

4. STAFFING ISSUES IN SCIENCE, ICT AND MATHEMATICS

Respondents provided ground-level perspectives on a range of issues concerned with staffing, including their perceptions of staffing profiles in their schools, their motivations for teaching in rural or regional schools, their reflections on pre-service teacher education and preparation and, finally, their teaching qualifications. This section summarises the main findings from the survey.

4.1 DEMAND AND SUPPLY OF TEACHERS IN RURAL AND REGIONAL SCHOOLS

Teachers were asked for their perceptions of annual staff turnover rates in their schools and the difficulty of filling vacant positions. Primary teachers were asked to rate the difficulty of filling general teaching vacancies, while secondary teachers were asked to rate the difficulty of filling vacancies in their subject areas.

1. Overall, about 13% of respondents reported a high annual teacher turnover (>20% p.a.) in their schools. Those in combined and secondary schools reported higher turnover rates than did those in primary schools.
2. Reported rates varied significantly with location. Figure 4.1 shows that almost twice as many respondents from Provincial Area schools, and about six times as many from Remote Area schools, reported a high staff turnover rate (>20% p.a.) compared with their colleagues in Metropolitan and Provincial City schools.

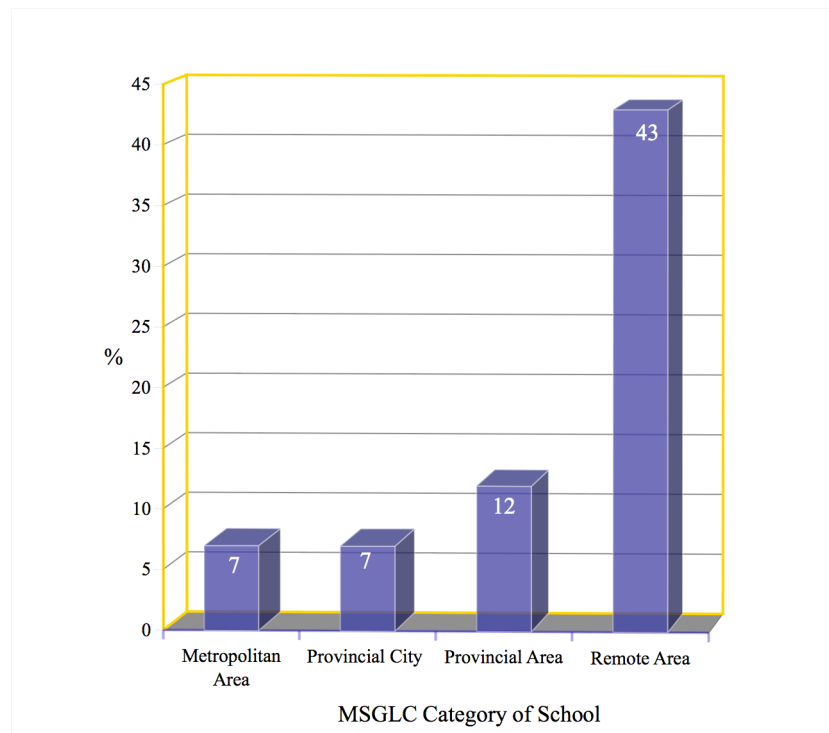


Figure 4.1. Percentage of primary and secondary respondents in different locations reporting an annual staff turnover greater than 20% (N=2702)

3. Figure 4.2 shows that twice as many primary respondents in Provincial Areas, and up to six times more respondents in Remote Areas reported that it was 'very difficult' to fill vacant teaching positions in their schools, compared with respondents in Metropolitan Areas.

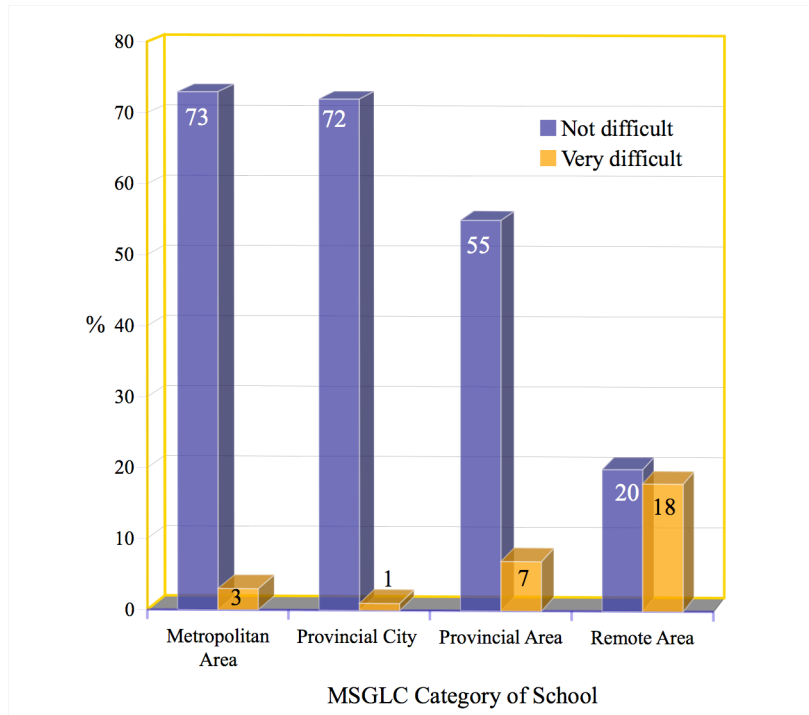


Figure 4.2. Reported difficulty of filling vacant primary teaching positions in different locations [only respondents reporting the situation as ‘not difficult’ and ‘very difficult’ are shown here] ($N=1480$)

- Secondary science, ICT and mathematics respondents in Provincial Areas were collectively about twice as likely, and those in Remote Areas about four times as likely, as those in Metropolitan Areas to report that it was very difficult to fill vacant teaching positions in those subjects (see Figure 4.3). Respondents in Provincial City schools were also considerably more likely than their metropolitan colleagues to regard it as very difficult to fill teacher vacancies in these subjects.

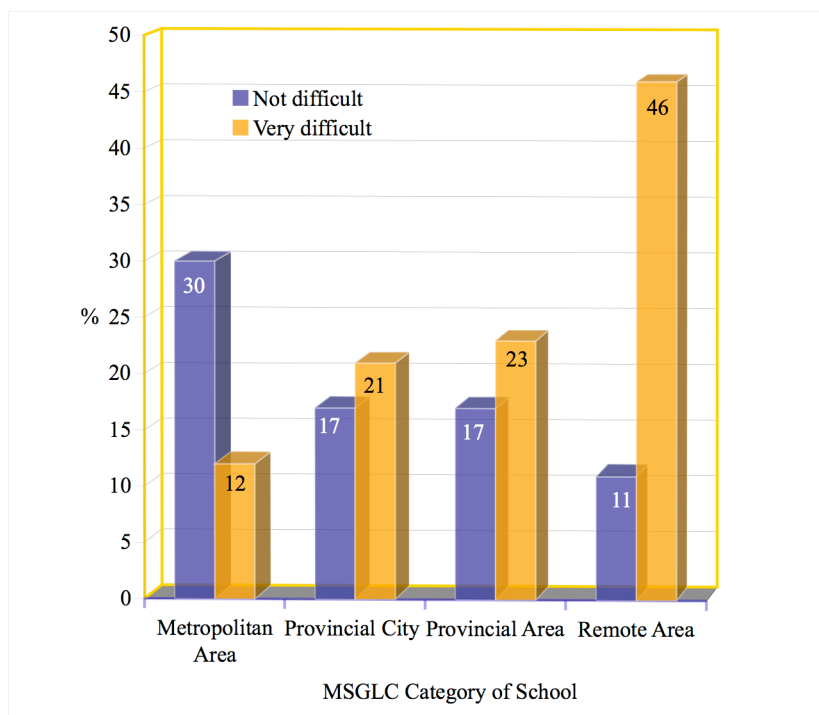


Figure 4.3. Reported difficulty of filling vacant secondary teaching positions in different locations [only respondents reporting the situation as ‘not difficult’ and ‘very difficult’ are shown here] (N (science, ICT and mathematics combined)=1261)

5. Figure 4.4 compares the proportions of secondary science, ICT and mathematics respondents in different locations reporting that it is ‘very difficult’ to fill vacancies in their subject areas. The evidence suggests that it is relatively more difficult to fill vacant mathematics positions in Provincial and Remote Areas, than to fill science and ICT vacancies in these locations.
6. The difficulty in filling vacant ICT positions appears to vary less with geographical location. However, ICT teachers seem to be in shorter supply in Metropolitan Areas than are science or mathematics teachers.

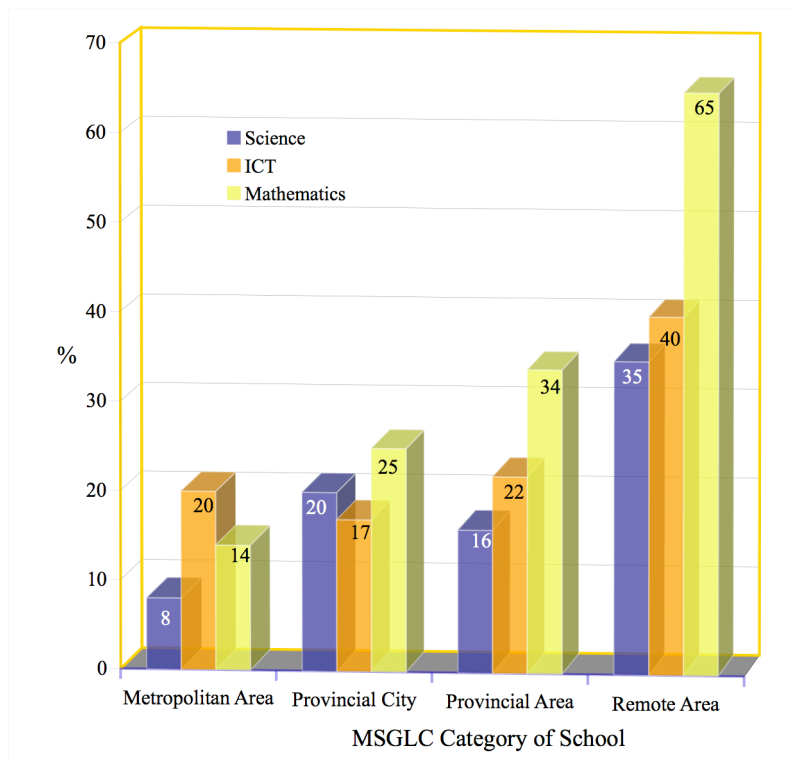


Figure 4.4. Percentages of science, ICT and mathematics respondents in different locations reporting that it is ‘very difficult’ to fill teaching vacancies in their subject areas (N=1261)

Discussion

The findings provide a ‘teacher perspective’ on the rural school staffing problems revealed elsewhere in the literature (e.g., Harris, Jenz & Baldwin, 2005; MCEETYA, 2003; Skilbeck & Connell, 2003). This is an important perspective, confirming inequities in the supply of qualified primary and secondary science, ICT and mathematics teachers to schools in different locations. These inequities have an obvious effect on the quality of education available to students in these locations. It is unlikely that students in a school that has a high turnover of staff, great difficulty in replacing these staff with qualified teachers, and where staff are required to teach outside their area of expertise, are receiving the same quality of education, and are as supported in their learning, as are those in schools adequately staffed with established, well qualified and experienced teachers. In view of this situation, it is difficult to avoid the conclusion of Alloway et al. (2004) and others that students in these schools are educationally disadvantaged by comparison with their city peers. The findings indicate that this disadvantage is most acute for secondary students, due to the higher turnover rates in combined and secondary schools and greater difficulty filling science and mathematics vacancies.

4.3 DESTINATION SCHOOLS OF CITY AND COUNTRY EDUCATED TEACHERS

Primary and secondary teachers were asked to indicate where they had lived while undertaking their high school education. Responses to this item served as a rough indicator of where they spent their formative years. Teachers were also asked where they had lived while completing their initial teacher education. Responses to these items were compared to the locations of their current schools. About 46% of respondents completed their high school studies in Regional (defined as having a population between 25000 - 50000⁵) or Rural Centres (defined as having a population fewer than 25000) and 43% in Metropolitan Areas (population >100000). However, the majority (about 62%) of respondents undertook their initial teacher education while in a Metropolitan Area. Female respondents tended to be somewhat more likely to have completed their initial teacher education outside a Metropolitan Area. Analysis of the teacher surveys revealed a number of associations between the destinations of teachers, and their locations while undertaking pre-service teacher education.

1. The findings revealed a tendency for teachers who attended high school in a rural or regional centre to move to a larger centre when undertaking their teacher training. This is not surprising, as nearly all universities and teachers' colleges are, or were, located in large centres, with most in the capital cities.
2. The findings exposed a tendency for teachers to gain employment in locations similar to those in which they lived while undertaking pre-service education. Figure 4.5 shows that 73% of respondents who lived in Rural Centres while completing their teacher education are currently working in Provincial Area or Remote Area schools. Only 5% of respondents who lived in Rural Centres during their teacher education were currently working in metropolitan schools.

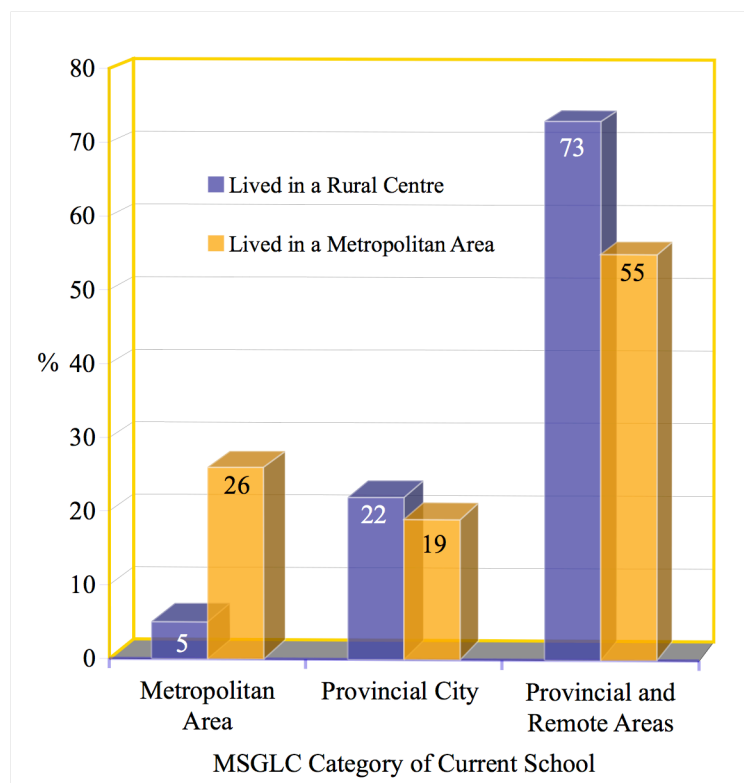


Figure 4.5. Current teaching locations of respondents who lived in either a Metropolitan Area or a Rural Centre when undertaking their initial teacher education (N=2895)

⁵ This population based classification was necessary as teachers were asked to identify their locations during these periods without reference to the MSGLC. The classification 'Regional Centre' corresponds to the MSGLC sub-category Provincial City 2.1.2, while 'Rural Centre' corresponds to Provincial Areas and Remote Areas.

3. On the other hand, the findings did not provide any evidence that teachers who lived in Rural Centres while attending high school or completing teacher education gain employment in Remote Areas. Rather, there appears to be a pattern of drift to larger centres.
4. The findings revealed that a greater-than-expected proportion (over 70%) of science, ICT and mathematics teachers lived in Metropolitan Areas during their teacher education. In view of finding 2, above, it is likely, therefore, that beginning teachers in these subject areas will tend to seek employment in Metropolitan rather than Provincial Area or Remote Area schools.

Discussion

The two most important findings in this section are the strong relationship between where teachers lived while undertaking their pre-service teacher education and where they subsequently teach, and the finding that over 70% of secondary science, ICT and mathematics teachers lived in metropolitan areas while completing their teacher education. These findings point to a greater supply of science, ICT and mathematics teachers in Metropolitan Areas, which is the current situation. In an environment of overall declining teacher numbers in these subjects (MCEETYA, 2003; 2005), it is clear that demand for these teachers in rural areas will increasingly outweigh supply.

4.4 MOTIVATIONS FOR TEACHING IN RURAL AND REGIONAL SCHOOLS

In order to understand the influences on staffing patterns and teacher motivations to work in rural and regional schools, the survey investigated the influences on teachers' decisions to work in, or to leave, these schools. The findings provide a solid basis for understanding these motivations, and for suggesting what steps can be taken to address the staffing problems identified above.

Motivations for moving to rural or regional schools

1. Table 4.1 shows that, overall, teachers initially taking up positions in these schools were motivated mostly by job availability, educational authority placement, and having previously lived in the same or a similar location.
2. The influence of motivational factors seems to vary with the sex of the teacher. Figure 4.6 shows that males were generally more motivated by financial and advancement considerations whereas females placed greater priority on family factors, such as spouse employment or location of other family members.

Table 4.1. Overall average ratings, standard deviations and valid N for the initial decision items (items are listed in descending order of mean rating) [Ratings on a 1 (Not influential) to 5 (Extremely influential) scale]

How influential were the following on your initial decision to teach in a rural or regional school?	Mean	s.d.	Valid N
Job availability	2.41	1.23	2388
Education authority placement	2.26	1.30	2416
Previously lived in the same or similar location	1.99	1.17	2408
Lifestyle change	1.84	1.07	2395
Family connections in the location	1.78	1.15	2410
Spouse's/Partner's employment situation	1.70	1.15	2402
Bond/contract with educational provider	1.61	1.10	2381
Promotion	1.43	.89	2372
Affordable housing	1.38	.75	2390
Rent subsidy	1.21	.59	2392
Rural or remote area allowance	1.14	.48	2389

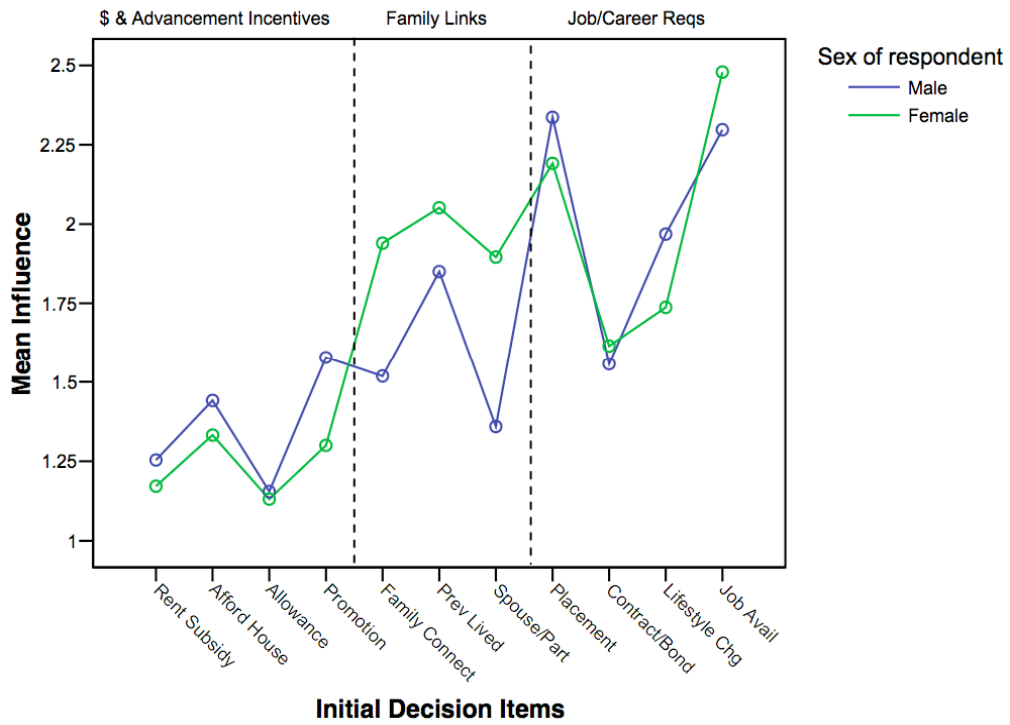


Figure 4.6. Profile plot of means for the eleven initial decision items, compared by Sex of Respondent (see Table 4.1 for item names in full)

3. There is evidence that the influence of motivational factors has changed over time. Figure 4.7 indicates that those who started their teaching careers 30 or so years ago were often allocated to rural or regional schools by education authorities, either through placement or

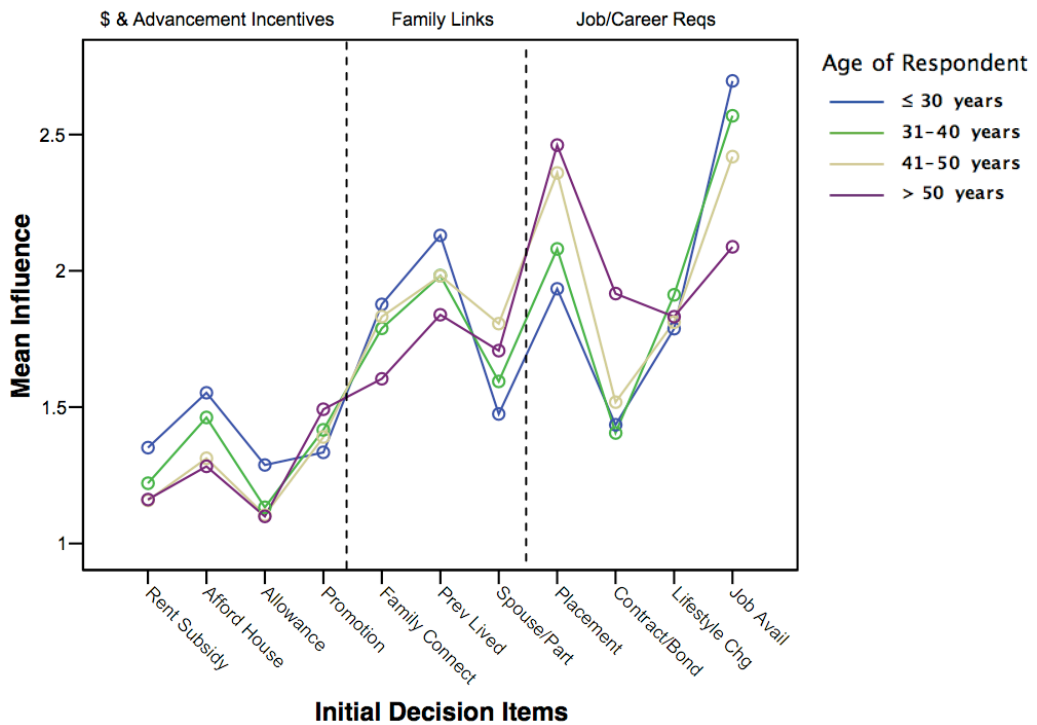


Figure 4.7. Profile plot of means for the eleven initial decision items, compared by Age of Respondent (Table 4.7 for item names in full)

scholarship bonds. However, these systems were not so influential (or extant) among younger teachers who were more motivated by job availability and whether they had previously lived in the same or a similar location. Younger teachers were also more motivated by financial inducements such as rent subsidies, affordable housing and allowances, while older teachers were more influenced by the situation of their partners.

4. Respondents from Government schools were more likely to have taken up a position at a rural or regional school due to education authority placement than were teachers in other systems.
5. The low mean ratings for subsidies and allowances possibly reflect the relatively small number of respondents who qualified for these incentives.

Motivations for remaining at a rural or regional school

1. The greatest influences on teachers' decisions to stay in rural and regional schools were their enjoyment of the lifestyle and community spirit. Table 4.2 shows that family links and partner's employment were also very influential.
2. The highest motivating school characteristic was small class size.
3. Female teachers considered their family situation to be more influential than did males, who rated the cost of living and quality of the lifestyle higher than did females.
4. Consistent with the findings on initial motivations, younger teachers were more inclined to remain in a rural or regional school because of financial considerations than were their older colleagues.
5. Promotion or advancement opportunities were also a greater incentive among younger teachers.

Table 4.2. Overall average ratings, standard deviations and valid N for the continuance decision items (items are listed in descending order of mean rating) [Ratings on a 1 (Not influential) to 5 (Extremely influential) scale]

How influential were the following on your decision to continue teaching in a rural or regional school?	Mean	s.d.	Valid N
Enjoyment of lifestyle	2.87	1.04	2253
Community spirit	2.43	1.00	2234
Spouse's/partner's employment situation	2.16	1.25	2245
Family connections in the location	2.11	1.24	2239
Smaller class sizes	1.84	.97	2232
Opportunity for promotion	1.71	.93	2239
Expense of moving to the city	1.66	.99	2225
Affordable housing	1.61	.91	2232
Opportunity to work with Indigenous students	1.29	.65	2232
Rent subsidy	1.26	.67	2222
Rural or remote area allowance	1.24	.63	2222

Motivations for leaving a rural or regional school

1. Respondents had a wide variety of mainly personal reasons for leaving rural and regional schools.
2. Table 4.3 shows that, for the most part, these reasons were family-related, such as changes in a partner's employment situation, or to improve educational opportunities for their own children.
3. Other teachers left due to a sense of social or professional isolation.
4. While problems with the school or community were the least influential factors, younger teachers tended to rate these as more influential than did older teachers.

5. Figure 4.8 shows that primary respondents rated these problems as less influential on their decisions than did those at secondary or combined schools. Professional isolation was a greater motivation among secondary and combined school respondents.

Table 4.3. Overall average ratings, standard deviations and valid N for the ‘decision to leave’ items (items are listed in descending order of mean rating) [Ratings on a 1 (Not influential) to 5 (Extremely influential) scale]

If you left a rural or regional school for a metropolitan school, how influential were the following?	Mean	s.d.	Valid N
Spouse’s/partner’s employment situation	2.16	1.27	678
Educational opportunities for your own children	1.97	1.18	682
Sense of social isolation	1.88	1.05	669
Sense of professional isolation	1.75	.94	679
Limited essential services	1.72	.96	655
Education authority placement	1.71	1.06	670
Reduced cost of travelling	1.67	.93	670
Opportunity for promotion	1.65	.95	687
Problems within the school	1.51	.90	668
Problems in the community	1.43	.83	666

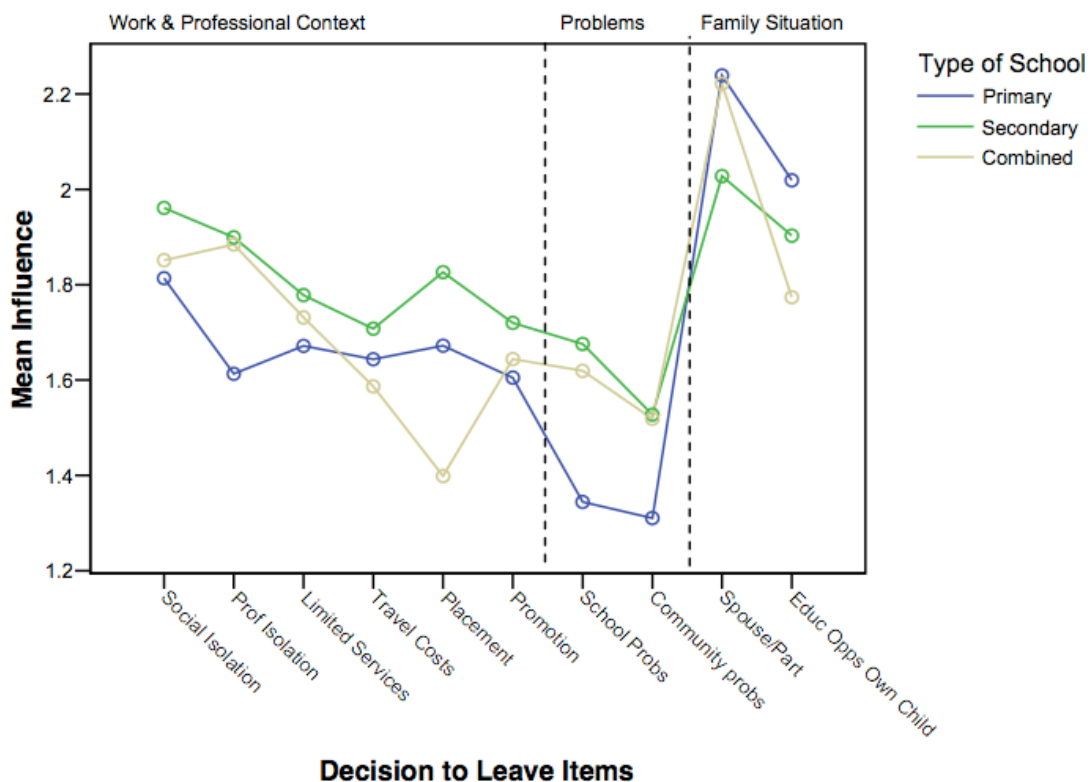


Figure 4.8. Profile plot of means for the ten decisions to move to a metropolitan school items, compared by Type of School (Table 4.3 for item names in full)

Motivations for moving from a metropolitan to a rural or regional school

Respondents who had only ever taught in metropolitan schools were asked to rate a range of items on their motivational value for taking up a position in a rural or regional school.

1. Table 4.4 shows that metropolitan teachers consider smaller class sizes and preference for future transfers to have the highest motivational value in terms of moving to a rural or regional school.
2. Financial incentives such as cheaper housing, rent and travel subsidies and allowances were also potentially influential.
3. Opportunities to work with a smaller staff, or with Indigenous students were the least influential items.
4. Figure 4.9 shows that the youngest group of teachers considered financial and advancement incentives to be substantially more influential than did their older colleagues.

Table 4.4. Overall average ratings, standard deviations and valid N for the motivation to take up a rural or regional teaching position items (items are listed in descending order of mean rating) [Ratings on a 1 (Not influential) to 5 (Extremely influential) scale]

How influential would the following be in motivating you to take up a position in a rural or regional school?	Mean	s.d.	Valid N
Smaller class sizes	2.10	1.00	603
Preference for future transfers	2.09	1.11	590
Affordable housing	2.05	1.02	598
Rent subsidy	2.05	1.03	597
Travel subsidy	2.01	1.03	593
Rural or remote area allowance	1.98	.98	596
More holidays	1.93	.98	595
Improved opportunities for promotion	1.89	.95	600
Smaller school staff	1.63	.83	595
Opportunity to work with Indigenous students	1.42	.71	596

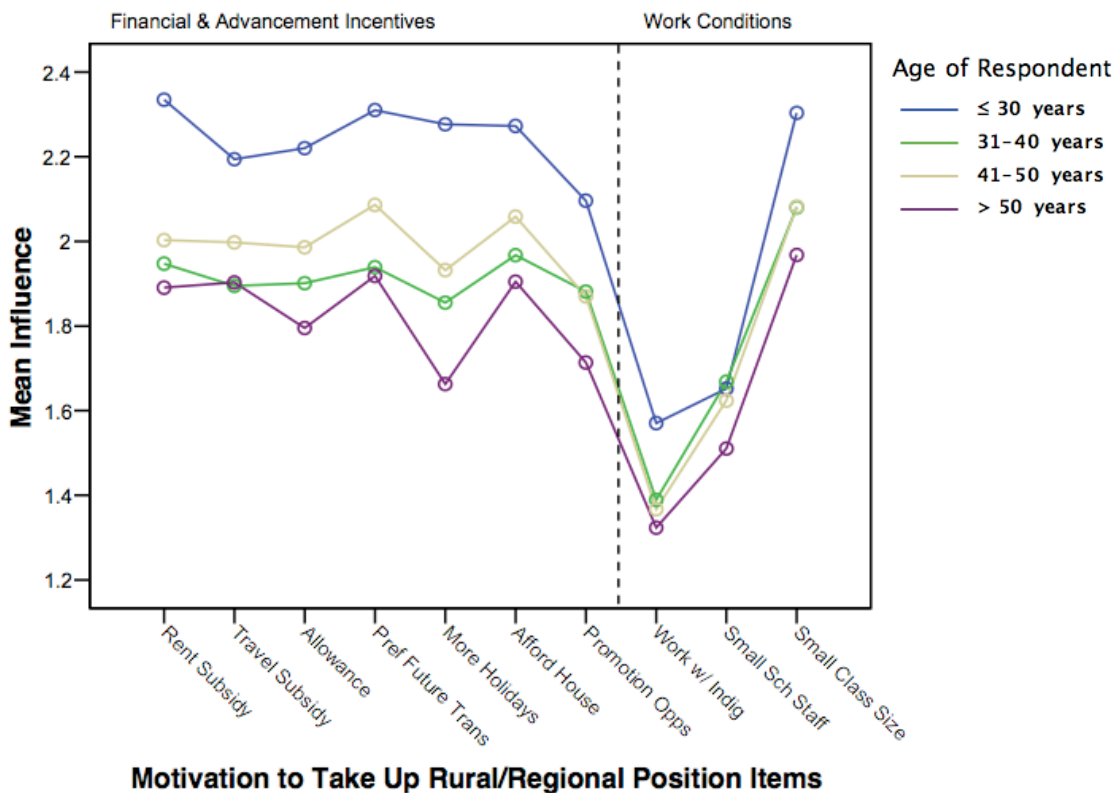


Figure 4.9. Profile plot of means for the ten motivation to take up a rural or regional position items, compared by Age of Respondent (Table 4.4 for item names in full)

Discussion

The finding that education authority bonds or placement were the reasons most teachers initially took up positions in rural and regional schools has a number of implications. First, since most teachers, particularly secondary teachers, were educated in metropolitan centres, it is questionable whether these teachers would have taken up rural teaching positions without such a strategy. Second, it is noteworthy that, once placed, many teachers remained because of satisfaction with the lifestyle and community, or through establishing family ties. However, without the initial placement, it is unlikely these factors alone would have attracted many city-bred teachers.

The analysis of destinations of teachers educated in different areas revealed a pattern of drift from smaller to larger centres. Furthermore, it provided evidence that young teachers are influenced principally by their familiarity with an area and whether they have contacts there. Because of these trends, and the aforementioned fact that most teachers are educated in metropolitan areas, it is difficult to see how rural and regional schools can be properly staffed in the future without either a system of obligatory placement or the development of more effective incentive schemes.

The findings indicate that younger teachers are more motivated than older colleagues by financial inducements such as rent subsidies, affordable housing and allowances. Opportunities for future promotion or preferential transfer were also deemed to be influential, even among experienced teachers. Nevertheless, the present high turnover rates and difficulties filling vacancies indicate that current incentive schemes are not effective, although this would probably vary across states/territories.

Finally, it is significant that a relatively high proportion of teachers who left rural schools did so in order to improve the educational opportunities for their own children. While it is understandable that a teacher would want to maximise these opportunities, such decisions may also suggest to the community that the standard of education in rural schools is inadequate. Thus, the decision has a compounding and self-perpetuating effect, particularly as it removes at least one more professional person from the community.

4.5 PERCEPTIONS OF TEACHER EDUCATION AND PREPARATION

Primary and secondary teachers were asked to reflect on how well their pre-service teacher education had prepared them for various aspects of their careers. The findings in this section refer to the suitability and effectiveness of respondents' pre-service education, not to their current skill levels.

Primary teacher preparation

1. The findings in Table 4.5 suggest that primary teachers in general feel they were well prepared by their teacher education for teaching mathematics, though considerably less so for teaching science. Figure 4.10 shows that this was the case for teachers of all ages.
2. Most primary teachers also seem to feel that they were reasonably well prepared for teaching in rural and regional schools, and for managing student behaviour. Figure 4.10 shows that, while there was little variation with age in the former, the youngest teachers tended to feel they were better prepared for dealing with student behaviour than were their older colleagues. This may be due to changes in the way teacher education institutions approach the issue of student management, or to younger teachers having less experience of a range of student behaviours.

Table 4.5. Overall average ratings, standard deviations and valid N for the primary teacher education preparation items (items are listed in descending order of mean rating) [Ratings on a 1 (Not at all prepared) to 5 (Extremely well prepared) scale]

How well do you think your teacher education prepared you for:	Mean	s.d.	Valid N
teaching mathematics?	3.09	.96	1546
teaching science?	2.60	.96	1545
teaching in rural and regional schools?	2.57	1.17	1543
managing student behaviour?	2.55	1.03	1548
teaching gifted and talented students?	1.98	.97	1549
teaching special needs students?	1.94	1.02	1550
using ICT across the curriculum?	1.77	1.03	1537
teaching Indigenous students?	1.72	.94	1550
teaching NESB students?	1.52	.84	1551

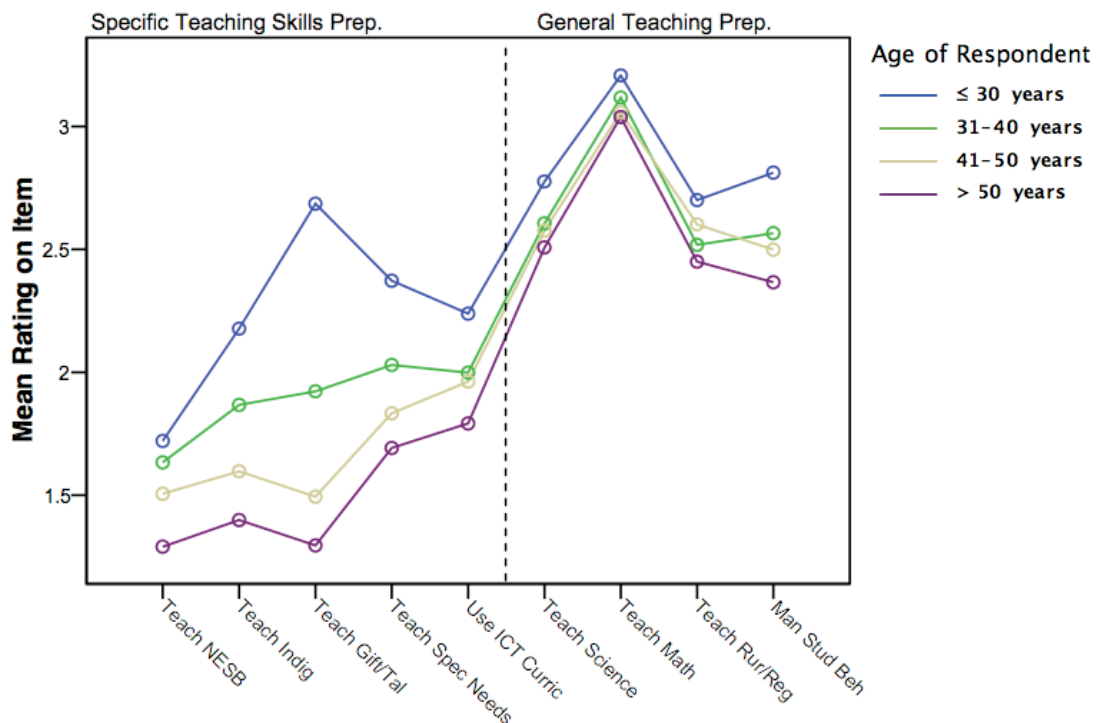


Figure 4.10. Profile plot of teacher preparation items, compared by Age of Respondent [ratings on 1 (Not Prepared) to 5 (Extremely Well Prepared) scale] (Table 4.5 for item names in full)

- The evidence suggests that primary teachers were considerably less well prepared for teaching Indigenous and NESB students, and for using ICT across the curriculum. It is reasonable to argue that the significant variation with age across a range of specific teaching skills is indicative of the changes in emphasis in teacher preparation over time, particularly with regard to using ICT, and catering for student diversity in the classroom. Acknowledgement by older teachers that their initial teacher education did not prepare them well for aspects of their current teaching environments underscores the importance of providing ongoing professional development.
- Figure 4.11 shows that primary teachers who lived in metropolitan centres during their teacher education felt less prepared in a number of areas, especially teaching in rural or regional schools and teaching Indigenous students. One reasonable interpretation is that

pre-service teachers in metropolitan centres were less likely to take their practical teaching experiences outside these centres.

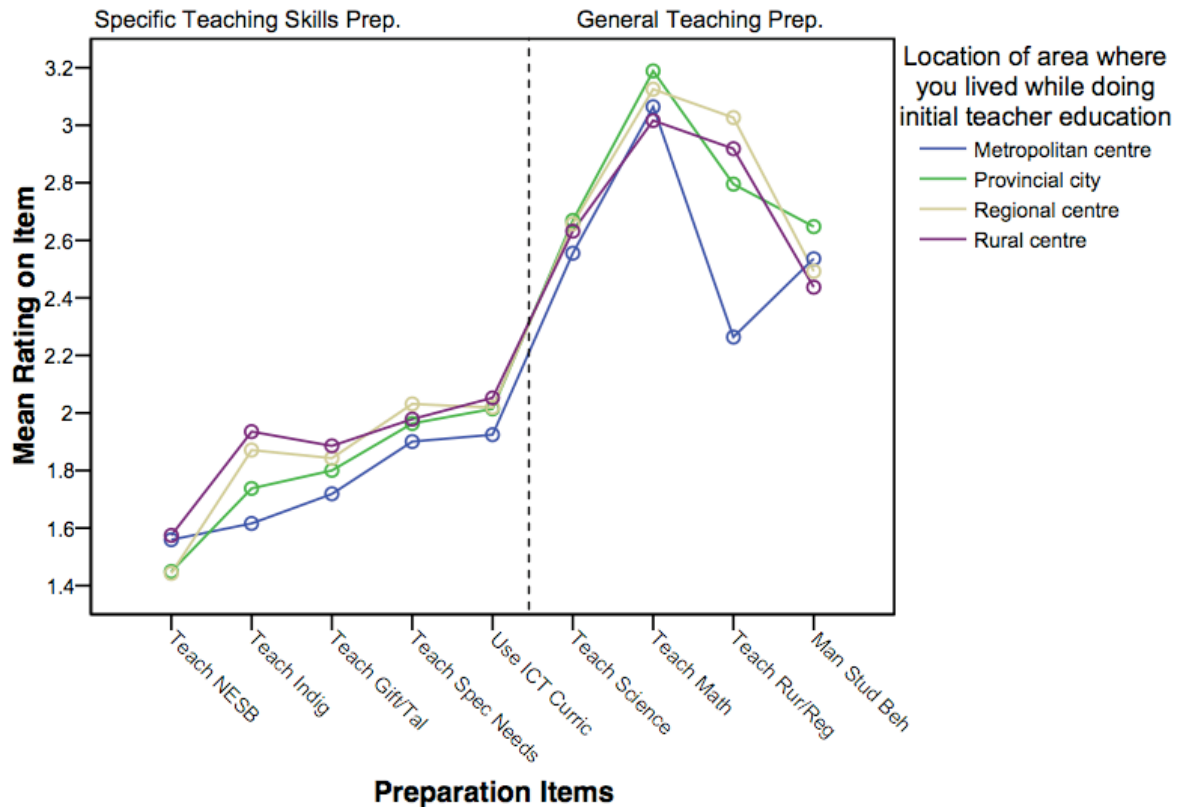


Figure 4.11. Profile plot of primary teacher preparation items, compared by Location During Initial Teacher Education (Table 4.5 for item names in full)

Secondary teacher preparation

1. The findings in Table 4.6 indicate that secondary science and mathematics teachers feel their teacher education prepared them relatively well for teaching their subjects. This was generally the case for teachers of all ages. However, Figure 4.12 shows that many ICT teachers felt their initial teacher education did not prepare them well for teaching their subjects. This is understandable given the relative novelty of ICT as a school subject and the dynamic nature of ICT in general.

Table 4.6. Overall average ratings, standard deviations and valid N for the teacher education preparation items for secondary respondents (items are listed in descending order of mean rating) [Ratings on a 1 (Not at all prepared) to 5 (Extremely well prepared) scale]

How well do you think your teacher education prepared you for:	Mean	s.d.	Valid N
teaching [science/mathematics/ICT]?	2.89	1.12	1348
teaching in rural and regional schools?	2.47	1.09	1331
managing student behaviour?	2.41	1.01	1342
teaching gifted and talented students?	2.10	1.00	1342
using ICT across the curriculum?	1.84	1.07	1332
teaching special needs students?	1.77	.95	1338
teaching Indigenous students?	1.59	.84	1339
teaching NESB students?	1.47	.83	1344

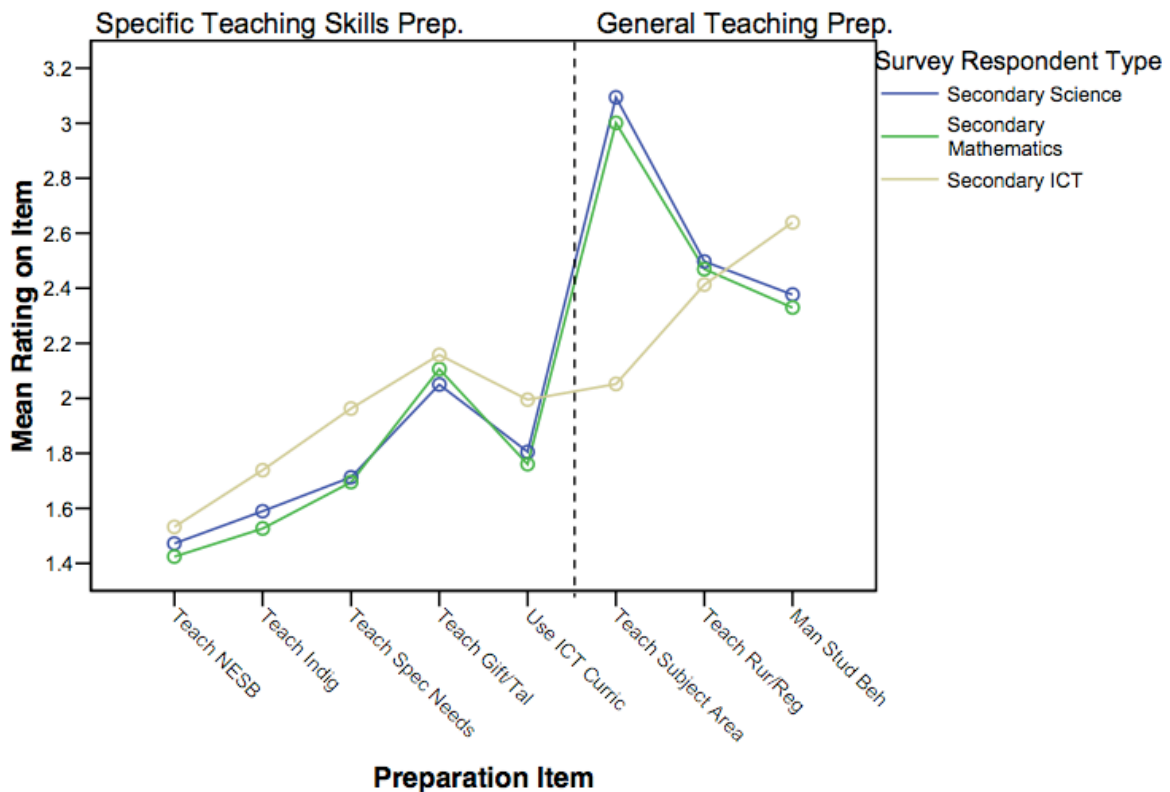


Figure 4.12. Profile plot of secondary teacher preparation items, compared by Survey Respondent Type (Science, ICT and Mathematics) [ratings on 1 (Not Prepared) to 5 (Extremely Well Prepared) scale] (Table 4.6 for item names in full)

2. Secondary teachers appear to have been reasonably well prepared for teaching in rural and regional schools, and for managing student behaviour. Figure 4.13 suggests that younger teachers felt better prepared by their pre-service education for incorporating ICT and catering for student diversity than did their older colleagues. As with primary teachers, this is probably indicative of changes in the educational landscape over time, and demonstrates the need for ongoing professional development.
3. Figure 4.14 indicates that secondary science, ICT and mathematics teachers who lived in provincial cities or regional centres during their initial teacher education felt better prepared in some respects by this experience than did those who were located in metropolitan or remote centres. This was particularly the case for preparation for teaching in rural and regional schools.

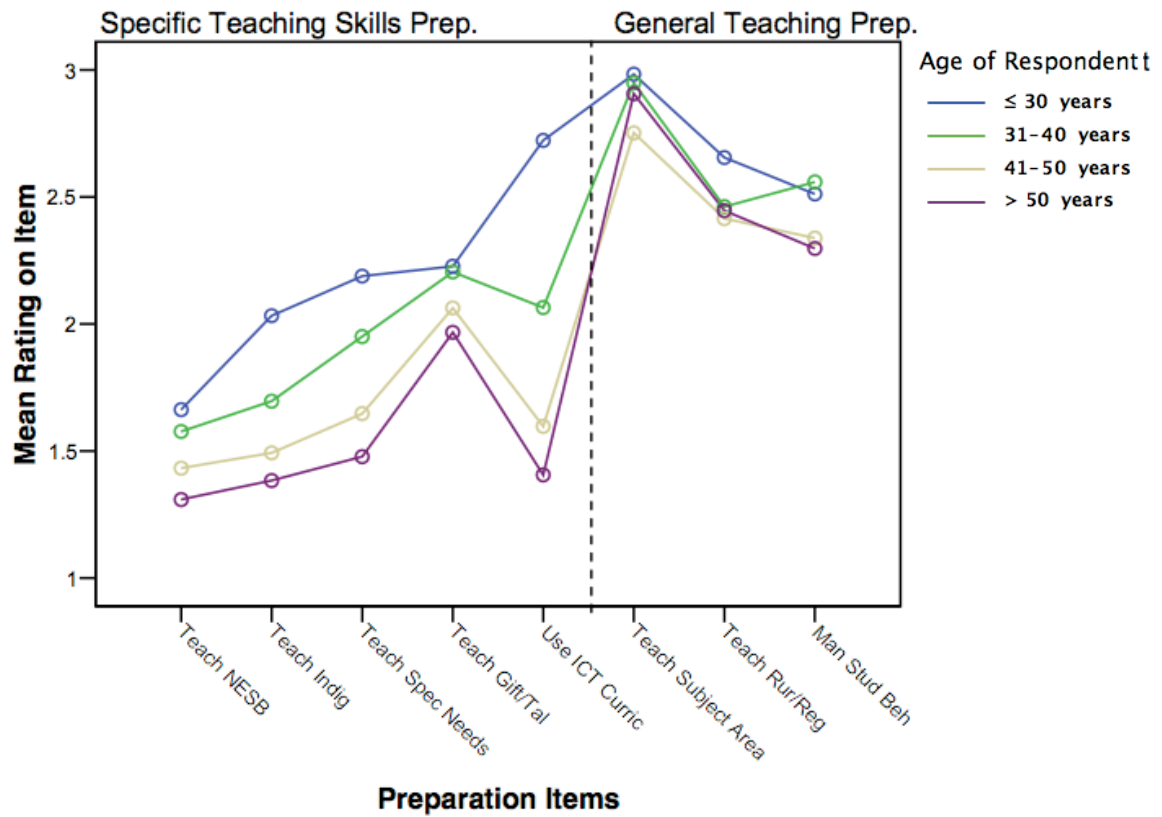


Figure 4.13. Profile plot of secondary teacher preparation items, compared by Age of Respondent [ratings on 1 (Not Prepared) to 5 (Extremely Well Prepared) scale] (Table 4.6 for item names in full)

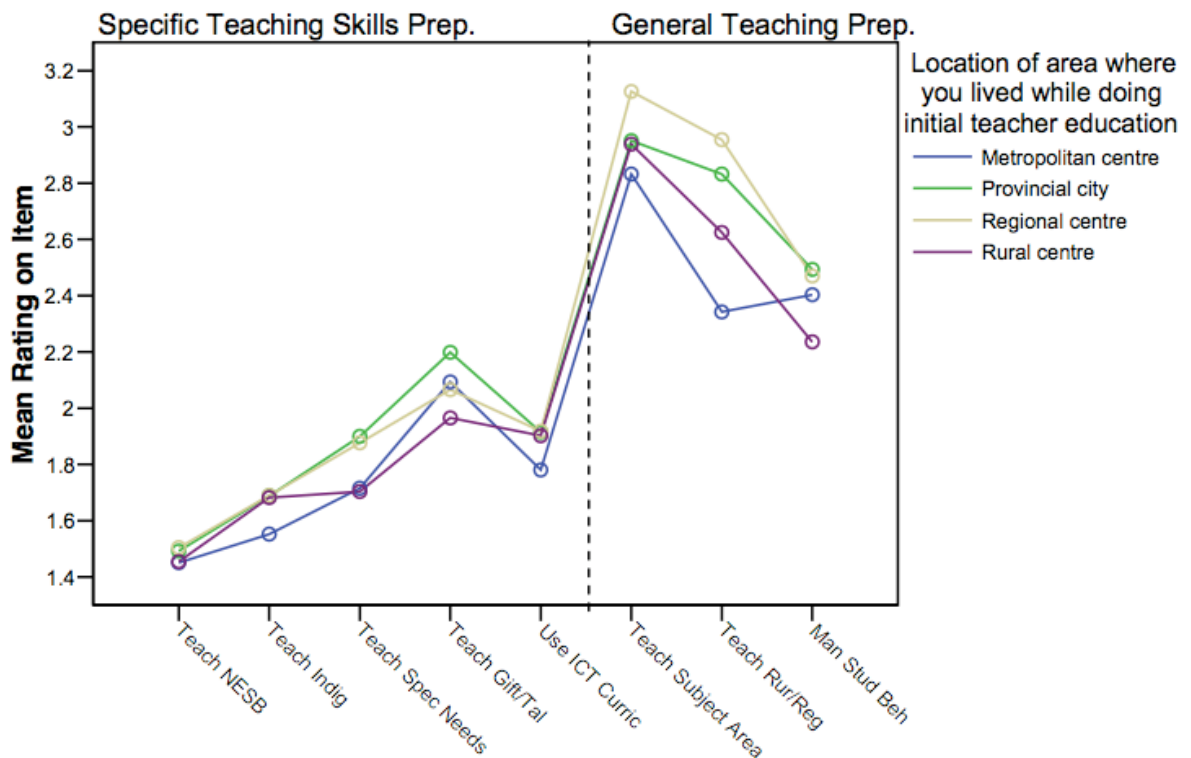


Figure 4.14. Profile plot of secondary teacher preparation items, compared by Location During Initial Teacher Education [ratings on 1 (Not Prepared) to 5 (Extremely Well Prepared) scale] (Table 4.6 for item names in full)

Discussion

The finding that primary teachers generally felt less well prepared by their pre-service education for teaching science than for teaching mathematics is consistent with the conclusions of Goodrum, Hackling & Rennie (2001) and Harris et al. (2005), who found that primary teachers are not as confident in teaching science as they are in other subjects. Secondary science and mathematics teachers felt they were relatively well prepared for teaching in their subject area. Nevertheless, the findings suggest that few ICT teachers feel their pre-service education prepared them adequately for teaching ICT subjects. In view of the relative novelty and dynamic nature of the subject matter, equipment and pedagogical models, this comes as no surprise. ICT teachers, more than any other group, are required to learn on the job, a situation that has implications for their professional development.

All teacher groups felt generally well prepared to teach in rural and regional schools, although those who had lived in rural or regional centres during their teacher education tended to feel considerably better prepared. While this is understandable since no city universities insist on their students having teaching experiences in a rural area (Boylan, 2003; Halsey, 2005), the finding may be a cause for some concern because of the high proportion of teaching students enrolled in metropolitan universities. In Western Australia, Tasmania and South Australia, for example, all universities are located in metropolitan areas.

4.6 TEACHER QUALIFICATIONS

Primary and secondary teachers were asked to describe their levels of qualification and experience (see Table 4.7). They were also asked whether they had been required to teach courses for which they are not formally qualified (see Figure 4.15).

1. Overall, more than 85% of respondents held either a Bachelor's degree (plus an undergraduate or postgraduate diploma) or some type of postgraduate teaching qualification.

Table 4.7. Level of teaching qualifications of primary teachers and secondary science, ICT and mathematics teachers

	Primary teachers	Science teachers	ICT teachers	Mathematics teachers
<B.Ed	21%	4%	13%	6%
B.Ed	45%	13%	30%	22%
Bach + UG or PG Dip.	19%	58%	32%	52%
PG degree + other	15%	24%	26%	21%
	100%	100%	100%	100%

2. The qualifications of primary and secondary science, ICT and mathematics respondents did not vary significantly with age, sex or geographic location.
3. There was strong evidence that many science, ICT and mathematics teachers are being required to teach subjects for which they are not qualified, and that this requirement is considerably more common in Provincial and Remote Area schools. Figure 4.15 suggests

that teachers in Provincial Areas are about twice as likely, and those in Remote Areas more than three times as likely as those in Metropolitan Areas to be required to teach a subject for which they are not qualified.

- The findings also suggest that ICT teachers are more likely to be required to take classes in another subject area than are science teachers. Mathematics teachers are least likely to be asked to take such classes.

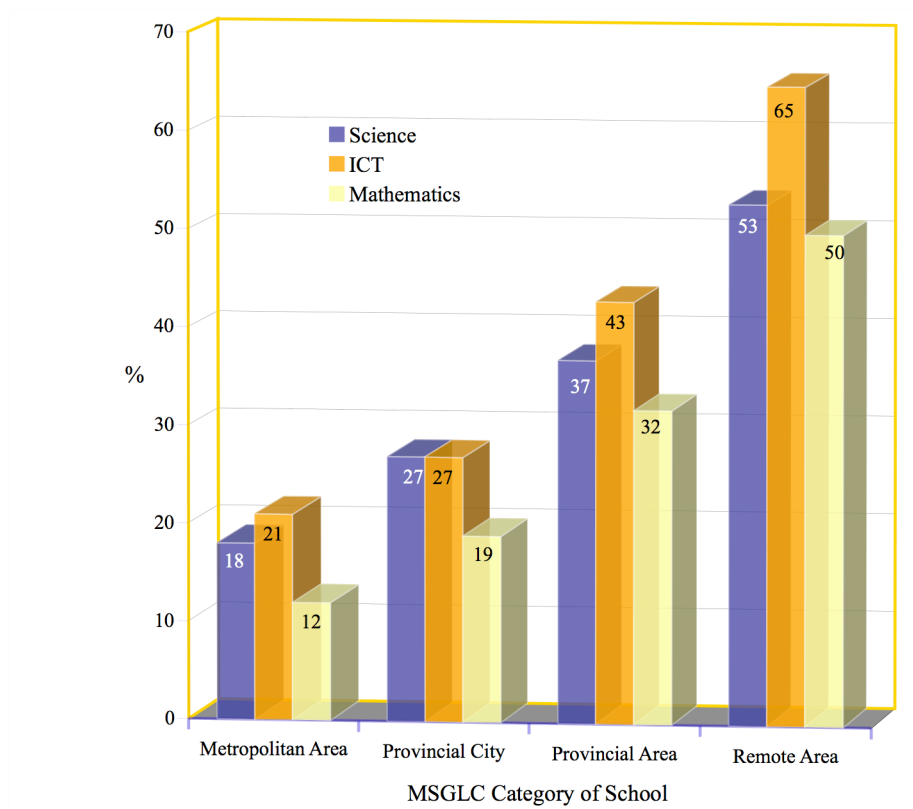


Figure 4.15. Percentages of science, ICT and mathematics respondents indicating they are required to teach subjects for which they are not formally qualified

Discussion

The study found that the qualifications of teachers do not vary significantly with age, sex or geographic location. While this might be taken as indicating that students in different areas have equal access to qualified teachers, the study also found that secondary teachers in Provincial and Remote Areas are, respectively, two to three times more likely to be required to teach outside their subject areas than are those in Metropolitan Area schools. The implication is that students in metropolitan schools are more certain of having a specialist teacher for each of their subjects than are students in Provincial and Remote Area schools. This has obvious implications for the understanding and achievement levels of senior students in different locations.