

Stronger links

From the survey data reported in Table 4.12 it can be seen that almost all primary beginning teachers thought that their school practice had given them 'some' or 'many' opportunities to implement what they had learned about literacy and numeracy, although fewer indicated they had opportunities to implement their knowledge about diversity. Secondary beginning teachers indicated that they had fewer opportunities than their primary counterparts to practise what they had learned about literacy. They also noted that they had substantially fewer opportunities to practise their knowledge about numeracy, but had more opportunities with students from diverse backgrounds. Just over half of both sets of beginning teachers reported that they had opportunities for practice in the area of learning difficulties.

Table 4.12. *Opportunities for practice: Percentage of positive responses by primary beginning teachers, secondary beginning teachers*

	Primary	Secondary
Literacy teaching	91	66
Numeracy teaching	92	38
Diversity	62	71
Learning difficulties	56	59

Although beginning teachers reported that their school experience had given them opportunities to practise what they had learned about literacy and numeracy, many of them were dissatisfied with the amount of time allocated to school experience. In the final open-ended question of the survey, 29% of primary and 12% of secondary respondents mentioned the need for more school experience in their teacher education program.

In the focus groups both senior staff and beginning teachers reinforced the importance of links with schools. It appears that preservice teacher education courses found it a challenge to maintain this connection. From the beginning teachers' perspectives adequate links with schools were as much dependent on the practices of individual staff as the structural characteristics of courses. There was a perception, shared by some of the younger teacher educators, that some university staff had 'forgotten what it is like':

Some people who taught us have been teaching the course for 30 years. You do wonder how relevant or up to date their methodologies are. I think this is something that most of the people in our course recognised and a large proportion mentioned it or wrote it down on feedback forms. (Recent graduate, SA)

Other beginning teachers acknowledged that some university staff remained in contact with classroom practice and were able to support preservice teachers to develop literacy and numeracy teaching strategies. Many beginning teachers indicated that they had been taught and motivated by a particularly committed lecturer. As one recent graduate highlighted, 'He had a real passion for learning and that came out'.

There was a broad consensus among focus group participants that it was beneficial to have recent or current practitioners at the tutorial or workshop level of courses. One recent primary graduate highlighted the benefits of tutors with recent classroom experience:

My tutors in literacy and numeracy were part

time teachers. The tutorial was late in the afternoon and it went for two hours but it was just so much fun and she taught us how to teach maths. (Recent graduate, SA)

Teacher educators confirmed the challenges of connection and the importance of closer ties with schools and the profession. There was a sense that there were 'gaps' between teachers in schools and teacher educators, and that these were difficult to bridge. For some teacher educators the issue was a matter of building 'relationships with a group of schools rather than ad hoc arrangements.' Others proposed structural solutions, such as separate roles for academics and seconded teachers working in teacher education. One teacher educator, frustrated with the tension between the role of university academic and teacher educator suggested that university staff have to roll up their sleeves:

I think we as academics have to get in, get our sleeves up and be out there with kids and with teachers and in that context. I think however we do it, I mean it's been done in different ways in the past and we've all got our own ideas and we don't have a definitive answer but I just think that's where teacher education, where academics are going to. I think that's where it's got to go. I don't think we're going to get away with continuing the way it is. (Teacher educator, VIC)

As some teacher educators mentioned in focus groups, the benefits of stronger links are reciprocal: students learn from schools and schools learn from students. In their words:

Within the schools the view is often much more positive and they see the beginning teachers as agents of change and providing stimulus and energy to more senior colleagues. (Teacher educator, VIC)

I've been working in one school where they were just really blown away with how we've conceptualised planning using the Curriculum Framework, and they thought that the students' documents were fantastic and copied them for all over the school. (Teacher educator, WA)

More content

Among primary school colleagues there was some concern that the amount of time allocated to literacy and numeracy in the undergraduate programs did not reflect the breadth of knowledge they required as teachers. As one beginning teacher put it:

'We're told to teach literacy and numeracy 80% of the time. You can't tell me that 80% of units in university are to do with literacy and numeracy, so the university needs to reflect what we need to teach and we need to teach 80% literacy and numeracy'. (Recent Graduate, WA)

Although more than three-quarters of beginning teachers completing the surveys believed that their preservice course had prepared them to manage student behaviour, only a third of the senior staff shared their view. In focus groups this was reflected in the view that more time should be spent on developing classroom management strategies during preservice education courses. As one beginning teacher argued, if classroom management had been foregrounded in preservice education courses then beginning teachers would have been more able to focus on teaching literacy and numeracy:

But [the University] is saying that if you've got an interesting enough program the kids will just want to do this and it's like 'no', because you've actually got to get them to sit down and listen so you can get this interesting program. (Recent graduate, WA)

Better induction

Although induction was rarely mentioned in open-ended responses to the surveys, it was an important theme in focus group discussions. There were many different views on ways to set up an appropriate program, but one point of agreement was that mentoring and induction of beginning teachers require allocation of system and school resources. Participants indicated that there were more opportunities for peer mentoring in schools where there were a number of beginning teachers, but that in some regions there were so few beginning teachers that this

was not an appropriate strategy. Some beginning teachers suggested developing a 'buddy' system to overcome the isolation of beginning teachers who were the only such person in their school. Beginning teachers were also reluctant to ask for advice from more experienced colleagues as they were concerned that their colleagues would feel they were not competent. Two beginning teachers highlighted the challenges:

I did not ask questions at the beginning of the term because I felt that if I asked too many questions they would think that I was not competent. There were things that I should just know. Like running records, I didn't know if I was supposed to buy books and then I saw the PM Benchmark Kit in another teacher's room and said, 'What is that?' I then said, 'Is this commonly known about?' She said, 'We all use it.' I didn't know about it. This made me think about how many other things that I am supposed to know about but I don't. No one says, 'Do you know about this?' (Recent graduate, QLD)

I think mentoring and induction are important. A booklet of the school would be useful – practical. You need to have a mentor in the area but not in your school. Two first years coming out can share together. You need a network of people that are going through the same thing. A buddy system would be good – relationship between first grads and an older teacher to confirm you are okay – 'strong arm around you'. A network of teachers that can help. (Recent graduate, NSW)

Relative importance of structural and substantive issues

Substantive issues – and especially substantive issues related to procedural knowledge – were much more salient than structural issues for beginning teachers completing the surveys. Almost all of the primary graduates responding to the survey chose to write in answers to the final open-ended question: How could your course have better prepared you for literacy and numeracy teaching? Their responses overwhelmingly focussed on the relevance of the knowledge developed during their teacher

education course (see Figure 4.5). Teachers called for more practical ideas and strategies, less theory, more basic literacy skills, more theory-practice links, more planning, more diagnostic assessment and more numeracy strategies. The structural issue most often mentioned was more and better professional experience, including more practicum/teaching rounds, more work with children and hands-on experience in coursework.

A somewhat lower proportion of the secondary beginning teachers responding to the survey chose to write in answers to the final open-ended question (see Figure 4.6). Their responses overwhelmingly focussed on substantive issues relating to relevance of the knowledge developed during their teacher education course. Teachers called for more practical ideas and strategies, specialist literacy and numeracy courses, more literacy across the curriculum, more numeracy in specialist areas, less theory, more decoding skills (phonics and sight vocabulary), and more on learning difficulties in literacy. The only structural issue mentioned by more than one tenth of these respondents was the need for more practicum/teaching rounds.

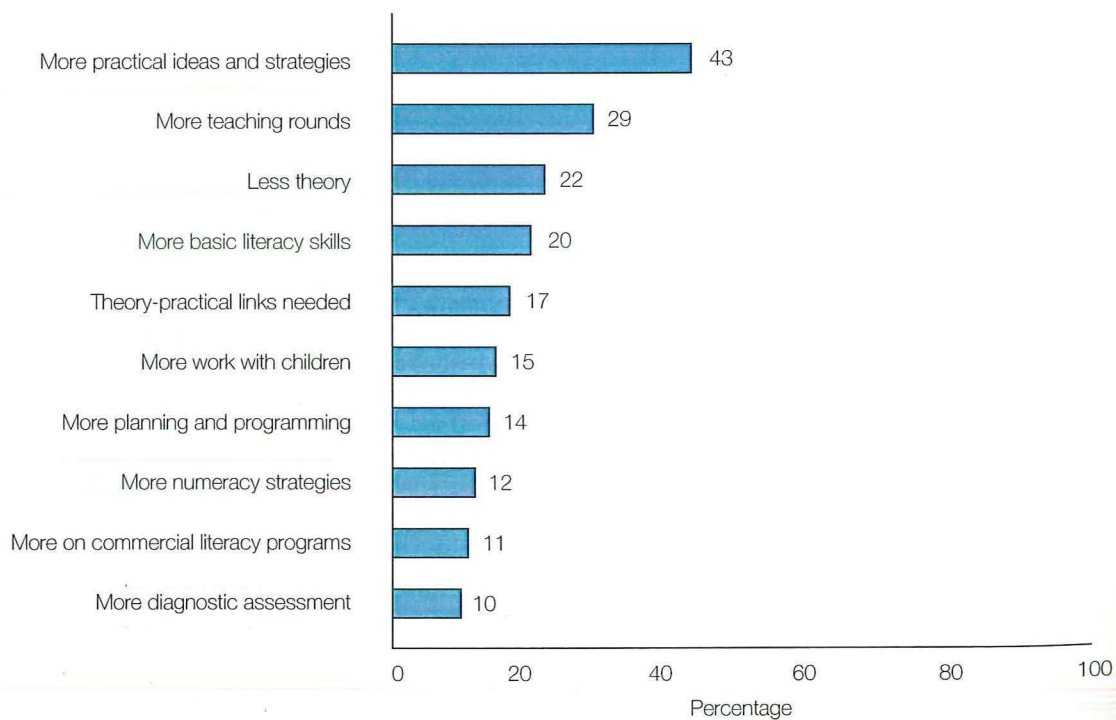


Figure 4.5. Suggestions for course improvement: Percentage of responses by primary beginning teachers

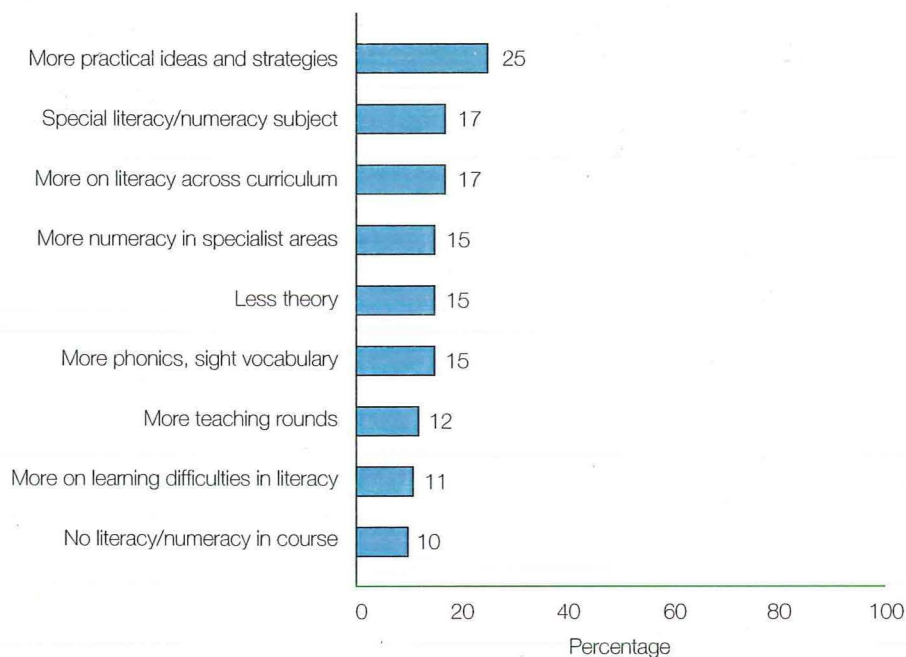


Figure 4.6. Suggestions for course improvement: Percentage of responses by secondary beginning teachers

Another indication of the relative importance of substantive issues came from the feedback completed by participants at the end of each focus group. Participants were invited to rank a mixture of structural and substantive issues on a written sheet collected at the end of the session. On substantive issues, they were asked to rate the relative importance of broad and relevant knowledge of literacy and numeracy teaching, personal literacy and numeracy competence, specific knowledge of literacy and numeracy and critical reflection. Participants were asked to nominate the three most important of these nine issues, which provided a quantitative insight into the relative importance of these issues for the three groups of participants. The results appear in Figure 4.7.

Substantive issues concerning teachers' knowledge were regarded as much more important than structural issues, such as the length of teacher education programs or school-university partnerships. For both senior staff and teacher educators the three most important issues were beginning teachers' personal competence in literacy and numeracy, specific knowledge in literacy teaching, and specific knowledge in numeracy teaching. Beginning

teachers rated their three most important issues as specific knowledge in literacy teaching, broad and relevant knowledge that allows preservice teachers to work with a wide range of students across all curriculum areas, and specific knowledge in numeracy teaching. It can be seen that there was a high level of agreement amongst all three groups in their three choices, with specific literacy and numeracy knowledge rated as two of the three most important issues by teacher educators, beginning teachers and senior staff. However, in terms of critical reflection, whilst only a few senior staff and even fewer beginning teachers rated this factor in their top three issues, it was nominated by well over half of teacher educators. In terms of structural issues no teacher educators and only a few senior staff and beginning teachers thought that a longer university based preservice teacher education program was important. There was some support for better school-university partnerships in particular by teacher educators and beginning teachers, stronger induction programs and more effective mentoring of beginning teachers.

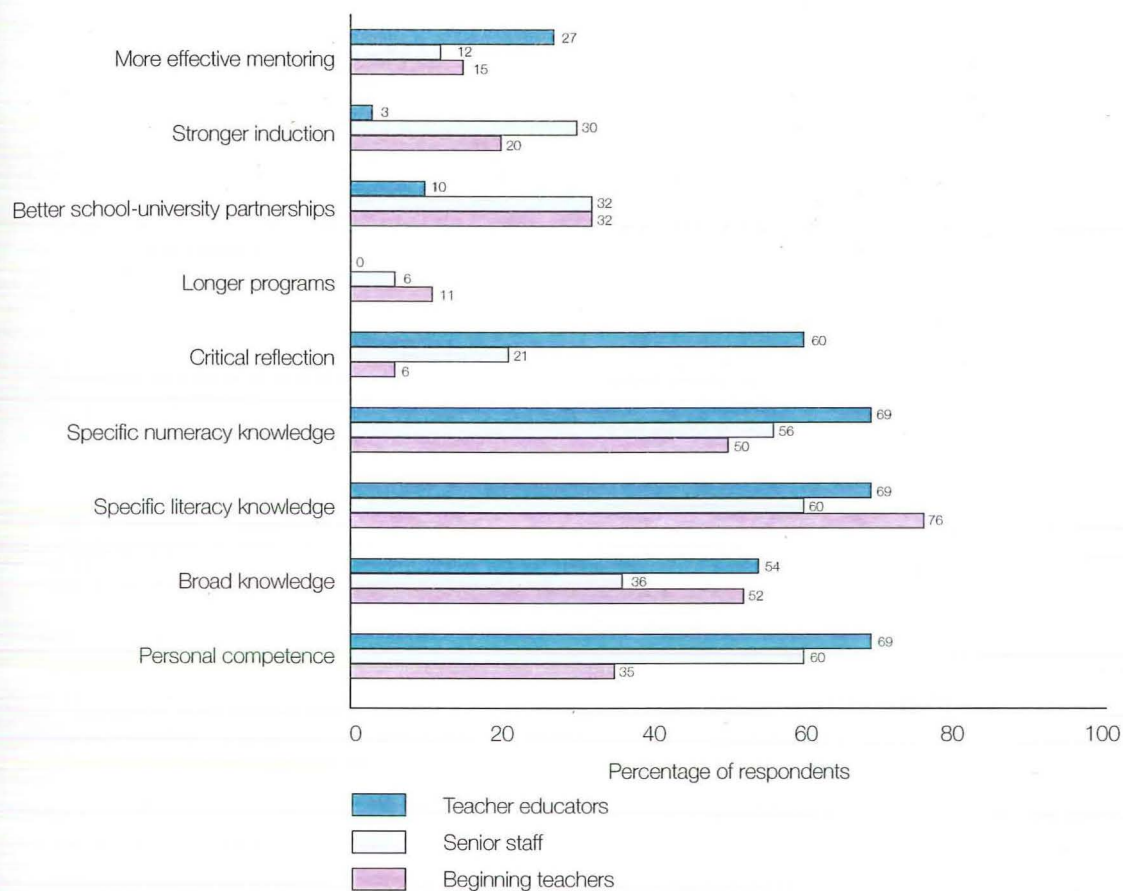


Figure 4.7. Percentage of 'Top three' most important issues of the nine ranked by beginning teachers, senior staff and teacher educators participating in focus group interviews

Discussion

In the final section of this chapter the results of the survey and focus group analysis are related to previous research literature. On the whole, the results of this study reflect and extend the conclusions of the literature review. The most serious concerns expressed by beginning teachers related to what the literature review characterised as relevant knowledge, that is specific knowledge such as strategies for teaching literacy and numeracy. In focus groups, teacher educators, senior staff and beginning teachers all saw relevant knowledge in both literacy and numeracy teaching as important issues in teacher education courses. Also of great concern was capacity to deal effectively with diverse communities of learners, especially second language learners and students from Indigenous communities.

Whilst personal competence in literacy and numeracy was nominated as an important

issue by teacher educators and senior school staff in the poll taken at the end of the focus group sessions, it was not a dominant theme in the preceding discussions, nor was it a matter of concern for the beginning teachers who responded to the surveys. Further, a majority of the senior staff who responded to their survey indicated that beginning teachers were adequately prepared in terms of personal competence in literacy and numeracy. In the open-ended survey questions breadth of discipline knowledge was not a major concern for beginning teachers, nor was capacity to see literacy and numeracy content as problematic. Whilst capacity for critical reflection was mentioned it was not highly rated by focus groups.

As anticipated by the literature review there was some support in the surveys and focus groups for structural changes to teacher education, especially stronger school-university links and

additional time for teaching practice/rounds. Support for these structural issues was closely related to the area most highly prioritised by beginning teachers in the surveys and focus groups, that is the substantive issue of relevant knowledge of literacy and numeracy teaching.

To a degree these results are broadly consistent with previous Australian studies, although overall the beginning teachers, but not the senior school staff, in the present study took a somewhat more positive view of their preservice teacher education courses. Some previous studies have registered substantial consumer concerns about the quality of preservice preparation. Batten, Griffin and Ainley's (1991) survey of recently recruited teachers found that less than half (47.1%) of new teachers were positive about the quality of their overall preparation for teaching (p. 16). More than two-thirds of these teachers reported 'great' or 'moderate' difficulty in catering for students with a range of learning needs (p. 29).

Similarly, fewer than half (44.6%) of teachers in a 2002 study conducted for the Australian Government rated themselves as 'well' or 'very well' prepared by their preservice teacher education course for their first year of teaching (Tasmanian Educational Leaders' Institute, 2002, p. 134). The areas of greatest dissatisfaction included preparation to manage administrative responsibilities, preparation for inclusion of students with disabilities and managing student behaviour. Typically, even these beginning teachers' low ratings of their teacher preparation were more positive than their supervisors' ratings. Less than one-third of their supervisors (29.6%) thought that beginning teachers were well or very well prepared for their first year of teaching (2002, p. 144). These ratings by supervisors are by and large consistent with the views of senior school staff in the present study.

Comparable results have been reported in international surveys of satisfaction with teacher preparation. In a US national survey, for example, (Loadman, Freeman, Brookhart, & McCague, 1999) reported lower ratings – a little above average on a seven-point scale – for overall quality of teacher preparation courses and

general education courses compared, with very high ratings given for field experience and school internships.

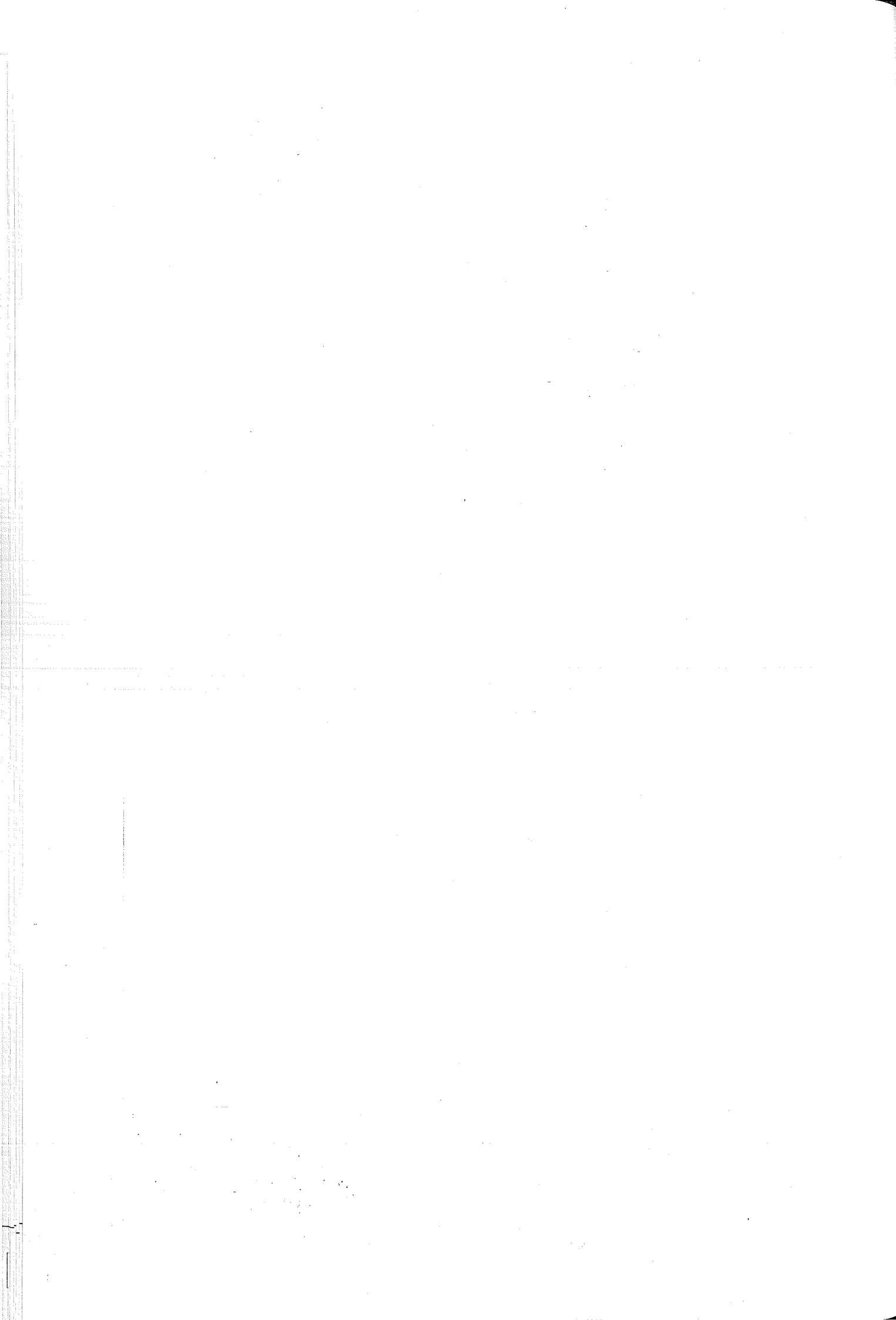
The high levels of beginning teacher concerns about gaps in knowledge of teaching strategies and capacity to deal with diverse student groups, reported in the present study, are familiar to readers of the local and international research literature. As long ago as 1980 McDonald and Elias' review of the literature on beginning teachers was subtitled 'A crisis in training'. More recently, Grossman et al. (1999, p. ix) have drawn attention to what she called the 'folk wisdom regarding the ineffectiveness of teacher education'.

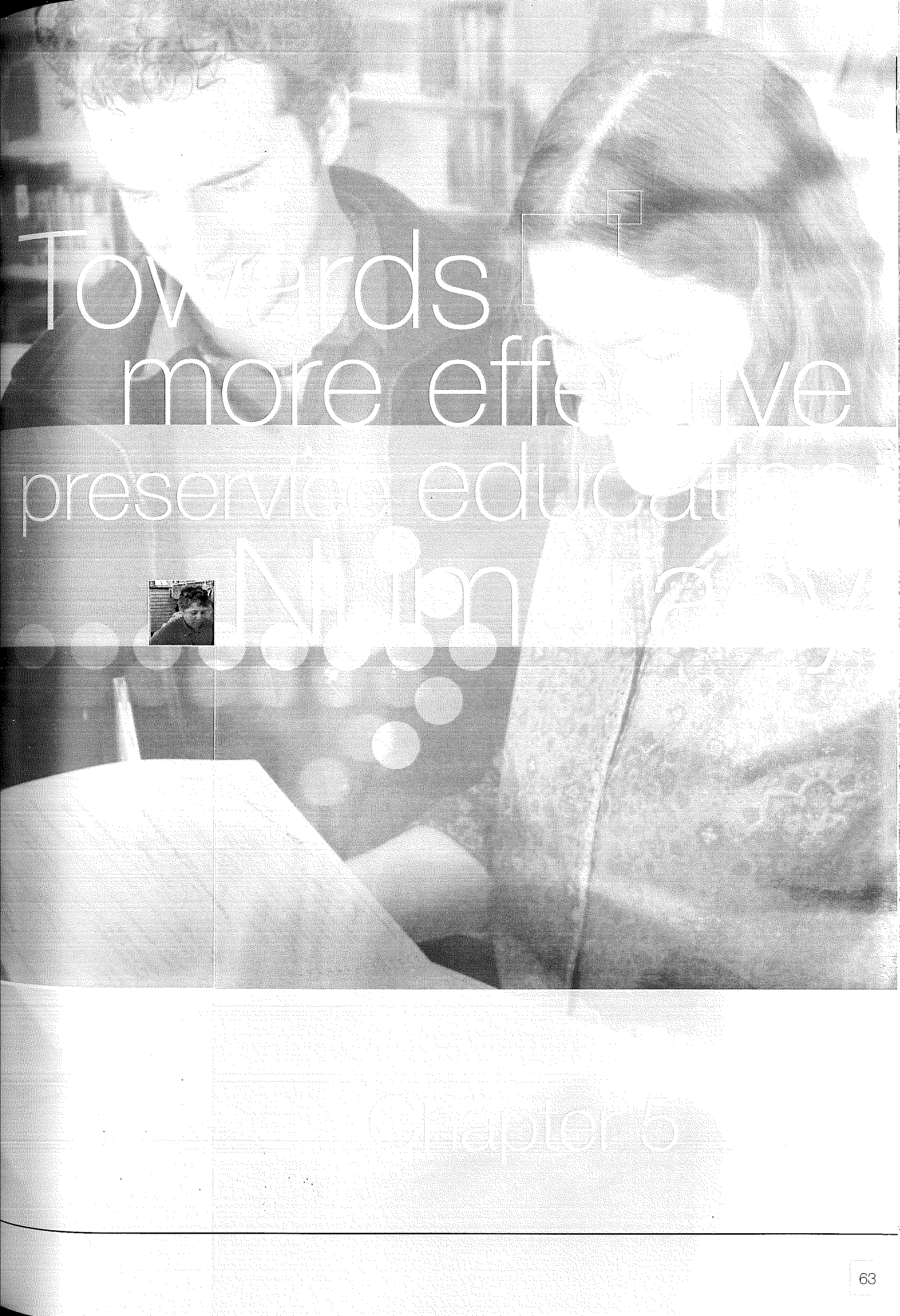
What explanations may be given, then, for this long-standing and internationally consistent scepticism about the capacity of teacher education to prepare beginning teachers to teach? Perhaps the strongest explanation concerns what Corcoran (1991) called 'transition shock' and others have called 'reality shock' (Khamis, 2000). As McDonald and Elias argued, almost all teachers find the first year the most traumatic: the most difficult problems they face are with classroom management and with teaching strategies and the transition period is characterised by feelings of fear, anxiety and loneliness (1980, pp. 42-43). During this period of transition shock beginning teachers are buffeted by the demands of the professional teaching role, overwhelming workload, physical and professional isolation, conflict between expectations and reality, difficult initial teaching assignments and inadequate induction (Tasmanian Educational Leaders' Institute, 2002, pp. 20-21).

In addition to these well-documented attacks on beginning teachers' confidence, the contexts in which they work are increasingly complex. Inclusion policies have increased the likelihood that regular classes will contain children with high support needs. Schools are more linguistically and culturally diverse than the group of beginning teachers entering the profession, and school policies require beginning teachers to take account of this diversity. Beginning teachers in the present study expressed particular concern

about their preparation to teach a diverse range of students in schools. The feminisation of teaching and the increased average age of the profession, which Luke (2003, p.71) suggests has led to 'a generational blame game', combine to make schools less socially comfortable than they may once have been for beginning teachers. Similarly, the status slide of the teaching profession may further undermine beginning teachers' confidence that they have chosen the right profession.

Despite the high proportion of beginning teachers who consistently report concerns about gaps in preparation for teaching strategies and behaviour management, and despite what may be special pleading about the impact of transition shock on beginning teachers' attitudes, care must be exercised in drawing the conclusion that teacher education is ineffective. Both primary and secondary beginning teachers saw some significant gaps in their preparation to teach literacy, and secondary beginning teachers as a group felt ill-prepared to teach numeracy. However, at the most general level the large majority of those who took part in the surveys for the present study felt prepared for teaching literacy. Primary beginning teachers felt particularly well prepared to teach numeracy. Further, there are more than a dozen Australian universities where more than two-thirds of students reported positive overall satisfaction with their teacher education course a few months into their teaching careers. The following two chapters of this report provide descriptions of some of these courses, where consistent attention was paid to the development of both critical reflection and procedural knowledge, and where strong links were maintained with schools.



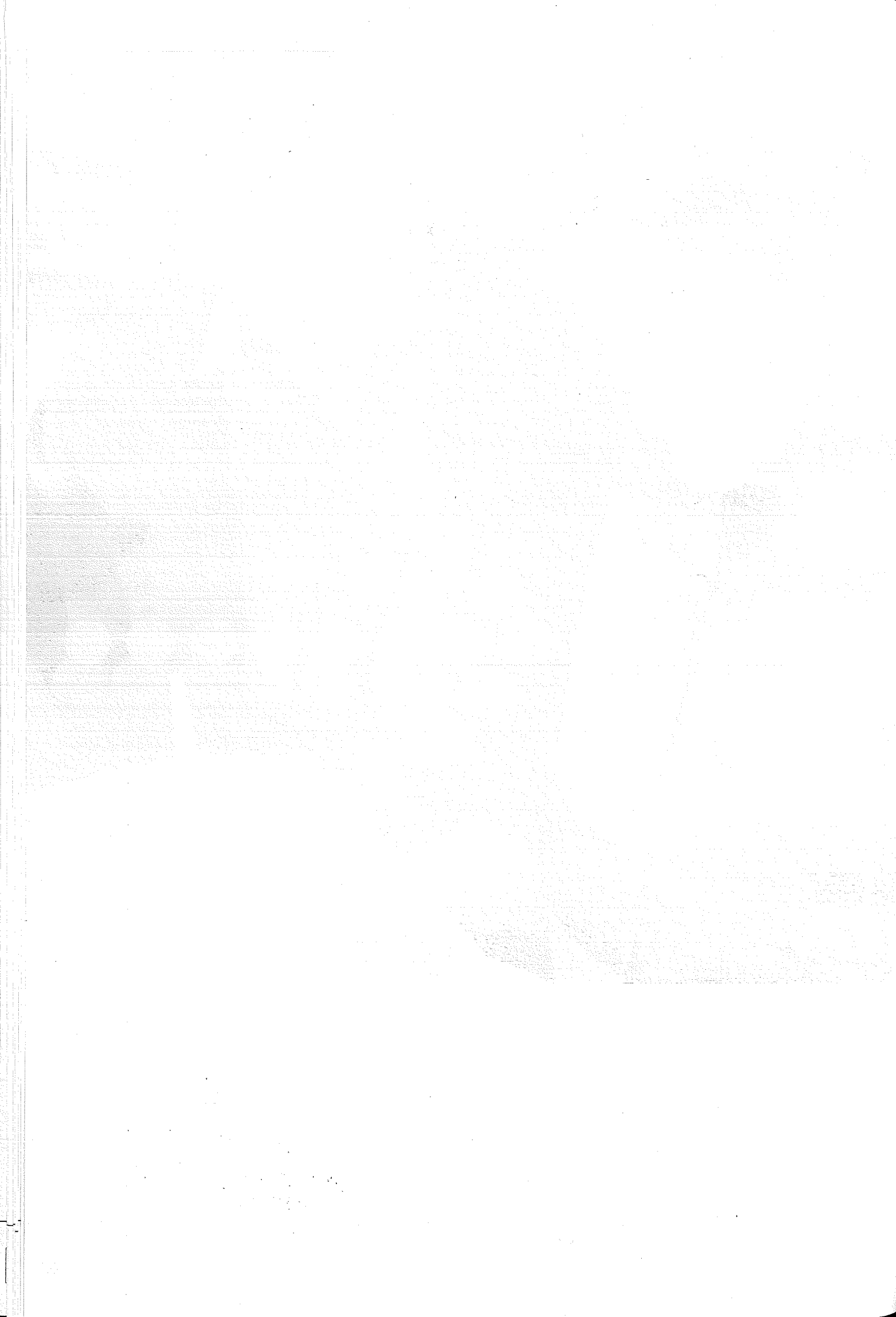


Towards more effective preservice education



Nitin Nayak

Chapter 5



5 Towards More Effective Preservice Education: *Numeracy*



Use things from class in Prac ... see how important it is that they [children] explore for themselves ... this is good for me because I'm good at mathematics ... it makes me stop and think about it, try to understand the way kids think ... did a lesson on tangrams, the kids who hated maths loved it.

The sites

In the course of the project visits were made to six programs sites, selected to represent the range of student intake characteristics, program types and geographical locations (see Table 5.1). All sites had been nominated as exemplary in some way in preparing preservice teachers for literacy and/or numeracy teaching. In this chapter the focus is on preparation for numeracy teaching in four of these sites. These numeracy site studies illustrate a broad spectrum of contexts. Two of the site study programs were two-year graduate programs: a primary Bachelor of Education offered in internal and external modes at a large new university we called Polytech, and a primary Bachelor of Teaching offered only in internal mode at an old inner-city university we called Metro. The third site study program was a four-year undergraduate, primary Bachelor of Education undertaken by a group of Indigenous students in a full-time enclave in a rural town. This site, which we called

Rural, used the external version of a large teacher education provider's city program. The study at the fourth site study took the form of a comprehensive overview of Regional university's one- two- and four-year primary and secondary programs. These programs included undergraduate and graduate degrees, and several double degrees. This site, more than half of the beginning teachers were enrolled in distance education mode.

In a domain as large as teacher education there are many lists, taxonomies and sets of standards designed to draw attention to program characteristics of effective teacher education programs. In the project literature review we distinguished between structural issues such as program length, links to schools and professional status and substantive issues concerning the nature of professional knowledge required among beginning teachers (Gore & Griffiths, 2002). Building on the taxonomical work of Bloom and others in school education, Shulman (2002) has provided a taxonomy of liberal and professional learning that he has called 'A Table of Learning' (see Table 5.2).

Table 5.1. Key features of the numeracy site studies

Site	Primary/ Secondary	Course	Number of students	Student/Course characteristic
Polytech	Primary	2-year graduate B.Ed.	423 students in 2002	internal and external modes 83% full-time, 40% external
Metro	Primary	2-year graduate B. Teach	397 students	full-time, internal
Rural	Primary	4-year undergraduate B.Ed	26 students, almost all Indigenous women	rural enclave, external study materials
Regional	All courses	B.Ed, B.Teach, Grad. Dip, B.Gen. Stud./ B.Teach & Combined Degree with B.Teach	1995 students in 2001	approximately 60% external, many international

Table 5.2. Shulman's 'Table of Learning' (2002)

Engagement and Motivation
 Knowledge and Understanding
 Performance and Action
 Reflection and Critique
 Judgement and Design
 Commitment and Identity

An alternative strategy is to represent effective teacher education in terms of teacher education program standards (NCATE, 2002a; TTA, 2002). Finally, there are evidence-based approaches to identifying the characteristics of effective teacher education. As the literature review revealed, there are few research programs that would meet a stringent test of evidence-based inquiry in this field. Perhaps the most obvious exception is

the work of the US National Commission on Excellence in Elementary Teacher Preparation for Reading Instruction (Hoffman et al., 2003a, p.11) as shown in Table 5.3, which has demonstrated an empirical link between program characteristics, teacher behaviour and student learning outcomes.

Combining material from the literature review, taxonomical approaches, professional standards and empirical inquiry, this chapter characterises effective teacher education in terms of five broad headings:

- Purpose
- Engagement
- Knowledge
- Linkage
- Diversity

Table 5.3. Eight Critical Features of Excellence in Reading Teacher Preparation Programs (Hoffman et al. 2003a)

1	Content	Teacher educators engage preservice teachers with a comprehensive curriculum and guide them toward the development of a cohesive knowledge base for effective teacher decision-making.
2	Apprenticeship	Teacher educators engage their preservice teachers in a variety of course-related field experiences where they have opportunities to interact with excellent models and mentors.
3	Vision	Teacher educators centre their program around a vision of literacy, quality teaching, and quality teacher education.
4	Resource and Mission	The teacher education program has sufficient resources (intellectual, financial, and professional) to support the mission for quality teacher preparation.
5	Personalized Teaching	Teacher educators value diversity and are prepared to offer their preservice teachers responsive teaching and an adapted curriculum.
6	Autonomy	Teacher educators are active in adapting and negotiating with their institutions to make sure their students receive the most effective preparation possible.
7	Community	Teacher educators work to create an active learning community that includes the faculty, their students, and mentor teachers.
8	Assessment	Teacher educators continually assess their students, their program, their graduates, and themselves to guide instructional decision-making and program development.

Purpose

All of the site studies were conducted in universities with deep historical roots in teacher education. They served diverse populations, recruited students from a range of educational backgrounds, and prepared beginning teachers for a variety of employment destinations. Each program, however, was characterised by a clear – and different – sense of purpose. Clarity of purpose describes the existence of shared and explicit program goals. This quality, similar to the quality identified as 'vision' by the US National Commission study (Hoffman et al., 2003a p. 11), is also reflected in the NCATE program standards requirement for a conceptual framework that is 'well articulated, knowledge-based, and consistent with the institution's mission' (NCATE, 2002a).

At Polytech, for example, the site-visit program was characterised by a clear focus on shared program standards and the particular needs of its students. The two-year graduate program at Polytech shared with other Polytech courses clear and well-articulated program goals. All of the teacher education programs were organised around four program standards and ten teacher practitioner attributes. Standard 3, for example, concerned 'skilled curriculum developers and reflective practitioners' and was associated with teacher attributes such as 'effectively design, create and manage learning environments'. These standards and attributes were articulated in each unit outline. More specifically, however, Polytech's two-year B.Ed. was shaped by the program's student characteristics. They were all graduates, relatively well qualified academically, and highly motivated to develop professional teaching skills. As the site study reported, the result was a program united by a graduate pedagogy 'that is experientially grounded, theory driven and empirically based' (Wright, 2002, p. 113). In the context of one of the largest teacher education programs in the nation, the B.Ed. staff kept the graduates as 'discrete groups' (p.113), gave them more options in assessment, and explicitly built on the thinking skills, world knowledge and experience that they brought to the course. The course coordinator distinguished between students in the four-year undergraduate and two-year postgraduate programs:

The grads are far more enthusiastic. They hold me more accountable. I always ask them to tackle me over issues, ask questions during lectures (which they do), and I stress the importance of being a critical thinker. I encourage them to discuss and be more flexible. The grads are more willing to take this on... Because the undergrads get more time on maths than the graduates, we try to raise their [the undergraduates] level of analysis. An example for undergraduates, is an assignment question focusing on critical analysis of a journal article. But for grads, I have things that are very practically oriented, for example, design a game board and some numeration questions to go with the game board. That's very much an application of what they're learning. (Wright, 2002, p. 102)

The purpose of the Rural program, in contrast, was to make teacher education available to a group of students who had experienced much less academic success than the Polytech graduate students. All of the course participants were Indigenous, almost all were mature women, and almost all gained university entrance through an alternative entry pathway (Greaves, 2002). Although the program used traditional paper-based external studies course materials distributed from the city university, the program delivered these materials through an intensive, full-time, on-site tutoring program supported by local and visiting tutors, a course coordinator and an Indigenous support officer. The intensity of instruction offered to the small group of students in the Rural program reflected its purpose. For each of the nominal three contact hours per week in literacy and numeracy units, four hours of formal seminars were scheduled, supplemented by an additional two hours for informal group activities. Even though Friday was designated as a personal study day, students were often called in for additional classes.

The Regional program, designed to serve both on-site and a majority of distance learners, was characterised by an explicitly constructivist approach to learning (Siemon, 2002, p. 161). A 'learning cycle', represented as a flow from experience to exploration, transformation, presentation and then to reflection, was featured in all programs and core units in those programs. Unit outlines also mapped the contribution of each unit to the development of university-wide graduate attributes, including communications skills, a global perspective, information literacy, life-long learning, problem-solving, social responsibility and team-work. Structured support for the transition from the role of student to teacher was also provided through a practicum program that included observation and analysis of classroom practices as well as practical experience.

Metro's two-year primary graduate B.Teach. was characterised by a strong commitment to content knowledge in mathematics. This reflected both the relatively high academic achievement of the students' and lecturers' well-articulated critique of deficiencies in primary mathematics teaching in Australia. As one of the Metro mathematics lecturers argued, in Australian primary mathematics classrooms 'what we have are nice lessons with very little content' (McIntosh, 2002, p. 184). At the heart of this problem was a lack of content knowledge in mathematics, and a consequent lack of cognitive demand in lessons:

I think there are quite a lot of countries around the world where teachers would have better content knowledge. It's a complex thing, it depends on the status of teachers and all sorts of things, but I think our teachers' content knowledge is inadequate... I think what Australian teachers lack is a real understanding of what is going on in the task. The typical Australian lesson lacks cognitive demand: it doesn't really get at the maths that has to be taught. (McIntosh, 2002, p. 184)

Within the program, this critique was reflected in the allocation of course time to numeracy, the presentation of mathematics content that went well beyond the primary school syllabus, and a strong focus on pedagogical content knowledge.

As one of the mathematics lecturers commented:

Content is taken particularly seriously here, I think that when you say that our courses are particularly strong on content, then this is right, but it is more correct to say that they are particularly strong on curriculum studies (pedagogical content knowledge). I have heard people from other institutions talking about expecting a mastery of topics that we do not do (e.g., algebra beyond number aspects). We concentrate pretty much on content that is relevant to primary maths (i.e., that contributes to a deeper understanding of it). We do not aim for our students to pass Year 10 equivalent, for example, although all of them nominally have. (McIntosh, 2002, p.185)

Engagement

A second quality that characterised many of the numeracy education programs was commitment to student engagement, to drawing students in as active learners engaged in worthwhile educational experiences (Shulman, 2002, p.5). For some, engagement was secured by the provision of personalised teaching (Hoffman et al., 2003), responsive and adaptive teaching that reflected the needs of particular student groups. Beyond the needs of diversity, engagement was also secured by the accessibility, enthusiasm and expertise of lecturers and tutors.

In the Rural program, student engagement was secured by the breadth of support services provided, as well as the intensiveness of that support. In addition to direct learning support in working with the external materials, the program staff mediated between the demands of the program and the family and cultural issues that may have influenced pass, retention and completion rates. The program coordinator often served as an advocate for Indigenous students in their contact with city-based lecturers and administrative officers, and the Indigenous support officer provided assistance with pressures such as childcare, domestic violence, health, finance and scholarships. Access to facilities and work-space in the local community was highly valued by students. As one student commented, 'I would not be studying B.Ed. if the facility was

not here in my local community' (Greaves, 2002, p131). In addition, locally recruited tutors were available to work through the external studies notes with students four mornings per week, and to support their private study in the afternoons. The consequence was an unusually high level of engagement. This engagement was reflected in subject pass rates, which were superior to those of other external Indigenous students in the university and to those of non-Indigenous students in the internal city program, as well as in students' comments about the program. In one student's words:

There's lots of feedback, they help you get through the exams. Other places are more competitive [but here] I am not intimidated. I can talk and share with tutors and make sure everything is clear. (Greaves, 2002, p.122)

At Polytech, students in the two-year graduate program appreciated that they were not 'just a number' as they thought they had been in their undergraduate programs. For some students the issue was availability of staff - willingness to continue an email dialogue or take phone calls - or an obvious interest in students' learning. For others it was represented as staff enthusiasm, lecturers who were described as 'a star' or 'a gem', who were 'interesting' or 'made maths fun'. Asked about the highlights of the course, Polytech students made comments such as these:

For me it was [the mathematics lecturer's] maths lectures. [The lecturer] was really interesting and [she/he] made maths exciting and fun.

[The mathematics lecturer] is very open for us to communicate with [her/him] by phone or email'.

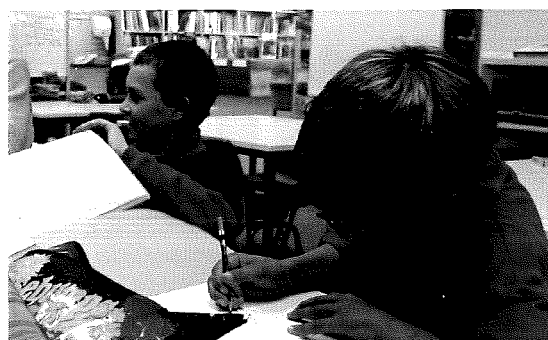
They [tutors] actually seem to be interested in how well you're doing and it means something to them, that is, how well you're doing. I thought in my undergraduate degree, I was just a number. Now, with [the mathematics lecturer] purposely trying to make you learn, and the tutor, she/he gets some laughs going, in an educational context. [The tutor's] young and vibrant, mad keen on her/his topic. [The

tutor] can talk about post modernism till we all wither and die and it's quite good to sit and listen to someone like that. To be in a big institution and it's like you've got a private tutor. (Wright, 2002, p. 106)

The capacity for engagement did not, however, seem to be a result of the two-year graduate program structure. The structurally similar program at Metro was described by some students as 'very lecture-based and theoretical' and 'not really showing us how to teach'. For staff in this program there was a conflict between their deep commitment to covering important mathematics content and the time constraints under which they worked. The amount of time available for mathematics in the program was regarded as 'inadequate', but it was not thought to be feasible to 'get any more time' (McIntosh, 2002, p.183). In their words:

I'm not completely happy with the structure, with the way we do it now. I would like more small group workshops and less lectures. But the economics of the situation, to have two hours of lectures and one of workshops, you can have one person dealing with 168 students all at the same time, instead of needing five or six for a workshop.

It seems to work reasonably well in that there is so much content to get through in so little time. One of the advantages of the lecture format is it does clearly to students and myself spell out the content, so I'm there, go into the lecture, it prescribes to students exactly what is really important. I will freely acknowledge that that is not necessarily going to cause the best learning to take place. With the tutorials the focus there is often on teaching activities they can use in a classroom. (McIntosh, 2002, p.183)



Knowledge

According to the desk audit undertaken for this project, the average allocation of time to numeracy in four-year undergraduate teacher education programs was a little over two units. Although the range ran from a low of one to a high of four units in mathematics and numeracy, the most common number of units was two, constituting 34% of all cases. In percentage terms, two units typically represented about 7% of the total course time. Among the undergraduate primary numeracy site studies, the proportion of time allocated to numeracy ranged from 6% in the Regional program to 10% in the Rural program (see Table 5.4). With 120 contact hours, Regional students were undertaking fewer than the 144 contact hours recommended for preservice programs by the Speedy Report (1989), unless they were in the small minority who opted for an additional numeracy elective (Siemon, 2002, p. 174). Among one-year graduate courses, the national average was 0.8 units for primary programs and 0.7 units for secondary programs, representing about 7% of the total time allocation. With proportions of numeracy time ranging from 6% to 12% in the Regional, Metro and Polytech two-year programs, these students would all have had less than the Speedy recommended minimum, unless they took additional mathematics or numeracy options or were preparing to be teachers of mathematics.

Within the 40-120 hours allocated to mathematics and numeracy in these programs, students were expected to demonstrate or develop their personal numeracy skills, to develop the breadth of their knowledge of mathematics curriculum content, and to develop some of the pedagogical content knowledge required to support children in their mathematics and numeracy learning. According to the beginning teacher surveys conducted in this project, primary teacher education programs were generally regarded as successful in this work. Almost all primary beginning teachers were satisfied with their personal numeracy, around three quarters were confident that they had an adequate conceptual understanding of number, space, measurement, and chance and data. Most were satisfied with their preparation to use mandated curriculum documents, with their preparation for numeracy teaching, and with the connections between theory and practice in the preservice courses.

However, whilst most secondary beginning teachers, were confident in their personal numeracy skills, they were not confident in their knowledge of specific mathematical areas nor with their preparation to teach numeracy. Senior school staff working with beginning teachers were also not convinced that this group, in general, had been well prepared for numeracy teaching.

Table 5.4. Numeracy curriculum content

University	Program	Program length	% of curriculum devoted to numeracy ¹
Regional	Secondary ²	1-year	6,12 ³
Regional	Primary	2-year	6
Regional	Secondary ²	2-year	6,12 ³
Metro	Primary	2-year	9
Polytech	Primary	2-year	12
Rural	Primary	4-year	10
Regional	Primary	4-year	6

Note 1: Percentages rounded to whole numbers

Note 2: Secondary programs required an additional 22-33% language/literacy or mathematics/numeracy discipline content

Note 3: Mathematics curriculum major students take 12%; mathematics minor students take 6%

The site-study programs, all offered a balance of personal numeracy, curriculum content and pedagogical content knowledge, typically within a constructivist epistemological framework. At Polytech, for example, the two-year graduate program prepared students for numeracy and mathematics teaching through a primary mathematics curriculum unit taken in the first year of the course, and through a second-year unit on programming and assessment in language and mathematics. In addition to the curriculum strands – number, space, measurement, chance and data and pre-algebra – the mathematics curriculum unit included a focus on applied mathematics knowledge such as mathematical modelling, problem posing and problem solving, usually associated with a numeracy perspective in mathematics. The pedagogical approach, too, was broadly constructivist. The lecturer emphasised the importance of 'how children learn maths' (Wright, 2002, p. 115) and this approach was strongly supported by the teacher education students who were interviewed. Through lectures and workshops, students' content knowledge was developed alongside their pedagogical knowledge. In the words of one student:

I find myself in a dual role – where I'm learning to teach but I'm also learning new ways. So rather than only draw on my own experiences I am learning new ways – renaming tens when you're doing subtraction, so that gives me a good confidence that I will be prepared to teach the right way. I think it's also that you get into it and you get your own pattern. (Wright, 2002, p.110)

At Regional, the approach taken to the primary mathematics curriculum unit was broadly similar to the approach taken in the Polytech program. The year-long five contact-hour mathematics curriculum unit in the first year of the primary undergraduate B.Ed. was the key mathematics content and pedagogy unit in the program. It comprised a weekly one-hour lecture and two two-hour workshops. Topics considered included children's learning, problem solving, calculator use, early number (including the Count Me In Too program), numeration and computation, number sense, space and chance and data.

The compulsory mathematics unit required in the primary graduate programs was shorter, but offered content similar to the longer B.Ed. unit. In this unit, there appeared to be less emphasis on the number strand and more emphasis on 'doing mathematics' than on 'the learning trajectories or developmental pathways that students progress through' (Siemon, 2002, p. 162). Regional's secondary programs focused on pedagogical and pedagogical content knowledge, and provided a similar constructivist approach to students' and children's learning as the primary programs. Two year-long units in mathematics method were required for mathematics major students. The junior secondary unit focused on the Years 7-10 syllabus requirements as well as the role of mathematics teachers in schools. There was a strong emphasis on practical pedagogical issues such as 'personal organisation, lesson planning, teaching aids, classroom management, revision and homework' (Siemon, 2002, p. 163). Students at Regional strongly supported the role of workshops in linking theory and practice. Primary B.Ed. workshops, for example, were appreciated because they were 'hands on', they provided 'stuff to help kids', and they provided material 'we will use in schools' (Siemon, 2002, p.170).

At Metro, the emphasis was on mathematical content knowledge. In a two-year program students had 72 contact hours of mathematics, 48 hours of which were in a year-long survey of primary mathematics curriculum content. The first semester focused on number; the second focused on measurement and chance and data. The second semester-long 24-hour unit was focused on space, reasoning and strategies, with some emphasis on organisational topics (McIntosh, 2002, p.181). The teaching structure was organised around two, one-hour lectures and one, two-hour workshop. The key focus of lectures was efficient delivery of mathematics content; the workshops provided hands-on experience with children's mathematics activities. Students' reaction to these courses emphasised the importance of content over pedagogy.

As one student with a strong background in mathematics commented:

I think I will feel comfortable teaching mathematics but maybe it has been a little narrow. We have been doing a lot of maths, catching up with maths which people shouldn't really need catching up with and they haven't really focussed on assessing, extending problems children face, the way children approach a problem. (McIntosh, 2002, p.190)

Students at Metro were less convinced than students in some other programs of the value of workshop time in developing their procedural knowledge of children's mathematical activities. Such workshops were dismissed by some as 'playing with blocks':

I think we could do the practical activities in half the time, and then go over what strategies we have learned and how we could use them in the classroom or perhaps more practical stuff about equipment, where you get it from and how you can use it in the classroom, rather than give us blocks and play with them.

I understand that it is definitely valid to handle the actual materials that we will use in the classroom and become familiar with them. My issue is that out of three hours of mathematics in a week, one hour of tutorials, we spend an hour playing with blocks, when I can understand the benefit, the reason for using them and how they actually work in maybe ten minutes playing with them, rather than sixty.

I feel we are at a place where we are able to be conceptual thinkers rather than having to actually go about every strategy that we are told to use, and I find it very irritating and actually quite frustrating from an academic sense that we spend a lot of time actually going through practical activities that we could actually deal with by discussion in a much shorter period of time. (McIntosh, 2002, pp.191-192)

Personal numeracy knowledge was a concern in most of the teacher education sites. At Metro, for example, staff expressed concerns about the numeracy knowledge of some of their graduate students who, as one lecturer said, 'typically have problems just because they haven't done maths for a long time' (McIntosh, 2002, p. 184). The academically able students in this program acknowledged that there was a wide range of numeracy competence among their colleagues, from those who were 'completely comfortable with mathematical thinking' to those with 'no mathematical background' who needed to 'build up their own skills before they can start to understand how other people do it'. In order to support students with less developed skills, the program lecturers had set a test of basic mathematical competence covering basic calculation skills, including fractions and decimals, metric conversions and chance and data. An 80% score was required to pass. Those who passed were excused further instruction in this area; the others were able to resit the test and had access to voluntary tutorials as well as a CD-ROM resource designed to build their capacity to pass the test (McIntosh, 2002, p. 184). Although staff were aware that 'competence' for primary teachers means something more and other than the ability to perform mathematics personally at a particular level, one of the unintended consequences of the personal numeracy test may have been to reinforce the notion that competence means capacity to perform simple arithmetical computations.

A similar hurdle test was applied at Regional, where students were provided with a set of tests and exercises. Like the Metro numeracy test, Regional's self-paced computer-based tests and exercises represented mathematics in a traditional way through explanations and activities that resembled secondary mathematics texts (Siemon, 2002, p. 162). Additional electives were available for students who wished to improve their mathematics knowledge, but it appeared that very few of the students took up this option.

Most of the Indigenous students in the Rural program reported that personal numeracy was of less concern than personal literacy, where language and dialect differences between Aboriginal English, Kriol and Standard Australian English compounded the effect of their prior school experiences. As one of the tutors noted, however, personal numeracy skills ranged from the minimal number skills required in the university bridging course to successful completion of Year 12 mathematics. Like the Metro and Regional programs, the Rural program provided additional support for less well-prepared students, based on their performance in proficiency tests of elementary mathematics, and directly taught the mathematical concepts through the mathematics activities to be used with the children in class.

Linkage

The US National Commission study identified 'apprenticeship' as a key characteristic of more effective teacher education programs. These programs, the authors argue, 'engage their preservice teachers in a variety of course-related field experiences in which they have opportunities to interact with excellent models and mentors' (Hoffman et al., 2003, p. 11). In the more general terms of Shulman's 'Table of Learning' for professional education, such field experience provides the opportunity to move from 'understanding' to 'action'. The difference between understanding and action, he has argued, is that understanding exists 'in our heads', whereas performance and practice require the capacity to 'act in and on the world, to change things in it' (Shulman, 2002, p. 6).

Performance can take place without understanding, but it is also the site for development of deeper understanding. The capacity of teacher education courses to support this two-way link between theory and practice was a source of concern for beginning teachers responding to the project surveys, as well as their more experienced school colleagues (Rohl et al., 2003a; b; c).

All four programs had a major commitment to the linkage of theory and practice through school experience. The number of days of school experience ranged from a minimum of 40 days in Regional's one-year graduate diploma to 100 days in the same university's four-year undergraduate programs (see Table 5.5). Both of the four-year undergraduate programs included 10-week internships. Polytech's two-year graduate program linked school experience to professional practice units, providing a total of 90 days school experience. Metro's two-year graduate program followed another strategy, providing 45 days of one-day or block practice followed by a 36-day internship in the last semester of the program.

Many students regarded practical experience in schools as the highlight of their program. At Polytech, for example, students said, 'I look forward to prac'; 'I'm loving the prac', and, 'Prac is where I've learnt the most' (Wright, 2002, pp. 106-7). For students such as these, school experience provided opportunities to put what they had learned in their university courses into practice. In the students' words:

Table 5.5. School experience by program

University	Program length	One-day or block practice (days)	Internship (days)	Total (days)
Regional	1-year	40		40
Regional	2-year	60		60
Metro	2-year	45	36	81
Polytech	2-year	89		89
Rural	4-year	45 ¹	50	95
Regional	4-year	60 ¹	50	110

Note 1: Includes observation days

My highlight is the prac. It cements things that we learn in maths because I'm teaching mostly maths at prac and it's like you're learning grouping one week, and that's what I'm doing on prac next week. I look forward to prac. I was dreading it first of all but now, I want to go more than one day a week sometimes. (Wright, 2002, p. 106)

I find in maths, a lot of the ideas I don't really grasp. When [the lecturer] says 'That's the sharing model' and I say, 'what was that again'. I found going to prac has helped to cement it all. Last week I was teaching grouping that we learned in the first week, and teaching it quite well I think, I thought having the prac straight away was really good. It really helped. (Wright, 2002, p. 110)

The strong link between school and university experience described by these students was, however, difficult for the staff involved in the program to manage and maintain. The Polytech course coordinator explained that when there were only 200 students in the course it had been possible to arrange informal site visits to provide an experiential context for subsequent lectures and tutorials conducted at the university. But since the course numbers had doubled, it was not possible to bring the theory out of students' observations of practice:

We had to return to giving a theoretical basis, simply because we can't place the people, unofficially, in sites to do the observations. It's become problematic. So, if they're not on prac, we just can't get enough of them into the one site to do observations to bring back. So we've had to invert what I believe is good pedagogy and that is to give them theoretical principles and get them to unpack those in a variety of ways and then as a third process go on prac... A very unsatisfactory way of working so, really I guess, the policy and the politics -- all the kind of pressures on us have forced us to work in particular ways. (Wright, 2002, p.99)

Like students at Polytech, the Metro graduate students gave priority to the kind of learning that was possible in schools: 'Where you do most of your learning in this course is in the classroom',

and, 'I find the time I learn most is when I am actually in a school' (McIntosh, 2002, p. 191). Their lecturers acknowledged the difficulties they had in connecting specific teaching experiences in schools to their teaching in the units. It was seen to be theoretically desirable but impractical, both because of the difficulty of scheduling curriculum assignment work during block practice time and because of the timing of the internship, after the mathematics education courses were completed. In their words:

I haven't actually asked them to do anything related to the mathematics I am teaching. ...I could get them to ask their teacher to let them try something, and if I did I'm pretty sure that that would happen. As far as the big internship is concerned, that is after my course has finished.

In relation to the professional practice before the internship, I guess it is an ongoing battle everywhere that lecturers of any curriculum areas want to use the school time for assignments related to their area and we generally find that schools are somewhat resentful of too many requirements. We always feel that there is too little of that (opportunity to get real interaction with schools into the specific subjects being studied) but we are forbidden from requiring them to do anything apart from small tasks in some teaching rounds.

Basically we are saying that we've given you some ideas of what you might be wanting to do, and we hope it will happen when you get out in the schools, but we make no assessment of whether or not it happens. I have no idea actually how they teach in the schools (McIntosh, 2002, p.186).

Students commonly reported this kind of disjunction between school and university experience. In the Rural program, the Indigenous enclave students were concerned about the 'big block of theory' they were presented with in the program. They 'put it into your head' as one student put it, 'but then there is no follow up - nothing concrete' (Greaves, 2002, p.127). Where there were strong links in the Rural program, however, they were informal.

The location in a small rural town, combined with tutors who worked both in schools and in the teacher education program, meant that some of the structural inflexibilities of block practice could be overcome locally. One of the mathematics tutors had invited groups of students into her school classroom and had brought into the university program her current programs and teaching materials. Rural students were critical of having only one week school experience in their first year of training. In later years they found more time in schools grounded the ideas that they learnt at university, that is, the application of concepts provided great learning experiences for the teachers in training.

Diversity

Diversity is an issue both in terms of the students recruited to the teaching profession, and in terms of the students they care for in schools.

Teacher education courses respond to children's diversity in the context of curriculum studies and general education units, as well as in specialist units focussed on the needs of students with learning difficulties, students for whom English is a second or additional language, and Indigenous students. According to the project's desk audit, the proportion of four-year preservice programs providing compulsory units with a special needs focus ranged from 54% of early childhood programs to 70% of secondary programs. Fewer than half of the undergraduate programs made an Indigenous education course compulsory, and a very small proportion of undergraduate courses made TESOL preparation compulsory. Typically, even fewer of the short one-year graduate programs made units in any of these specialist areas compulsory.

Whether the cause is the complexity of preparing students for the diversity they confront in the first few years of teaching or the result of limited course time devoted to the area, beginning teachers responding to the survey were especially critical of their preparation for student diversity. Fewer than a quarter of beginning teachers thought that they had been adequately prepared to teach numeracy to second language learners, and fewer than a half thought that they had been adequately prepared to teach

numeracy to Indigenous students with learning difficulties. Fewer than a quarter of senior staff thought that beginning teachers were adequately prepared to teach any of these special needs groups.

Compared with the success of the literacy site study programs in preparation for student diversity (see Chapter 6) there was limited evidence of this in the numeracy programs described in this chapter. An exception was a compulsory clinical unit of study Teaching Students with Special Educational Needs, at City University, although two-thirds of the preservice teachers worked in the literacy units and only one-third were able to work with children in the numeracy unit. The features of this unit of study, which were similar for both numeracy and literacy, are described with reference to literacy in Chapter 6.

At Polytech, the mathematics curriculum lecturer took a broadly constructivist view of learning. The emphasis in the primary mathematics unit was on 'the child's existing knowledge' and the capacity to identify and work through their 'misconceptions' (Wright, 2002, p 115). Having neither the background knowledge nor the time, the lecturer did not focus on specific learning difficulties 'such as the attention-deficit child or the visually impaired child' (p.102). Special needs were dealt with in a specialist subject in the hope that 'if students have sufficient knowledge of maths education, and they are given background understanding of children with special needs then they can marry the two' (Wright, 2002 p.115).

Similarly, in the two-year Metro B.Teach. graduate program, mathematics curriculum staff spoke about not spending 'a lot of time', nor feeling 'particularly expert' in dealing with special needs students (McIntosh, 2002, p.187). In so far as there was an emphasis on children with learning difficulties it was through a study of children's thinking, 'because this tends to concentrate on children's misunderstandings'. A case in point was in counting strategies where 'we are particularly focussing on children with difficulties'. As another of the Metro mathematics staff put it:

We don't spend a lot of time on [children with difficulties]. We look at different strategies for doing things: some of the activities they do, they might think, these could be used. We do look at the decimal things in some detail, we try to introduce them to some of the difficulties children have with operations but [we do not cover] how they might deal with that in the classroom setting organisationally and so on (McIntosh, 2002, p.187).

Metro students acknowledged the relative absence of an emphasis on diversity and special needs in the mathematics education program. 'We've covered the teaching strategies in class [but] we don't learn things... to help different students with different ability problems', and, 'We have talked about this in other subjects but not in maths', they said. As one student put it, 'The only preparation I've had for this is in school placements' (McIntosh, 2002, p.191).

Summary and discussion

Purpose

The four numeracy sites were characterised by clarity of purpose – and by a wide range of purposes. The two-year graduate program at Polytech was shaped by an explicit set of program characteristics, a set of graduate attributes, and by the characteristics of the students, all of whom had first degrees in a substantive discipline. In contrast, the purpose of the Rural program was to support a paper-based external undergraduate program taken by a predominantly female and Indigenous group, almost all of whom came to the program through alternative admission schemes. Regional's program was unified by a set of university-wide graduate attributes and an explicitly constructivist approach to numeracy education. The numeracy element of Metro's graduate program was animated by the need to increase beginning teachers' mathematical content knowledge, in response to what was seen as the low cognitive demands of Australian primary mathematics classrooms.

In each case, purposes shaped program and pedagogy: Polytech's graduate pedagogy, Rural's intensive instruction, Regional's constructivism

and Metro's high cognitive demand. No one program's approach is preferred, but they all seemed to be better than adequate responses to the respective program designers' analysis of the needs of their diverse student groups.

Engagement

Several of the programs were conspicuously successful in securing high levels of student engagement. The strategies they used reflected difference in purpose and student characteristics. In the Rural program, engagement of a student group that is both under-represented in tertiary education and subject to higher rates of attrition was secured by a combination of strong support services and intensive teaching. Elsewhere, students remarked positively on the impact of staff availability and enthusiasm for mathematics and numeracy education, and negatively on the impact of time pressure and content demands on the quality of teaching and learning. Development of beginning teachers' engagement in numeracy, it seems, depends as much on the personal characteristics of individual staff working in the program as it does on program design.

Knowledge

Most of the substantive issues identified in the project literature review concerned forms of knowledge: personal numeracy competence, breadth and depth of knowledge, capacity for critical reflection and understanding of the contested and conditional character of knowledge claims about teaching.

Each of the site study programs provided a mix of mathematical content and pedagogical content, typically structured around the Cockcroft categories (number, measurement, space, chance and data) and including a numeracy focus on problem setting and problem solving, and universally within a constructivist framework. There were some variations of emphasis, with Metro's two-year graduate program having the strongest emphasis on mathematical content knowledge.

Personal numeracy competence was a key issue in several of the site-study programs. One kind of response was to establish hurdle tests of basic mathematical competence. At both Metro and Regional universities, student teachers were required to take such tests, and were provided with CD-ROM resources to support their learning. A similar paper-based strategy was followed in the Rural program.

Notwithstanding these attempts to underwrite the basic numeracy skills of non-specialist teachers, the diversity of mathematical preparation posed serious pedagogical problems for staff. The need to upgrade students' skills diverted attention from what might be thought of as the proper content of university numeracy or mathematical education units: patterns of children's mathematical development and the pedagogical content knowledge required to meet children's developmental needs. Further, for mathematically well-prepared students the diversion of class time into upgrading of other students' basic mathematical skills was a source of irritation.

The crowded curriculum of teacher education placed further pressure on preparation to teach numeracy. For student teachers other than secondary mathematics specialists, the proportion of time allocated to numeracy in site-visit programs ranged from 6 to 12% of the program. For preservice teachers in the two-year programs at Regional, Metro and Polytech universities, this proportion was less than the 144 hours recommended by the Speedy Report (1989). Where the program minimum was supplemented by elective studies, fewer preservice teachers selected numeracy than literacy electives. At Regional, for example, 43% of the cohort chose a language and literacy elective but only 11% chose a mathematics elective.

In each program a balance was struck between teaching and learning activities aimed at content knowledge, dispositions towards mathematics and numeracy, and procedural knowledge of classroom teaching strategies. Time constraints, combined with the need to upgrade the personal numeracy of many prospective primary teachers, challenged the programs' capacity to provide

as rich a program of numeracy education as lecturers would have liked. More time for numeracy preparation seemed to be necessary, but would require reduction of time for some other aspects of teacher preparation. Higher mathematical entry standards would reduce the need to re-teach school mathematics, but entry standards depend on labour market conditions outside the control of teacher education programs.

Linkage

All of the site study programs had a commitment to the development of practical knowledge through school experience. Although there were some differences of emphasis, the number of days of school experience depended most on the length of the teacher education program considered. The only one-year program studied allowed for 40 days school experience, divided between one-day and block-practice arrangements. Two-year programs ranged from 60 to 89 days and sometimes included an internship. Four-year programs ranged from 95 to 110 days of school experience and in both cases included a 50-day internship. Students regarded this time in schools as a highlight of their program.

When programs were working well, school experience and university programs were mutually reinforcing. Larger programs, such as Polytech's two-year graduate program, struggled to maintain a program of informal school visits to provide the context for university work that had been possible with smaller enrolments. Timing of university work and school experience was also a challenge. Metro's lecturers were frustrated by structural impediments, such as the impracticality of scheduling university assignment work during block practice periods and scheduling of the major internship after the mathematics and numeracy program was over.

Site visit programs chosen for the literacy strand of this study dealt with linkage in two innovative ways that were not characteristic of the numeracy site visit programs: Western University's partnership program and City University's clinical tutoring program. Both of these strategies, described in detail in the next chapter, were also available to support the numeracy preparation programs in those universities. One-to-one contact with an individual child over an extended period of time and immersion in the life of schools through partnership programs both offer opportunities to improve the fragile links between the school and university elements of preparation to teach numeracy.

Diversity.

Preparation for teaching a diverse range of students is a well-documented area of concern in teacher education (Gore & Griffiths, 2002). The beginning teacher surveys (Rohl et al., 2003a; 2003b) and senior staff survey (Rohl et al., 2003c) all identified preparation for diversity as a weakness. Few new primary graduates and even fewer new secondary graduates felt well prepared to teach numeracy to second language learners, Indigenous children, low SES children or children with learning difficulties.

Two related weaknesses may be identified from the site studies. First, mathematics curriculum staff acknowledged that they did not have sufficient background knowledge or expertise in the area of learning difficulties. From this point of view catering for children's diversity in numeracy was the responsibility of lecturers teaching units in special needs or learning difficulties. Second, the influence of constructivism on mathematics education appeared to locate learning difficulties as a sub-set of the broader phenomenon of children's misconceptions. This argument would not normally be made in the field of literacy, where identification of specific learning difficulties and specialist teaching strategies for children with particular language or cultural backgrounds are well-developed fields. In preparation for teaching literacy to children with diverse needs preservice teachers can draw on a range of compulsory or optional studies in TESOL, Indigenous education or special needs, but this appears not to be the case in numeracy.



Towards more effective preservice education: Literacy

Chapter 6



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6 Towards More Effective Preservice Education: *Literacy*



In primary school for the whole five days a week, half the day was just literacy...literacy is far and away the biggest thing.

In the course of the project, visits were made to six preservice teacher education sites. In Chapter 5 the focus was on preparation for numeracy teaching in four of these sites. In this chapter the focus is on preparation for literacy teaching.

In addition to the two site studies that provided the bulk of the data for this chapter, reference also will be made in the discussion of diversity to Rural University (Greaves, 2002), a site that was unusual in the way that it dealt with the issue of diversity among the preservice teacher education cohort.

The cross case of analysis of the City and Western sites, supported by references to diversity in the Rural site, takes up the framework established in Chapter 5. Building on the work of Shulman (2002) and Hoffman, Roller and the National Commission on Excellence in Elementary Teacher Preparation for Reading Instruction (2003a) this framework identifies: purpose, engagement, knowledge, linkage and diversity as being critical features of effective teacher education programs.

Despite an enormous amount of research literature in the area of literacy teaching and learning, there is very little evidence-based research into exactly what constitutes effective preservice teacher education in literacy. As has been shown by Gore and Griffiths (2002) there has been little definitive research to show that what happens in preservice teacher education courses influences either the ways in which beginning teachers teach literacy in the classroom or the literacy outcomes of the students they subsequently teach.

An examination of public databases by the U.S. National Reading Panel revealed that approximately 100,000 research studies on the teaching of reading, which is just one aspect of literacy, have been published since 1966 (National Reading

Panel, 2000). This Panel developed what it called an 'evidence-based assessment of the scientific research literature on reading and its implications for reading instruction' of the type normally used in research studies of the efficacy of interventions in psychological and medical research for 'fostering of robust health or psychological development and the prevention or treatment of disease' (National Reading Panel, 2000, Introduction p. 5).

In searching the literature on the effectiveness of preservice teacher education programs, the National Reading Panel was unable to locate any studies that measured student as well as teacher outcomes in reading. Accordingly, the Panel was unable to draw specific conclusions about preservice teacher education and called for more research in this area.

In a literature analysis for the US National Research Council, Snow, Burns and Griffin (1998) commented, 'Teacher preparation for the teaching of reading has not been adequate to bring about the research-based changes in classroom practices that result in success', adding that 'the problem of transferring the knowledge to the future teacher's practice must be addressed' (p. 289). Further, in the literature review conducted for another US national body (Hoffman et al., 2003b), Hoffman and colleagues called for further research, using a range of research methodologies, including case studies of exemplary practices.

Despite the dearth of definitive research findings in the area of teacher preparation for literacy teaching, there is, however, evidence-based research to show that what happens in teachers' classrooms does have an effect upon student outcomes. The National Reading Panel was able to make strong conclusions about the literacy content of teachers' programs on the basis of meta-analyses of many experimental studies that conformed to stringent standards:

Effective reading instruction includes teaching children to break apart and manipulate the sounds in words (phonemic awareness), teaching them that these sounds are represented by letters of the alphabet which can then be blended together to form words (phonics), having them practise what they have learned by reading aloud with guidance and feedback (guided oral reading), and applying reading comprehension strategies to guide and improve reading comprehension' (National Reading Panel, 2000, Overview p. 10).

Building on the Panel's findings and other large research reviews the International Reading Association, in creating a draft set of standards for reading professionals, added vocabulary, background knowledge and motivation to these major components of reading. In addition other dimensions, including teaching for individual differences (including diverse backgrounds) and use of a variety of materials, strategies, groupings and assessment tools (IRA, 2003). The importance of the skills and knowledge of the individual teacher is seen by Snow et al. (1998) as critical in preventing reading and writing difficulties. They refer to research studies in which 'outstanding' teachers have been characterised as 'effectively and deliberately planning their instruction to meet the diverse needs of children in a number of ways' (p. 196), that involve 'masterful' management of the classroom and the creation of a 'literate environment'.

The question remains as to how preservice teachers gain the knowledge and skills with which to orchestrate the multi-faceted literacy demands of the classroom. In order to address the lack of evidence-based research in this area the National Commission on Excellence in Elementary Teacher Preparation for Reading Instruction (Hoffman et al., 2003a) examined eight identified sites of excellence in reading teacher education (SERTE) and found that recent graduates from these sites were in fact more effective than controls in increasing the literacy outcomes of the students they taught. The National Commission also identified particular features common to all SERTE sites (see Appendix.1) that have informed the framework used to analyse the case study sites in our study.

The sites

Western University

Western is a new university serving a community with a high proportion of first generation higher education students. Its Bachelor of Education program, which is the focus of the study, catered for a total of 650 preservice teacher education students. Student demographics reflected the location and mission of the university. A demographic comparison between students in the School of Education and all Australian university students (Louden, 2002, p. 39) showed that most of the students were women, and that the student group over-represented low socio-economic and language other than English home backgrounds. Further, few of the students came to the program directly from Year 12 secondary education.

The Bachelor of Education was an eight-semester preservice teacher education program. Students were prepared for employment in preschool, primary and secondary contexts. The particular feature of the course that led the research team to the site was its reputation for action learning in partnership with schools and other educational agencies. Partnership activities were included in more than half of the units of study. Through partnership projects, students had extended opportunities for self-directed learning in teams and in context.

City University

City was the first university to be established in the state and is a member of the Group of Eight oldest universities in Australia. It is situated in an inner-city area. A number of research and teaching centres are attached to the Faculty of Education, including the Children's Centre, which plays an important role in the literacy and numeracy preparation of preservice teachers.

The Faculty of Education enrolled students for both the 4-year undergraduate Bachelor of Education and 2-year Master of Teaching (M.Teach.) preservice teacher education degrees in either primary (K-6) or secondary education. The focus of the case study undertaken for this project was the four-semester Primary M.Teach. degree.

It is noted that many of the features of this program were common to both courses, with the M.Teach. being essentially a condensed version of the Bachelor of Education in that the Bachelor 10-week long units were reduced to 6 weeks in the M.Teach. program. The M.Teach. Handbook stated that the degree 'marks a new and exciting approach...that provides a...teaching qualification in contemporary Australian schools and also orients students to major changes in the future' (Rohl, 2001. p. 66).

Features of the course that are especially noteworthy are its inquiry/case-based constructivist approach, pass/fail assessment procedures, and the field study component called Teaching Students with Special Educational Needs that took place in the Children's Centre.

Another feature of note was the high level of reflection by staff members as they researched their own practice and wrote about it for publication and conference presentations. The site was nominated for inclusion in the study on the basis of excellence in preparation for teaching both literacy and numeracy to a diverse range of students. Table 6.1 summarises the main features of interest in the City and Western sites.

It will be seen that there are many distinct differences between these two teacher education sites in terms of type of institution, graduate status, entry criteria and length of course. Nevertheless, in terms of what appears to make a difference in preservice education for effective literacy teachers they have some features in common with each other and with other sites of excellence (Hoffman et al., 2003a).

Table 6.1. Key features of the literacy site studies

Feature	City University	Western University
Type of institution	Old inner-city university (Group of 8)	New university, predominantly first generation students
School level addressed	Primary (K-6)	Preschool, primary and secondary
Length of course	2 years	4 years
Graduate status	Postgraduate (Master of Education)	Undergraduate Bachelor of Education
Entry requirements	'Appropriate' undergraduate degree	TER > 60 plus supplementary evidence
Amount of practicum	50 days + 50 days internship	130-145 days + 35 days internship
Assessment	Pass/Fail (90% attendance required), emphasis on cases, journals and portfolios	Cases, commentaries, portfolios
Philosophical approach	Constructivist (explicit)	Constructivist (implicit) Action learning, partnerships
Number of compulsory contact hours	Literacy/English [54], TESOL [15], learning difficulties-literacy or numeracy [24], special education [15], IT [24]	Literacy [260], TESOL [0], learning difficulties-literacy or numeracy [0], special education [24], IT [52]
Key feature of the course	Intensive assessment and teaching of a child with difficulties in literacy (or numeracy) in the Children's Centre	Extended opportunities for self-directed learning, in teams, in partnership links

Rural University

Rural University is referred to in this chapter mainly in terms of issues related to literacy and diversity. A full description of this site can be found in Chapter 5. The key feature of Rural University's external studies preservice teacher education course was its commitment to preparing teachers from Indigenous backgrounds. Its innovative delivery model provided a unique and powerful solution to the training of Indigenous teachers to work in rural towns and remote communities through staff who had the cultural sensitivities of those communities. Well-regarded educators in the local community intensively supported the course and they were supported by external studies lecture materials with guest appearances by the lecturers who had written them. The course delivery acknowledged not only the specific learning needs of the Indigenous preservice teachers who were not native speakers of Standard Australian English, but also their personal and cultural needs. It was delivered in geographically appropriate locations so that the preservice teachers, many of whom had strong obligations to their extended families, could remain in or near their home communities.

Purpose

Both Western and City preservice teacher education sites had a purpose or 'vision' (Hoffman et al., 2003a) that was clearly articulated. At City, the emphasis was on a constructivist approach to preservice education:

The Master of Teaching is an example of an inquiry case or problem based university program which has attempted to acknowledge student prior learning and experiences, prepare teachers in a way which recognises the complexities and challenges of teaching as a profession in the 21st century and encourage deliberate and critical reflection about teaching and learning issues which demand a new vision given the rapid change in education and its social contexts (Rohi, 2001, p. 68).

This vision viewed preservice teachers as future 'education change agents'. The commitment of staff to these principles was evident in all interviews and observations conducted for the

project and in various research publications by staff in teacher education journals. It was also evident in the basic structure of the course, whereby an 'inquiry case or problem-based' methodology was used to provide students with 'authentic' problems from practice in the profession, a methodology used in other professional courses in the university. Case-based instruction is promoted as a most useful strategy in preservice teacher education for literacy by Snow, Burns and Griffin (1998) who see it as 'a bridge between the course-based and practicum-based elements of a program of studies. (p. 290).

Through the use of cases, many of them written by classroom teachers, students at City were introduced to 'real' issues and concerns within particular school contexts. In terms of literacy, the cases included classroom issues such as communication with Indigenous students and school staff, and the phonics/whole language debate. Use was made of multiple learning contexts situated in a variety of educational environments so that the cases involved preservice teachers working with school students in the university setting as well as in schools. With all case studies a high level of reflection on practice was required. This was also evident in the progressive assessments conducted during the course that were geared towards the compilation of a professional portfolio and included an action research project in the final school experience.

The mission for Western was based upon the belief that effective preservice teacher education involves extensive professional experience and strong partnership links with schools that lead to improved outcomes for school students:

Project partnerships are constructed as the central activity of the course, initiating inquiry about educational theory and curriculum and connecting teaching method areas to student learning. The essential aim, that of the enhancement of the learning of school students, is therefore the shared work of schools, communities, universities and a range of learning environments (Louden, 2002, p. 40).

Key staff in the program, both school and university-based had made a long-term commitment to the partnership model. Partnerships were characterised in terms of 'authentic' context and critical reflection:

Partnerships provide the authentic context for student teachers, their school mentors and teacher educators, in collaboration, to understand and enhance teaching competence. The practical experiences of student teachers in partnerships are also the basis of their critical reflection and theorising on practice which leads to sustainable improvement and change (Louden, 2002, p. 45).

The 'project partnerships' involved school teams that included student teachers, mentor teachers, the school partnership coordinator and a university colleague. Through the partnership teams, preservice teachers worked with mentor teachers in schools on long-term school-based curriculum initiatives intended to directly support the learning of school students. Examples of recent individual school-based partnership activities included a literacy support program for students in the middle years of school and a project in which preservice teachers planned and implemented a program on children's literature, writing and publishing for students in the early years of school.

A related course principle 'practice-theory' was characterised as 'practical social science' and linked to ideas such as action research and reflective practice. For the teacher educators in the course, practice-theory required them to 'make explicit links between student teachers' experiences in partnerships and the development of understanding in classes and through the completion of assessment tasks' (Louden, 2002, p. 8). These assessment tasks usually took the form of cases, commentaries and portfolios and culminated in a professional portfolio at the end of the course.

It can be seen that in both sites there was a clear vision of the purposes of the preservice teacher education courses that included an articulated emphasis on the exposure of preservice teachers to 'authentic' experiences on which to reflect critically in order to actively construct their

knowledge of effective teaching practice. At City some of these experiences were university-based, whereas at Western most of these experiences took place in partnership schools. Additionally there was in both sites the long-term aim of effecting educational change. For Western this change was articulated as improvement in outcomes for school students; for City it was a more general vision of the program graduates as 'educational change agents'.

Engagement

Engagement is seen as essential in many taxonomies of learning for both school students (Cambourne, 2002) and preservice education students (Shulman, 2002). For preservice teachers in the City and Western sites, this engagement began before they were enrolled in the program. Both universities had stringent standards for student admission. The prerequisite for entry to the M.Teach. course at City was an 'appropriate' undergraduate degree, which meant that all selected students had already successfully completed at least three years of university education and many had experience in professions other than teaching. All applicants were interviewed, a relatively uncommon procedure in Australian teacher education courses, questioned about their reasons for wanting to become a teacher and their communication skills informally assessed. This interview process appeared to ensure that only students who were willing and able to engage at a high level in the course were selected. Some of those interviewed for the study indicated that the interview process had been beneficial to their attitude to the course in that they felt 'chosen' and appreciated the initial confidence placed in them by academics.

Western's entry procedures were also stringent, but somewhat different in terms of the students selected. The university's 2002 minimum tertiary entrance percentile rank was relatively low at 60, and many students enrolled through alternative entry paths. Nevertheless, for the 2002 academic year, students offered a place represented fewer than 10% of those applicants who had completed both the standard application and a compulsory supplementary form. The supplementary form

provided evidence of work with young people, a statement of educational background, and academic and personal testimonials. The course team, who ranked applications on the basis of both tertiary entrance score and supplementary information, selected the top 140 students. Thus, students who were most likely to engage with the course were selected and, as at City, they knew that they had been selected on more than academic achievement alone.

Once admitted to the course there were features in both programs that encouraged student engagement. At City, students received a high level of support, particularly in regard to assessment, which was on a 90% attendance and pass/fail basis. The pass/fail criterion-referenced grading system was seen as helping maintain standards, in that students could be required to complete every part of an assignment to a satisfactory standard. Thus, for assessment purposes, students were required to attend and engage in all parts of the course. The case-based nature of the course, particularly the unit that took place in the Children's Centre, required active engagement in the construction of knowledge about teaching and learning.

The course at Western also required a high level of student engagement in the partnership arrangements, which one of the staff called a commitment to 'a greater involvement by teachers in teacher education and greater involvement by student teachers in the schools' (Louden, 2002, p.44). This sense of engagement was articulated by mentor teachers:

The students come with that notion of a partnership, of work in progress, and production of something at the end of it. So they walk away with a sense of achievement, having had an impact in the school (Louden, 2002, p. 51).

Preservice teachers in the course also appreciated the high level of engagement required in that it helped them take on the role of teacher:

I feel like a teacher. I've spoken to a lot of people who go to universities and they feel like a university student...Like when I taught at

this school last year, I'm a student teacher but it's my school. I've had this amazing teaching experience and I think in other universities there is not as much emphasis on teaching. When they go and do their rounds they are more there for observation. (Louden, 2002, p. 49)

Also related to engagement was the factor of 'personalised teaching' (Hoffman et al., 2003a). Preservice education students at both sites felt that their lecturers had given them individual attention and knew them personally. A Western student volunteered the comment: 'The lecturers actually know us all by name and they are really approachable' (Louden, 2002, p. 48). A City student appreciated the level of support given in the unit that took place in the Children's Centre: 'We had one-on-one with the lecturers which we hadn't had before and not in my first degree either' (Rohl, 2001, p. 81).

Knowledge

The Christie Report (Christie et al., 1991) suggested that teachers need a broad range of knowledge about language and literacy and this is built into the STELLA standards for teachers of English (AATE, 2002). The need for teachers to have such broad knowledge needs to be seen in light of the Commonwealth definition of literacy:

...the ability to read and use written information, to write appropriately, in a wide range of contexts, for many different purposes, and to communicate with a variety of audiences. Literacy is integrally related to learning in all areas of the curriculum, and enables all individuals to develop knowledge and understanding. Reading and writing, when integrated with speaking, listening, viewing and critical thinking, constitute valued aspects of literacy in modern life. (DEETYA, 1998, p. 7)

Literacy, as currently defined in the Australian context, involves many complex skills, including the ability to engage with 'new technologies' (Luke, 2003). Nevertheless, it seems that across primary and early childhood preservice teacher education courses the average number of units devoted to literacy is only 2.2 out of a total of approximately 28 units.

In the City and Western sites literacy was given prominence in the programs and included in both the English learning area and in related areas.

The literacy program at City University

At City, the learning area of English was allocated more time than any other curriculum subject. In the 2-year M.Teach. course there were four, 6-week and one, 3-week units of study in English in addition to literacy-related units in Information Technology, TESOL, Drama and Special Education. Preservice teachers interviewed at the end of their course were able to articulate the importance of the time allocated to literacy. As one explained:

Literacy is the biggest bubble in the communication age. It includes reading, writing, being able to type, able to use all those technologies...listening, speaking...public speaking...handwriting (Rohl, 2001, p. 82).

The rationale for the English learning area component of the course included:

- The development of students' awareness of issues in the teaching of English K-6;
- Familiarity with State syllabus documents, content and materials used in primary English classrooms;
- The development of reflective, creative professionals who can use a wide variety of strategies to provide for a range of individual needs within the learning area.

Consistent with the constructivist approach to the course, some emphasis was given to the social construction of literacy, although preservice teachers were encouraged to explore a range of perspectives in order to form their own philosophies of English teaching. Staff-authored Web-based resources included several articles that addressed the whole language-versus-phonics debate. The intended outcomes for preservice teachers were based on the learning area rationale, particularly in terms of developing a theory-based philosophy of English teaching and learning, in addition to competence in teaching and in preservice teachers' own language and literacy use. The content of the five units was divided into three areas of study (see Table 6.2).

In the first unit of study, the focus of which was early literacy including the mechanics of learning to read (such as phonological awareness, phonics and word identification), preservice teachers were introduced to the concept of the social construction of literacy. Two of the set texts for this unit (Anstey & Bull, 1996; Campbell & Green, 2000) take a socio-cultural approach. The second unit focused on spoken language and its relationship to writing development and teaching, including handwriting, spelling and text types, in addition to grammatical features. There was again a focus on the early years of school. In the third unit the middle and upper primary age group was targeted, with a focus on the use of literary texts, particularly the novel and poetry in developing critical literacies.

Table 6.2. Overview of the content of English units at City University

Areas of Study	Literacy Development	Organising for Language Learning
Development and history of English teaching	Reading – phonics, whole language, text-types, wide reading	Planning using State curriculum documents
Early language acquisition and development	Spoken language, writing, their inter-relationships	Classroom routines and learner needs
Language modes: reading, writing, listening, talking	Children's literature, the media Language structure Literacy difficulties Children from diverse language backgrounds	Groupings and teaching strategies Assessment, recording, reporting, evaluating Programming

The fourth unit focussed on critical appraisal of approaches to, and strategies and materials for, teaching oracy and literacy. There was an emphasis on reading, the assessment of reading and the evaluation of materials for teaching reading. Programming for the English learning area was the focus of the 3-week final unit.

Texts used throughout the course went beyond those based within a social constructivist view of literacy and included State syllabus documents, and readings based on cognitive models of literacy. There was throughout an emphasis on Australasian texts. Assessment tasks, which were tightly integrated into the units, involved a combination of theory and practice, usually within a particular case setting. Several required students to observe and work with individual children. These tasks culminated in the case study for the unit Teaching Children with Special Educational Needs that took place in the Children's Centre, and involved assessment and teaching of a child with difficulty in literacy (for two-thirds of the students) or numeracy (for one-third of students). The Director of the Centre described this unit as 'based on current theory'.

Throughout all the curriculum-based units of study there was a strong emphasis on the State curriculum. The Director expressed the view that he and other staff were 'philosophically opposed' to this emphasis as he believed the course should be 'preparing students for teaching in the world not just [the State]'. Nevertheless, the State education department placed demands on the university and students were 'expected to know [the curriculum] and apply it', their employment dependent upon their demonstrating a close knowledge of curriculum documents in interviews with the department. He did, however, point out that there were some positive spin-offs in that the State English curriculum document focused on early literacy and a 'long overdue emphasis on phonemic awareness'. Further, through knowledge of curriculum outcomes and diagnostic testing, preservice teachers were prepared to help children meet benchmark standards in literacy.

The literacy program at Western University

The 4-year Bachelor of Education course at Western contained six units that included explicit literacy education content. Half of the literacy units were in the first year of the course, and most were partnership units, involving both university lectures and workshops and school experience. One first year literacy unit was in the core general studies strand of the course. In addition, students could choose to take English or communications studies units among their 16 general studies units. Table 6.3 provides a list of the literacy units and a summary of the focus of each.

The core unit, Language and Literacy, focused on personal literacy skills and understanding of language usage patterns. Topics covered included oral language, introductory linguistics (grammar, syntax, semantics), language and culture, language and communication, language and technology, critical literacy, and academic discourse. The text *Literacies and Learners* (Campbell & Green, 2000), which takes a socio-cultural approach to literacy learning, was the basis of much of the reading for the literacy units. Assessment requirements included research reports on teaching a syntactical aspect of language, the literacy education of an older Australian resident, and a personal writing portfolio.

Other first-year units with literacy content were both in the partnership strand. One had a focus on personal literacy and information technology skills, with graded assessment points allocated to personal reflection on literacy and a simple investigation, and ungraded assessments for a computer literacy portfolio and partnership participation. Another partnership unit had a focus on language and culture. Topics included the State literacy program, identification of a personal literacy issue, and socio-cultural issues such as gender, poverty and Indigenous education. The graded assessment points included an investigation of a current literacy issue, a reflective case and commentary, and ungraded portfolio and partnership activities.

Table 6.3. Overview of the content of language and literacy units of study at Western University

Year	Units	Focus
1	Language, technology and education	Impact of information technology on language and literacy education
1	Language, education and culture	Strategies for teaching language and literacy in schools characterised by cultural and language diversity
1	Language and literacy	Personal literacy skills and understanding of language and its contemporary usage patterns
2	Arts and literacy education	Partnership-based teaching and learning in the arts and literacy
3	Society and environment and literacy education	Partnership-based teaching and learning in the studies of society and environment and literacy
4	Mentoring literacy and numeracy	Mentoring less experienced student teachers and practising teachers, particularly with respect to literacy and numeracy curriculum, teaching and learning in schools

Some partnership units combined literacy with content in other key learning areas. The arts and literacy unit required students to undertake a work sample analysis, identifying student learning in the arts and associated literacy understandings. In addition, they were required to develop a classroom case, an elaborated, referenced commentary on the case, as well as a portfolio of planned and evaluated lessons that focused on literacy learning and the arts. Topics in the society and environment and literacy unit included teaching strategies, integrated and inquiry approaches, classroom management, negotiated curriculum, the middle years, and the application of information and communication technologies. Students were also expected to explore connections between society and environment and literacy, and issues such as gender, cultural and economic diversity, and ethnicity. Assessment included cases, commentaries, evidence of lesson planning, and participation in partnership activities.

The final unit with literacy content focused on mentoring literacy and numeracy. In this unit final-year students worked with first-year students to assist them with planning, teaching and curriculum development, and evaluation. Assessment included a personal reflection on mentoring, a workshop presentation on literacy or numeracy education, a

personal view on literacy and numeracy, and a portfolio of lesson planning and evaluation in literacy or numeracy.

It will be seen that the literacy program at Western reflected the view that, wherever possible, literacy should be integrated across the curriculum. There was a strong emphasis on the integration of literacy across the humanities and technology. The final unit assumed an important relationship between the areas of literacy and numeracy, addressing them both within this significant mentoring unit.

Critical features of the literacy programs

In the National Commission on Excellence in Elementary Teacher Preparation for Reading Instruction (SERTE) research report (Hoffman et al., 2003a) the literacy content of identified sites of excellence in preservice teacher education is outlined in some detail. The overarching critical feature is described as: 'Teacher educators engage preservice teachers with a comprehensive curriculum and guide them toward the development of a cohesive knowledge base for effective teacher decision-making' (p.11). The content of a comprehensive curriculum is then identified in terms of the following key topics, which overlap with those identified by the National Reading Panel (2000) and

the International Reading Association's Standards for Reading Professionals (IRA, 2001):

- Early literacy, including oral language, phonemic awareness, phonics and word identification;
- Fluency, vocabulary, and comprehension;
- Assessing all aspects of literacy learning;
- Organising and managing literacy instruction across grade levels. (Hoffman et al., 2003a, p.10)

It will be seen that in the literacy programs at City and Western there were various illustrations of the SERTE overarching critical features in that preservice teachers were engaged in 'a comprehensive curriculum' and guided 'toward the development of a cohesive knowledge base for effective teacher decision-making. Preservice teachers were encouraged to reflect critically on their learning and were guided in this by their lecturers (and at Western by their partnership teachers).

In terms of the key topics, whilst many were being addressed in both sites, there were differences in that City appeared to address the topics more specifically. At Western, as some topics were addressed within individual partnership schools, it seems that the topics were less consistently addressed. It will also be seen that in both of these sites the literacy curriculum was much broader than that identified by the National Commission on Excellence in Elementary Teacher Preparation for Reading Instruction (Hoffman et al., 2003a) and included topics such as literacy and technology, grammar, visual literacy, critical literacy and literacy across the curriculum. There are many differences between the US and Australian contexts in terms of literacy education, particularly in regard to the socio-cultural approach adopted widely in Australia by university literacy educators and State departments of education (see Christie et al., 1991; Wilkinson, Freebody & Elkins, 2000).

In summary, in the City and Western teacher education sites literacy was taken extremely seriously and given a great deal of prominence in the teacher education program. Personal competence in literacy was addressed at Western where preservice teachers' literacy skills were

not always high. They were given a high level of support in two compulsory units that focused on personal competence in literacy and numeracy, although several mentor teachers interviewed for the study felt that not all students had the personal literacy skills to meet the demands of the classroom. At City, personal competence in literacy was not seen as an issue as the preservice teachers in the course were graduates and communication skills were assessed in the application interview.

At both sites the preservice teachers were exposed to a broad literacy curriculum and a socio-cultural view of literacy underpinned preservice teacher learning, in line with the course philosophies of reflective learning that indicated a commitment to problematic knowledge. In both sites there was also attention to State curriculum documents, indicating that students were gaining procedural knowledge required for working within particular State education systems, although at Western the extent of this knowledge was to a degree dependent upon school placements. Of concern at both sites was how to find a balance between the need to address all the facets of literacy that underpin the socio-cultural approach prevailing in Australian schools and university departments of education (see Luke, 2003), literacy across all curriculum areas, basic skills in literacy and the requirements of State education departments in terms of literacy curriculum documents and strategies.

Linkage

Western and City had developed very strong links with schools and their preservice teachers experienced various apprenticeship opportunities. Apprenticeship is seen by Hoffman et al. (2003b) as engagement in 'a variety of course-related field experiences where [preservice teachers] have opportunities to interact with excellent models and mentors' (p.11). At City the total amount of practicum, 100 days, was extremely high for an intensive postgraduate course and included a 10-week internship in the final semester of the course. At this time, under the guidance of a mentor teacher, the preservice teachers, who by this time had fulfilled the State requirements

for certification as teachers, took over much of the responsibility for a class. The large amount of school experience was appreciated by the preservice teachers. One explained:

It's a 2-year course and sometimes you don't feel you get everything. Most of it comes from on the job training. I learnt so much from my two pracs and 10-week internship about constructivist theory. (Rohl, 2001, p. 83)

In their unit in the Children's Centre the preservice teachers received personalised teaching and modelling by staff as required, as they prepared for, taught and reflected on their teaching experiences in tutorial groups of 10. Another feature of the apprenticeship model at this university, verbalised by several preservice teachers was that they were prepared to be 'beginning' teachers who still had much to learn. As one put it:

I'm not confident that everything's going to go right and everything's going to go smoothly, but I know where to start and I'm prepared to jump on the bike and start riding and every pothole I bump on I know that I've got the knowledge to get back up and where to head to get help (Rohl, 2001, p.83).

The teacher education course at Western was dedicated to the partnership model that was, in effect, an apprenticeship. Preservice teachers undertook up to 145 days of school experience, in the partnership program and the fourth-year internship. Preservice teachers developed what one called 'an incredibly strong relationship' during their extended periods of contact with schools through partnership projects. Similarly, participating teachers thought that partnerships allowed preservice teachers to have 'an impact in the school', to 'consolidate skills... and then come back again and keep refining those skills', and to 'become part of the staff'. They also noted that many partnership preservice teachers took responsibility for their own learning, seeking out professional development that would help them prepare for their working life as teachers. Additionally, preservice teachers at Western were provided with many models of literacy teaching as they observed their mentor teachers at work in the classroom.

It was not only the preservice teachers who gained from the strong relationships with schools in the two sites. There were definite spin-offs for the participating schools such that professional identity was fostered within and across various communities. The partnership teachers at Western were impressed by the reciprocity of the program, commenting that 'it isn't just what the university people get out of it'. Rather, they saw the program as 'a two-way thing', where the school contributed to the preservice teachers' education, and they contributed time, labour, energy and new ideas to the schools. The partnership projects were the linchpin, but by no means the only aspect of the Bachelor of Education's extensive links with schools. Some teachers who worked as mentors of teacher education students in their schools, also worked as tutors in the university courses.

Academic staff reported that they had specifically provided schools with resources in order to ensure that 'the outcomes, the processes, the engagement of the student teachers are negotiated and not assumed'. Preservice teachers reported extensive links with schools, including 'a lot of guest speakers' and extended opportunities for 'sharing of experience' during university classes. The result of both the extended periods of school experience and the reciprocal links between schools and the university was that teachers were very satisfied with the quality of the Western graduates who were highly sought after, regarded as 'better prepared', 'better than other applicants', and 'completely up to speed' by the end of four years of partnership activities and an internship. One teacher explained:

They have been able to present as much more accomplished than people who have done the normal teaching practice. The fact is we haven't employed any graduates from any other program for the last four or five years. (Louden, 2002, p. 52)

The cost of this achievement for university staff, however, was substantial. A great deal of personal energy seemed to be required to sustain active partnerships with upwards of 130

schools, especially when the partnerships with schools were managed by a team that included many casual staff. In other teacher education contexts, or perhaps in another time at Western, this level of personal energy and commitment might not be sustainable in the long term.

City also fostered professional identity across communities. Strong links with particular schools were forged in various ways that included reciprocal benefits for teachers, children and preservice teachers from the unit of study undertaken in the Children's Centre and professional development of school staff by academics as they engaged in school-based research projects. A particular feature was professional development provided for the mentor teachers of interns that contributed to post-graduate qualifications for these teachers.

Diversity

Preparation for teaching literacy to a diverse range of students was not identified as a factor common to SERTE sites, although the feature of excellence 'personalised teaching' addressed the needs of preservice teacher education students from diverse backgrounds who might need 'responsive teaching and an adapted curriculum' (Hoffman et al., 2003a, p.11). This section of the chapter draws not only on the Western and City sites, but also the Rural site in examining how the issue of literacy for diverse learners was addressed for both the preservice teachers themselves and for preparing them for teaching literacy to a range of students in schools, particularly to those who could be seen as educationally disadvantaged.

Literacy preparation of preservice teachers from diverse backgrounds

The Western Bachelor of Education program took very seriously the issue of diversity. This university had a mission to its region and its ethnically diverse population. The great bulk of partnership schools reflected the diversity and economic circumstances of the region. In addition, the course team continued to set the academic entry standard at a tertiary entrance percentile rank of 60 when there was sufficient demand to accommodate a much higher cut-

off. Those accepted into the program were linguistically and ethnically more diverse and more likely to be from a lower socio-economic group than Australian university students in general. Whilst the program did not devote extended coursework time to TESOL as such, the unit Language, Education and Culture prepared students for work with a diverse range of students, including those for whom English was not their first language. Further, students spoke of their commitment to 'make a difference' for children whose home language was not English, or for children with difficulties. Thus, it can be seen at this university that many of the preservice teachers were themselves from a diverse range of backgrounds and that much of their extended teaching experience in the course was in schools containing students from diverse backgrounds.

The course at Rural targeted Indigenous preservice education teachers. It was an offshoot of a metropolitan university teacher education program set up in a country town with a large Indigenous population. It was envisaged that this facility would operate for five years in order to take one cohort of students through a 4-year Bachelor of Education (Primary) program and would then move to another similar location. This procedure was seen as creating opportunities for Indigenous people to undertake a teacher education course near or within their communities.

Most of the students in this course were admitted on the basis of 'alternative' entry criteria, with few having completed secondary education, and many speaking Standard Australian English as a second or additional language or dialect. Accordingly, personal competence in English literacy was an issue for most. The mode of study at Rural was extremely intensive, with detailed prescriptive external study materials from the metropolitan campus providing the basis for up to 54 hours of weekly instruction by local tutors during semester.

The tutors addressed the preservice teachers' personal literacy competence in various ways. At the beginning of each session the literacy tutor usually spent considerable time helping them study the vocabulary in the set readings before they began this reading. The tutors also gave

general instruction in study skills and specific assistance with assignment planning, writing and proof-reading. They would spend many hours with preservice teachers in one-to-one assistance with the final drafts of assignments that were to be sent to the metropolitan campus for marking. Intensive assistance was also provided by the student support officer who had already completed the Bachelor of Education degree and understood the cultural factors involved. She explained that she used Aboriginal English when appropriate with the preservice teachers, 'We do things here the black way', pointing out, 'I am one of them and I have their respect' (Greaves, 2002, p. 133).

The intensity of instruction within their home community combined with cultural support appeared to be highly effective in supporting these Indigenous students through the course, with first year pass rates higher than those of the university's metropolitan first year teacher education students and Indigenous students in a range of other external courses.

As these preservice teachers remained in or near their home community, which had a high Indigenous population, their 19 weeks of school experience was in schools containing many Indigenous students. Accordingly, the preservice teachers were aware that these students had particular literacy needs. There was, however, criticism of the Rural course content in that it did not appear to make clear links between theory and practice, nor did it specifically address the issues involved in teaching literacy to Indigenous students. As one recent graduate teaching in a remote community put it:

They didn't get into LOTE much at Uni. It's very important as all our kids are ESL. We have to teach all kids. We even have to train them to ask properly, 'May we please go to the toilet' (Greaves, 2002, p. 136).

Preparation to teach literacy to diverse learners: A clinical unit

At City, in which the student body did not reflect diversity to such an extent, there was a highly structured approach to working with diverse students who could be at risk of experiencing

difficulties with English literacy. There were core units in ESL and special education. In addition there was the compulsory unit of study Teaching Students with Special Educational Needs that took place in the purpose-built Children's Centre. This Centre contained three sections: Numeracy, Language Development (reading, writing, oral language for children aged 8-11 years of age) and Early Learning (with a focus on children aged 5-7 years who needed extra help in reading and writing). The unit of study was offered towards the end of the course. Preservice teachers were allocated to one section of the Centre for this practical 6-week unit, with two, 2-hour sessions per week. It was designed for the preservice teachers to examine one child's level of thought through the application of various assessment techniques that included observation, discussion and testing. For the unit assignment each preservice teacher was presented with a 'case' and a problem to solve:

This child is not doing as well at school as the teachers think he or she should be doing... What can you find out about this child and what curriculum modifications can you make that will facilitate learning for this child? (Rohl, 2001, p. 78)

On the basis of assessment of the child preservice teachers designed and implemented a program of work for him/her using 'diagnostic and reflective techniques'. The procedures were similar for the numeracy, language development and early learning sections of the Centre. The outcomes for the language development components included developing preservice teachers' understanding of how children learn literacy.

Preservice teachers were given highly specific instructions about the unit components and assessment tasks. By the end of the fifth session they were expected to have analysed school referral information and their own initial literacy assessment of the child and to have submitted to their lecturer a program for their individual child's learning. It was a requirement that the program contain between two and four outcomes derived from the State syllabus outcomes and pointers, learning experiences, resources, modelling

appropriate language, assessment techniques and checklists for each outcome. The next six sessions were devoted to teaching the program, at the end of which preservice teachers were required to submit a portfolio of their study and a two-page typed report to be given to the child's school. Preservice teachers were warned that satisfactory completion of the assessment, programming, implementation and reporting components was 'essential' and that 'no report that is less than perfect in presentation may be awarded a pass grade'.

The 2-hour workshop sessions with children were divided as follows: preparation for teaching 30 minutes; teaching 50 minutes; debriefing 30 minutes. One lecturer, working with up to 10 preservice teachers, conducted the preparation and debriefing sessions and supervised the teaching sessions. Thus, preservice teachers were able to share their teaching plans and outcomes with their peers and their lecturer and have the lecturer readily available for any problems that might arise during teaching. The lecturer modelled appropriate strategies if required.

Work in the Children's Centre was carefully researched by staff, an activity seen as important for the field of literacy teacher education by Anders, Hoffman and Duffy (2000). Peer-reviewed published documentation of program evaluation by the Director of the Centre indicated positive literacy and numeracy outcomes for the preservice teachers, children taught in the Centre, and their teachers. Preservice teachers felt that their tutors had taken on a 'facilitative' role in the workshops with children and appreciated this level of support as playing a crucial role in the success of the program. The children indicated that they had enjoyed their experiences, for example, 'Before, I thought reading was boring'. The majority of their teachers perceived a degree of improvement that could be attributed to the program.

The Director saw these results as justification for this 'withdrawal' program for children with learning difficulties, in terms of child and preservice teacher learning. Furthermore, the preservice teachers took part in activities in the Centre

towards the end of their course of study, when they had undertaken 'satisfactory' practice teaching, and learnt the 'advanced teaching skills [of] diagnosing individual needs within the classroom'. Such experience was intended to help give them the tools to teach diverse learners and become 'the kind of teacher who doesn't see a class of children, but thirty individuals'. The Director saw the importance of this as 'outweighing any economic argument' and as justifying the high costs involved in running a program that made high demands on staff time and he referred to the many requests he had received from preservice teachers to be allowed to take part in both the numeracy and literacy units.

All preservice teachers interviewed for the project were highly appreciative of the practical work undertaken in the Children's Centre. Further, they were all able to describe their learning in the Centre and how they were able to use this learning in the following 10-week internship.

For example Daniel described the process in which he identified a child's difficulties as 'constructing texts', particularly in the area of 'breaking words down into their parts'. This difficulty was apparent in the areas of both spelling and word reading. It also became apparent early on that the child was not motivated to read and write. Accordingly, Daniel followed his tutor's instructions to design a program 'based on something they were interested in', which in this case turned out to be 'skateboarding tricks', a topic the child was 'really into'.

In the teaching program Daniel concentrated on the text form of procedure, using skateboarding magazines and web sites as sources. Daniel explained:

He would have to read the procedure word for word. We had a mini skateboard and he had to read the procedure and do the trick on the skateboard. (Rohl, 2001, p. 80)

Any 'troublesome' words encountered were later studied out of the text and split into syllables. These words were then used in dictionary

activities and incentive games that focused on pronunciation and meaning. The child 'really liked that and he started looking more closely at words'.

Next, Daniel devised activities that involved the writing of a procedure. After the child, with some help from Daniel, had taken apart the skateboard and cleaned it, they discussed this procedure. The child then wrote his own procedure which, after revision, he typed. Daniel also provided some spelling activities after noticing that the child appeared to rely solely on a 'sounding out strategy' and 'needed to develop visual strategies'.

When reflecting on his experiences in the Children's Centre Daniel reported, 'For me it was very rewarding...really good to be supported [by the tutor] in that'. In terms of his own professional growth he stated:

I learnt about programming [for literacy and] the importance of first hand experience: he [the child] didn't think he was doing work any more – he thought he was getting out of schoolwork...we were changing bearings on mini-skateboards...having a good time...he didn't realise that he was learning all this literacy stuff (p. 80).

As a group the students found their interactions with the tutor a most important part of the experience and felt 'surprisingly well prepared' for teaching literacy, attributing much of this confidence to 'a lot of practical experience working with kids when we did the work in the Children's Centre'. One student found this to be:

Really helpful when going into a classroom and being aware of the different levels children have and targeting work at different levels, as well as an idea of the things I needed to include in the programs. (p. 81)

The TESOL unit was also rated highly by preservice teachers, who were able to explain many of the difficulties facing ESL children in classrooms and some of their possible educational needs. One explained that 'a child

who can't communicate in English isn't stupid', agreeing with the course emphasis on inclusivity, and seeing the need to move ESL children from exclusive use of 'playground language' to becoming able to express abstract ideas in English.

Addressing diversity: Key features of the sites

It will be seen that in the three sites diversity was addressed extremely seriously, albeit in very different ways. Western and Rural were committed to producing teachers who were themselves from backgrounds that are under-represented in teacher education courses. As graduate teachers they would have first-hand experience of the backgrounds of some of the students in their classes who might be at risk of developing learning difficulties. Staff at these two sites were understanding of, and specifically addressed, the personal literacy needs of the preservice education students. However, it was not clear from the case studies how well prepared beginning teachers were in terms of the procedural knowledge required to effectively teach literacy to a diverse range of students.

At City, which did not attract such a diverse range of preservice teachers, there was a highly structured clinical program that addressed the specific literacy (and numeracy) learning needs of a wide range of school students, including those who could be at risk of developing learning difficulties. This type of program is seen by Snow, Burns and Griffin (1998) as: 'the critical component in the preparation of preservice teachers [which] is supervised, relevant, clinical experience in which preservice teachers receive ongoing guidance and feedback' (pp. 289-290). Clinical experience such as that in the City program is, however, extremely demanding in terms of resources. Despite published documentation reporting on its effectiveness, the Director of the Children's Centre was regularly required to justify the existence of the program, which he did by offsetting it against other units of study that could be delivered by one staff member lecturing to large numbers of students.

Summary and Discussion

The university teacher education sites that are the subject of this chapter were chosen as being in some way exemplary in preparing preservice teachers for the teaching of literacy. It should be noted that whilst some positive data were available to the research team on student outcomes for the clinical unit at City, there was generally no empirical evidence for site selection. This should be taken into account when interpreting the case studies.

Whilst programs at these sites were different in many ways they shared some features that have been identified in the literature as of importance in preservice teacher education programs.

Purpose

Both City and Western had a strong sense of purpose and a vision of desired graduate qualities. Their clearly articulated mission statements included effecting change: in terms of improved school student outcomes at Western and as 'educational change agents' at City. Academic staff were committed to their course mission, which was operationalised at Western through strong partnership links with schools that provided preservice teachers with authentic experiences as the context for critical reflection on teaching and learning. At City a constructivist approach was taken in which case studies of teaching and learning issues provided authentic experiences on which to critically reflect. This sense of a vision that pervades the whole preservice education course was identified in all SERTE sites, although the individual vision of what constituted literacy, good teaching and good teacher preparation varied from site to site (Hoffman et al., 2003a). Assessment by teacher educators of their own programs and practice was also a critical feature of SERTE sites. At City this was strongly connected to the constructivist case study approach, as academic staff researched this approach to evaluate their own teaching.

A strong sense of purpose and a vision that includes desired graduate attributes that is shared by staff in the program and operationalised throughout the program,

appear to be most important in preservice education programs.

Engagement

At both City and Western a variety of strategies seemed to result in the engagement of preservice teachers with their programs, a factor seen as most important by Shulman (2002). Both courses had stringent selection procedures, which meant that only those most likely to engage with the program were selected. A high level of engagement with educational issues was required in both programs in terms of school and university experiences, including assessment procedures. A result of this appeared to be the confidence with which preservice teachers at the end of their courses were able to express confidence in their abilities as teachers in words such as, 'I feel like a teacher,' and, 'I know where to start'. The articulated confidence of new SERTE graduates in their readiness for teaching was shown by Maloch, Fine and Flint (2002), although some of the City preservice teachers were realistic in that they saw themselves as 'beginning' teachers who might need some mentoring.

A high level of engagement with their preservice education course was associated with a sense of confidence in their abilities as beginning teachers, tempered by awareness that much still needed to be learnt and where to find assistance if necessary.

Links

There have been many calls for strong links between teacher education institutions and schools (Gore & Griffiths, 2002). Western demonstrated strong links with schools in the partnership program in which preservice teachers spent a large proportion of their course with mentor teachers committed to the program. City also had strong links with particular schools, albeit in less formal arrangements. These links provided various 'apprenticeship' opportunities, a feature of the SERTE sites (Hoffman et al., 2003a). At both City and Western the benefits were not confined to the preservice teachers but school students, teachers and university staff also gained from these links, and active learning

communities (a further feature of SERTE sites) were created. However, maintaining the high levels of involvement with partnership schools at Western was extremely time-consuming for both school and university staff and demanded particularly high levels of commitment.

Whilst there is no doubt that strong links are desirable, provision of adequate resources to staff in schools and universities to make and maintain these links appears to be essential.

Personal competence in literacy

The personal literacy competence of beginning teachers was seen to be an area for some concern by senior teachers who took part in a survey for this study (Rohl et al., 2003c). Although most beginning teachers rated their own literacy skills as sufficiently developed for their work as teachers, 40% of senior staff did not share this confidence. Whilst beginning teachers' personal competence in literacy cannot generally be assumed (AATE, 1999), at City, with its graduate clientele, personal literacy competence was not seen to be an issue.

On the other hand, at both Western and Rural, which enrolled preservice teachers from a variety of socio-economic, linguistic and cultural backgrounds, personal competence in literacy was identified as an area of concern and specifically addressed. At Western attention was paid to personal literacy skills as part of a first year unit of study and preservice teachers had many opportunities to use these skills in assignments, such as in writing portfolios. It is, however, noted that some of the partnership teachers did not feel that all preservice teachers' literacy skills were adequate. Rural targeted Indigenous preservice education students, most of whom had not completed secondary education and spoke Standard Australian English as a second or additional language or dialect. Tutors at this university provided intensive one-on-one support in both reading and writing to help preservice teachers with their course reading and assignment writing. Personalised teaching such as this was identified as a critical feature of the SERTE sites where diversity is valued and 'preservice teachers are offered

'responsive teaching and adapted curriculum' (Hoffman et al., 2003a, p.11). A question arises as to the adequacy of personal literacy skills at Rural when tutor support was removed at the end of the course.

The personal literacy competence of preservice teachers, particularly in sites that enrol students from a diverse range of backgrounds, is an area that needs to be systematically addressed within the teacher education program.

Knowledge about literacy teaching

The large amount of literacy content with which preservice teachers in Australia need to become familiar presents a dilemma for teacher educators as they endeavour to find a balance between presenting knowledge as problematic and the demands of preservice teachers and education systems for procedural knowledge (House and Loudon, 2002; Rohl et al., 2003a; b). Both Western and City appeared to address this issue in terms of a broad literacy curriculum that included critical approaches to literacy and multiliteracies, in addition to elements shown by US researchers to be related to improved student outcomes in reading. This mix seems to be important in providing preservice teachers with the tools with which to challenge school students and thus help to prevent the 'dumbing down' of the literacy curriculum which, according to Luke (2003), is a wide-spread problem in schools.

Whilst there is a need for a broad literacy curriculum there is also a need for preservice teachers to be well informed about particular aspects of literacy teaching. Many of the beginning teachers who responded to the surveys felt that their preservice education course had not prepared them adequately for teaching in particular areas. Around 40% or more were concerned about their preparation for teaching reading, writing, speaking and listening and this percentage rose to more than 50% for teaching viewing, spelling, phonics and grammar, with 75% of secondary graduates feeling unprepared for teaching phonics. Senior staff shared these views. These responses may well be associated with the great breadth of knowledge required to teach all aspects of literacy to a wide range of students in schools.

Adequate time allocation for literacy in teacher preparation courses seems therefore to be of the utmost importance. In the Western and City courses where many aspects of literacy were addressed, there were more than the national average of 2.2 units in literacy education. As was shown at Western, all literacy units of study do not need to focus exclusively on literacy but, as literacy is involved across the curriculum, it can be integrated into key learning areas.

It is though important that the focus on literacy is not lost in the learning area content. Further, there need to be specific opportunities for preservice teachers to put into practice what they have learnt about literacy teaching and learning in school settings and to have the opportunity to reflect on these experiences with others.

In regard to procedural knowledge in literacy, it seems important that beginning teachers are made familiar with teaching strategies that research has shown can lead to improved outcomes for school students, and the particular strategies required by the education systems in which they work. What also appears to be important is that preservice teachers are equipped with the knowledge and skills of analysis with which to critically assess the value of these strategies for particular students in particular teaching contexts.

Diversity of teachers

Literacy preparation for diversity was addressed in the case study sites in terms of preparing preservice teachers from a range of socio-economic, cultural and linguistic backgrounds and also in terms of preparing preservice teachers to teach literacy to students from a range of backgrounds. A large proportion of the Rural preservice teachers were Indigenous and spoke Standard Australian English as a second or additional language. With intensive scaffolding, including one-on-one tutoring, there was a high retention rate. This scaffolding was particularly important in developing the preservice teachers' own literacy skills. Preservice teachers selected for the Western course were linguistically and ethnically more diverse and more likely to be from lower socio-economic groups than Australian university students in general.

It is important for the teaching profession to be made up of teachers from a range of backgrounds, particularly those who can be seen as role models by groups of students who are educationally disadvantaged. It is also important that preservice teachers from these backgrounds receive appropriate support, particularly in the area of personal literacy.

Diversity of students

Survey data for this project suggest that a majority of beginning teachers do not feel prepared to teach literacy to a diverse range of students (Rohl et al., 2003a; b; c). Fewer than 50% of beginning teachers felt prepared to teach literacy to students who were Indigenous, disabled, of low socio-economic status and who spoke English as second language; around 50% felt prepared to teach literacy to students with learning difficulties. Senior staff took an even gloomier view, with less than 25% feeling that beginning teachers had the required expertise in these areas. Of particular concern is that beginning teachers saw themselves as unprepared to teach phonics and spelling to educationally disadvantaged students who previous research suggests may particularly benefit from the teaching of phonological skills (Hempenstall, 2003; Williams, 1986).

The teacher preparation programs at Rural and Western, whilst their preservice teachers were placed in schools where there were high proportions of educationally disadvantaged students, did not appear to specifically address the teaching of literacy to these students. It is, however, acknowledged that some preservice teachers from these programs may have become well-prepared in this area during their school-based experiences. In the clinical program at City a structured approach was taken in preparing preservice teachers to work with students who were not achieving in literacy or numeracy for a variety of reasons. The success of this program in preparing preservice teachers to teach literacy or numeracy to low-achieving students has been documented by the academic staff and in the case study presented here. According to the preservice teachers interviewed at this site it also helped them in their teaching in general in that they gained the skills to plan for individual differences

within a class. Their only criticism of the clinical program was that they were not able to work in both the literacy and the numeracy units. This was not possible because of the high demands on resources in a clinical program that necessitated a high staff-student ratio.

Within the context of diversity it is important to note that, in terms of teaching literacy to the diverse range of students in Australian schools, many factors have the potential to impact upon student outcomes. Whilst teacher education for literacy teaching is an important factor, other factors often outside teachers' control, such as poor school attendance and behavioural, emotional and social difficulties, have the potential to disrupt learning even where literacy teaching is of a high standard.

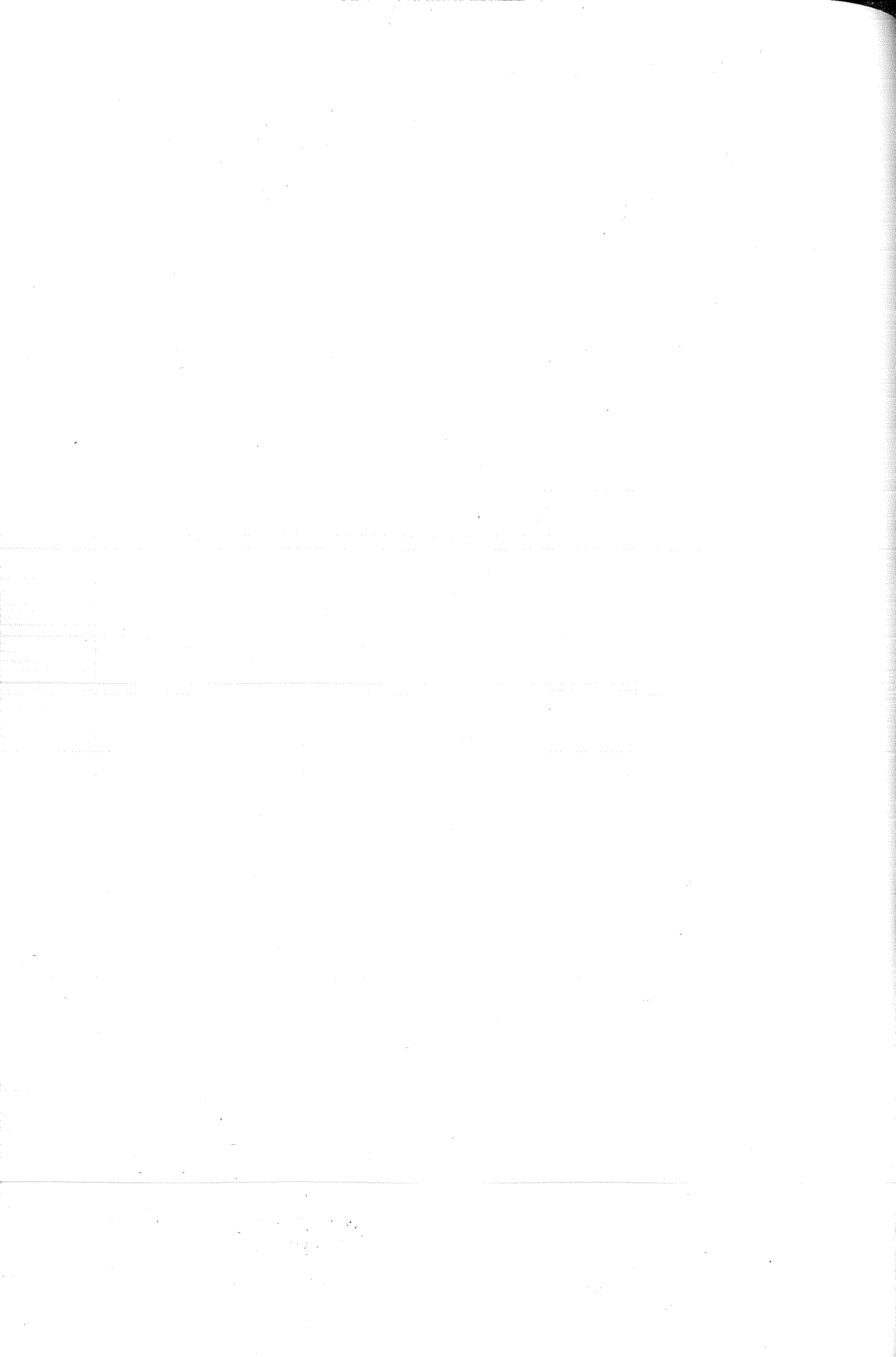
A structured approach that specifically addresses the assessment and teaching of literacy to educationally disadvantaged students is needed in order to ensure that beginning teachers are prepared for teaching literacy to these students. This approach seems to be particularly effective where preservice teachers have intensive experiences in the assessment and teaching of individual students under the close supervision of expert staff.

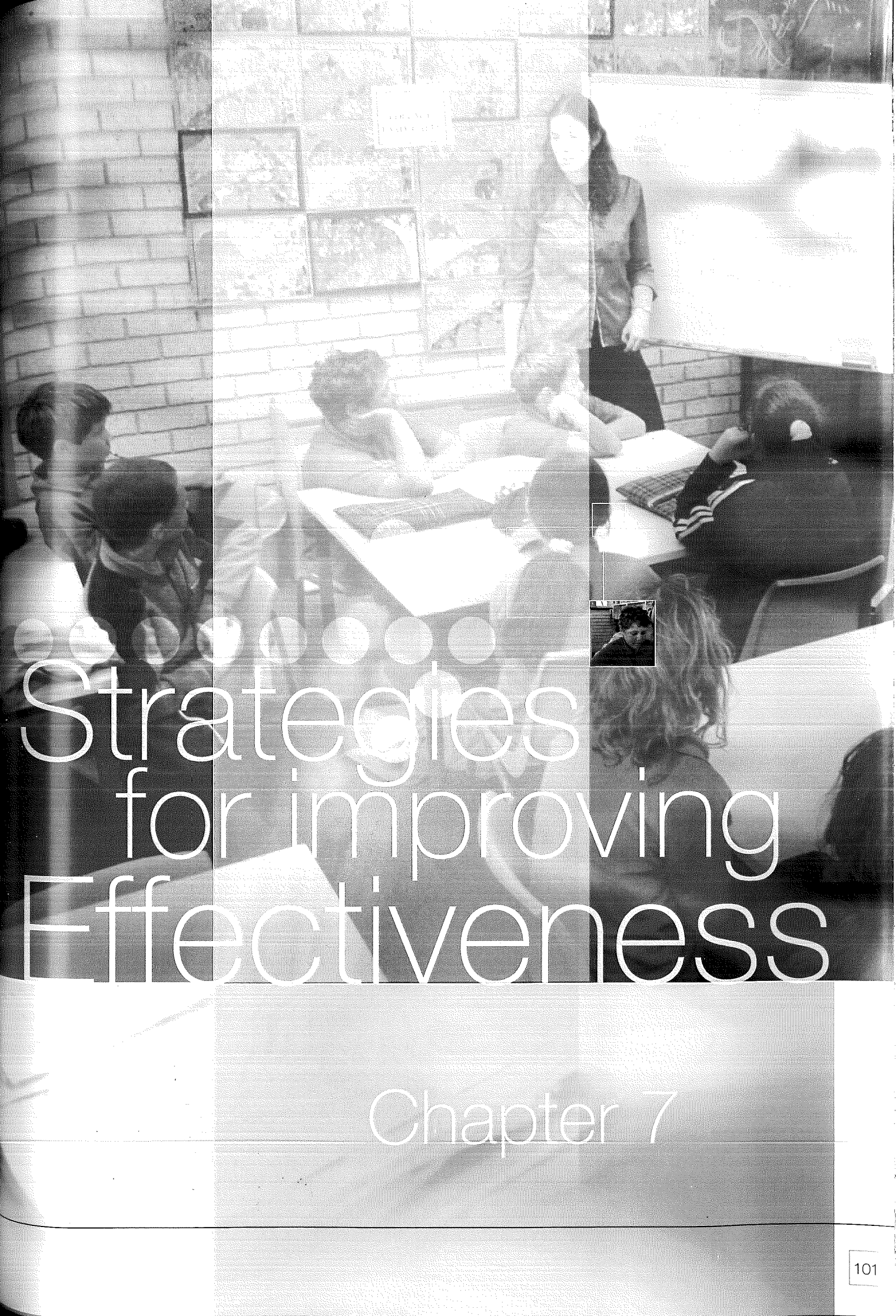
Resources

Adequate resourcing was seen as a feature of the SERTE sites (Hoffman et al., 2003a). Sufficient time allocation in which preservice teachers can be provided with the problematic and procedural knowledge of a broad, current literacy curriculum is crucial. Also crucial to the programs are committed, expert staff who are able to provide the experiences and knowledge necessary for teaching literacy. Placements in schools which have strong links with teacher education programs are necessary for preservice teachers to gain relevant experience and to relate literacy theory to practice.

The features of excellence in the sites described in this chapter placed high demands on financial resources in that they involved a high level of staff time and commitment. The liaison with partnership schools at Western, the intensive one-on-one tutoring at Rural and the high level of supervision in

the clinical program at City all made high demands on staff time, that needed to be realistically funded on a continuing basis if they were to remain viable.





Strategies
for improving
Effectiveness

Chapter 7



7 Strategies for improving effectiveness



Teacher education is a large and complex enterprise, involving tens of thousands of Australian preservice teachers each year. Although many beginning teachers are satisfied with the experience, there are some who are not. Some surveys show as few as half of new graduates being satisfied with the quality of their teacher preparation (Batten et al., 1991, p. 29). Even fewer established teachers working with beginning teachers regard teacher education as effective (Tasmanian Educational Leaders' Institute, 2002, p. 144). This view, characterised by Grossman et al. (1999, p. ix) as the 'folk wisdom regarding the ineffectiveness of teacher education' may reflect 'transition shock' (Corcoran, 1991) for new graduates in the first years of responsibility for their own classes, or a 'generational blame game' (Luke, 2003, p. 71) played by experienced teachers with jaundiced views about the younger teachers' capacities.

In order to explore these issues, this study has drawn on a variety of data sources: the project literature review; a desk audit of publicly available information on teacher education in Australia; national surveys and focus groups on beginning teacher graduate and senior staff perceptions of the effectiveness of teacher education programs; and site visits to a range of undergraduate and postgraduate teacher education programs in four States. These teacher education programs were chosen as being in some way exemplary in the preparation of preservice teachers for teaching literacy or numeracy. Some issues that may need to be addressed within these programs have been identified in Chapters 5 and 6.

This final chapter of the report brings together the data from these sources and the discussions of effective literacy and numeracy strategies in Chapters 4 and 5, with the goal of identifying a set of strategies for improving the effectiveness of teacher education. These strategies are grouped under five headings: purpose, engagement, knowledge, linkage and diversity.

Purpose

Teachers form one of Australia's largest occupational groups, and preparation for teaching reflects the size and diversity of the profession. Most of Australia's universities have teacher education programs. More than 400 separate programs are offered in early childhood, primary, middle years and secondary specialties. Total enrolments range from less than 100 to more than 3,000 preservice teachers. Some programs are highly selective, enrolling well-qualified graduates with demonstrated commitments to teaching; others enrol undergraduates with tertiary entrance ranks around the 60th percentile. Many programs draw a significant proportion of their students from non-school leavers: mature people returning to study or changing careers, and people admitted on the basis of TAFE or incomplete university qualifications.

Program diversity reflects this diversity of scale and student intake characteristics. Despite diversity of purposes, the six site study programs were all characterised by internal clarity of purpose and vision. As the SERTE site studies undertaken by Hoffman and colleagues (2003a) in the United States showed, effective teacher education programs are characterised by coherence of vision about what constitutes good teaching and good teacher preparation, rather than by similarity of vision between programs. At City University, for example, the two-year graduate program was characterised by an inquiry-based approach. This shared purpose was reflected in extensive use of pedagogical cases, by a commitment to authentic tasks with students in schools and in the university setting, and by strongly scaffolded reflection on practice. Other programs with different student intakes or graduate destinations were characterised by a clear focus on partnerships with schools, by intensive instruction and culturally appropriate support, by agreed graduate attributes, or by a commitment to improving teachers' mathematical

content knowledge. On the basis of this evidence we draw the conclusion that:

A strong sense of purpose or vision is important in preservice teacher education programs. It should:

- include desired graduate attributes,
- be shared by staff in the program, and
- be operationalised throughout the program.

Engagement

Shulman (2002) has identified student engagement as one of the essential categories in a taxonomy of professional learning. This idea, which builds on Boyer's (1996) notion of the 'scholarship of engagement' and Egerton's (1997) reworking of this idea as 'pedagogies of engagement', focuses attention on the necessity for deep and active student engagement in professional education. Engagement may be promoted by strategies such as problem-based, collaborative or field-based teaching and learning, or it may be promoted by teaching that grabs and holds students' interest (Shulman, 2002). One of the outcomes of engagement in professional learning, he argues, is that preservice teachers learn to think like a member of the profession. In the words of preservice teachers from one of the site visit programs, the goal of engagement is preservice teachers who towards the end of their programs were able to say, 'I feel like a teacher,' and, 'I know where to start'.

In this study, the evidence on engagement is mixed. Some programs, such as City and Western actively recruited students whom they thought were more likely to be engaged by teacher education, supplementing academic entrance criteria with interviews or evidence of prior interest and experience in working with children. Western supported the growth of engagement through the partnerships program, focusing on the development of preservice teachers' capacity to think like a teacher by extended periods of engagement in a variety of school roles. City supported students' engagement through problem-based learning, and through a strategy of pass-fail assessment that ensured all students developed and

displayed a high level of analytical and practical knowledge. This approach was especially sharply focused through supervised one-to-one literacy and numeracy support in the program's learning difficulties clinic.

Preservice teachers' comments on their programs emphasised the importance of what Hoffman and colleagues (2003a) have called 'personalised teaching'. For some, this was a matter of individual staff interest, accessibility and enthusiasm for literacy or numeracy. Preservice teachers at Polytech, for example, appreciated that they were not 'just a number' to staff, that the lectures were 'exciting and fun' and that the tutor was 'mad keen' on mathematics. For other preservice teachers, such as those in the Rural program, the key to engagement was culturally appropriate support for retention and progression through the program.

Structural characteristics such as course length did not seem strongly associated with engagement. One of the two-year graduate programs was regarded by preservice teachers who spoke to the research team as very engaging; another structurally similar program was characterised as 'very lecture-based and theoretical' and 'not really showing us how to teach'.

Together, these observations about the role of engagement in the preparation of teachers lead us to the following conclusions:

Engagement is an important precondition for professional preparation. It may be promoted by:

- professional as well as academic selection criteria for preservice programs;
- problem-based and other collaborative learning strategies;
- social and cultural structures that support students' capacity to continue in the program; and
- staff accessibility, interest and enthusiasm for literacy and numeracy.

Knowledge

The literature review for this project identified various forms of knowledge as important in the context of literacy and numeracy preservice teacher education. These forms include personal competence in literacy and numeracy, broad knowledge that includes seeing literacy and numeracy as underpinning all learning areas, relevant knowledge that includes preparation in the use of particular teaching strategies and programs, and problematic knowledge that refers to understanding of the uncertain nature of literacy and numeracy.

Personal competence

There is strong support in the literature for the view that new graduates need to have appropriate levels of personal competence in literacy and numeracy if they are to teach effectively in these areas (ACDE, 1998). There is also some concern that beginning teachers do not possess these levels of literacy and numeracy competence (Kaminski, 1997; Perry, 2000).

Findings from the surveys and focus group studies were somewhat mixed. Personal competence was an issue for some focus group participants. In the surveys, however, most new primary teachers indicated that they believed their personal literacy and numeracy skills were adequate for their work as teachers, with somewhat fewer new secondary teachers feeling confident about their numeracy skills. More than half of the senior staff perceived beginning teachers as prepared in terms of their personal literacy and numeracy competence.

These mixed results may well be attributed to the diversity of the preservice teacher population and the variety of approaches taken by individual teacher education programs to the issue of personal competence. At City where literacy levels were high, no specific measures (apart from monitoring assignment presentation) were seen to be needed for literacy. At Western, where literacy levels were identified as not being generally at a high level, the development of personal literacy skills was specifically addressed in a first year unit and was monitored in later years in assignment writing. At Rural, where the majority of preservice

teachers spoke Standard Australian English as a second or additional language or dialect, there was intensive individual tutoring in reading and writing.

In terms of personal numeracy competence, concern was addressed at all visited sites about entry levels of, and dispositions towards, numeracy. Some programs, such as Metro and Regional, required preservice teachers to sit 'hurdle' tests of numeracy competence and to demonstrate mastery in the area before being allowed to pass. Rural also made use of proficiency tests and provided intensive tutoring to ensure success. There was no 'hurdle' test at City, but attention was paid to personal competence and dispositions towards numeracy, with an emphasis on participation that helped preservice teachers develop confidence in the area.

Personal literacy and numeracy is a public interest issue in teacher education. A higher than average standard of personal literacy and numeracy is expected of teachers, and members of the community are apt to question teachers' general competence when they encounter specific weaknesses in literacy and numeracy. For this reason we draw the following conclusions about personal literacy and numeracy:

Given the diversity of both teacher education programs and preservice teachers enrolled in them, no one approach will suit all teacher education programs:

- Where preservice teachers possess adequate entry-level literacy and numeracy skills, general monitoring appears to be sufficient.
- Where entry-level literacy and numeracy skills are not adequate teacher education course builders need to formulate explicit procedures to directly target the personal competence of preservice teachers.

Literacy and numeracy course content

Preservice teacher education programs are often criticised in the literature (Gore & Griffiths, 2002) for not providing the breadth and depth of knowledge with which to teach literacy and numeracy to school students. Broad knowledge of literacy and numeracy was seen as a key area by the beginning teachers in the focus groups and specific knowledge of both literacy and numeracy teaching was seen as key by senior school staff, beginning teachers and teacher educators. Among the empirically more effective SERTE sites in the United States (Hoffman et al., 2003b) knowledge of content was a defining characteristic.

Literacy

Comprehensiveness is a reasonable curriculum goal, but what counts as comprehensive curriculum content depends on local decisions about time and resources as well as epistemological judgements about what matters most in literacy and numeracy.

A sociocultural view of literacy predominates in Australian literacy education (Wilkinson et al., 2000). The Commonwealth has defined literacy in the Australian context as:

...the ability to read and use written information, to write appropriately, in a wide range of contexts, for many different purposes, and to communicate with a variety of audiences. Literacy is integrally related to learning in all areas of the curriculum, and enables all individuals to develop knowledge and understanding. Reading and writing, when integrated with speaking, listening, viewing and critical thinking, constitute valued aspects of literacy in modern life. (DEETYA, 1998, p. 7).

This broad definition of literacy involves far more than reading and writing. Yet literacy itself is not identified as a curriculum learning area. It overlaps to some extent with the English curriculum learning area, but is seen as underpinning all learning areas of the curriculum. School systems and sectors generally recognise the importance of literacy in terms of the amount of time allocated to its teaching in schools. For example,

some school systems have mandated a 2-hour literacy block for the early years of primary schooling. This represents approximately 40% of the school day. It would therefore be expected that preservice teacher education programs would contain a substantial literacy component, but this appears generally not to be the case. The average number of literacy units in Australian four-year primary teacher education programs is 2.2 out of a total of approximately 28 units of study.

Nevertheless, beginning teachers participating in the study's surveys and focus groups felt fairly well prepared to teach literacy and to use mandated literacy-related curriculum documents, although they perceived that there were significant gaps in their knowledge base. Senior school staff generally did not share this confidence and were particularly concerned about the beginning teachers' overall preparation for literacy teaching. Beginning secondary teachers were less optimistic than their primary counterparts about preparation for literacy teaching.

Beginning teachers were generally confident in their conceptual knowledge of the broad areas of reading, writing, speaking and listening, but were somewhat less confident that they were prepared to teach these areas. They were also confident in their preparation to use some common classroom literacy strategies, such as reading to children, shared book/modelled reading, guided reading and modelled writing. However, neither beginning teachers nor senior staff were confident in new graduates' preparation for teaching the areas of viewing, spelling, phonics and grammar. Further, more than half of new primary graduates did not feel prepared to use strategies for teaching in the specific areas of vocabulary and phonological awareness which previous research (National Reading Panel, 2000) has shown to be particularly important in early literacy teaching. Additionally, a similar proportion did not feel prepared to use computers in the literacy classroom.

The site study programs showed that where significant time and resources are devoted to literacy, preservice teachers can engage with a comprehensive curriculum that includes not only intensive study of traditional modes of literacy such as reading, writing, speaking and listening, but also newer modes such as multi-literacies and critical literacy. The courses at City, Western and Rural contained well above the national average of 2.2 literacy units in their primary preservice education programs. This more generous time allocation allowed preservice teachers to take on a socio-cultural approach to literacy teaching and learning that is implied in the Commonwealth government definition of literacy and is current in Australian schools and university teacher education sites (see for example Anstey & Bull, 1996; Campbell & Green, 2000; Luke & Freebody, 1999). During the literacy units at City and Western, preservice teachers were helped to construct their own literacy knowledge through authentic experiences as they engaged with children in schools or university-based cases that were closely linked to theories of literacy teaching and learning. They were also encouraged to see literacy knowledge as problematic as they were presented with dilemmas of literacy teaching, such as how to reconcile various theories and practices.

Together, these observations about literacy content lead us to the following conclusions:

- Knowledge about literacy learning is an essential component of teacher education:
- A substantial proportion of time and resources should be devoted to preparing beginning teachers for literacy teaching and learning.
- Preservice teachers need to be exposed to a comprehensive literacy curriculum in which they have extended opportunities to engage in authentic experiences where they can apply and question both theoretical and practical knowledge about literacy learning and teaching.
- This comprehensive curriculum should include a balance between fundamental knowledge of specific skill areas and higher order knowledge.

Numeracy

Like literacy, in this project, numeracy is seen as part of the sociocultural environment of students in that it involves:

to be numerate is to use mathematics effectively to meet the demands of life at home, in paid work, and for participation in community and civic life (AAMT, 1997, p. 13).

Numeracy, unlike literacy, is defined as closely related to a specific curriculum area. It is underpinned by mathematical knowledge, yet it also includes dispositions towards the use of mathematics in everyday life. A positive attitude towards mathematics is seen as a key characteristic of effective teachers of numeracy (Bobis, 2000). And in terms of preparedness to teach numeracy, the beginning primary teachers surveyed appeared to demonstrate a positive attitude.

The beginning secondary teachers did not, however, generally share this positive attitude to numeracy teaching. Whilst around three-quarters of primary beginning teachers indicated that their conceptual understanding of number, measurement, space, and chance and data was adequate, less than half of their secondary counterparts shared this view. And in terms of preparedness to teach these aspects and use numeracy-related curriculum documents, only around one-third of beginning secondary teachers responded positively, compared to three-quarters of their primary counterparts. For the area of algebra, which appeared only in the secondary survey, the proportion of positive responses was even lower. These lower levels of preparedness may reflect the smaller proportion of secondary teachers who saw themselves as teachers of numeracy or who had mathematics as an area of specialisation.

In terms of preparation to use strategies to teach numeracy, primary beginning teachers responding to the survey were particularly positive, with the majority confident in using most of the strategies widely used in classrooms. More than three-quarters felt confident in using the strategies of group work, games, problem solving and modelling. In contrast to this positive disposition among new primary graduates, the concerns expressed by senior staff responding to the survey and teacher education lecturers in the site studies leave open the possibility that some of this confidence about knowledge of mathematical content is misplaced.

Secondary beginning teachers felt less well prepared than their primary counterparts in terms of numeracy strategies. Nevertheless, they were more positive about strategies than in their knowledge of numeracy itself, and indicated that they had been well prepared to use group work and higher order questioning. In the absence of a consensus that numeracy is every teacher's business, it is likely that numeracy will continue to be second best (Louden et al., 2000, Vol.1, p. 25). Perhaps the lower level of secondary teachers' confidence also reflects a lack of consensus that numeracy is every teacher's business.

The site study programs had in common a constructivist framework, a mix of mathematical content and pedagogical content knowledge, and a focus on problem setting and problem solving. What differences there were constitute differences of emphasis rather than approach. Outside of specialist mathematics teachers' preservice programs, none of the site study programs met the Speedy (1989) requirement for 144 hours in mathematics and numeracy, and there was some evidence that fewer students supplemented the minimum course content with numeracy than with literacy electives.

Knowledge about numeracy learning is an essential component of teacher education:

- A substantial proportion of time and resources should be devoted to preparing beginning teachers for numeracy teaching and learning, especially primary teachers, almost all of whom will have

direct responsibility for mathematics and numeracy.

- Preservice teachers need to be exposed to a comprehensive mathematics curriculum that includes a numeracy focus on problem setting and solving.
- This comprehensive curriculum should be additional to any upgrading of skills for preservice teachers who do not have a strong content background in mathematics.

Linkage

The literature review on which this study is based identified 'more and better professional experience' and 'stronger links' between teacher education institutions and schools among the key structural issues in reform of teacher education. Some commentators have argued for a shift towards school-based teacher education, for extending the internship period, or for making professional experience the central part of teacher education. Together, this range of structural proposals anticipates the evidence of the US National Commission study that 'apprenticeship' is a key characteristic of more effective teacher education programs. These programs, Hoffman and colleagues argue, 'engage their pre-service teachers in a variety of course-related field experiences in which they have opportunities to interact with excellent models and mentors' (Hoffman et al., 2003a, p. 11).

According to teachers consulted through this study's focus groups, better school-university linkage was among the few structural issues rated as important. About a third of new graduates and senior staff rated it a 'top three' issue, many fewer than those who nominated substantive issues such as specific literacy and numeracy knowledge. Although new graduates responding to the surveys reported that their school experience had given them adequate opportunities to practise what they had learned about literacy and numeracy, almost one-third of new primary graduates identified the need for more school experience in the final open-ended response section of the survey.

The school experience patterns identified by the desk audit conducted for this study included classroom observation, one-day distributed experience, block practice and long-term internships. Among the four-year preservice programs this school experience constituted about 12% of program time, an average of 17 full-time-equivalent weeks. Shorter programs had a higher average proportion of time, but a lower number of full-time-equivalent weeks. Among the six site study programs, school experience ranged from as low as 40 days in a one-year graduate program to as much as 145 days over four years in Western's partnerships program. Many of the site studies included extended internships of 36-50 days.

School experience was the highlight of the program for many of the preservice teachers consulted in the site visit programs. Preservice teachers in the site visit programs talked about 'loving prac' (Wright, 2002, p. 114) and saw school experience as 'where you do most of your learning' (McIntosh, 2002, p. 209). At its best, school experience provided well-structured opportunities to capitalise on the knowledge offered in taught courses. As one preservice teacher put it:

It's a 2-year course and sometimes you don't feel you get everything. Most of it comes from on the job training. I learnt so much from my two pracs and 10-week internship about constructivist theory (Rohl, 2001, p. 83).

It was, however, common for preservice teachers and their lecturers to lament the weakness of theory-practice links in teacher education courses. In one of the numeracy site visit programs, for example, it was regarded as impractical to connect specific university teaching and learning activities to school experience. University assignments could not be set during teaching rounds, and the internship began after the teaching program was over. The task of integrating school experience and taught courses was a matter for individual preservice teachers:

Basically we are saying that we've given you some ideas of what you might be wanting

to do, and we hope it will happen when you get out in the schools, but we make no assessment of whether or not it happens. I have no idea actually how they teach in the schools (McIntosh, 2002, p. 204).

Among the site study programs, the most ambitious set of linkages was at Western, where there was a strong, reciprocal relationship established between the university and 130 schools. Preservice teachers spent up to 145 days of their four-year program in schools. They engaged in a wide range of school activities, in addition to extended periods of whole-class teaching. Teachers saw the program as 'a two-way thing' where the school supported preservice teachers and the prospective teachers provided their time, energy and expertise to the schools. A substantial number of school staff were also employed as sessional teaching staff in the university program. One of the strengths of this program was that the graduates were highly sought after and particularly competitive in job selection processes. As a potential employer in one partnership school said:

They have been able to present as much more accomplished than people who have done the normal teaching practice. The fact is we haven't employed any graduates from any other program for the last four or five years (Louden, 2002, p. 53).

This program was, however, more labour intensive than the standard pattern of university lectures and teaching rounds. Much of the work developing and maintaining school partnerships was additional to regular academic staff workload calculations. For this reason, the program was vulnerable to changes in personnel or resource settings.

A range of structural solutions may be adopted to build the quality of school-university links in teacher education:

- Intensive clinical programs, extended internships, and partnership programs can all underpin effective school-university links.
- Links are fragile and their maintenance is resource intensive. Innovative programs depend on very high levels of academic staff commitment.
- More widespread adoption of the innovative partnership approaches would require higher levels of financial commitment or cost reduction in other aspects of preservice teacher education.

Diversity

Australian schools contain students who come from a diverse range of backgrounds and have a diverse range of educational needs (Luke, 2003). Previous research has emphasised the need for beginning teachers to be prepared to deal with this diversity (Rosen & Abt-Perkins, 2000) and has also identified diverse groups of students who could be seen as educationally disadvantaged and at risk of developing learning difficulties (Louden et al., 2000). In this study five groups of diverse learners were identified as being at possible risk of learning difficulties: English as a second language learners, Indigenous students, students with learning difficulties, students with disabilities, and students from low socio-economic backgrounds.

Results of the surveys showed that teaching literacy and numeracy to this diverse range of students in schools was an area in which the beginning teachers felt particularly unprepared and senior school staff confirmed this inadequacy.

In terms of literacy, primary and secondary beginning teachers were in agreement. Around half felt prepared to teach students with learning difficulties, but less than half felt prepared to teach students with disabilities and students from low socio-economic, Indigenous and ESL backgrounds, with the proportion falling to less

than one third feeling prepared to teach literacy to ESL students. Senior school staff took a particularly gloomy view, with less than one quarter seeing beginning teachers as prepared to teach literacy to any of these groups of students. Perceptions of preparedness for numeracy teaching to diverse students were even more negative as far as beginning teachers were concerned, with secondary beginning teachers having extreme concerns (a low of 17% feeling prepared to teach numeracy to ESL students).

Given that the identified groups of students may be at risk of developing learning difficulties and that good classroom teaching has the potential to help prevent the development of learning difficulties (Snow, Burns & Griffin, 1998), the perceived lack of preparation for teaching these students is cause for considerable concern. Compounding this lack of preparedness to teach literacy to these students is the beginning teachers' apparent lack of knowledge about particular aspects of literacy, particularly spelling and phonics, identified by themselves and by senior school staff. There is a wealth of research to show that many students with learning difficulties have particular difficulties in encoding and decoding written English and that those with specific literacy learning disabilities have specific and very severe difficulties in this area (Hempenstall, 2003; Louden et al., 2000). Beginning teachers appear to be least well prepared to teach literacy to those students who find it hardest to learn.

The negative survey responses concerning preparation for teaching numeracy to diverse groups of students is also cause for concern. Previous studies have shown little specific provision in Australian schools for teaching numeracy to students with learning difficulties (Louden et al., 2000) and disabilities (van Kraayenoord et al., 2000) in terms of procedures and teacher knowledge. If teachers beginning their careers in schools feel unprepared to teach these students it is likely that this lack of provision will continue.

One of the ways in which site study programs supported diversity was in enrolling teachers from a range of socio-economic, linguistic and cultural backgrounds. Western was committed to the preservice education of 'first generation' university entrants and Rural to the preservice education of Indigenous people. Entry procedures targeted these groups and addressed issues of personal literacy and (to a lesser extent) numeracy competence.

In some sites there were compulsory courses that focused on teaching particular groups of students, such as students with disabilities or ESL students. City, however, was notable for its highly structured approach to units of study in special education, TESOL and, in particular, a clinical unit that specifically addressed the teaching of children who were not achieving in literacy or numeracy for a variety of reasons. University staff, preservice teachers, children and their teachers all saw this unit of study as particularly useful in improving outcomes for students 'at risk'. University staff and preservice teachers saw the unit as highly effective in helping preservice teachers deal with difference at individual and whole class levels. The additional expense of this unit meant that staff were required to continually justify its existence to the university and that, because of time and resource constraints, preservice teachers were able to work in either the numeracy or the literacy unit, but not in both.

Diversity is an important issue in teacher education, both in terms of preservice teacher intake and in terms of preparation to teach diverse groups of school students.

- Culturally appropriate support facilities and extended partnerships with schools are required to support the progress of preservice teachers from second language, Indigenous and other diverse communities.
- A structured approach that explicitly addresses the assessment and teaching of numeracy and literacy to educationally disadvantaged students is needed to ensure that preservice teachers are prepared to teach these students effectively.

- Intensive teaching programs (such as City's clinical unit) seem to be particularly effective in preparing preservice teachers for the practical teaching demands of diverse school populations.
- Such program elements, however, are resource hungry and either require cross subsidisation from other program elements or lead to the intensification of teacher educators' work.

Conclusion

This study provides a basis for considering the effectiveness of current teacher preparation programs. Although there was some scepticism among beginning teachers about the quality of specific areas of their preparation for literacy and numeracy, a higher proportion were satisfied than in some previous Australian studies.

Whether the previously reported concern about the effectiveness of teacher education is justified – or just reflects the complexity of the transition from student to teacher – concerns about preparation to teach literacy and numeracy focused most forcefully on gaps in propositional knowledge. New graduates and their senior staff colleagues wanted stronger preparation in specific literacy and numeracy strategies, and in preparation to use these strategies in teaching and assessing students who had difficulties with literacy and numeracy.

The six site study programs, chosen to represent the range of contexts and on the basis of their reputation for effectiveness, demonstrated to a greater or lesser degree the following characteristics:

- clarity of purpose,
- active engagement in literacy and numeracy learning,
- comprehensive literacy and numeracy knowledge,
- linkage with schools, and
- strategies for dealing with student and preservice teacher diversity.

Two further observations may be made about these six programs. First, the success of these programs frequently required additional resources or higher than sustainable workloads for staff. Second, the methodology adopted in this study allowed the research team to identify innovative and highly regarded program characteristics, but did not yield evidence about the impact of these program characteristics on teachers' long-term behaviour and school students' literacy and numeracy outcomes.

Further research

The methodology adopted in this study – focussing as it has done on capturing a broad range of stakeholder perceptions of effectiveness – has described the characteristics of site study programs but has not demonstrated the empirical superiority of these programs. It may be that superior long-term effects on teacher behaviour and student outcomes can be achieved within current resource constraints by careful attention to the substantive knowledge issues identified in the study's literature review. Or – and this is an empirical question – greater long-term effects may be produced in more resource intensive clinical and partnership programs.

There have been many large-scale studies and reports on teacher education in Australia – more than 20 major public reports and reviews in the last 20 years – but none of them has attempted to link program characteristics, program costs, graduate behaviour and student outcomes. In a period of heightened national interest in teacher education, such an inquiry would provide an evidence-based strategy for overcoming long-term concerns about the effectiveness of teacher education.

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APPENDIX A: Primary Beginning Teacher Survey



ID

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office use only

Beginning Teachers How well prepared are you to teach literacy and numeracy?

The Department of Education, Science and Training (DEST) has commissioned us to find out how teacher education providers are preparing beginning teachers for teaching **literacy and numeracy in the primary school**. This survey is a very important part of a national project that is being carried out by researchers from a number of universities. We invite you to take fifteen minutes of your time to complete it. Please note that any information you supply about yourself will be treated in the **strictest confidence** since only general summaries of the data will be reported.

The questions have been designed to be answered quickly and easily. For most questions, you need only **tick** ✓ the appropriate box with a black pen; the last question provides the opportunity for a brief written response.

When you have completed the survey **please return in the envelope provided or fax to Ms Helen House on 08 9273 8714**

Current Teaching Information

1. State/Territory: ACT NSW NT QLD SA TAS VIC WA
2. School: Government Catholic Other non-government
3. Gender: Male Female
4. Age: 20 - 25 26 - 30 31-40 41+
5. Year of Teaching: First Year Second Year
6. School location: Urban Rural Remote
7. Year Level/s presently taught: _____
8. In your current work do you see yourself as a teacher of:
literacy Yes No
numeracy Yes No

Details of Teacher Education Course

9. Teaching qualification :

Four Year Bachelor of Education <input type="checkbox"/>	Degree plus Two Year Graduate Diploma/M. Teach <input type="checkbox"/>
Degree plus One Year Graduate Diploma <input type="checkbox"/>	Other <i>(Please specify)</i> <input type="checkbox"/>

10. Teaching qualification completed: 1999 2000 2001 Other *(Please specify)* _____
11. Early Childhood Primary Middle School Secondary Other *(Please specify)* _____
12. Subject specialisation (if any): _____

Literacy

13. Overall how well did your pre-service education course prepare you to begin teaching literacy?

Not at all Not very Fairly Very

14. In each of the literacy areas listed below how well did your course:

	Help to develop <u>your own</u> conceptual understanding and skills?					<u>Prepare you to teach</u> the associated knowledge and skills?			
	Not at all	Not very	Fairly	Very	NA	Not at all	Not very	Fairly	Very
Reading									
Writing									
Speaking/Listening									
Spelling									
Viewing									
Phonics									
Grammar									
Critical analysis of texts									
Comprehension									
Assessment									
Planning									

*NA - Not Applicable means your own understandings and skills in this area were good/excellent before commencing the course

15. Specifically, how well did your pre-service teacher education course prepare you to use the following literacy-related strategies/activities in your classroom?

Strategy/Activity	Not at all	Not very	Fairly	Very
Shared book/ Modelled reading				
Reading to children				
Guided Oral Reading				
Independent Silent Reading				
Hearing children read				
Metacognitive strategies				
Word Recognition				
Phonological awareness				
Modelled writing				
Shared writing				
Guided/Interactive writing				
Independent writing				
Strategies for linking reading and writing				
Computer activities in literacy				
Vocabulary instruction				
Language experience				
Socio-dramatic play				
Homework reading aloud				

16. Please list the 5 most important literacy teaching strategies that you learnt in your pre-service teacher education course.

- i
.....
- ii
.....
- iii
.....
- iv
.....
- v
.....

17. How well did your pre-service teacher education course prepare you to teach literacy to students who may have particular educational needs?

	Not at all	Not very	Fairly	Very
ESL students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Indigenous students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Students with learning difficulties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Students with disabilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Students from low socio-economic backgrounds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. How well prepared were you to use the state curriculum/syllabus documents that relate to literacy teaching?

Not at all	Not very	Fairly	Very
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19. How adequate do you feel your own literacy skills are for your work as a teacher?

Not at all	Not very	Fairly	Very
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. How well did your pre-service teacher education course make connections between theory and practice for literacy?

Not at all	Not very	Fairly	Very
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Numeracy

21. Overall how well did your pre-service teacher education course prepare you to begin teaching numeracy?

Not at all Not very Fairly Very

22. In each of the numeracy areas listed below, how well did your course:

	Help to develop <u>your own</u> conceptual understanding and skills?					<u>Prepare you to teach</u> the associated knowledge and skills?			
	Not at all	Not very	Fairly	Very	NA	Not at all	Not very	Fairly	Very
Number									
Measurement									
Space									
Chance and Data									
Assessment									
Planning									

*NA – Not Applicable means your own understandings and skill in this area were good/excellent before commencing the course.

23. How well did your course prepare you to use the following numeracy teaching strategies/activities in your classroom?

Strategy/practice	Not at all	Not very	Fairly	Very
Estimation				
Exploring connections (eg. number relationships)				
Games				
Group work				
Guided discovery				
Higher-order questioning				
Inquiry-based learning (eg testing conjectures)				
Mathematical discussion				
Mental computation				
Modelling (real life problems eg preparing a budget))				
Open-ended tasks				
Practical/outdoor activities				
Problem solving				
Projects				
Puzzles				
Journal writing				
Report writing				
Using calculators				
Using computers				
Using manipulatives				
Early number strategies				

24. Please list the 5 most important numeracy teaching strategies that you learnt in your pre-service teacher education course.

i

ii

iii

iv

v

25. How well did your pre-service teacher education course prepare you to teach numeracy to students who may have particular educational needs?

	Not at all	Not very	Fairly	Very
ESL students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Indigenous students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Students with learning difficulties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Students with disabilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Students from low socio-economic backgrounds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

26. How well prepared were you to use the state curriculum/syllabus documents that relate to numeracy teaching?

Not at all	Not very	Fairly	Very
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

27. How adequate do you feel your own numeracy skills are for your work as a teacher?

Not at all	Not very	Fairly	Very
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

28. How well did your pre-service teacher education course make connections between theory and practice for numeracy?

Not at all	Not very	Fairly	Very
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Related Issues

29. How well prepared were you to manage student behaviour?

Not at all	Not very	Fairly	Very
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

30. How well prepared were you to teach students in rural/remote areas?

Not at all	Not very	Fairly	Very
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

31. How many opportunities on your practicums did you have for practising what you had learnt about:

Literacy teaching	None	Few	Some	Many
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Numeracy teaching	None	Few	Some	Many
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Diversity	None	Few	Some	Many
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Learning Difficulties	None	Few	Some	Many
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Your Comments

How could your teacher education course have better prepared you for teaching literacy and numeracy? *(If you would like to add further comments about your preparation for teaching literacy and numeracy please feel free to fax additional comments)*

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Please provide an estimate of the time taken to complete this form hrs mins

THANK YOU FOR YOUR TIME. WE REALLY APPRECIATE IT.

APPENDIX B: Secondary Beginning Teacher Survey



ID
office use only

Beginning Teachers

How well prepared are you to teach literacy and numeracy?

The Department of Education, Science and Training (DEST) has commissioned us to find out how teacher education providers are preparing beginning teachers for teaching **literacy and numeracy to students in secondary schools**. This survey is a very important part of a national project that is being carried out by researchers from a number of universities. We invite you to take fifteen minutes of your time to complete it. Please note that any information you supply about yourself will be treated in the **strictest confidence** since only general summaries of the data will be reported.

The questions have been designed to be answered quickly and easily. For most questions, you need only **tick** ✓ the appropriate box with a black pen; the last question provides the opportunity for a brief written response.

When you have completed the survey **please mail in the enclosed envelope or fax** to Ms Helen House on 08 9273 8714

Current Teaching Information

1. State/Territory: ACT NSW NT QLD SA TAS VIC WA
2. School: Government Catholic Other non-government
3. Gender: Male Female
4. Age: 20 - 25 26 -30 31-40 41+
5. Year of Teaching: First Year Second Year
6. School location: Urban Rural Remote
7. Year Level/s presently taught: _____ Subject area (if applicable): _____
8. In your current work do you see yourself as a teacher of:

literacy	Yes <input type="checkbox"/>	No <input type="checkbox"/>
numeracy	Yes <input type="checkbox"/>	No <input type="checkbox"/>

Details of Teacher Education Course

9. Teaching qualification :

Four Year Bachelor of Education <input type="checkbox"/>	Degree plus Two Year Graduate Diploma/M. Teach <input type="checkbox"/>
Degree plus One Year Graduate Diploma <input type="checkbox"/>	Other (<i>Please specify</i>) <input type="checkbox"/>

10. Teaching qualification completed: 1999 2000 2001 Other (*Please specify*) _____
11. Early Childhood Primary Middle School Secondary Other (*Please specify*) _____
12. Subject specialisation (if any): _____

Literacy

13. Overall how well did your pre-service teacher education course prepare you to begin teaching literacy?

Not at all Not very Fairly Very

14. In each of the literacy areas listed below how well did your course:

	Help to develop <u>your own</u> conceptual understandings and skills?					Prepare you to teach the associated knowledge and skills?			
	Not at all	Not very	Fairly	Very	NA	Not at all	Not very	Fairly	Very
Reading									
Writing									
Speaking/Listening									
Spelling									
Viewing									
Phonics									
Grammar									
Specific written genres for your subject area/s eg. narrative, report									
Textual analysis									
Language Use									
Comprehension									
Film and TV analysis									
Multimodal texts									
Research and referencing									
Critical literacy									
Literacy across the curriculum									
Assessment									
Planning									

*NA - Not Applicable means your own understandings and skills in this area were good/excellent before commencing the course

15. Specifically, how well did your pre-service teacher education course prepare you to teach the following literacy-related strategies/activities?

Strategy/Activity	Not at all	Not very	Fairly	Very
Independent silent reading				
Metacognitive strategies				
Modelled writing				
Guided/Interactive writing				
Independent writing				
Strategies for linking reading and writing				
Computer activities involving literacy				

16. Please list the 5 most important literacy teaching strategies that you learnt in your pre-service teacher education course.

- i
- ii
- iii
- iv
- v

17. How well did your pre-service teacher education course prepare you to teach literacy to students who may have particular educational needs?

	Not at all	Not very	Fairly	Very
ESL students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Indigenous students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Students with learning difficulties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Students with disabilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Students from low socio-economic backgrounds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. How well prepared were you to use the state curriculum/syllabus documents that relate to literacy teaching?

Not at all	Not very	Fairly	Very
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19. How adequate do you feel your own literacy skills are for your work as a teacher?

Not at all	Not very	Fairly	Very
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. How well did your pre-service teacher education course make connections between theory and practice for teaching literacy within your subject area ?

Not at all	Not very	Fairly	Very
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Numeracy

21. Overall how well did your pre-service teacher education course prepare you to begin teaching numeracy?

Not at all Not very Fairly Very

22. In each of the numeracy areas listed below, how well did your course:

	Help to develop your own conceptual understanding and skills?					Prepare you to teach the associated knowledge and skills?			
	Not at all	Not very	Fairly	Very	NA	Not at all	Not very	Fairly	Very
Number									
Measurement									
Space									
Chance and Data									
Algebra									
Assessment									
Planning									

*NA – not applicable means your own understandings and skills in this area were good/excellent before commencing the course.

23. Specifically, how well did your pre-service teacher education course prepare you to use the following numeracy-related strategies/activities in your classroom?

Strategy/practice	Not at all	Not very	Fairly	Very
Estimation				
Games				
Group work				
Guided discovery				
Higher-order questioning				
Inquiry-based learning (testing conjectures)				
Mathematical discussion				
Mental computation				
Modelling (real life problems eg preparing a budget)				
Open-ended tasks				
Practical/outdoor activities				
Problem solving				
Projects				
Puzzles				
Journal writing				
Report writing				
Using computers				
Using graphic calculators				
Using scientific calculators				

24. Please list the 5 most important numeracy teaching approaches that you learnt in your pre-service teacher education course.

i

ii

iii

iv

v

How well did your pre-service teacher education course prepare you to teach numeracy to students who may have particular educational needs?

	Not at all	Not very	Fairly	Very
ESL students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Indigenous students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Students with learning difficulties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Students with disabilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Students from low socio-economic backgrounds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

26. How well prepared were you to use the state curriculum/syllabus documents that relate to numeracy teaching?

Not at all Not very Fairly Very

27. How adequate do you feel your own numeracy skills are for your work as a teacher?

Not at all Not very Fairly Very

28. How well did your pre-service teacher education course make connections between theory and practice for teaching numeracy in your subject area?

Not at all Not very Fairly Very

Related Issues

29. How well prepared were you to manage student behaviour?

Not at all Not very Fairly Very

30. How well prepared were you to teach students in rural/remote areas?

Not at all	Not very	Fairly	Very
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

31. How many opportunities on your practicums did you have for practising what you had learnt about:

Literacy teaching	None	Few	Some	Many
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Numeracy teaching	None	Few	Some	Many
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Diversity	None	Few	Some	Many
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Learning Difficulties	None	Few	Some	Many
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Your Comments

How could your teacher education course have better prepared you for teaching literacy and numeracy? *(If you would like to add further comments about your preparation for teaching literacy and numeracy please feel free to fax additional comments)*

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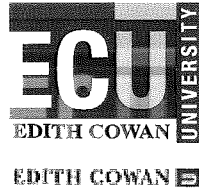
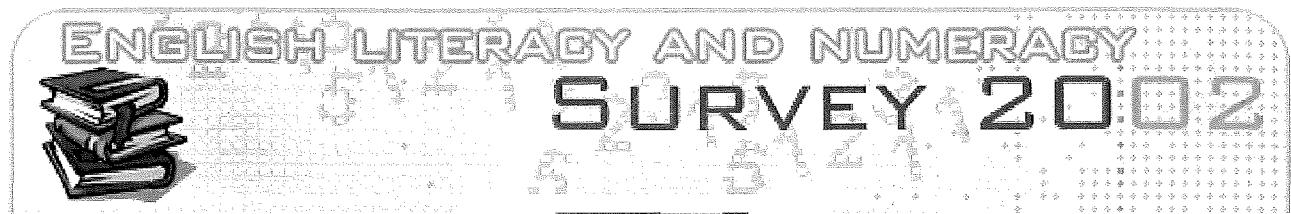
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Please provide an estimate of the time taken to complete this form hrs mins

THANK YOU FOR YOUR TIME. WE REALLY APPRECIATE IT.

APPENDIX C: Senior School Staff Survey



How well prepared are beginning teachers to teach literacy and numeracy?

This survey provides you with a chance to contribute to a national study of teacher education, with a special emphasis on literacy and numeracy. It concerns early years, primary and secondary teachers.

How long will the survey take?

The questions cover literacy teaching, numeracy teaching and some general teaching areas. It takes approximately five minutes to click on the buttons - longer if you choose to write in responses.

Who should complete the survey?

Any teacher or school leader with recent experience of new graduates may respond. Please forward the survey to any appropriate staff in your school. More than one person per school may respond.

Who is sponsoring the survey?

The Commonwealth Department of Education, Science and Training commissioned the survey. The project team includes researchers from Edith Cowan University, RMIT University, Southern Cross University, The University of Melbourne, The University of Newcastle, and The University of Tasmania.

Is it confidential?

Please note that any information you supply will be treated in the strictest confidence. Only general summaries of the data will be reported.

How will I find out about the results?

This survey is part of national project scheduled to report to the Commonwealth Government in December 2002. People responding to this survey will receive a brief summary of results by e-mail early in 2003.



Commonwealth Government Statistical Clearing House
Approval Number 01218 -- 02

ENGLISH LITERACY AND NUMERACY SURVEY 2002



Instructions

The majority of questions in this survey are multiple-choice. To record your answer, simply click the button next to the most appropriate answer.

Example:

How well do you think these instructions have described the task of recording your answer?


Not at all Not very well Fairly well Very well

You will notice that some questions have a *Comment* button next to the answers. These are provided for you to give more comprehensive feedback to a question if you wish to do so.

To add a comment simply click the *Comment* button. A window will pop up with a text box for you to write your comment. When finished, click the *Submit* button to record the comment and continue the questionnaire.

Example:

How well do you think these instructions have described the task of recording your answer?

Not at all Not very well Fairly well Very well  Comments

NOTE: You can use your browser's *Back* button to go back and change your answers.
Your responses will not be finalised until you hit the *Completed* button on the final page.



ENGLISH LITERACY AND NUMERACY SURVEY 2002

Literacy

How well do you think beginning teachers are prepared for:

Teaching literacy to students who may be educationally disadvantaged?

ESL Students	Not at all <input type="radio"/>	Not very well <input type="radio"/>	Fairly well <input type="radio"/>	Very well <input type="radio"/>	Comments
Indigenous students	Not at all <input type="radio"/>	Not very well <input type="radio"/>	Fairly well <input type="radio"/>	Very well <input type="radio"/>	Comments
Students with learning difficulties	Not at all <input type="radio"/>	Not very well <input type="radio"/>	Fairly well <input type="radio"/>	Very well <input type="radio"/>	Comments
Students from low SES backgrounds	Not at all <input type="radio"/>	Not very well <input type="radio"/>	Fairly well <input type="radio"/>	Very well <input type="radio"/>	Comments
Students with disabilities	Not at all <input type="radio"/>	Not very well <input type="radio"/>	Fairly well <input type="radio"/>	Very well <input type="radio"/>	Comments

How well do you think beginning teachers are prepared for:













Using the state curriculum/syllabus documents that relate to literacy teaching?

Not at all Not very well Fairly well Very well Comments

How well do you think beginning teachers are prepared for:

Teaching the following components of literacy?

Reading	Not at all <input type="radio"/>	Not very well <input type="radio"/>	Fairly well <input type="radio"/>	Very well <input type="radio"/>	Comments
Writing	Not at all <input type="radio"/>	Not very well <input type="radio"/>	Fairly well <input type="radio"/>	Very well <input type="radio"/>	Comments
Speaking / Listening	Not at all <input type="radio"/>	Not very well <input type="radio"/>	Fairly well <input type="radio"/>	Very well <input type="radio"/>	Comments
Spelling	Not at all <input type="radio"/>	Not very well <input type="radio"/>	Fairly well <input type="radio"/>	Very well <input type="radio"/>	Comments
Viewing	Not at all <input type="radio"/>	Not very well <input type="radio"/>	Fairly well <input type="radio"/>	Very well <input type="radio"/>	Comments


Phonics	Not at all <input type="radio"/>	Not very well <input type="radio"/>	Fairly well <input type="radio"/>	Very well <input type="radio"/>	 Comments
Phonological Awareness	Not at all <input type="radio"/>	Not very well <input type="radio"/>	Fairly well <input type="radio"/>	Very well <input type="radio"/>	 Comments
Grammar	Not at all <input type="radio"/>	Not very well <input type="radio"/>	Fairly well <input type="radio"/>	Very well <input type="radio"/>	 Comments
Specific written genres eg. narrative, report	Not at all <input type="radio"/>	Not very well <input type="radio"/>	Fairly well <input type="radio"/>	Very well <input type="radio"/>	 Comments
Textual analysis Language Use	Not at all <input type="radio"/>	Not very well <input type="radio"/>	Fairly well <input type="radio"/>	Very well <input type="radio"/>	 Comments
Language Use	Not at all <input type="radio"/>	Not very well <input type="radio"/>	Fairly well <input type="radio"/>	Very well <input type="radio"/>	 Comments
Comprehension	Not at all <input type="radio"/>	Not very well <input type="radio"/>	Fairly well <input type="radio"/>	Very well <input type="radio"/>	 Comments
Film and TV analysis	Not at all <input type="radio"/>	Not very well <input type="radio"/>	Fairly well <input type="radio"/>	Very well <input type="radio"/>	 Comments
Multimodal texts	Not at all <input type="radio"/>	Not very well <input type="radio"/>	Fairly well <input type="radio"/>	Very well <input type="radio"/>	 Comments
Research and referencing	Not at all <input type="radio"/>	Not very well <input type="radio"/>	Fairly well <input type="radio"/>	Very well <input type="radio"/>	 Comments
Critical literacy	Not at all <input type="radio"/>	Not very well <input type="radio"/>	Fairly well <input type="radio"/>	Very well <input type="radio"/>	 Comments
Literacy across the curriculum	Not at all <input type="radio"/>	Not very well <input type="radio"/>	Fairly well <input type="radio"/>	Very well <input type="radio"/>	 Comments

How well prepared are beginning teachers in terms of their own literacy competence?

Not at all Not very well Fairly well Very well

What would you like to see more of? What would you like to see less of?

How knowledgeable are beginning teachers about the theories that inform current literacy teaching and learning practices?

Not at all Not very well Fairly well Very well  Comments

Not at all Not very well Fairly well Very well



Comments

How well prepared are beginning teachers to use literacy assessment information to inform their teaching of individual students?

Not at all Not very well Fairly well Very well



Comments

Overall, how well do you think University teacher education courses are preparing pre-service teachers to teach literacy in primary and secondary schools?

Not at all Not very well Fairly well Very well



Comments

Please comment on any changes you think need to be made to teacher education courses in order to better equip pre-service teachers with the knowledge and skills to improve literacy outcomes for all students.

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ENGLISH LITERACY AND NUMERACY SURVEY 2002

Numeracy

How well do you think beginning teachers are prepared for:

Teaching numeracy to students who may be educationally disadvantaged?

	Not at all	Not very well	Fairly well	Very well	
ESL Students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Comments
Indigenous students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Comments
Students with learning difficulties	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Comments
Students from low SES backgrounds	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Comments
Students with disabilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Comments

How well do you think beginning teachers are prepared for:

Using the state curriculum/syllabus documents that relate to numeracy teaching?

Not at all	Not very well	Fairly well	Very well	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Comments

How well do you think beginning teachers are prepared for:

Teaching the following components of numeracy


	Not at all	Not very well	Fairly well	Very well	
Number	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Comments
Measurement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Comments
Space	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Comments
Algebra	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Comments
Chance and Data	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Comments
Planning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Comments

How well prepared are beginning teachers in terms of their personal numeracy competence?


Not at all Not very well Fairly well Very well

What would you like to see more of? What would you like to see less of?	
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How knowledgeable are beginning teachers about theories that inform current numeracy teaching and learning practices?

Not at all Not very well Fairly well Very well  Comments


How well prepared are beginning teachers to assess the numeracy development of students?

Not at all Not very well Fairly well Very well  Comments

How well prepared are beginning teachers to use numeracy assessment information to inform their teaching of individual students?

Not at all Not very well Fairly well Very well  Comments

Overall, how well do you think University teacher education courses are preparing pre-service teachers to teach numeracy in primary and secondary schools?

Not at all Not very well Fairly well Very well  Comments

Please comment on any changes you think need to be made to teacher education courses in order to better equip pre-service teachers with the knowledge and skills to improve numeracy outcomes for all students.

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ENGLISH LITERACY AND NUMERACY SURVEY 2002



General

How well do you feel beginning teachers:

Are prepared for managing student behaviour?

Not at all Not very well Fairly well Very well



Comments

Have the professional competence required to operate in a school environment?

Not at all Not very well Fairly well Very well



Comments

Are prepared to integrate ICTs into literacy and numeracy across the curriculum?

Not at all Not very well Fairly well Very well



Comments

ENGLISH LITERACY AND NUMERACY SURVEY 2002



Biographical

My position in the school:

- Principal
Deputy or Assistant Principal
Head of Department
Other

My gender:

- Male Female

My age:

- 21 - 30 31 - 40 41 - 50 51 +

State/Territory:

- ACT NSW NT QLD
SA TAS VIC WA

School Sector:

- Government
Catholic
Other non-government

School location:

- Urban Rural Remote

Year levels enrolled in school:

from to

ENGLISH LITERACY AND NUMERACY SURVEY 2002



Literacy | Numeracy | General | Biographical

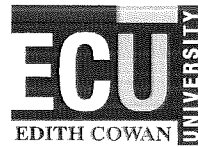
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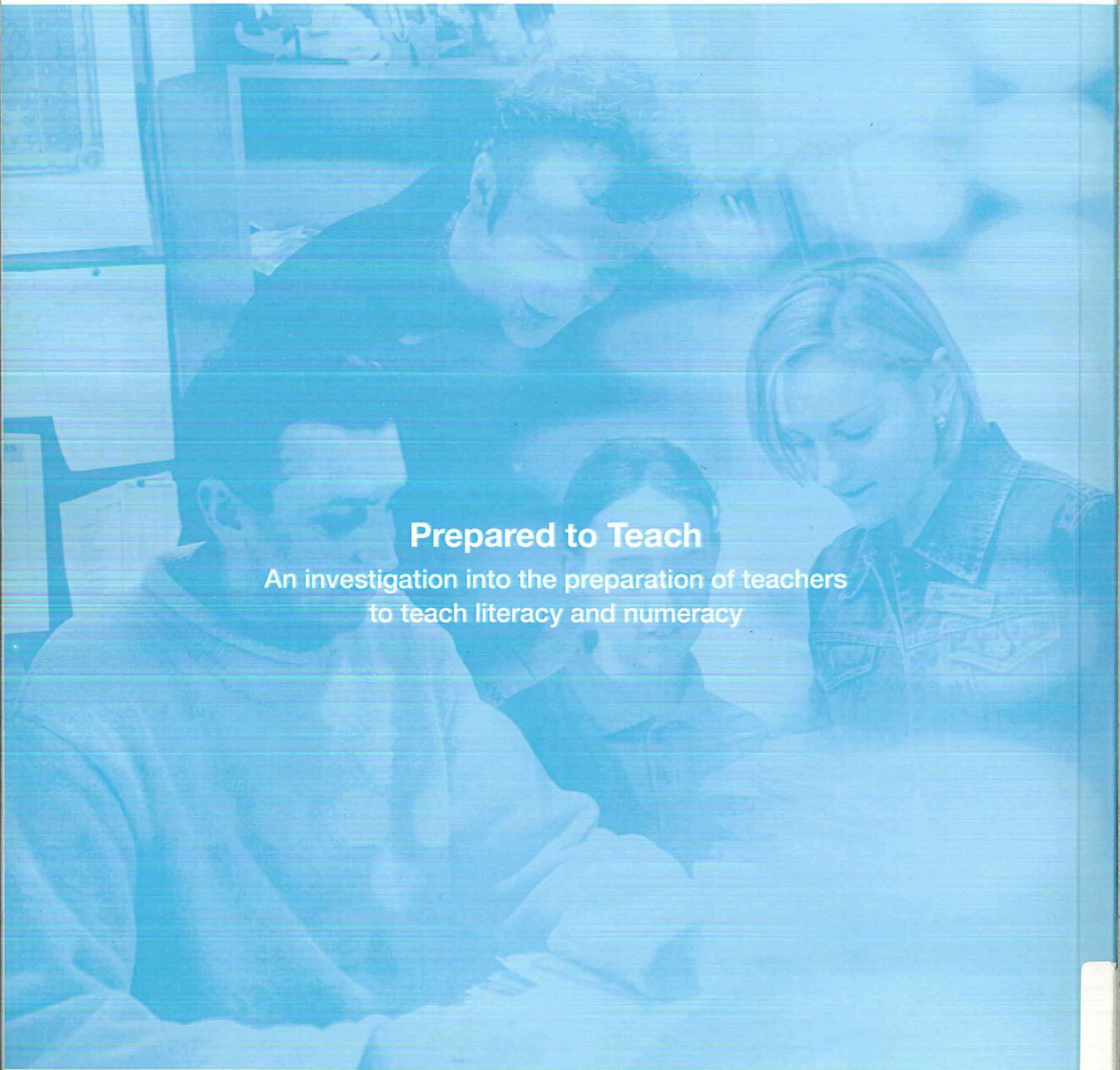
Thank You.

You have now completed the survey, feel free to use the menu above to review your choices and or make alterations.

To submit your survey please click on the image below
We value your input and are grateful you took the time to respond.

Completed ::::





Prepared to Teach

An investigation into the preparation of teachers
to teach literacy and numeracy



Australian Government

Department of Education, Science and Training