CHAPTER EIGHT

PARENTS/CAREGIVERS' PERSPECTIVES ON THEIR CHILDREN'S SCIENCE, ICT AND MATHEMATICS EDUCATION

8.1 INTRODUCTION

This chapter reports the perceptions of respondent parents/caregivers about a range of issues relating to their children's science, ICT and mathematics education. Parents/caregivers were invited to complete the survey with reference to the school attended by their eldest school-age child, and to give their perceptions of the educational experiences of that child. Additional questionnaires could be completed if parents/caregivers also wished to refer to schools attended by younger school-age children.

Interpretations of the results presented in this chapter should recognise that while parents/caregivers have a unique and valuable perspective on their children's schooling, they are often a step removed from specific school processes and dynamics. To maximise the reliability of responses, a 'don't know' option was provided for many items on the survey. One implication of this was that the number of useable responses on some items was less than the total number of respondents. Overall, useable responses were received from 928 parents/caregivers.

Parents/caregivers were also given ample opportunity to provide comments and explanations. These were categorised and analysed for common themes, and variation with respondent and school characteristics. Illustrative comments are used throughout the chapter.

8.2 CHARACTERISTICS OF PARENT/CAREGIVER RESPONDENTS

Table 8.1 provides a breakdown of the respondent sample by State/Territory, School System and MSGLC Category of School. About 70% of respondents were located in just three states: NSW, Queensland and Victoria, while about 72% responded with reference to a government school.

Overall, just over 74% of the parents/caregivers were female. Table 8.2 details the schooling circumstances of children referred to by respondents. Over 53% of respondents had two or more children attending the reference school. Nearly 60% of the respondents indicated that their eldest child attending the school was primary-aged. Almost all (nearly 98%) of respondents indicated that their child was a day student.

Table 8.1 Distribution of parent/caregiver respondents by State/Territory, School System and MSGLC categories of School

State		School System			MSGLC Category of School				Overall
		Government	Catholic Systemic	Independent	Metropolitan city	Provincial City	Provincial Area	Remote Area	
NSW	Count	218	45	31	53	66	166	9	294
	% of Row	74.1%	15.3%	10.5%	18.0%	22.4%	56.5%	3.1%	100.0%
	% of Column	32.7%	34.9%	23.5%	33.3%	35.5%	34.1%	9.4%	31.7%
QLD	Count	152	27	24	23	39	105	36	203
	% of Row	74.9%	13.3%	11.8%	11.3%	19.2%	51.7%	17.7%	100.0%
	% of Column	22.8%	20.9%	18.2%	14.5%	21.0%	21.6%	37.5%	21.9%
VIC	Count	103	17	33	19	33	100	1	153
	% of Row	67.3%	11.1%	21.6%	12.4%	21.6%	65.4%	.7%	100.0%
	% of Column	15.4%	13.2%	25.0%	11.9%	17.7%	20.5%	1.0%	16.5%
SA	Count	87	11	28	30	0	87	9	126
	% of Row	69.0%	8.7%	22.2%	23.8%		69.0%	7.1%	100.0%
	% of Column	13.0%	8.5%	21.2%	18.9%		17.9%	9.4%	13.6%
WA	Count	72	22	11	31	17	26	31	105
	% of Row	68.6%	21.0%	10.5%	29.5%	16.2%	24.8%	29.5%	100.0%
	% of Column	10.8%	17.1%	8.3%	19.5%	9.1%	5.3%	32.3%	11.3%
TAS	Count	10	3	4	0	14	3	0	17
	% of Row	58.8%	17.6%	23.5%		82.4%	17.6%		100.0%
	% of Column	1.5%	2.3%	3.0%		7.5%	.6%		1.8%
NT	Count	24	2	1	0	17	0	10	27
	% of Row	88.9%	7.4%	3.7%		63.0%		37.0%	100.0%
	% of Column	3.6%	1.6%	.8%		9.1%		10.4%	2.9%
ACT	Count	1	2	0	3	0	0	0	3
	% of Row	33.3%	66.7%		100.0%				100.0%
	% of Column	.1%	1.6%		1.9%				.3%
	Count	667	129	132	159	186	487	96	928
	% of Row	71.9%	13.9%	14.2%	17.1%	20.0%	52.5%	10.3%	100.0%
	% of Column	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 8.2 School-related characteristics of families

	Characteristic	Count	%
Number of children attending this school	1 child	**428**	46.5%
	2 children	**362**	39.3%
	3 or more children	**130**	14.1%
In what year level is the eldest child at this school?	Kindergarten/Lower primary	**175**	19.1%
	Upper primary	**369**	40.2%
	Junior secondary	**167**	18.2%
	Senior secondary	**206**	22.5%
Is your child a day/ boarder/distance education student?	Day student	**897**	97.7%
	Boarding student	**9**	1.0%
	Distance education student only	**12**	1.3%

8.3 TRAVEL TIME TO SCHOOL

About 82% of parents/caregivers reported that their children had to travel less than half an hour to school. Table 8.3 shows that there was no significant association between MSGLC Category of School and how long a child had to travel to get there. While the figures showed that a greater proportion of children in Remote Areas travelled for longer than one-half hour, this was a very weak trend.

Table 8.3 Parents/caregivers estimates of time taken for children to travel to school [a]

			Metropolitan Area	Provincial City	Provincial Area	Remote Area	*Overall*
If child is a day student, how long to travel to school?	**< Half an hour**	**Count**	**135**	**150**	**385**	**66**	**736**
		% of Row	18.3%	20.4%	52.3%	9.0%	100.0%
		% of Column	87.1%	84.3%	81.1%	71.7%	81.8%
	One-half to one hour	**Count**	**17**	**23**	**78**	**23**	**141**
		% of Row	12.1%	16.3%	55.3%	16.3%	100.0%
		% of Column	11.0%	12.9%	16.4%	25.0%	15.7%
	> One hour	**Count**	**3**	**5**	**12**	**3**	**23**
		% of Row	13.0%	21.7%	52.2%	13.0%	100.0%
		% of Column	1.9%	2.8%	2.5%	3.3%	2.6%

[a] Shaded cells indicate categories making a significant ($p < .001$) contribution to the overall association between a pair of variables. Pink means *more than an expected number were observed*; green means *fewer than an expected number were observed*. 'Expected' refers to what would be expected if the pair of variables were not associated.

8.4 PARENTS/CAREGIVERS' ASPIRATIONS FOR THEIR CHILDREN

Parents/caregivers were asked to rate how important they considered it that their children complete four educational 'landmarks': the final year of compulsory schooling (Year 10 in most states/territories), the final year of schooling (Year 12), a technical course at an Institute of Technical and Further Education (TAFE), and a university degree. Two MANCOVAs were conducted, one each for MSGLC Category of School and School System. Table 8.4 shows that, overall, there were no significant associations between the educational aspirations of parents/caregivers and these variables when controlling for Total FTE (proxy for school size), MWHI (median weekly household income) and SES Index (socio-economic status of the area where the school was located).

It was recognised, however, that the control variables of SES Index and MWHI had a considerably larger modifying effect on results from analysis of parent/caregiver aspirations than was the case for other MANCOVAs. For example, in uncontrolled analyses, it was found that parent/caregiver aspirations for their children to complete a university degree were significantly associated with MSGLC category. Indeed, in this treatment, parents in Metropolitan Areas were about twice as likely as those in Remote Areas to consider it extremely important that their children complete a degree. This is an intriguing finding and one worthy of further investigation. Nevertheless, it is outside the established boundaries of this study's MANCOVA analyses.

Table 8.4 Breakdown of the parent/caregiver aspiration items, by MSGLC categories and School System [ratings on 1 (Not at all Important) to 5 (Extremely Important) scale][a]

			Parent/Caregiver's aspiration for child to:				
			Complete Year 10	Complete Year 12	Complete a TAFE Course	Complete a University Degree	Valid N
MSGLC categories	Metropolitan Area	Mean	**4.88**	**4.55**	**3.46**	**3.73**	
		s.e.(Mean)	.05	.08	.12	.12	126
	Provincial City	Mean	**4.80**	**4.47**	**3.08**	**3.37**	
		s.e.(Mean)	.05	.07	.10	.11	153
	Provincial Area	Mean	**4.85**	**4.44**	**3.12**	**3.36**	
		s.e.(Mean)	.03	.04	.06	.06	407
	Remote Area	Mean	**4.71**	**4.47**	**2.98**	**3.27**	
		s.e.(Mean)	.06	.10	.15	.15	75
School System	Government	Mean	**4.83**	**4.47**	**3.19**	**3.35**	
		s.e.(Mean)	.02	.04	.05	.05	549
	Catholic Systemic	Mean	**4.91**	**4.52**	**3.18**	**3.62**	
		s.e.(Mean)	.05	.08	.12	.12	110
	Independent	Mean	**4.80**	**4.38**	**2.94**	**3.52**	
		s.e.(Mean)	.05	.08	.12	.12	102

[a]Shading denotes significant or suggestive mean differences between the groups being compared. Gold shading indicates significant differences ($p < .001$); light blue shading indicates suggestive differences ($p < .01$).

8.5 PERCEPTIONS OF CAPACITIES OF SCHOOLS TO ATTRACT AND RETAIN TEACHERS OF SCIENCE, ICT AND MATHEMATICS

Parents/caregivers were asked for their perceptions of the capacity of their child's school to attract and retain suitably qualified primary teachers, or secondary science, ICT and mathematics teachers. Their ratings of the attraction and retention items were analysed using univariate ANCOVAs, since there was just the single dependent variable of interest. Two ANCOVAs were conducted – one for MSGLC category of school and one for Type of School.

8.5.1 Perceptions of capacity to attract and retain qualified primary teachers.

Table 8.5 summarises the estimated means and their associated standard errors for the two ANCOVAs relating to primary teachers. The ANCOVA for Type of School was not significant. The univariate test for MSGLC category differences on the attracting and keeping primary teachers item was suggestive[57]. Table 8.5 shows that respondents' levels of agreement were highest for Metropolitan Area schools, followed by Provincial City and then Provincial Area schools. Respondents whose children attended schools in Remote Areas were least inclined to agree. Note, however, that all means were at least positive in the sense of falling at, or above, the 'agree' anchor point on the rating scale. Figure 8.1 illustrates the pattern of decline with geographical location of school.

[57] $F(3, 572) = 4.26$, $p = .005$, partial $\eta^2 = .02$

Table 8.5 Breakdown of the item focusing on perceptions of school capacity to attract and keep qualified primary teachers, by MSGLC categories and Type of School [ratings on a scale of 1 (Strongly Disagree) to 4 (Strongly Agree)] [a]

			The school is able to attract and keep suitably qualified primary teachers	Valid N
MSGLC category	Metropolitan Area	Mean	3.43	
		s.e.(Mean)	.08	93
	Provincial City	Mean	3.34	
		s.e.(Mean)	.08	90
	Provincial Area	Mean	3.21	
		s.e.(Mean)	.04	330
	Remote Area	Mean	3.01	
		s.e.(Mean)	.09	66
Type of School	Primary	Mean	3.27	
		s.e.(Mean)	.03	469
	Secondary	Mean	NA	
		s.e.(Mean)	--	--
	Combined	Mean	3.14	
		s.e.(Mean)	.07	110

[a]Shading denotes significant or suggestive mean differences between the groups being compared. Gold shading indicates significant differences ($p < .001$); light blue shading indicates suggestive differences ($p < .01$).

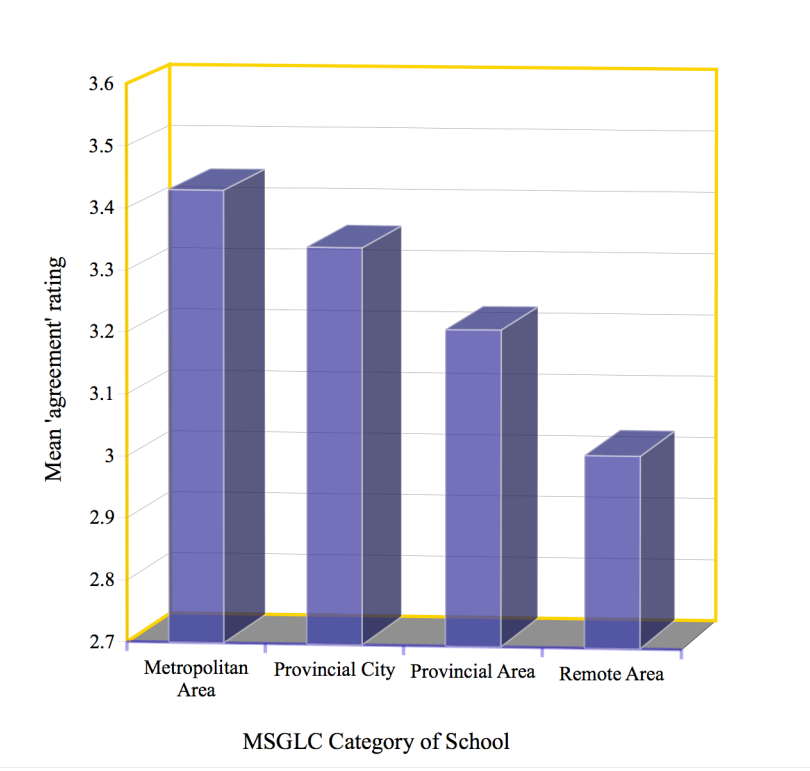

Figure 8.1 Mean 'agreement' by respondents that their child's school is able to attract and keep qualified primary teachers, compared by MSGLC categories [ratings on a scale of 1 (Strongly Disagree) to 4 (Strongly Agree)]

8.5.2 Perceptions of capacity to attract and retain qualified science, ICT and mathematics teachers

Parent/caregivers responding with reference to secondary schools were asked to rate the capacity of those schools to attract and retain qualified teachers of science, ICT and mathematics. Responses to these questions were analysed using two MANCOVAs for MSGLC Category of School and Type of School. While Table 8.6 displays a similar pattern to Table 8.5 in perceptions across MSGLC categories, the MANCOVAs did not yield significant or suggestive associations, possibly due to the lower number of parents completing the survey with reference to secondary schools.

Table 8.6 Breakdown of items focusing on schools' capacity to attract and keep suitably qualified secondary teachers, by MSGLC categories and Type of School [ratings on a scale of 1 (Strongly Disagree) to 4 (Strongly Agree)] [a]

			This school is able to attract & keep suitably qualified …			
			Science teachers	Math teachers	ICT teachers	Valid N
MSGLC category	Metropolitan Area	Mean	3.36	3.39	3.32	
		s.e.(Mean)	.11	.11	.11	52
	Provincial City	Mean	3.17	3.15	2.97	
		s.e.(Mean)	.08	.08	.09	85
	Provincial Area	Mean	2.91	2.90	2.82	
		s.e.(Mean)	.06	.06	.07	153
	Remote Area	Mean	2.85	2.78	2.77	
		s.e.(Mean)	.16	.16	.17	22
Type of School	Primary	Mean	--	--	--	
		s.e.(Mean)	--	--	--	--
	Secondary	Mean	3.04	3.04	2.96	
		s.e.(Mean)	.05	.05	.06	189
	Combined	Mean	3.07	3.03	2.92	
		s.e.(Mean)	.07	.07	.07	123

[a]Shading denotes significant or suggestive mean differences between the groups being compared. Gold shading indicates significant differences ($p < .001$); light blue shading indicates suggestive differences ($p < .01$).

Parent/caregivers' comments identified two main concerns about the qualities of rural teachers in science, ICT and mathematics. The first was the apparent lack of specialist primary and secondary teachers in these subject areas. For example:

> Our biggest obstacle for ICT would be (that) we have no specific teacher specialising in this area. (Parent/caregiver, Provincial Area, NSW)

> There is a lack of staff specifically trained in science. Additional professional development resources (are needed) to enable teaching staff to gain additional ICT training. (Parent/caregiver, Provincial Area, Vic.)

> (Our region) is very limited in being able to access specialty teachers in country schools, at both primary and secondary levels. (The) Internet has been good, to a point, but I wonder whether this will become a greater part of the classroom experience, to the loss of teacher/child interaction. (Parent/caregiver, Remote Area, WA)

Second, respondents from Remote Areas were more inclined than those in other locations to be critical of the inexperience of some teachers in their children's schools. The following quote covers the main elements and implications of these comments:

> In our small community it is not uncommon to get teachers who seem to have no idea what they are teaching. This requires the parents to do countless hours of home schooling to help the child grasp the concepts needed to keep up and it is very demanding on the child's self esteem. In the end they are willing to give up because they have not been taught even the basic concepts. It causes many an argument at home. (Parent/caregiver, Remote Area, SA)

Apart from the issue of inexperience, respondents in Remote Areas were appreciative and supportive of teachers in their local schools.

8.5.3 Summary of findings and implications

1. The findings indicate that parents/caregivers' confidence in the capacity of their children's primary schools to attract and retain qualified teachers decreases with the size and remoteness of school location. The findings also show that parents/caregivers in rural and Remote Areas are aware of staffing difficulties in those locations. Overall, parent/caregiver perceptions are generally in agreement with those of teachers, who considered vacant positions in metropolitan schools easiest to fill.
2. Analysis of the responses of parents/caregivers reporting about secondary schools did not reveal the same significant geographical pattern in staffing difficulties reported by science and mathematics teacher respondents in Chapter Four. However, it may be that many parents/caregivers are unfamiliar with the subject-specific qualifications of secondary teachers, generally assuming that those teaching mathematics or science to their children are qualified to teach those subjects.
3. While parents/caregivers in Remote Areas are generally appreciative of their children's teachers, there appears to be concern about the inexperience and capabilities of the teachers commonly recruited to these schools, and the long-term effects on the education of children.

8.6 PERCEPTIONS OF ACHIEVEMENT AND TEACHER ATTITUDES IN SCIENCE, ICT AND MATHEMATICS EDUCATION

Parents/caregivers were asked to rate, on a four-point scale,[58] their agreement with four statements about the quality of education experienced by their child in each of the three subject areas. The first two statements concerned perceptions about achievement levels while the second pair related to perceptions of teachers' attitudes. The four statements were:

1. Teachers in this school encourage students to achieve to their potential in (science/ ICT/ mathematics);
2. Students achieve to a high standard in (science/ ICT/ mathematics);
3. My child's teachers care if my child is not doing as well as he/she can in (science/ ICT/ mathematics);
4. My child's teachers are enthusiastic in their approaches to teaching (science/ ICT/ mathematics).

[58] 1. Strongly disagree, 2. Disagree, 3. Agree, 4. Strongly agree

Overall, respondents were satisfied with the quality of science, ICT and mathematics teaching experienced by their children. This satisfaction was evidenced by the relatively high mean scores on the four items (Tables 8.7, 8.8 and 8.9), which seldom dropped below the 'agree' anchor point on the scale, and by respondents' comments about the greatest strengths of their children's schools. Over half the respondents referred to the commitment, effort and enthusiasm of teachers. For example:

> The teachers are the greatest strengths of this school, as the teachers my children have had have always been eager to help them in these subjects in every way they possibly can. (Parent/caregiver, Metropolitan Area, WA)
>
> (The greatest strengths are) enthusiastic teachers and a principal who is always striving to improve learning outcomes. Staff understand we live in a changing world and that the learning needs of today's students are different to those of students in the past. (Parent/caregiver, Provincial Area, SA)
>
> The teachers are very dedicated, they have a great rapport with the students and go out of their way to assist and motivate. (Parent/caregiver, Metropolitan Area, NSW)

For each subject area, responses to the four items were analysed as a set using MANCOVAs again controlling for Total FTE (proxy for school size), MWHI (median weekly household income) and SES Index (socio-economic status of the area where the school was located). Separate MANCOVAs were conducted for MSGLC category and Type of School.

8.6.1 Perceptions of student achievement and teacher attitudes in science

Perceptions of achievement levels in science

Table 8.7 summarises the estimated means and their associated standard errors for the two MANCOVAs. The MANCOVA for Type of School was not significant. The multivariate test for MSGLC category differences across the four perceptions of science teaching items was significant[59]. This significant multivariate difference was due to suggestive geographical differences on the two items concerned with perceptions about achievement.

Figure 8.2 shows that respondents with children in Metropolitan Area schools were the most inclined to agree that teachers in those schools encouraged students to achieve to their potential in science. Respondents with children attending Provincial City schools tended to agree more than did those with children in Provincial and Remote Area schools. With respect to respondents' perceptions that students achieved to a high standard in science, Figure 8.2 shows that agreement was highest among those with children in Metropolitan Area schools, and declined steadily with size and remoteness of location. For respondents with children attending Remote Area schools, the mean on this item dipped below the 'agree' point on the scale.

[59] Wilks' lambda = .956, $F(12, 1918.461) = 2.71$, p = .001, partial $\eta^2 = .02$

Table 8.7 Breakdown of parent/caregiver perceptions of achievement levels and teacher attitudes in science, by MSGLC categories and Type of School [ratings on a scale of 1 (Strongly Disagree) to 4 (Strongly Agree)][a]

			Rating of achievement levels		Rating of teacher attitudes		
			Teachers in this school encourage students to achieve to their potential in science	Students achieve to a high standard in science	My child's teachers care if my child is not doing as well as he/she can in science	My child's teachers are enthusiastic in their approaches to teaching science	Valid N
MSGLC categories	Metropolitan Area	Mean	3.47	3.21	3.38	3.35	
		s.e.(Mean)	.06	.07	.07	.07	124
	Provincial City	Mean	3.38	3.11	3.46	3.44	
		s.e.(Mean)	.06	.06	.06	.06	149
	Provincial Area	Mean	3.19	2.98	3.21	3.22	
		s.e.(Mean)	.04	.04	.04	.04	390
	Remote Area	Mean	3.23	2.87	3.28	3.27	
		s.e.(Mean)	.08	.08	.09	.09	72
Type of School	Primary	Mean	3.27	3.04	3.28	3.27	
		s.e.(Mean)	.04	.04	.04	.04	384
	Secondary	Mean	3.27	2.97	3.32	3.4526	
		s.e.(Mean)	.05	.05	.06	.06	212
	Combined	Mean	3.34	3.09	3.31	3.4737	
		s.e.(Mean)	.06	.06	.06	.06	139

[a]Shading denotes significant or suggestive mean differences between the groups being compared. Gold shading indicates significant differences ($p < .001$); light blue shading indicates suggestive differences ($p < .01$).

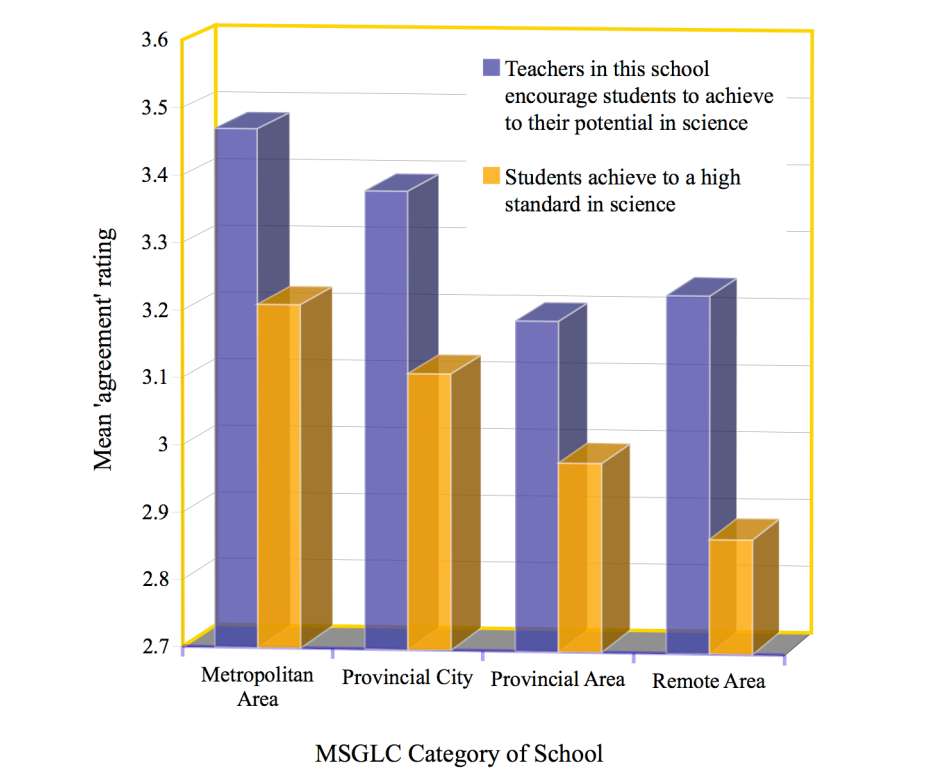

Figure 8.2 Mean 'agreement' of parent/caregiver respondents with statements about science achievement in their children's schools, compared by MSGLC categories [ratings on a scale of 1 (Strongly Disagree) to 4 (Strongly Agree)]

Perceptions of teacher attitudes

Table 8.7 shows that parents/caregiver perceptions of the care and enthusiasm of their children's teachers with regard to teaching science did not vary significantly with MSGLC category. Nor was there a similar geographical pattern of responses to that found in perceptions of achievement levels. Nevertheless, the lower level of agreement on both items by respondents with children in Provincial Area schools suggests a need for further investigation.

8.6.2 Perceptions of student achievement and teacher attitudes in ICT (secondary only)

Perceptions of achievement levels in ICT

Parents/caregivers with children in secondary schools were asked to indicate their levels of agreement with the four statements concerning ICT education. Table 8.8 summarises the estimated means and their associated standard errors for the two MANCOVAs. The MANCOVA for Type of School was not significant. The multivariate test for MSGLC category differences across the four perceptions of secondary ICT teaching items was significant.[60] This significant multivariate difference emerged due primarily to a significant difference on the item dealing with teachers encouraging students to achieve to their potential in secondary ICT, and a suggestive difference on the item dealing with students achieving to a high standard in secondary ICT.

Table 8.8 Breakdown of parent/caregiver perceptions of achievement levels and teacher attitudes in ICT (secondary only), by MSGLC categories and Type of School [ratings on a scale of 1 (Strongly Disagree) to 4 (Strongly Agree)] [a]

			Rating of achievement levels		Rating of teacher attitudes		
			Teachers in this school encourage students to achieve to their potential in ICT	Students achieve to a high standard in ICT	My child's teachers care if my child is not doing as well as he/she can in ICT	My child's teachers are enthusiastic in their approaches to teaching ICT	Valid N
MSGLC categories	Metropolitan Area	Mean	3.59	3.29	3.26	3.35	
		s.e.(Mean)	.11	.11	.11	.11	49
	Provincial City	Mean	3.29	3.08	3.30	3.33	
		s.e.(Mean)	.09	.08	.09	.08	76
	Provincial Area	Mean	3.08	2.83	3.10	3.03	
		s.e.(Mean)	.06	.06	.06	.06	145
	Remote Area	Mean	2.95	2.76	3.09	3.27	
		s.e.(Mean)	.17	.17	.17	.17	18
Type of School	Primary	Mean	--	--	--	--	
		s.e.(Mean)	--	--	--	--	--
	Secondary	Mean	3.17	2.94	3.16	3.15	
		s.e.(Mean)	.05	.05	.05	.05	178
	Combined	Mean	3.28	3.03	3.20	3.22	
		s.e.(Mean)	.07	.07	.07	.07	110

[a]Shading denotes significant or suggestive mean differences between the groups being compared. Gold shading indicates significant differences ($p < .001$); light blue shading indicates suggestive differences ($p < .01$).

Figure 8.3 shows that respondents with children in Metropolitan Area schools were the most inclined to agree that teachers in those schools encouraged students to achieve to their potential in ICT. Respondents with children attending Provincial City schools tended to agree more than

[60] Wilks' lambda = .887, $F(12, 735.81) = 2.83$, $p = .001$, partial $\eta^2 = .04$

did those with children in Provincial Areas, while those with children attending Remote Area schools were least inclined to agree. This last group indicated a mean perception less than the 'agree' point on the scale.

With respect to respondents' perceptions that students achieved to a high standard in secondary ICT, Figure 8.3 shows that agreement was highest among those with children in Metropolitan Area schools, and declined steadily with size and remoteness of location. For respondents with children attending Provincial and Remote Area schools, the mean on this item dipped below the 'agree' point on the scale.

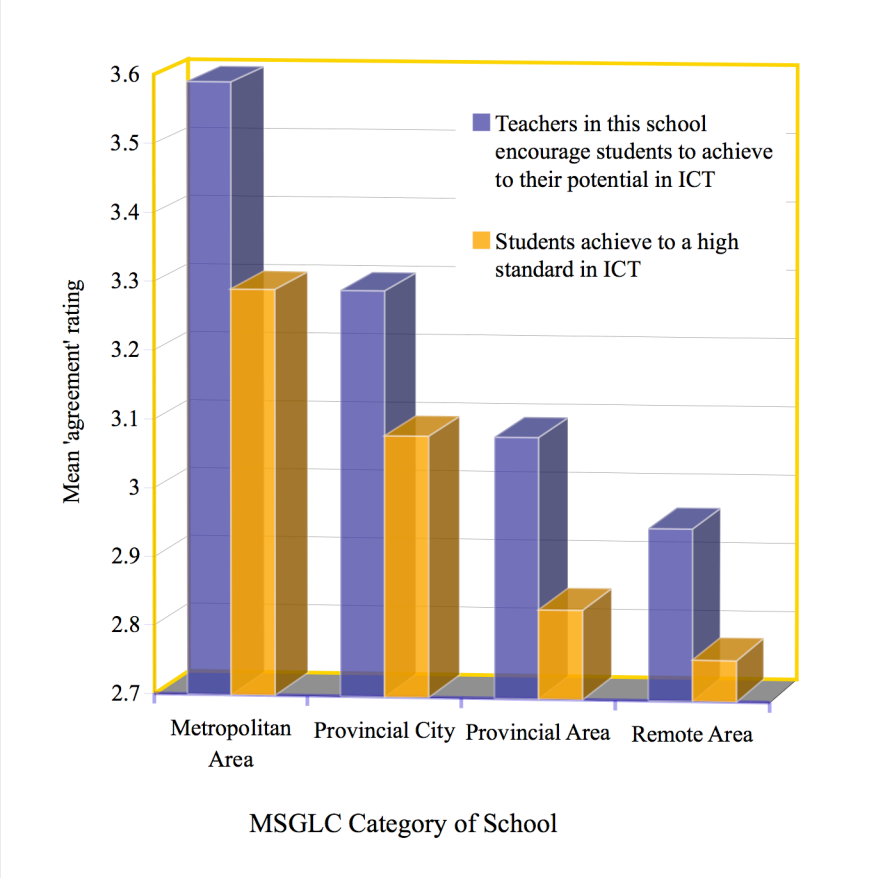

Figure 8.3 Mean ratings by parent/caregiver respondents on perceptions of ICT achievement levels in their child's school, compared by MSGLC categories [ratings on a scale of 1 (Strongly Disagree) to 4 (Strongly Agree)]

Perceptions of teacher attitudes

Table 8.8 indicates that parents/caregiver perceptions of the care and enthusiasm of their children's teachers with regard to teaching ICT did not vary significantly with MSGLC category. Nor is there a similar geographical pattern of responses to that found in perceptions of achievement levels. Nevertheless, the lower level of agreement on the enthusiasm of teachers in Provincial Area schools suggests a need for further investigation.

8.6.3 Perceptions of student achievement and teacher attitudes in mathematics

Perceptions of achievement levels in mathematics

Parents/caregivers were asked to indicate their levels of agreement with the four statements concerning mathematics education. Table 8.9 summarises the estimated means and their

associated standard errors for the two MANCOVAs. The MANCOVA for Type of School was not significant.

The multivariate test for MSGLC category differences across the four perceptions of mathematics teaching items was significant[61]. This significant multivariate difference emerged due primarily to significant differences on all items except that dealing with teachers being enthusiastic in their approaches to teaching mathematics. Figure 8.4 displays a pattern similar to that for science achievement, with respondents having children in Metropolitan Area schools more inclined than others to agree that teachers in those schools encouraged students to achieve to their potential in mathematics. Respondents with children attending Provincial City schools tended to agree more than those with children in Provincial and Remote Area schools, who held similar perceptions.

Table 8.9 Breakdown of parent/caregiver perceptions of achievement levels and teacher attitudes in mathematics, by MSGLC categories and Type of School [ratings on a scale of 1 (Strongly Disagree) to 4 (Strongly Agree)].[a]

			Rating of achievement levels		Rating of teacher attitudes		
			Teachers in this school encourage students to achieve to their potential in math	Students achieve to a high standard in math	My child's teachers care if my child is not doing as well as he/she can in math	My child's teachers are enthusiastic in their approaches to teaching math	Valid N
MSGLC categories	Metropolitan Area	Mean	3.57	3.33	3.49	3.42	
		s.e.(Mean)	.06	.06	.07	.07	129
	Provincial City	Mean	3.45	3.16	3.53	3.47	
		s.e.(Mean)	.06	.06	.06	.06	151
	Provincial Area	Mean	3.27	3.02	3.24	3.28	
		s.e.(Mean)	.03	.04	.04	.04	398
	Remote Area	Mean	3.23	2.86	3.27	3.26	
		s.e.(Mean)	.08	.08	.08	.09	73
Type of School	Primary	Mean	3.43	3.16	3.41	3.41	
		s.e.(Mean)	.04	.04	.04	.04	398
	Secondary	Mean	3.25	2.98	3.27	3.25	
		s.e.(Mean)	.05	.16	.06	.06	213
	Combined	Mean	3.31	3.04	3.27	3.31	
		s.e.(Mean)	.06	.06	.06	.06	140

[a]Shading denotes significant or suggestive mean differences between the groups being compared. Gold shading indicates significant differences ($p < .001$); light blue shading indicates suggestive differences ($p < .01$).

With respect to respondents' perceptions that students achieved to a high standard in mathematics, Figure 8.4 shows that agreement was highest among those with children in Metropolitan Area schools, and declined steadily with size and remoteness of location. For respondents with children attending Remote Area schools, the mean on this item dipped below the 'agree' point on the scale.

[61] Wilks' lambda = .943, $F(12, 1960.793) = 3.65$, $p = .001$, partial $\eta^2 = .02$

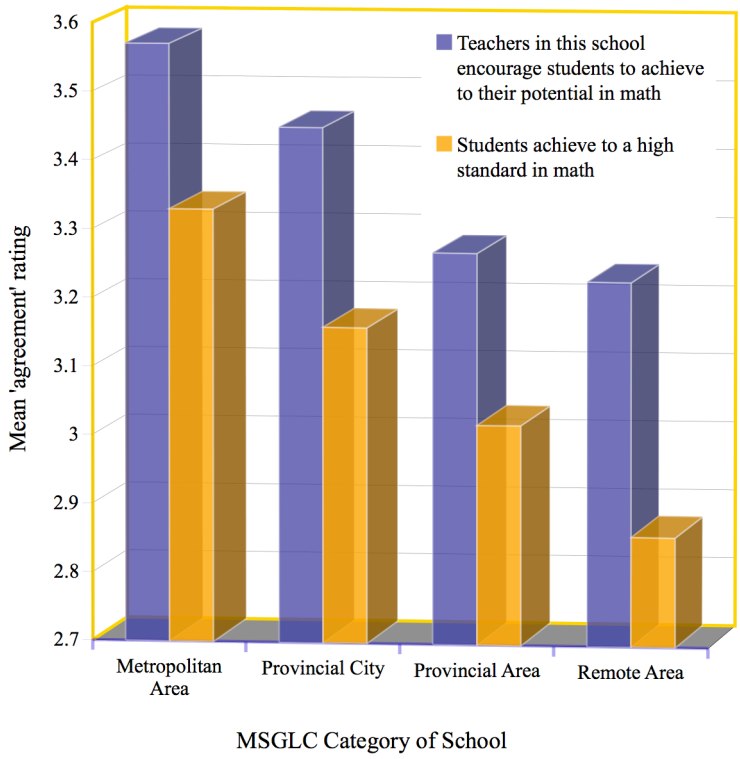

Figure 8.4 Mean ratings by parent/caregiver respondents on perceptions of mathematics achievement levels in their child's school, compared by MSGLC categories [ratings on a scale of 1 (Strongly Disagree) to 4 (Strongly Agree)]

Perceptions of teacher attitudes

Perceptions about whether teachers cared if children were not doing as well as they could in mathematics differed significantly with MSGLC category. However, the differences did not follow the pattern found with student achievement items. Rather, teachers in Provincial City schools were perceived as caring the most, and those in Provincial Area schools as caring the least, though this was still above the 'agree' point on the scale. There were no significant of suggestive differences in parents/caregivers' perceptions about teachers' enthusiasm for teaching mathematics.

8.6.4 Summary of findings and implications

1. The findings indicate firstly that parents/caregivers consider the commitment and enthusiasm of teachers to be one of the greatest strengths of schools. Perceptions of the levels of enthusiasm teachers bring to class do not appear to vary significantly with geographical location or type of school.
2. With regard to parents/caregivers' views on whether teachers care that students work to their potential, there was little evidence of substantial variation with type or location of school. Nevertheless, the weak but consistent (and in the case of mathematics, significant) pattern suggesting that parents/caregivers with children attending Provincial Area schools were less inclined than others to consider that teachers care whether students work to their potential is perhaps cause for further investigation.
3. The evidence suggests that the perceptions of parents/caregivers across Australia about achievement levels in science, ICT and mathematics vary substantially with geographic location. Parents/caregivers with children attending metropolitan primary and secondary

schools are more inclined to agree that children in these schools achieve to a high standard in science, ICT and mathematics, than are parents/ caregivers with children in non-metropolitan schools. Those with children attending schools in Remote Areas are least inclined to agree. The geographical pattern in perceptions is consistent with patterns of achievement levels in science and mathematics revealed in international studies (Thomson et al., 2004).

4. There also seems to be a perception that teachers in primary and secondary schools in larger population centres provide greater encouragement for students to achieve to their potential in these subjects.

8.7 PERCEPTIONS OF STRENGTHS AND OBSTACLES IN SCIENCE, ICT AND MATHEMATICS EDUCATION

Parents/caregivers were asked to comment on the greatest strengths of their children's schools in science, ICT and mathematics, and the greatest obstacles to learning in these subject areas. As might be expected, there was a wide variety of responses. However, the four most common themes concerned the qualities of teachers (discussed above), the availability of student learning opportunities, the ability or inability to cater for individual differences in the classroom, and the availability of ICT resources, training, and support personnel.

8.7.1 Availability of learning opportunities

Many respondents (22%) discussed the greatest strengths and obstacles in terms of the range of learning opportunities available to their children. These opportunities related to learning facilities, excursions and available course options. By and large, parents/caregivers' comments about school facilities were generally positive, with the exception of ICT resources, discussed later. Apart from this issue, there was no indication that parents/caregivers' perceptions about resources and facilities differed substantially with geographic location.

Opportunities for excursions and visits

Comments by parents/caregivers in Provincial and Remote Areas frequently concerned the limited educational opportunities available to their children due to remoteness or small school size. A recurring issue was the distance and cost associated with excursions:

> Being in the country, the school cannot access and take students to visit places like Scitech, the zoo, Underwater World etc. (Parent/caregiver, Remote Area, WA)

> Due to isolation there are reduced opportunities for students to make relevant visits or have relevant visitors to the school. (Parent/caregiver, Provincial Area, NSW)

Complaints about excursion costs were also made by some parent/caregivers in Metropolitan and Provincial Cities, but these related to the frequency of excursions for which they were required to pay, rather than the cost of individual excursions.

Composite classes

One area of concern for parents/caregivers with secondary-age children in smaller Provincial and Remote Area schools was the availability of senior courses and the necessity for composite classes. The following comments illustrate what respondents saw as some of the implications of this arrangement:

> (There is a) lack of … subjects offered when students reach Years 11 and 12. A lack of student numbers means that not all subjects offered meet the requirements needed by a student to go onto university and they need to go to another school involving longer travel. (Parent/caregiver, Provincial City, NT)

> Small classes in senior science (lead to a) lack of fellow students to stimulate each other. (Parent/caregiver, Provincial Area, NSW)

> My son (in Year 12) has to share two out of five of his subjects with Year 11 students. Teachers are trying to achieve the impossible, that is, cater for students who want to achieve high TER scores for future careers, and students 'filling in time' avoiding the real world of working to survive. The overall culture of the Year 12s is not supporting the rigorous study of Maths and Science. They feel like 'nerds'. (Parent/caregiver, Provincial Area, SA)

No doubt the issue of maximising the number of courses available to senior students is a concern for any small school, regardless of location. However, no comments of this type were received from respondents with children in Metropolitan Area schools.

8.7.2 Catering for individual student needs

A second theme, identified by about 18% of parents/caregivers, was the ability (or inability) of schools or systems to cater for the range of individual student differences found in schools. One common area of concern was the availability of support for special needs or gifted and talented students. Parents/caregivers were greatly appreciative of this support when available:

> My daughter started at this school at the beginning of the year, and what attracted us to the school was that they have special classes for those children who are struggling in some areas of their work. Not only that, they have the gifted classes for those in Years 5 and 6. I feel that the school can offer my child a great deal in all areas mentioned. (Parent/caregiver, Provincial Area, NSW)

On the other hand, such support was not always available or adequate. The frequency of comments suggest that the problem is more acute for gifted and talented children, though this probably reflects the smaller number of respondents concerned about special needs.

There was a perception among some respondents that schools in rural areas were not able to support and nurture high achieving students. In a small number of cases, this consideration influenced parents/caregivers to send children to schools in Metropolitan Areas:

> My youngest child is in Year 7 and is very advanced in mathematics. Unfortunately there are NO teacher's aides or 'special need' groups available for him yet there are groups available for children who are 'struggling'. This is unfair and my son should be encouraged and not discouraged! (Parent/caregiver, Provincial Area, Vic.)

> I also think that country schools don't have good quality teachers, because the HSC marks are lower than for students in city schools. My daughter, who is now in high school, wants to be a doctor. She attends a single sex school in Brisbane, two hours away, because I do not believe that the standard of teaching is sufficiently good in country NSW to enable her to compete with children from selective schools in Sydney. (Parent/caregiver, Provincial Area, NSW)

The sentiments expressed in this response reflect the geographic differences in perceptions of achievement levels apparent in Tables 8.7, 8.8 and 8.9.

8.7.3 ICT resources, training, and support personnel

The availability and use of ICT resources was a frequent theme (16%) of parent/caregiver comments about school strengths and obstacles. While some of these comments, both positive and negative, concerned hardware and facilities for ICT, the majority referred to the abilities of staff and students to use effectively the resources for teaching and learning.

> When it comes to ICT, the problem is having the availability of knowledgeable IT staff/parents/department people who can fix problems when they occur, and not have to wait for days/weeks to have things fixed. I think the department has done a great job in providing resources in a material sense; now they need to provide people resources to help train the people that are there. (Parent/caregiver, Metropolitan Area, NSW)

> The biggest obstacle to learning technology is that most teachers and aides do not have the skills themselves to be able to teach students. In this school only two of 16 teachers from Years 4 to 7 have the ability to teach students skills beyond basic computing. (Parent/caregiver, Metropolitan Area, Qld)

A greater-than-expected proportion of such comments came from respondents in Provincial or Remote Areas who identified the lack of ICT maintenance personnel and support for teachers to integrate ICT into their subject areas as the most pressing concerns:

> (There is a) lack of working computers and resources – no IT person in the town to help the resources work correctly. (There is a) lack of trained maths and ICT teachers. (Parent/caregiver, Remote Area, WA)

> The school is under-staffed and under-resourced in most learning areas. Rectification of these would greatly assist the work of the existing staff. They have no classroom network and very few computers that are linked. Most of these are continually off line and getting IT support in remote areas is difficult and costly. (Parent/caregiver, Remote Area, WA)

Nine respondents addressed their remarks to Distance Education programs. Of these, six commented about the difficulty of communicating effectively with centres. For example:

> The biggest obstacles are distance and the lack of infrastructure in the bush for technology to progress. (Parent/caregiver, Provincial Area, Qld)

> Teaching communication is via telephone, email and very rarely face-to-face. Some areas of science and mathematics require a face-to-face environment in order to be able to explain and show critical aspects of the subjects being taught. At the senior level the home supervisor (in this case, the mother) is often unable to back up any advice given over the phone as the complexity of the subjects are now beyond the supervisor's capabilities. (Parent/caregiver, Provincial Area, NT)

8.7.4 Summary of findings and implications

1. The findings suggest that, overall, parent/caregivers are appreciative of the commitment, efforts and enthusiasm of teachers involved in science, ICT and mathematics education.
2. Understandably, their greatest concern appears to be that their children have access to an adequate range of learning experiences and opportunities. These include excursions, visits by experts, and a good variety of senior courses from which to choose. Parents/caregivers seem to be aware that student access to these experiences and opportunities is considerably greater in larger population centres. There is also evidence that those outside these centres are concerned that their children are at an educational disadvantage.
3. Parents/caregivers with children having special needs or talents are appreciative where schools are able to provide relevant support. However, there appears to be concern from parents/caregivers in Provincial and Remote Areas that their schools are unable to provide this support adequately, and a tendency to send bright students to metropolitan schools where possible.
4. Finally, ICT education emerged as a key area of interest among parent/caregivers. There seems to be a general concern that children are not incorporating ICT into their learning as effectively as parents/caregivers would like, and a specific concern among those with children in rural schools that there is insufficient expertise and technical support for ICT.

The findings reported in this chapter are discussed in more detail in Chapter Nine, where they are linked to recommendations.