

Secondary Beginning Teachers' Preparedness to Teach Literacy and Numeracy: A Survey

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Abstract: This paper reports the findings of an Australia-wide survey conducted as part of a national teacher education research project that explored the preparation of teachers to teach literacy and numeracy in Australian schools (Louden, Rohl, Gore, Greaves, McIntosh, Wright, Siemon & House, 2005)¹. The project included various phases of inquiry, beginning with a desk audit of teacher education program characteristics and an international literature review (Gore & Griffiths, 2002), that drew on literature published in English in the last few decades. The issues identified in the literature review guided the construction of a set of national focus groups that targeted early years, primary and secondary teachers and teacher educators. Data from the focus groups informed three nationally representative questionnaire surveys, the purpose of which was to determine the preparedness of new graduates to teach literacy and numeracy to a range of school students. A survey was designed for each of the following three groups: senior school staff, primary beginning teachers and secondary beginning teachers.

The focus of this paper is the survey designed for teachers working with secondary aged students. (Other aspects of the study have been published elsewhere, for example Louden & Rohl, 2006; Rohl & Greaves, 2005). The secondary survey adds further insights to the recently released report of the National Inquiry into the Teaching of Literacy (Rowe, 2005) which found that the preparation of teachers to teach literacy was 'uneven across universities' (Rowe, 2005, p.12), and recommended that 'literacy teaching within subject areas be included in the coursework of secondary teachers' (Rowe, 2005, Recommendation 12, p.20). There has been much concern in recent years about the requirements for teacher education courses. Over the past 20 years there has been an average of one national or state inquiry into teacher education each year and in 2005 there were two national inquiries: a national parliamentary inquiry into teacher education and a national inquiry into the teaching of literacy that included preservice education for literacy teaching (Rowe, 2005). Some have pointed to the need to develop national standards (for example Louden, 2000; Rowe, 2005) and within the standards debate there are calls for graduating teachers to have adequate understandings of literacy and numeracy (Ministerial Advisory Committee on the Quality of Teaching, 1998) and a knowledge of 'what and how to teach literacy' (Rowe, 2005, p.12). At the secondary level, literacy and numeracy are embedded across the curriculum and teachers need to be able to foster those skills within their subject areas. There is some question as to whether beginning teachers achieve 'adequate' understandings and know how to incorporate literacy and numeracy instruction into their teaching when and where necessary. Changes to pre-service preparation for teaching are often suggested.

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Many secondary teachers undertake one- or two-year graduate diploma courses, following first degrees. Some educationists argue, therefore, for longer courses as it is difficult to include all the necessary knowledge and experiences to become a teacher in such a short time. Others have focused on issues such as entry-level requirements, standards, course content, practicums and school/university links and experiences (Gore & Griffiths, 2002). The National Inquiry into the Teaching of Literacy indicated the need for quality teaching and recommended the 'development and implementation of national standards for literacy teaching' and 'that these standards form a basis for the accreditation of teacher preparation courses' (Rowe, 2005, Recommendation 8, p.17).

The desired outcome of pre-service courses is the graduation of teachers who are competent to teach the students in their classrooms. The current population in Australian secondary schools is made up of students from a diverse range of backgrounds, including those who speak English as a second or other language, and those with learning difficulties or disabilities. These students have specific educational needs, particularly in relation to literacy and numeracy. In relation to these needs the National Inquiry into the Teaching of Literacy (Rowe, 2005) found however that quality teaching could elevate the performance of students from disadvantaged backgrounds.

There has been federal and state government attention to literacy and numeracy. Both have been identified as key areas in which teachers need to have expertise (Rowe, 2005; van Kraayenoord, Elkins, Palmer, Rickards & Colbert, 2002). Therefore, secondary teachers not only need to be conversant with their own subject areas, general teaching methods and subject-specific pedagogic strategies; they also need to know how to teach literacy and numeracy to students with a wide range of educational needs. The survey described here sought to determine the extent to which beginning secondary teachers felt their university courses had prepared them to teach in this environment and whether they felt their own levels of competence in literacy and numeracy were sufficient for teaching.

Methodology

The survey items were based on the Department of Education, Science and Training (DEST) project brief, the literature review and findings from the focus groups. Gore and Griffiths (2002) identified a number of structural and substantive issues, important in the area of preservice teacher education. These were combined to form a framework for focus group discussion that included issues around mentoring, induction, school-university links, length of preservice programs, critical reflection, diversity, and personal competence in and knowledge of literacy and numeracy. 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 issues of most concern to the school-based focus group participants were specific knowledge of literacy and numeracy, broad and relevant knowledge that allows preservice teachers to work with a wide range of students, and personal competence in literacy and numeracy. Accordingly these issues were given prominence in the survey, along with other issues identified by DEST in the project brief.

Participants

The survey participants were 303 teachers in their first or second years of teaching. All states and territories were represented in the sample.

The Survey

The survey questionnaire was designed in a 'tick a box' format for ease of completion and for ease of later data analysis. It contained 32 questions. 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 about literacy training and teaching and Questions 17-28 addressed numeracy training and teaching. The final questions (29-32) asked about more general teacher preparation issues. Most of the questions from 13 to 32 were Likert-type questions of the form, 'How well did your pre-service teacher education course prepare you to...?', 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' and 'very well'. A fifth option - 'not applicable' - was added where appropriate. Three questions required respondents to write lists, for example, to list the five most important literacy and numeracy teaching strategies they had learnt during their teacher education courses. The final question was open-ended and invited beginning teachers to suggest how their teacher education courses might have better prepared them for teaching literacy and numeracy.

The survey was prepared in several phases. A first draft survey was drawn up for beginning teachers in both primary and secondary schools. This draft was sent for comment to 20 principals of schools known to have a number of beginning teachers and, after feedback from this source and research colleagues, was sent to both DEST and the project Advisory Committee. Next, in order to cater more specifically for secondary and primary beginning teachers, two slightly different versions were created, one to be sent to secondary schools and one to primary schools, in consultation with colleagues who were specialists in primary literacy, primary numeracy, secondary literacy and secondary numeracy. The two surveys differed in four questions. Question 14 asked teachers how well their course had prepared their knowledge about various aspects of literacy and how it had prepared them to teach these aspects; Question 15 asked how well their course had prepared them to use specific literacy strategies and activities. Questions 22 and 23 asked similar questions with reference to numeracy. The primary and secondary surveys were then sent for comment to research team and advisory committee members and piloted in five states with approximately 70 new graduates and final year teacher education students. They were modified to take account of feedback from this trial.

Finally, the revised versions of these surveys were sent to DEST and to all state systems and Catholic sectors for approval. Several changes were made on the basis of the feedback received from these sources. The final versions of the surveys were then sent to the Commonwealth Statistical Clearing House for approval to circulate them to Australian schools.

Procedure

DEST provided a database of 9724 schools that contained school-aged children. Of these, 205 were identified as special schools and removed from the database as the focus of the project was new graduates teaching in mainstream schools. A random sample, representative of the national database in terms of state and school sector, was used to select schools that contained students within the secondary age range. Questionnaires were sent to 679 schools. Forty-six schools indicated that they had no beginning teachers on staff and 303 questionnaires were returned from beginning secondary teachers.

Table 1 indicates that the returning sample was for the most part similar to the population of schools in the database. It should be noted, however, that NSW was relatively under-represented and Queensland relatively over-represented.

	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
National database	2%	32%	3%	18%	8%	3.0%	24%	11%
Survey sample	3%	22%	0.1%	28%	8%	6%	21%	12%

Table 1: National and survey sample database by state

Results

Background demographics are presented first, followed by teachers' responses to the questions about their preparation to teach literacy and numeracy. Data are presented as frequencies and percentages. A number of secondary teachers (45) completed a version of the survey intended for primary school teachers. This occurred as schools containing both primary and secondary students were sent copies of both surveys and so teachers in these schools may have inadvertently completed the incorrect survey. As previously explained the surveys differed slightly in four questions only, thus minimising any impact on results. Where data for these four questions are presented and discussed this missing data is noted.

In order to simplify the presentation of data in questions about how well their courses had prepared the beginning teachers to teach literacy and numeracy, in some figures we have combined the categories of 'not at all well' and 'not very well' to form the category of 'not well' and the categories of 'fairly well' and 'very well' to form a 'well' category. In other figures all four categories are presented. Where possible, the results for literacy and numeracy have been presented on the same graph.

Background Information

Of the teachers who completed the survey 65% were female. As expected in a group of beginning teachers 65% were in the age group 20-25 years, with 21% in the 26-30 age group, 9% in the 31-40 age group and 5% aged over 40.

The proportion of respondents in their first year of teaching was 77%, the remainder being in their second year. The majority (61%) reported that they were teaching in urban areas, 36% in rural areas and 3% in remote areas. A sizeable proportion (41%) identified themselves as teaching all year levels in their secondary school. Twelve per cent indicated that they taught junior high classes and 4% identified middle school as their teaching focus. More than a quarter (27%) indicated that they taught in both junior high and middle school. Almost all (90%) indicated that they saw themselves as teachers of literacy, while 55% indicated they saw themselves as teachers of numeracy.

Beginning Teachers' Pre-service Teacher Education Courses

The most common qualification identified by 40% of respondents was a four-year Bachelor of Education degree while another 38% had a three-year degree plus a one-year graduate diploma. A further 8% had a two-year Graduate Diploma or M.Teach, and 8% a Bachelor of Arts/Bachelor of Education. The remainder indicated that they had 'other' qualifications.

Subject Specialisation

Figure 1 depicts the percentage of first and second specialisation areas and includes 241 of the 303 respondents who indicated their first area of subject specialisation and 127 respondents who identified their second subject specialisation. English was nominated by 24% of teachers as their first subject specialisation, followed by Health and Physical Education (18%) and

Mathematics (14%). The most common second specialisation nominated was Society and Environment (32%), followed by Science (23%). Less than 2% nominated Special Education and Learning Difficulties as a first subject specialisation and less than 1% as a second subject specialisation.

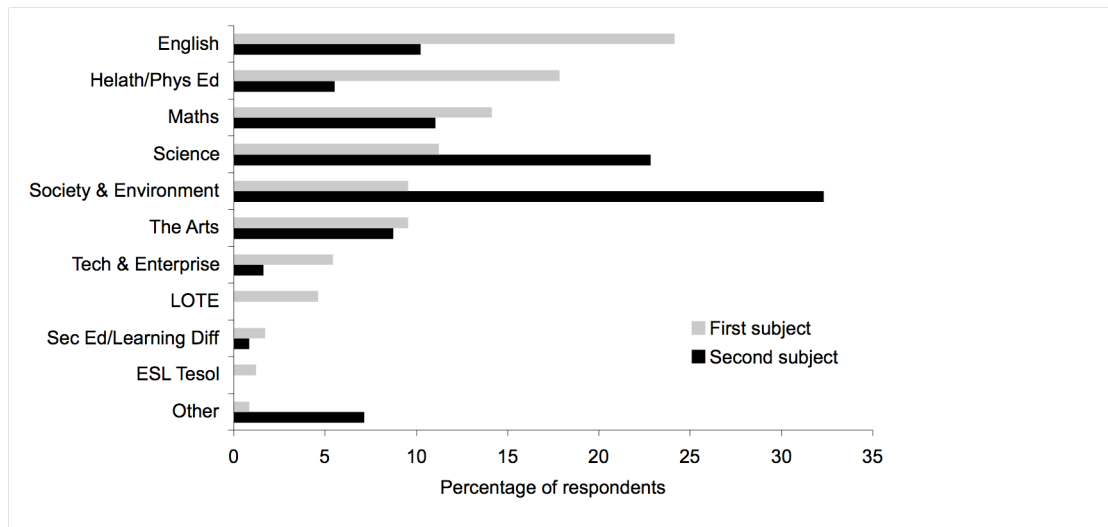


Figure 1: First and Second Subject Specialisation

Overall Preparation for Teaching Literacy and Numeracy

While English is an identified key learning area of the school curriculum and literacy is seen as underpinning all curriculum areas, there is some overlap between English and literacy, and a general public perception that teachers of English know how to teach literacy. Accordingly, for each of the questions relating to literacy, the responses of the 34% of teachers who nominated English as their first or second area of specialisation were analysed both as part of the whole group and also separately from the rest of the group. Similar analyses were conducted for the 25% of teachers indicating Mathematics as their first or second specialist area. Differences between the responses of the English and the Mathematics specialists and the whole group are noted below.

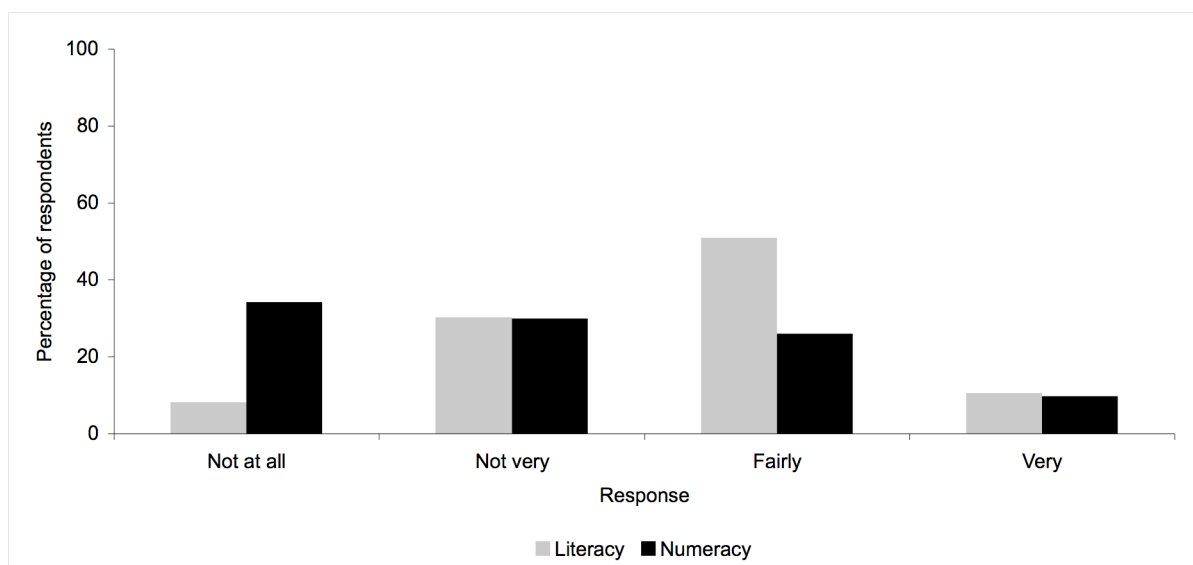


Figure 2: Overall Preparedness for Literacy and Numeracy Teaching

It can be seen from Figure 2 that while 62% of teachers responded positively about their preparation to teach literacy, 39% indicated that they had not been well prepared. Further, only 10% of all respondents indicated that their course had prepared them 'very well' to teach literacy. As 34% of the respondents listed English as their first or second area of specialisation, it would appear that 24% of the English teachers in the sample did not feel 'very well' prepared to teach literacy. When the responses of English specialist teachers were compared with those of the whole group they were found to be quite similar, with less than two-thirds (64%) responding positively about their preparation to teach literacy.

When asked how well their pre-service education had prepared them to teach numeracy, only around one-third indicated that they had been well prepared, and only around one-tenth chose the category of 'very well' prepared. Half had previously indicated that they saw themselves as teachers of numeracy. This is in contrast to the 90% who saw themselves as teachers of literacy. Not only did a much smaller proportion of the beginning teachers see themselves as teachers of numeracy than of literacy, as a group they felt much less well prepared to teach it. A separate analysis was conducted for the responses of teachers who had listed Mathematics as their first or second subject specialisation. As might be anticipated, in contrast to the whole group response, almost 70% of these Mathematics specialists indicated that they had been well prepared to teach numeracy, although of concern is the fact that over 30% gave negative responses.

Development of Teachers' Own Literacy Concepts and Skills

Teachers were asked about the extent to which their pre-service courses had developed their personal skills and understandings in particular aspects of literacy and the extent to which their courses had prepared them to teach those areas. There were some missing data for this question, as the secondary teachers who used the primary survey form for their responses were presented with a shorter list of options. This means that the proportions of responses may be under-represented for the following items which did not appear on the primary survey: specific written genres for the teachers' subject area, language use, film/TV analysis, multimodal texts, research and referencing, critical literacy and literacy across the curriculum. More than three-quarters of beginning teachers indicated that their pre-service courses had helped to develop their concepts and skills in the areas of planning, assessment, research and referencing, speaking/listening and writing (see Figure 3). Between 70% and 75% indicated that development had occurred in reading, text analysis, language use, subject genres, comprehension and critical literacy, while more than 60% indicated development in literacy across the curriculum and viewing. However, the teachers were less positive about other areas of development with just under half of the respondents feeling that their courses had developed their conceptual understandings and skills in spelling, grammar, multimodal texts and film/TV analysis. The teachers saw phonics as the area in which they had developed the least, with just over one-third indicating development of concepts and skills in this area.

Analysis of English specialists' responses to this question provided very similar results for most aspects. Most indicated that their own reading (88%) and writing (87%) skills had been developed. Other aspects of their own development of literacy concepts and skills, nominated by more than half, ranged from multi-modal texts (61%) to text analysis (85%). The areas in which fewest English specialists indicated that their own understandings or skills had been developed were phonics (37%), grammar (40%) and spelling (47%), reflecting very similar responses to those of the whole group. One difference between the responses of English specialists and the whole group was that nearly three-quarters of the former (72%) felt their courses had developed their understanding of film/TV and nearly two-thirds (62%) their understanding of multi-modal texts.

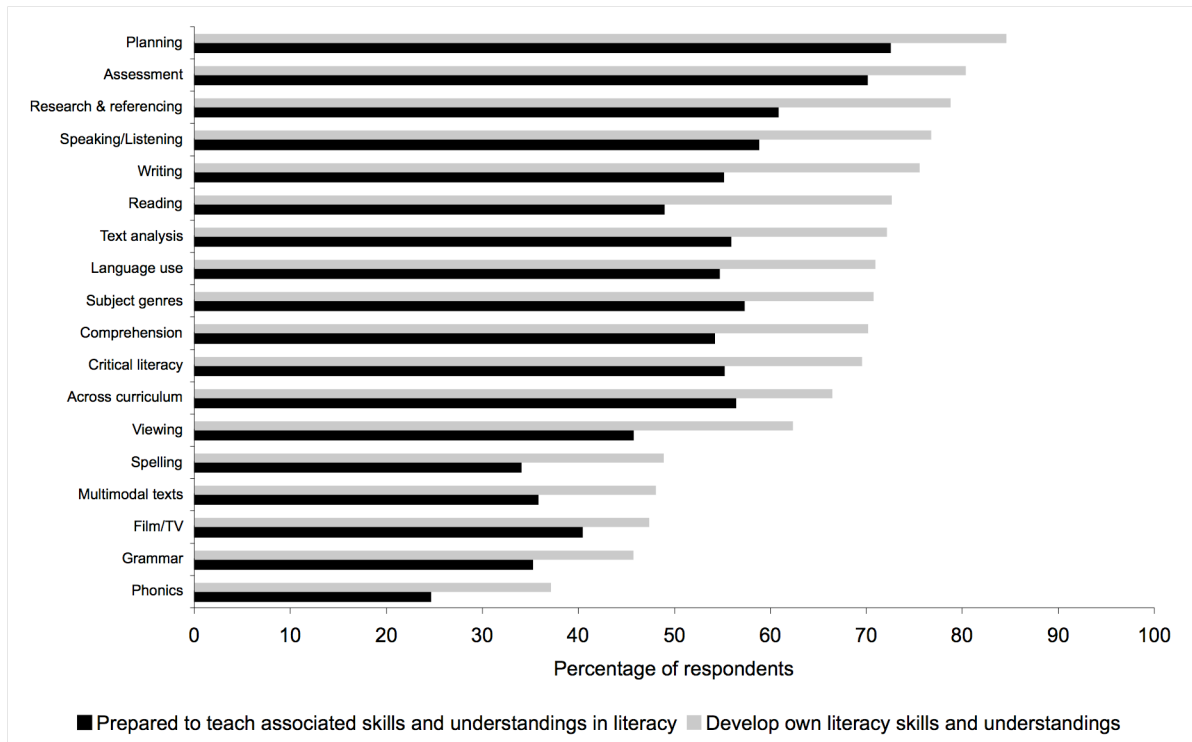


Figure 3: Development of Teachers' Literacy Concepts and Skills and Preparation to Teach Them

Preparation to teach specific aspects of literacy

Teachers' responses to the question of preparedness to teach specific aspects of literacy showed a fairly similar pattern to their responses to questions about how well their courses had developed their own skills and understandings. As shown in Figure 3, the teachers felt most well prepared for teaching in the areas of planning (72%) and assessment (70%). On the other hand, only around one-third believed they were well prepared to teach grammar (35%) and spelling (34%) and one-quarter (25%) prepared to teach phonics. Overall, teachers were less positive about their course preparation to teach literacy than for the development of their own understandings. For example, while nearly three-quarters stated that their own understandings and skills in reading and comprehension had been developed, less than half felt their courses had prepared them to teach these aspects. Similarly, for writing, three-quarters felt their own skills and understandings had been developed, but only just over half indicated that their courses had prepared them to teach it. As reading and writing are integral to virtually all secondary school subjects, it is of concern that around half of new graduates did not feel their courses had prepared them to teach in these areas. The use of multimodal texts, film/TV and viewing also cross subject boundaries. Less than half the teachers indicated they had been prepared to teach multimodal texts and film/TV. Whilst this may be an underestimate in view of some missing data for these areas, less than half also indicated that they had not been prepared to teach viewing, an area in which there were no missing data.

A comparison of the whole group responses to those of the English specialist teachers revealed many similarities, although greater proportions of English specialists indicated they had been prepared to teach text analysis (69%), critical literacy (64%), subject genres (62%), reading (57%) and viewing (52%). English specialists also felt least well prepared to teach spelling (31%), grammar (26%) and phonics (21%), indicating that study in English at university was not strongly related to preparation to teach in these areas.

Preparation to Teach Literacy Strategies and Activities

Figure 4 shows how well the teachers believed they had been prepared by their courses to teach various literacy strategies. Just over half stated they had been prepared to teach metacognitive strategies (58%) and strategies for linking reading and writing (52%), and just under half that they had been prepared in independent and modelled writing (49%), computer activities for literacy (46%) and guided interactive writing (46%). The strategy fewest teachers thought they had been prepared to teach was independent silent reading (28%). English specialist teachers were a little more positive than the whole group for most items, with proportions around 10% greater for metacognitive strategies, strategies for linking reading and writing, guided interactive writing and independent writing. They were much more positive about their preparation to teach modelled writing (65%).

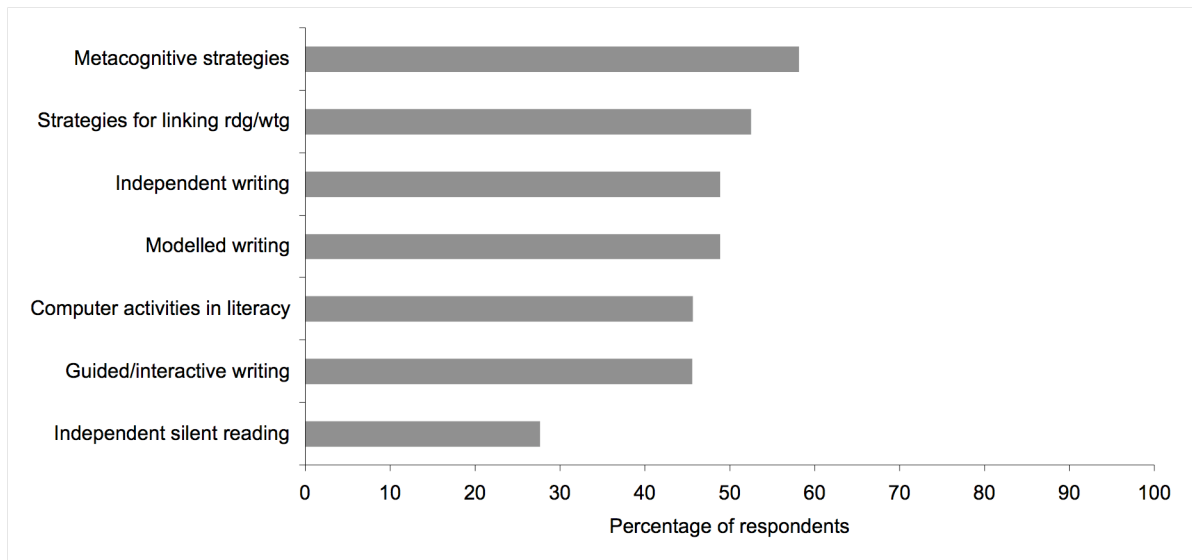


Figure 4: Preparation to Teach Specific Literacy Related Strategies/Activities

The Most Important Literacy Strategies Learnt

Teachers were asked to list the five most important literacy strategies they had learnt during their courses. While 62% described between one and six strategies, some teachers (11%) wrote the comments 'none', 'nil' or 'can't recall any'. When coding the responses to this question, those such as 'modelling', 'sharing', 'questioning', 'discussion' and 'brainstorming' - which did not specify areas of literacy - were classified as 'overarching literacy strategies'. A number of specific strategies that were listed by very few teachers, and did not fall into any of the other groupings, were coded as 'various literacy strategies'.

Table 2 displays responses for each category of literacy strategies, beginning with those identified by many teachers as most important. The percentages given represent the proportion of respondents to the question who listed that particular strategy. As this question was in multiple-response format, the percentages add to more than 100. Strategies listed by fewer than 5% of respondents are not included in the table. Overall, the teachers listed a wide range of strategies, with the result that the proportion of respondents choosing any particular strategy was often fairly small. Some of those who responded to the question included general teaching techniques and other items that were not specific literacy strategies, such as assessment techniques, behaviour management, resources, curriculum documents, programs and motivation. As these responses were not unique to literacy and were made by less than 10% of teachers, they have not been included in the analysis.

Strategy	Percentage of respondents
Reading comprehension strategies	40
Reading and writing genres	21
Modelled writing	20
Critical literacy	18
Oral language	17
Developing writing skills	16
Overarching literacy strategies	16
Independent writing	14
Shared/guided interactive writing	13
Vocabulary	12
Various literacy strategies (each listed by 1-4 teachers)	12
Writing, essays, journals	11
Literacy across the curriculum	10
Computers for literacy	9
Text analysis	8
Viewing	7
Grammar	6
Independent (silent) reading	6
Note-taking/summarising	6
Spelling	6
Linking reading & writing	6
Phonics/Graphophonics	6
Reading	5
Developing reading skills	5

Table 2: Teachers' Perceptions of the Most Important Literacy Teaching Strategies Learnt in Their Teacher Education Courses

As might be expected, there was an emphasis on comprehension, analysis and writing, using a variety of text types. Table 2 indicates that reading comprehension strategies were the most commonly nominated, followed by reading and writing different genres, modelled writing, critical literacy and oral language strategies. Strategies nominated by more than 10% of teachers included overarching literacy strategies, vocabulary, literacy across the curriculum and a range of writing strategies.

A comparison of teachers' responses to questions which asked about their own knowledge and how well their courses had prepared them to teach various aspects of literacy - and their listing of the most important strategies - reveals some parallels. Reading comprehension strategies were listed by 40% as important strategies learnt, and around half felt they had been well prepared to teach such strategies. Modelled writing and reading and writing different genres were each included by around one-fifth of teachers in the five most important strategies learnt, and around half of the respondents indicated they had been prepared to teach these strategies. Critical literacy and oral language were seen as important strategies learnt by a smaller proportion of teachers and over half indicated they had been well prepared to teach them. Strategies that over half the teachers perceived they had been well prepared to teach, but which only a small proportion included in their five most important, were literacy across the curriculum and linking reading and writing.

The strategy fewest teachers felt they had been prepared to teach was independent silent reading and it was nominated as important by a very small proportion. Spelling, phonics and grammar were also areas that few teachers felt they had been well prepared to teach as they were rarely identified in the 'write in', list and just over 5% included them in the five most important strategies learnt.

Development of Teachers' Own Numeracy Concepts and Skills and Preparation to Teach Specific Aspects of Numeracy

Teachers' perceptions of their own skill development and preparation to teach various aspects of numeracy are shown in Figure 5. While around half the respondents indicated that their own concepts and skills in planning (50%) and assessment (49%) had been well developed by their courses, somewhat fewer (around 40%) indicated that their courses had facilitated their own development in the areas of chance and data, space, measurement and number. Only one-quarter (26%) felt the courses had developed their understanding of algebra. A separate analysis of the Mathematics specialists' responses indicated more positive perceptions, with between 62% (for chance and data) and 69% (for number) feeling that their own concepts and skills had been developed in each of these aspects of numeracy.

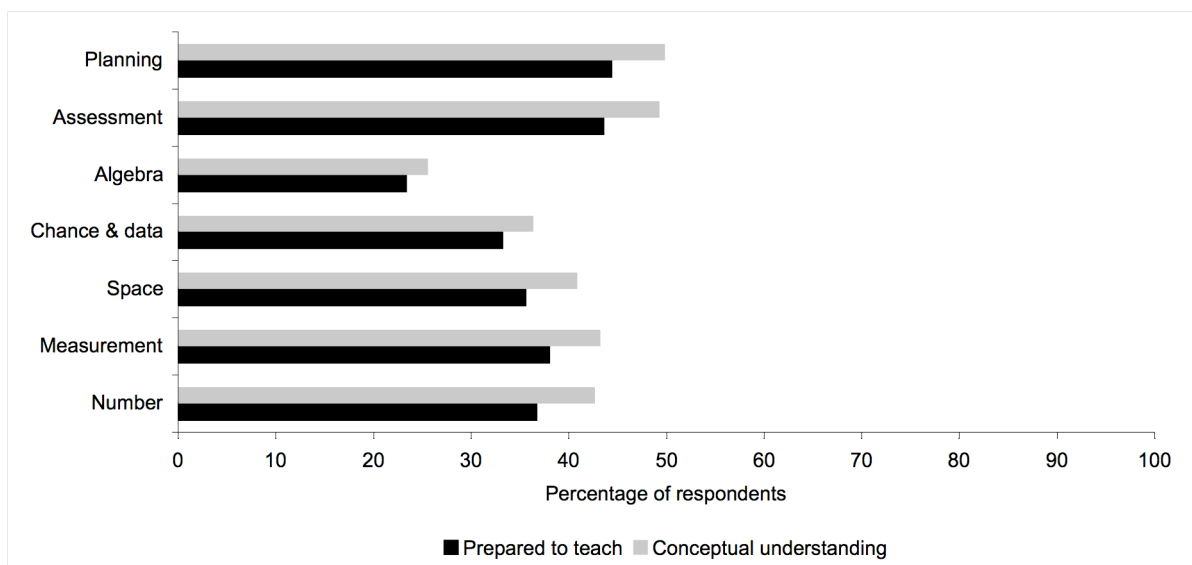


Figure 5: Development of Teachers' Numeracy Concepts and Skills and Preparation to Teach Them

Responses to questions about how well their courses had prepared them to teach the various aspects of numeracy reflected the beginning teachers' responses to the previous question about their own development. Slightly smaller proportions of teachers (44%) indicated they had been prepared to use planning and assessment in numeracy, and around one-third indicated their preparation to teach most aspects, with less than one-quarter (23%) feeling prepared to teach algebra. In contrast, Mathematics specialists generally indicated that they had been well prepared to teach each aspect of numeracy, with positive responses ranging from 58% for assessment to 74% for measurement.

Preparation to Teach Numeracy Strategies and Activities

The survey also asked teachers to indicate how well their courses had prepared them to use specific numeracy strategies or techniques. Almost three-quarters indicated they had been well prepared to use group work (73%) and nearly two-thirds (62%) to use higher-order questioning (see Figure 6). Well over half also indicated preparation for using computers (60%), problem solving (58%), guided discovery (58%), open-ended tasks (57%) and games (56%). Mathematics specialists' relatively more positive responses reflected similar choices, with most (85%) feeling prepared for group work, followed by games (77%), problem solving (73%), open-ended questions, use of computers (71%), guided discovery and higher-order questioning (69%).

The numeracy strategies/techniques that least teachers (fewer than 20%) felt prepared to teach were scientific (18%) and graphic (15%) calculators, although it is noted that there were some missing data for these two items, as they were not listed on the primary survey that some secondary teachers filled in. Less than one-quarter felt prepared to teach mathematical discussion (24%) and less than one-third to teach mental computation (31%). While Mathematics specialists also indicated that they felt least well prepared to teach these strategies/techniques, their responses were more positive, with around half indicating their preparation to teach the use of scientific calculators and graphic calculators and mathematical discussion.

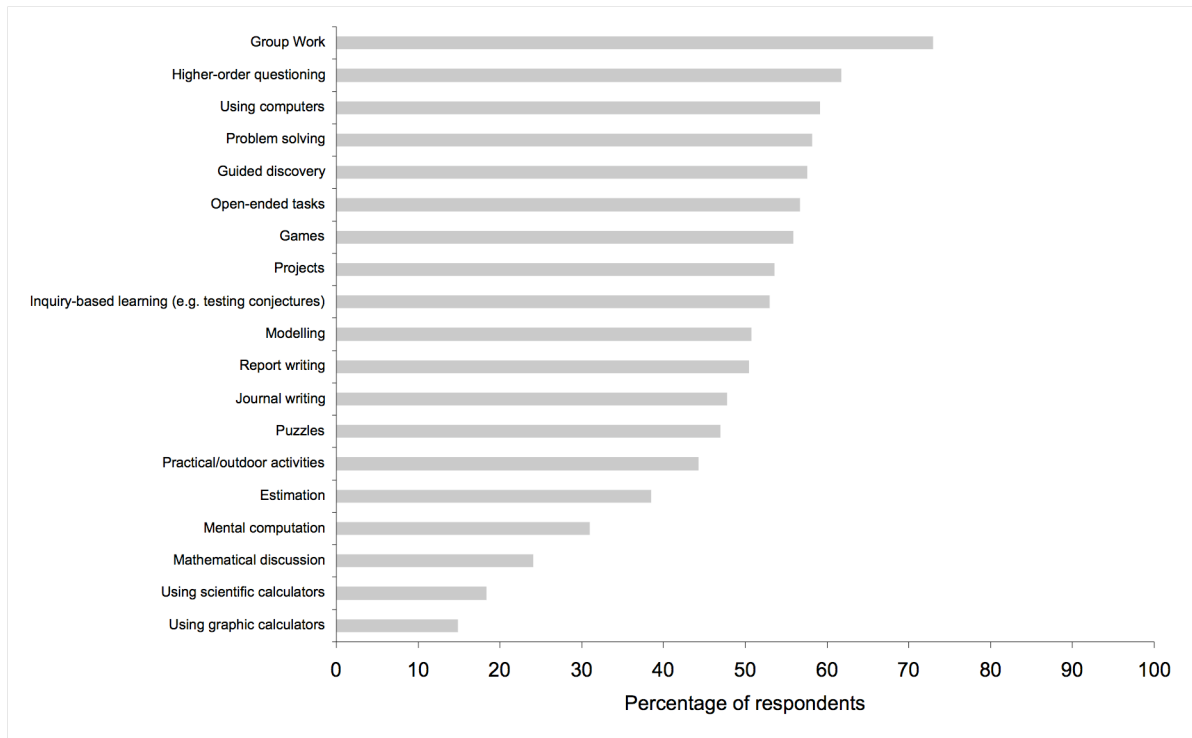


Figure 6: Preparation to Teach Specific Numeracy-Related Strategies and Activities

The Most Important Numeracy Strategies Learnt

When teachers were asked to list the five most important numeracy strategies they had learnt in their pre-service courses, a large number of categories were generated. While 49% wrote responses to this question, around one-third (32%) listed between one and five strategies, a further 13% wrote ‘none’ and 4% wrote ‘don’t teach numeracy’. Table 3 displays the proportions of secondary teachers who nominated each particular strategy. Only strategies nominated by at least 5% of teachers have been listed. A further 26% of responses could not be coded. The question was in multiple-response format, so that the total percentage is more than 100.

Strategy	Percentage of respondents
Group work	38
Problem solving	29
Modelling (real life problems)	26
Guided discovery	19
Games	14
High order questioning	13
Computer and other technology (multimedia)	12
Open-ended tasks	12
Estimation	12
Inquiry-based learning	10
Practical/outdoor activities	7
Chance and data	7
Numeracy across the curriculum	7
Generate discussion	7
Conceptual understanding	5
Use of manipulatives	5
Measurement	5

Table 3: Teachers' Perceptions of the Most Important Numeracy Strategies Learnt in Their Pre-Service Education Courses

The numeracy teaching strategies most commonly listed were group work, problem solving and modelling (more than one-quarter of teachers), followed by guided discovery, games, higher-order questioning, computers and other technology, open-ended tasks and estimation (more than 10%).

A comparison of the teachers' lists of the most important strategies learnt with the strategies they indicated they were well prepared to teach demonstrates a close match, with teachers indicating they were well prepared to use most of the strategies they considered important.

Preparation To Teach Literacy and Numeracy to Students With Particular Educational Needs

On the whole, beginning teachers did not feel particularly well prepared to teach literacy or numeracy to students who might be considered as educationally disadvantaged or who had specific educational needs (see Figure 7). Of great concern is the finding that only one-quarter of the respondents indicated their pre-service courses had prepared them for teaching literacy to students who speak English as a second or other language (ESL students). Less than half reported that their pre-service courses had prepared them to teach literacy to indigenous students, students with disabilities and those from low-SES backgrounds, with just over half reporting their preparedness for teaching literacy to students with learning difficulties. The proportions of responses from English specialists were almost identical to those of the whole group for most student groups, although they were more positive (54%) about their training to teach literacy to indigenous students.

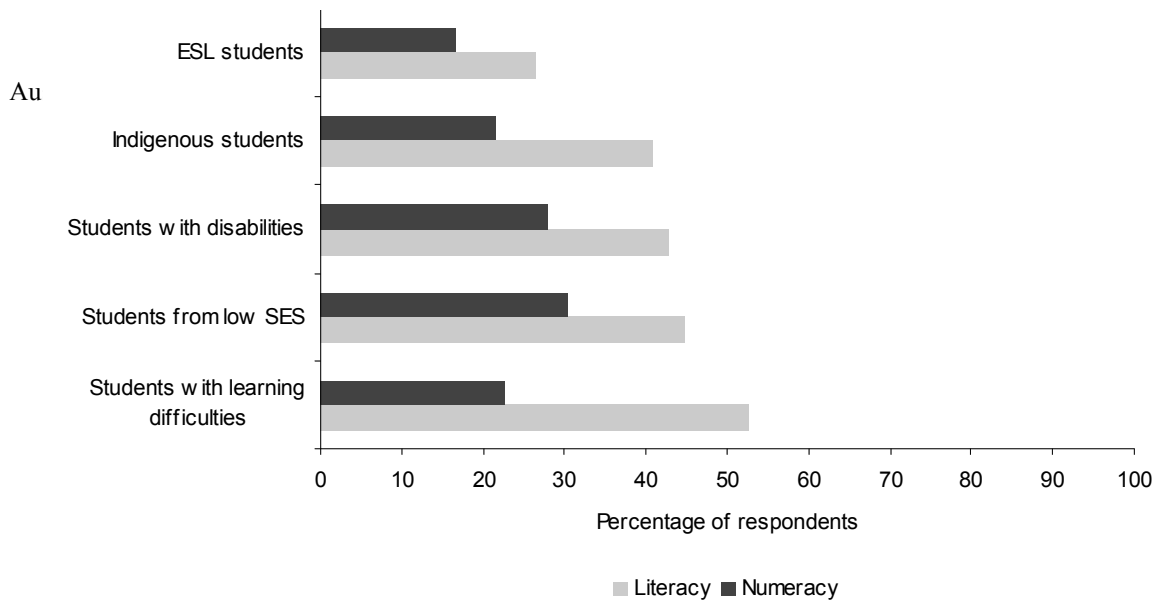


Figure 7: Preparation to Teach Literacy and Numeracy to Students With Particular Educational Needs

The beginning teachers generally felt even less prepared to teach numeracy to those students who were likely to need the most help, with under one-third indicating their preparation to teach students with disabilities or learning difficulties and less than one-quarter prepared to teach numeracy to students from low socioeconomic or indigenous backgrounds. Respondents felt least well prepared to teach students who spoke English as a second language (17%). These low proportions may be due in part to the fact that only half of the teachers saw numeracy as being within their teaching brief. While Mathematics specialists were rather more positive about their preparation to teach numeracy to these students, their responses reflected a fairly similar pattern, with only half feeling prepared to teach students with learning difficulties and less than half feeling prepared to teach numeracy to students from low SES backgrounds (44%), indigenous students (38%), students with disabilities (32%) and ESL students (31%).

Preparedness To Use State Literacy And Numeracy-Related Curriculum/Syllabus Documents

More than half (60%) of the teachers and nearly three-quarters of English specialist teachers (74%) felt that their courses had prepared them well to use their state curriculum/syllabus documents for literacy. However, only-one third (35%) indicated that their courses had prepared them to use state curriculum or syllabus documents for numeracy (see Figure 8). As many secondary teachers do not teach Mathematics as a subject, they may not see the need to be conversant with curriculum documents outside their own subject areas. By comparison, two-thirds of the Mathematics specialists felt prepared to use the numeracy documents, although a sizeable minority gave negative responses to this question.

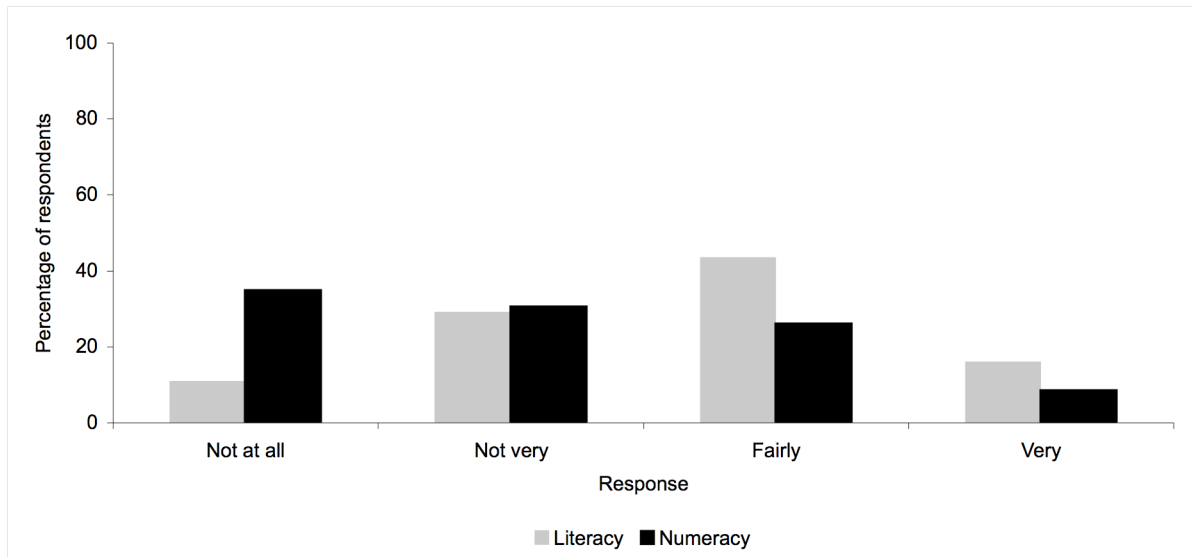


Figure 8: Preparation to Use State Curriculum/Syllabus Documents That Relate to Literacy and Numeracy Teaching

Adequacy of Teachers’ Own Literacy and Numeracy Skills For Teaching

The overwhelming majority of beginning teachers perceived their own literacy skills as being adequate for their work as teachers, with only 5% indicating that their skills were less than adequate (see Figure 9). A majority of teachers also thought that their numeracy skills were adequate for their teaching. The responses to this question need to be interpreted in the light of the less-positive responses to some previous questions, specifically the development of teachers’ own numeracy concepts and skills, and the background question that asked teachers if they saw themselves as teachers of numeracy. From these responses, it can be surmised that, as most respondents were teaching subjects other than Mathematics, they felt that they did not need high levels of numeracy in their teaching. As might be anticipated, almost all Mathematics specialists (96%) indicated that their own levels of numeracy were adequate for their teaching. Nevertheless, possession of adequate numeracy skills does not necessarily translate into the ability to teach those skills to others, especially to students with particular educational needs.

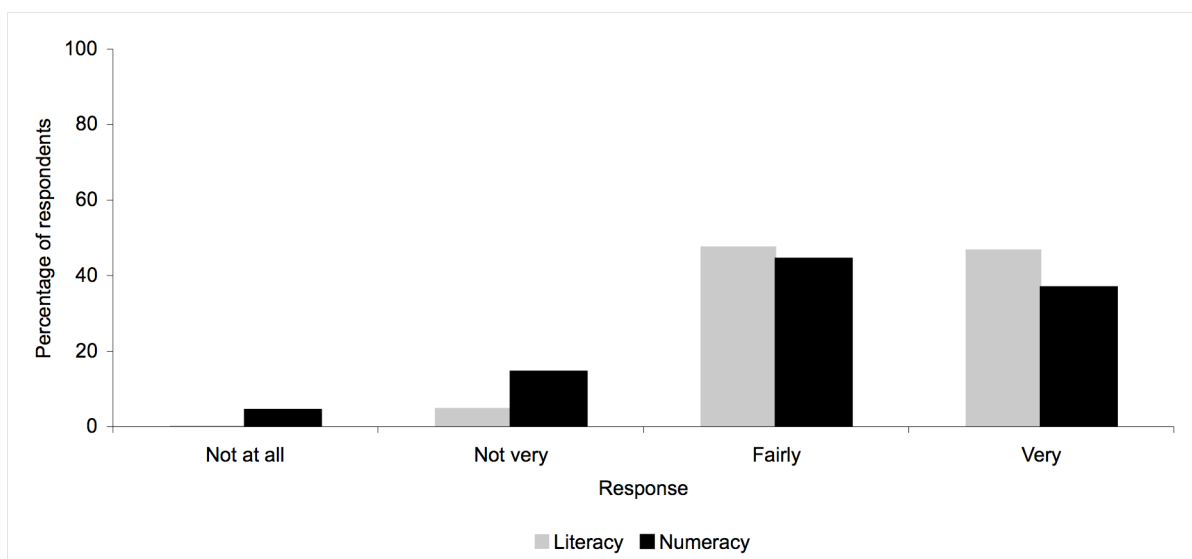


Figure 9: Adequacy of Teachers’ Literacy and Numeracy Skills for Teaching

Connections between literacy theory and practice in pre-service courses

Just over half of the beginning teachers felt that their courses had made connections between literacy theory and practice (see Figure 10). But when asked about the connections made between numeracy theory and practice, over two-thirds of teachers gave negative responses, with almost one-third selecting the ‘not at all’ response. In contrast, 73% of Mathematics specialists indicated that their courses had made connections between numeracy theory and practice.

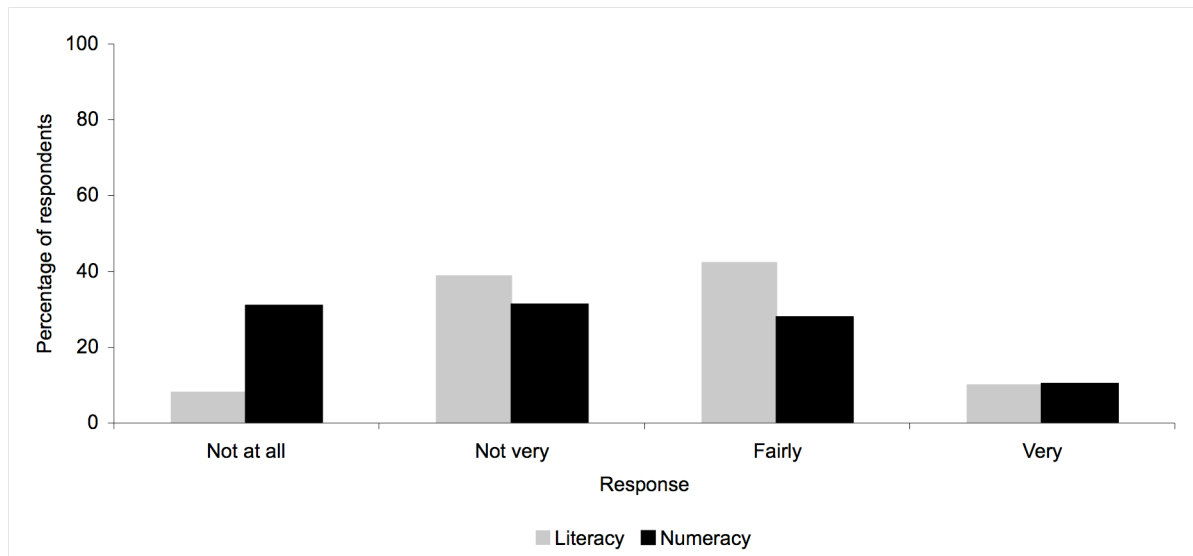


Figure 10: Connections Between Theory and Practice for Literacy and Numeracy

Some General Perceptions of Pre-Service Education Courses

Beginning teachers were asked how well their pre-service courses had prepared them to manage student behaviour and to teach in rural and remote areas. Three-quarters (77%) indicated that their courses had prepared them to manage student behaviour, with around one-fifth (19%) choosing the ‘very well’ category. Respondents were somewhat less positive about their preparation to teach in rural and remote areas, although just over half (60%) felt that their courses had trained them to do so.

Opportunity to Practise University-Based Learning on Practicums

The survey asked teachers whether they had had opportunities while on their practicums to use what they had learnt at university about literacy, numeracy, diversity and learning difficulties (see Figure 11).

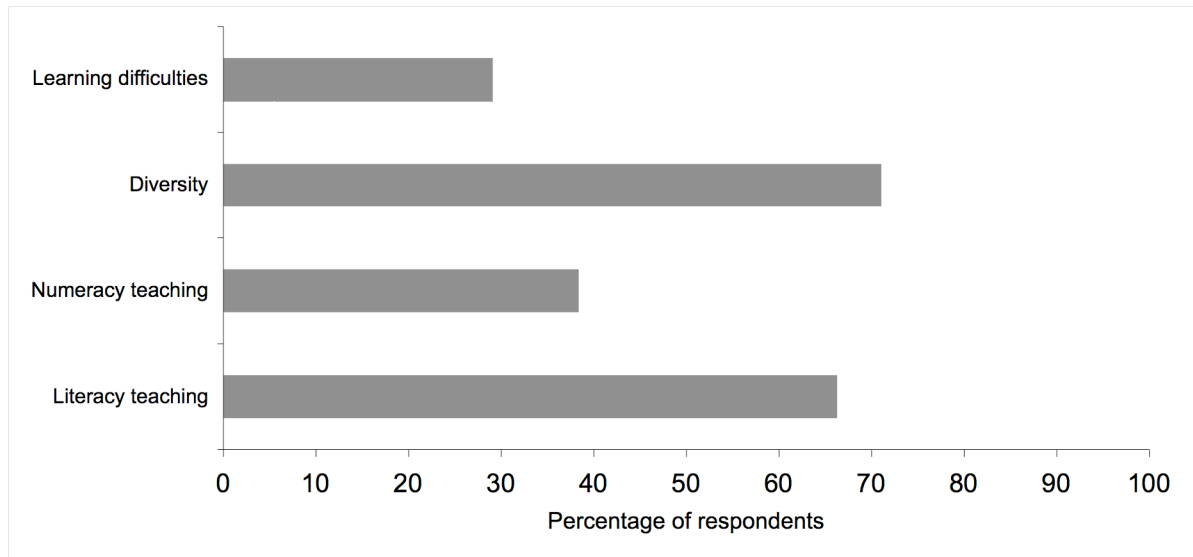


Figure 11: Opportunities on Practicums For Practising What Was Learnt About Literacy, Numeracy, Diversity and Learning Difficulties

Almost three-quarters of the teachers (71%) indicated that they had been able to put into practice what they had learnt about diversity, two-thirds (66%) what they had learnt about literacy teaching, somewhat over half (59%) what they had learnt about learning difficulties, and around one-third (38%) what they had learnt about numeracy teaching. While, with the exception of numeracy teaching, many of the responses were positive and seem to indicate that respondents were able to put into practice a great deal of what they had learnt in particular areas while on practicum, they may reflect the subjects, classrooms and students the beginning teachers experienced during their practicums, rather than what they had learnt at university. For example, a comparison with responses to the questions relating to preparation to teach literacy and numeracy to diverse groups of students shows that a high proportion of teachers did not feel prepared in this area.

Two other interpretations of the relatively positive responses to the question about practicums are possible. First, although many teachers did not feel they had been well prepared in some of these areas, they were nevertheless able, as pre-service teachers, to put into practice whatever knowledge they had gained. Another alternative is that as pre-service teachers they had experienced preparation for dealing with learning difficulties and diversity in a general sense, but not in a way that related specifically to teaching literacy or numeracy.

Nevertheless, as expected, there were some differences between the responses of Mathematics and English specialists to the question on practicums. Mathematics specialists responded differently to the whole group on two items, with 72% indicating opportunities to practise what they had learnt about numeracy, but only 44% indicating opportunities to practise what they had learnt about literacy. Conversely, 88% of English teachers indicated opportunities to put into practice their knowledge of literacy teaching, while only 16% of this group indicated opportunities to put into practice their knowledge of numeracy teaching. English specialists also indicated they had more opportunities than the whole group to practise their skills in the areas of diversity (78%) and learning difficulties (74%).

Suggestions for Course Improvement

The final question was open-ended, allowing teachers to comment on ways in which they felt their teacher education courses could have better prepared them to teach literacy and numeracy. Sixty seven percent chose to respond. As the question asked for suggestions for improvements, responses tended to be expressed negatively and need to be interpreted in conjunction with the more positive responses to many other survey questions.

A few teachers (6%) indicated that their courses had prepared them well to teach either their subject areas or literacy/numeracy. While a further 7% of the teachers who gave a response volunteered that they felt better prepared to teach literacy than numeracy, only 3% indicated the reverse. Table 4 itemises responses made by 5% or more of these teachers. A range of other responses was made by very small proportions of teachers.

Category	Percentage of teachers
More practical ideas/strategies	25
Need special literacy/numeracy subject	17
More on literacy across the curriculum	17
More on numeracy across the curriculum	15
Less theory	15
More on basic literacy skills including phonics/sight words	15
More on learning difficulties in literacy/numeracy	14
More practicums	12
More on ESL/Indigenous students	11
No literacy and/or numeracy in course	10
Better prepared to teach literacy than numeracy	7
More theory/practice links	6
More on numeracy strategies	6
Well prepared in subject area/literacy/numeracy	6
More on individual differences	5
Learnt much/most on practicums	5

Table 4: Suggested course improvements for preparation in teaching literacy and numeracy

The most common response, made by one-quarter of the teachers who answered this question, was that they wanted the course to contain more practical ideas and strategies. Related to this, around 15% of teachers wanted less theory, 11% wanted more practicums/teaching rounds and 6% felt that links needed to be made between theory and practice. A small group of teachers (3%) felt the course should give them the opportunity to have practicums in different contexts to give them wider experience. Some typical comments follow:

Need more practical opportunities to teach and less theoretical analysis. (Vic)

More practical experience in classrooms. Connect theory to practical situations. (NSW)

Some units I found were a waste of time. For example the unit "Issues in Education". We spent 16 weeks studying claims, sub-claims in newspaper articles about educational issues. (WA)

Some teachers (10%) remarked that there was no literacy or numeracy teaching within their pre-service courses and a few (3%) that literacy and numeracy strategies were not applicable to their areas of study. Further, 17% of the teachers wanted separate subjects for literacy and numeracy, 17% believed the course needed to include literacy across the curriculum and 15% stated that the course needed to include numeracy across the curriculum. For example:

While all my lecturers informed me of my accountability regarding teaching literacy and numeracy, none of them actually taught me ways in which to teach literacy and numeracy. Instead they concentrated on teaching me the content and processes of my chosen subjects.

While this proved most beneficial in developing my own knowledge and understanding of Drama and Geography it failed to equip me with a general body of practical and workable strategies for teaching literacy and numeracy across the curriculum. (QLD)

We only spent a very short time (a couple of lectures) on literacy. We did not discuss literacy or numeracy related documents especially numeracy. I think that all university courses need to spend more time on these areas (mandatory) and it should relate specifically to your subject area. (NSW)

Numeracy was not included in our subject training at all and neither was literacy. Teaching students these concepts was non-existent. (Vic)

Perhaps the introduction of a basic compulsory subject related to Mathematics and English could be developed similar to that covered in primary teaching courses. This may enable teachers to develop strategies to improve subject performance across the curriculum. (NSW) Commenting on specific content, around 15% of those responding to the question stated that their courses needed more on literacy skills including phonics and sight vocabulary, 14% wanted more on learning difficulties in literacy and numeracy, and a further 11% wanted more on teaching either ESL or Indigenous students. Further, 6% of teachers wanted more on numeracy strategies. Other areas teachers wanted to learn more about in their courses included behaviour management (5%) and the English syllabus/curriculum documents (4%). For example:

Focus on the basics, spelling, grammar etc. There definitely should have been time spent at Uni focussing on how to teach literacy to students with learning disabilities. We were provided with hundreds of pieces of paper with academic theories and writings; however we should have been provided with ideas, advice and realistic classroom guidance documents. (Vic)

All teachers, regardless of subject area, should learn how to write and teach specific styles of genre writing. For eg how to write a report, a narrative etc. Also basic grammar rules and paragraph /structures (applicable to high school students) should be taught. Many pre-service teachers are highly skilled in writing and reading but lack the skills and knowledge to teach the required skills for high school students. (QLD)

Some teachers (5.4%) stated that they had learnt most on their teaching practice and a further 2.5% indicated that they had learnt most during their first year of teaching. For example:

The Grad Dip Ed (being only 1 year) did not teach us how to teach students. We were given a lot of resources ... but were required to find things out on our own.....Honestly, I found the Grad Dip Ed quite irrelevant to teaching high school students. All my learning came from both pracs. (SA)

As a science teacher I see literacy and numeracy as being part of the courses I teach but the strategies that I use came more from the practicums and my own experience than anything in the Grad Dip Ed course I did. (Vic)

There were also some positive comments by the teachers about their pre-service education, including:

The diploma in education course covered most concepts as thoroughly as possible in the limited time (1 year). Everyone doing the course was highly literacy/numeracy trained. Therefore, the course concentrated on issues such as discipline, learning difficulties and teaching techniques instead of content. (Vic)

I think my teacher education training was quite good; however it did lack in some areas. The time spent at actual schools, was the time where I learnt the most. Some of the subjects while studying at Uni like Language in Education were very good and helped my literacy and numeracy skills. (Vic)

The "Stepping Out" program is very valuable. I think more instruction in remedial literacy would be helpful. (WA)

My teacher education in literacy was fantastic. In numeracy however, I felt there wasn't as great a focus as literacy. What subjects I did take in Maths were beneficial to my current teaching. (NSW)

Not a lot of time was spent on literacy. Numeracy on the other hand was looked at in great depth. (VIC)

Summary and Discussion

In this study 303 teachers beginning their careers in secondary schools responded to a number of questions that asked about the effectiveness of their pre-service preparation for teaching literacy and numeracy to a range of students. These teachers were specialists rather than generalists, with 34% having English as a first or second area of specialisation and 25%
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having Mathematics as a specialist area. The secondary teachers as a group felt better prepared to teach literacy than numeracy and fewer saw numeracy as being within their teaching brief. Almost all of the teachers saw themselves as teachers of literacy and more than half felt generally well prepared to teach it. However, when questioned about their preparation to teach specific aspects of - and strategies for - literacy teaching, it became apparent that their confidence in their preparation was not always high. They felt well prepared in their own skills, knowledge of content (including curriculum documents) and teaching of particular areas of literacy, such as planning, assessment, research, referencing and writing. In terms of strategies for literacy teaching, around half felt prepared to teach commonly-used strategies such as metacognitive strategies and linking reading and writing, although only around a quarter felt prepared to teach independent silent reading. Further, there were areas in which they did not feel well prepared and these included spelling, grammar and phonics.

Accurate phonics, spelling and grammar are required in most areas of the curriculum, and teachers cannot assume that students entering secondary school will have adequate skills in these areas, so teachers need to be able to give instruction in these skills. There is a wealth of research to show that many students with learning difficulties have particular difficulties in encoding and decoding written English (Chan & Dally, 2001; Hempenstall, 2003; Ramus et al., 2003) so that teachers who are not able to provide such instruction are not able to address the educational needs of these students. This position relates to the outcomes of the National Inquiry into the Teaching of Literacy, which found that 'an evidence-based and integrated approach including instruction in phonemic awareness, phonics, fluency, vocabulary knowledge and text comprehension needs to be adopted' (Rowe, 2005, p.12), and that teaching literacy is the responsibility of all secondary teachers across the curriculum.

Additionally, teachers responding to the survey indicated they did not generally feel well prepared to teach literacy to the range of students present in Australian classrooms, with only a quarter considering that they were equipped to teach speakers of English as a second language. The National Inquiry into the Teaching of Literacy noted that quality teaching could lift the performance of students from diverse backgrounds and that pre-service courses needed to focus on quality and standards.

Responses to our survey on similar issues relating to numeracy teaching showed a generally negative reaction to the preparation provided by pre-service courses. Only around half saw themselves as teachers of numeracy and for the most part half or less perceived that they were prepared at either a general or specific level to teach it. Exceptions were in areas that, while used widely in Mathematics, could also be seen as general teaching strategies, such as group work, higher-order questioning, using computers and problem solving among others. The beginning teachers did not feel well prepared to use numeracy-related curriculum documents nor to teach a diverse range of students. The negative survey responses concerning preparation for teaching numeracy to diverse groups of students is 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., 2002) 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.

These negative numeracy-related perceptions could not be attributed to perceptions of inadequacy of teachers' own numeracy skills as most saw them as appropriate for their work, nor to an inability to manage student behaviour, an area in which the great majority felt prepared.

The beginning teachers were able to provide a wide variety of suggestions for improvements to their pre-service courses. Many addressed a perceived need for more practical experience at the expense of university-based theory. A number of teachers indicated that they would have liked their university courses to include units in literacy and numeracy across the curriculum. The reality of teacher education and funding policies in current times means that increases in the length of courses are unlikely. While there have been previous calls for an increase in school-based learning and practicums, and they have been reiterated in the current research, it is often difficult in practical terms to increase the school component of courses (Gore &

Griffiths, 2002). Therefore any changes to pre-service education may need to be within current course structures.

The findings of this survey indicate that pre-service secondary education courses need to include literacy and numeracy understandings and strategies to teach students from diverse backgrounds and with particular educational requirements. The courses also need a greater focus on how to teach specific aspects of literacy, such as spelling, grammar and phonics, to those students who require development in these areas. These findings provide evidence that supports the findings and recommendations of the National Inquiry into the Teaching of Literacy. Further, courses need to demonstrate where numeracy skills are necessary across the curriculum and to provide instruction in how to develop these skills in students.

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