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Science, ICT and Mathematics Education in Rural and Regional Australia:

State and Territory Case Studies

Companion volume to the
SiMERR National Survey

Edited by Terry Lyons

National Centre of Science, ICT and Mathematics Education
for Rural and Regional Australia

University of New England

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Terry Lyons,
SiMERR National Centre
May 12, 2006

FOREWORD

For some time now it has been recognised that students in rural and regional schools have not been achieving to the same levels in science and mathematics as their capital city peers, and that rural and regional teachers have less access to resources and professional development than their city colleagues. I believe the underachievement of rural school students, approximately one-third of our student population, is one of the most pressing issues in education in Australia today.

Concerns about these issues prompted the Federal Government, through its Regional Partnerships Program within the Department of Transport and Regional Services, to establish the National Centre of Science, ICT, and Mathematics Education for Rural and Regional Australia (SiMERR) in July 2004. The SiMERR National Centre conducts targeted research that helps identify areas of educational inequity, and promotes strategies to support rural and regional teachers in providing quality education for their schools.

When we read the chapters in this book about rural schools and their students, teachers and parents the resulting stories allow us to see beyond the statistics of the main report. The vignettes drawn by research teams from the SiMERR hubs provide first-hand perspectives on the rural-urban education divide.

In talking about rural education, it is easy to feel overwhelmed by the complexities of the issues identified and their apparent intractability. It is also easy to slip into a deficit-type model where everything is negative. However, we know that this is not an accurate portrayal of rural and regional schools.

Woven within the case-studies in this volume is another side of the story. A side that does not negate the data concerning inequity but one that talks about hope, achievement, possibilities, and potential advantages. There are stories of capable and talented students, committed and enthusiastic teachers, and involved and caring parents. There are examples of innovative practices at work in difficult situations. Most significantly, there is the sense that the many problems currently being experienced by rural and regional students are not inevitable. These case-studies offer glimpses of new or alternative ways of thinking and acting that highlight an exciting potential for rural education and allow us to contemplate that, with national collaboration, there may be an opportunity to bring about real and sustainable change.

I commend this volume to you.

I add my thanks to those whom Dr Terry Lyons has acknowledged and in particular the work of the SiMERR research teams in what was our first truly national research project. However, I especially acknowledge the quality work, energy, conscientious approach and good humour that Terry has brought to his role as the SiMERR National Survey Manager and as the editor of this volume. His relentless pursuit of excellence and the strength of his abilities across a wide range of activities are amazing. The quality evident in this volume is but one manifestation of his extraordinary efforts.

John Pegg
Project Team Leader
Professor and Director SiMERR National Centre

CONTENTS

INTRODUCTION

This book is the companion volume to *Science, ICT and Mathematics Education in Rural and Regional Australia: Report from the SiMERR National Survey*. It reports the findings from a series of focus group interviews conducted with teachers, parents/caregivers and students in each state and territory. A total of 112 interviews were held in 38 rural and remote schools, generating a rich body of data that complements the mainly quantitative nature of the first volume.

The interviews were conducted by research teams from each of the state and territory hubs of SiMERR Australia. Team members travelled widely in an attempt to tap into the diversity of rural schools. While following a common, semi-structured interview schedule, each research team also explored local issues and teased out similarities and differences in school situations. This approach allowed the hub teams a degree of flexibility in the structure and emphasis of their reports.

Rationale for conducting the focus group interviews

Concerns about the status of science, ICT and mathematics education in rural areas are detailed in Chapter Two of the first volume. In brief, recent research (e.g., Thomson, Cresswell & De Bortoli, 2004) has identified a significant gap between rural and metropolitan students in terms of their achievement levels in science and mathematics. Furthermore, numerous studies of rural education in general suggest there are critical staffing problems in the three subject areas, and point to disadvantages faced by country teachers in accessing professional development opportunities, adequate resources, and a range of learning experiences for their students. The extent of these disadvantages, and of the staffing problems, was explored in Phase One of the SiMERR National Survey.

The focus group interviews complement the first phase of the study in two ways. First, they provide a means of triangulating the mainly statistical data gathered via the questionnaires. According to Guba and Lincoln (1994), multi-method approaches such as this can provide a more sophisticated representation of what is happening in a given situation, thereby enhancing the credibility of the research. Triangulation does not necessarily seek to confirm or refute an impression gained from one set of data, but can be used to provide different perspectives, in which a divergence of perceptions is as valuable as convergence. Interviews have the potential to illuminate and add meaning to statistical patterns, and the raw voices of teachers, students and parent/caregivers bring an authenticity to research reports that statistical analyses often lack. This report is rich with such voices.

Second, Phase One of the study made no comparisons between states and territories, as such comparisons would be problematic given the wide variation in geographic and social contexts in different states/territories (e.g., Western Australia and Tasmania). Nevertheless, the extent of this variation also means that conclusions in the *Report from the SiMERR National Survey* need to be considered in the light of individual state and territory circumstances. The chapters of this volume provide insights into some of these circumstances.

Interview schedules

The interview questions were developed from open-response items included in the National Survey questionnaires. Research teams were free to determine the order and priority of questions and to include follow-up questions where appropriate. Interviews with teachers, students and parents/caregivers were conducted separately, with the exception of two

situations in which interviewees felt more comfortable in combined groups. The core interview questions for each group are detailed below.

Questions for Teachers

a) What are your reasons for teaching in a rural/regional school?
b) What do you see as the strengths of your school in helping students achieve their potential in science, ICT and mathematics?
c) What do you see as obstacles to students achieving their potential in science, ICT and mathematics?
d) Do you have any examples of successful initiatives or programs?
e) What are your views on attracting and retaining qualified science, ICT and mathematics teachers for rural schools?
f) What recommendations would you make to education authorities to improve student outcomes in these subject areas in rural schools?

Questions for Parents/caregivers

a) What are your reasons for living in a rural and regional area, and for your choice of school?
b) What are your educational aspirations for your children?
c) What are the strengths of your children's school in helping them achieve their potential in science, ICT and mathematics?
d) What do you see as obstacles to students achieving their potential in science, ICT and mathematics in rural/regional schools?
e) Do you know of any successful initiatives or programs?
f) What local community factors affect student outcomes in science, mathematics and ICT education?
g) What recommendations would you make to education authorities to improve student outcomes in these subject areas in rural schools?

Questions for students

a) What are the advantages of living and schooling in this area?
b) What are the disadvantages of living and schooling in this area?
c) What would you like to do when you leave school? Do you intend to stay here or move?
d) What do you think of mathematics (positive and negative)? What are you doing in mathematics?
e) What do you think of science (positive and negative)? What are you doing in science?
f) What do you think of ICT classes (positive and negative)? What are you doing in ICT? (only where appropriate)
g) Tell me about your experiences of using computers in this school (positive and negative).

Clearly the data generated by these questions were based upon individual or group perceptions. Nevertheless, the teachers' experiences are grounded in day-to-day situations and provide credible perspectives on situations and activities at the 'chalk-face'. Likewise, the observations of secondary students have been found to be reliable (Levy, Wubbels, Brekelmans & Morganfield, 1997) and those of students in general provide the reader with a means of triangulating data to gain an overall impression. Parents/caregivers, as both primary educators and community members, are in a position to provide multiple perspectives on their children's education and on their schools.

School locations

In accordance with our obligations to participants, the descriptions and locations of schools throughout the chapters have been kept deliberately vague, and the names of schools and individuals replaced with pseudonyms. The MCEETYA Schools Geographic Location Classification (MSGLC) categories of schools are provided throughout the report to give an indication of levels of remoteness/accessibility (Jones, 2004). The MSGLC categories are described in Table 1.

Table 1. Categories of the MCEETYA Schools Geographic Location Classification (MSGLC) used in the report.

MSGLC Category	Code	Sub-category	Criteria	Examples
Metropolitan Area	1.1	State Capital City regions (except Darwin)	State capitals (except Hobart, Darwin)	Sydney, Melbourne, Brisbane, Adelaide, Perth, Canberra-Queanbeyan, Cairns, Gold Coast-Tweed, Geelong, Hobart, Newcastle, Townsville, Wollongong
	1.2	Major urban Statistical Districts	Pop. ≥ 100 000	
Provincial City	2.1.1	Provincial City Statistical Districts (+ Darwin)	Pop. 50 000 – 99 999	Ballarat, Bathurst-Orange, Burnie-Devonport, Bundaberg, Darwin, Launceston, Portland, Bunbury
	2.1.2	Provincial City Statistical Districts	Pop. 25 000 – 49 999	
Provincial Area	2.2.1	Inner provincial areas	Pop. < 25 000, CD ARIA[a] Plus score ≤ 2.4	Armidale, Busselton, Mt. Gambier, Gympie Dimboola, Huonville
	2.2.2	Outer provincial areas	CD ARIA Plus score > 2.4 and ≤ 5.92	
Remote Area	3.1	Remote areas	CD ARIA Plus score > 5.92 and ≤ 10.53	Port Headland, Cowell, Lightning Ridge, Mataranka, Cloncurry, Cape Barren Island
	3.2	Very Remote areas	CD ARIA Plus score > 10.53	

[a] Accessibility and Remoteness Index of Australia used by the Australian Bureau of Statistics.

Overview of the report

The following chapters report findings from each of the SiMERR Australia hubs. Chapter Two brings us the perspectives of teachers, families and students in rural West Australian communities. The SiMERR WA team, Sandra Frid, Len Sparrow, Sue Trinidad, David Treagust, and Kirsteen McCrory, from Curtin University of Technology, covered a lot of territory, from the remote north coast, to a small inland mining community, to a regional centre in the southwest of the state. Yet they note that as they travelled from Perth in various directions they found 'much diversity and richness in the social, cultural, economic and physical environments'.

They also found complexity, particularly in looking at the interplay of characteristics affecting student outcomes in science, ICT and mathematics. They found student transience 'integrally linked' to curricula; living environments to teacher retention; and professional isolation to a shared sense of community in adversity. With three quarters of the WA population living in Perth, rural WA is for most teachers, 'somewhere different to go'.

South Australia also has a very concentrated population, and the SiMERR SA team of Carol Aldous, Julie Clark (Flinders University of South Australia), Alan Barnes and Bruce White (University of South Australia) also clocked up some kilometres. Their study schools were in

coastal fishing towns and farming communities in Provincial and Remote Areas. The team found a significant need to 'close the gaps' between what is available in Adelaide and what can be accessed by teachers in the study schools. The team also concluded that school structures and practices in some areas of South Australia 'need to be re-thought and re-constructed to take account of the reality of the lives of many Indigenous students'.

The Victorian team of Russell Tytler and Judy Mousley (Deakin University), Steve Tobias (LaTrobe University), Agnes MacMillan (Royal Melbourne Institute of Technology) and Genée Marks (University of Ballarat) 'explored the boundaries' – geographical, curricular and digital, negotiated by teachers, students and families in six rural and regional schools. The team also interviewed a group of Victorian Regional Project Officers to gain a further perspective. Like their counterparts in Western Australia, the team found a complex interactivity between school characteristics such as size, location and community profile, and issues like staff retention, student learning opportunities and teacher professional development.

Two researchers from SiMERR Tasmania, Kim Beswick and Natalie Brown (University of Tasmania), made an effort to choose four schools as distant as possible from the major centres of Hobart and Launceston. They found a strong sense of community and collegiality, and in contrast to some hub reports, satisfaction with the availability of material resources. On the other hand, the team found that teachers were commonly required to teach outside their subject areas, and were concerned about the effects of this arrangement on their students' learning.

When Australians think of the Australian Capital Territory, they generally think of Canberra. This can be an irritation to ACT teachers in rural schools who feel that if they 'don't shout loudly, they might be ignored'. The SiMERR ACT team of Catherine McLoughlin, Sue Wilson, Jo Brady and Steve Arnold (Australian Catholic University) went to two schools and found much to shout about. On the other hand, they also found concerns at one school that parents regarded it as an 'incubator', sending older primary children to larger city schools for a more 'academic' finish. The unique situation of the second school has generated a number of challenges for staff and the local community.

Howard Smith, Peter Merrotsy and David Paterson (University of New England), spent a couple of days in two communities in the far north of New South Wales, while the other members of SiMERR NSW, Karoline Afamasaga-Fuatai and Terry Lyons (University of New England), headed south and then west. Interviews from the two northern schools highlighted the effects of sudden changes in local industries on small rural communities, and the implications for teachers and students. In the central west, teachers were concerned about a 'brain drain' to city boarding schools, and about how to attract relief staff so they could access professional development opportunities.

Queensland is possible the most environmentally and culturally diverse state in the country. The SiMERR Queensland team of David Lake, Max Lenoy, Juanita Sellwood, Rhonda Faragher and Louise Archer (James Cook University) sampled this diversity, visiting nine schools from the Torres Strait to the central west, and from the east coast to the rainforests of the far north. The team commented that the schools often had less in common with each other than they did with city schools. This diversity extended to the strengths and obstacles nominated by focus groups, and the team has done well to sift through the huge amount of data and identify the significant findings.

The team from the Northern Territory, Ruth Wallace, Lalitha Nair and Greg Shaw (Charles Darwin University), and Susan Barton-Johnson (NT Department of Employment, Education and Training) visited five schools. They found dynamic communities incorporating the diversity of local languages, knowledge, skills and experiences into the classroom and curriculum. They also identified transience of students, families and teachers as one of the greatest challenges to conventional education models. In a section on Indigenous education, the authors report on the importance of family, community and school links, and outline the opportunities and challenges for teachers living in Indigenous communities and teaching science, ICT and mathematics to students for whom English is a second or third language.

The final chapter of this report attempts to draw together some of the key themes identified by these studies. The very difficulty of this endeavour underscores the huge diversity of issues, approaches and contexts found in different geographical areas and educational jurisdictions.

REFERENCES

Alloway, N., Gilbert, P., Gilbert, R., & Muspratt, S. (2004). *Factors impacting on student aspirations and expectations in regional Australia*. Canberra: Department of Education, science and Training.

Guba, E. & Lincoln, Y. (1994). Competing paradigms in qualitative research. In N. Denzin & Y. Lincoln (eds). *Handbook of Qualitative Research,* London: Sage, pp. 105-117.

Jones, R. (2004). Geolocation Questions and Coding Index. A technical report submitted to the MCEETYA Performance Measurement and Reporting Taskforce. Retrieved July 2005 from www.mceetya.edu.au/mceetya/default.asp?id=11968

Levy, J., Wubbels, T., Brekelmans, M. & Morganfield, B. (1997). Language and cultural factors in students' perceptions of teacher communication style. *International Journal of Intercultural Relations, 21*(1): 29-55.

Thomson, S., Cresswell, J., & De Bortoli, L. (2004). *Facing the future: A focus on mathematical literacy among Australian 15-year-old students in PISA*. Camberwell, VIC: ACER.

‘Somewhere different to go’

Report from SiMERR Western Australia

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Len Sparrow
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INTRODUCTION

Western Australia is a state of 2.5 million square kilometres with only about 400000 people living outside the Perth metropolitan area. The distances are great, the population is sparse, and people live and work in a wide range of geographic and socio-economic environments. There are desert regions and isolated mining sites with daily temperatures that can soar to 50 degrees. There are also lush forests, agricultural lands, and seaside resort communities. The capital city, Perth, is known as the most isolated capital city in the world, so that, even with a population of over 1.2 million, it is a city characterised by physical separation from other populated centres. Yet, as one travels away from Perth within Western Australia, there is much diversity and richness in the social, cultural, economic and physical environments. It is in this context that this chapter is written.

METHOD

Four schools in Western Australia participated in the focus group discussions. The project team selected the schools to represent some of the geographic and socio-economic diversity of the state (see Table 2), and in this regard the phrase ‘regional and remote’ is used in place of ‘rural and regional’ to describe more appropriately the context of these WA schools. Once a school was identified as a potential focus group SITE, a researcher contacted a teacher or the principal to organise an on-site visit. The visit involved individual interviews with teachers and principals at Bush Junction, Rocky Hill and Sandy Cove primary schools and group interviews with teachers at Seaview Catholic College. The team conducted individual interviews with parents at Rocky Hill Primary School, group interviews with parents at the other three schools, and group interviews with students at all four schools. Decisions about whether to conduct interviews individually or in small groups were based upon what the school and individuals deemed to be most convenient and efficient at the time. For example, it was usually most convenient to conduct the teacher interviews individually when each person had free time during the day or as a relief teacher rotated between classrooms to provide free time. In addition, an informal meeting was conducted in Perth with two experienced teachers from the northwest region of WA. Thus, the teacher interview sample overall consisted of 23 teachers, 17 parents, and 20 students (see Table 2).

Table 2. School and focus group participants

School *	Sector	Type	Location	MSGLC Category	Student population	No. Teacher	No. Parents	No. Students
Rocky Hill Primary School	Government	Primary/ Secondary, Years K-9	Remote inland mining region	3.2 Very Remote	50-60	5	2	3
Bush Junction Primary School	Government	Primary, Years K-7	Regional southwest coastal suburb	2.1.2 Provincial City	500+	6	6	7
Seaview Catholic College	Catholic	Primary/ Secondary, Years K-12	Remote northern coastal town	3.1 Remote	420	6	7	7
Sandy Cove Primary School	Catholic	Primary/ Secondary, Years K-10	Remote northern coastal community	3.2 Very Remote	80-120	4	2	3

* School names are pseudonyms

Within the context of student learning in science, ICT and mathematics, the interviews focused upon each individual's views of the school's strengths in helping students achieve their potential, obstacles to improving learning outcomes and programs or practices that have been successful in supporting outcomes. They also explored the nature of the curricula and recommendations for how education providers might support the improvement of student learning outcomes. In a more general context, teachers and parents (but not students) were asked to comment on teacher attraction to and retention at the school, their reasons for living and working in that community, their reasons for staying or planning to leave the community and other issues they deemed relevant to rural and regional education.

The findings are reported initially as a series of four case studies, each adopting a grounded approach to data analysis (Powney & Watts, 1987). Thus, the initial emergence of key themes and issues within each case study proceeded inductively. For each case study, one researcher and a research assistant independently analysed interview transcripts to identify commonalities and issues raised by the interviewees. These key themes and issues, although reported in a structure of distinct components, are not in fact independent, but rather interlinked, creating a web of interconnected factors described by the interviewees as having an effect upon student learning outcomes in science, ICT and mathematics. Further, some of these factors do not appear initially to be directly connected to science, ICT or mathematics learning. In other words, the factors that help or hinder student learning in science, ICT and mathematics are not always directly related to these curricular areas, but rather are more global aspects of educational contexts fundamental to what schools are able to achieve.

Thus, an initial finding from the focus group discussions was that in order to consider the improvement of student learning outcomes in science, ICT and mathematics, it is necessary to take into account a number of holistic and contextual features of regional and remote education that affect schools and teachers. In each case study the identifying 'titles' for key themes and issues have been chosen to encapsulate the essence and foci of subsequent discussions. The order of these subsections has been structured to create a logical flow that captures an overall contextual picture. Thus, the case studies were constructed independently, and although there are similarities and differences between the theme/issue 'titles', the exact 'titles' were created to best describe the related discussions and evidence. Subsequently, final data analyses involved an examination of the commonalities and differences in the themes and issues that emerged across the four case studies. These are reported as assertions (Erikson, 1998) that form the basis for conclusions and recommendations related to the WA focus group findings.

ROCKY HILL PRIMARY SCHOOL

Our job is, in these areas, is basically teaching. You live the school.

Driving into Rocky Hill, you feel like you are entering a different world. You have just driven much of a day in travelling from Perth – through the outer suburbs, then through the wheat belt into the outback, and then several more hours of driving through sparse vegetation and rocky terrain. You finally reach Rocky Hill, a small community of about 200 people in a formerly vibrant mining area, and when you drive down the main street you spot a post office, police station, a pub, an old-style hotel bed and breakfast, and a few small shops. Nearby are the nursing post, the school, a large community hall and a large sports oval. You passed the nearest supermarket about one hour before reaching Rocky Hill.

The school, situated off the main street, has an enrolment of about 50 in Kindergarten up to Year 9. Although officially a primary school, this year there were 12 students in Years 8 and 9, as an initiative to support student retention. Previously, students had to travel an hour to attend high school. The school has a grassed sports oval, a main reception area, a principal's office, a very small kitchen area serving as a staff room, three classrooms, and some additional 'sheds' for use as a library, storage, and a workshop. Along with the principal, the teaching staff includes three teachers (Years K-2, Years 3-7, and Years 8-9), an additional support teacher, an early childhood teaching assistant, and an Indigenous teaching assistant.

Student transience

A key point noted by all the teachers was that students will not achieve learning outcomes if they are not at school, so the issue of attendance is paramount. First, one must get the students to school. This is a particular challenge with some of the Indigenous students whose culture and lifestyle do not always support regular school attendance:

> It's a huge problem, a huge problem … we get them and then they go away and they might not attend school for say two or three months, maybe more, because some of these children go out towards the desert and a more traditional type setting, and not to another school somewhere. (Nancy, teacher)

> A lot of students are transient, you know, they come and go. That hinders their learning, that's an obstacle … where they turn up one day then they're not there the next, and it really affects your programs. (John, teacher)

It is noteworthy that the three students interviewed at Rocky Hill (three girls in Year 8) had all been to several schools in their lives, generally widespread around the state, with one student noting: 'I've been to eight. Newman, Geraldton … Mandurah, here, Geraldton two different schools.' These students did not give any comments on the effect moving from school to school might have had on their learning, except indirectly with regard to their perceptions that other locations had provided more 'chances to do other things'. They spoke nostalgically of their previous schools, focusing on what they remembered that made those schools 'more fun' than Rocky Hill:

> You don't do farm here (Student 1). … Yeah, you don't go out and learn about cows, sheep, goats. (Student 2)

> You didn't have to wear shoes or nothing, and we went on excursions all around. (Student)

> You got to go home for lunch and have a swim. (Student)

Two things the teachers noted as strengths of the school regarding efforts to support school attendance and engagement in learning, and also school retention into the high school years, were the community relationships they actively fostered between the school and families, and the use of ICT across the curriculum. These two issues are outlined below.

Community and living environment

Key to developing learning programs appropriate for the student clientele and for developing positive relationships between the school and the community is that the culture of living in a small town leads to people knowing one another. This fosters communication and connections that the teachers see as an asset for the school:

> I guess developing a relationship with the kids and their families, which we probably wouldn't have, that I didn't have in Perth. And that's definitely an advantage. I can communicate really well with the parents and I'm on the phone to them all the time and, you know, like I can go to the pub tonight, and say "G'day" to the parents and they'll say, "How's it all going? How's little Johnny going with his Maths? We've been trying at home." And so I can, sort of give real instant feedback, rather that waiting for report time or anything like that. (Nathan, teacher)

> The smallness of the community makes us a lot closer-knit. Communication's a lot easier … I think it's a plus because you do really become part of the community. (John, teacher)

Parents also saw the culture of knowing 'everybody's face' as a positive community-oriented feature of living in a small town:

> I like how you know everybody's faces. It's not like in the city where you walk down the shop and you don't know anybody and there's no one to say, "Hi, how are you, Elizabeth?" Or even if they don't know your name, just "Hello". (Elizabeth, parent)

In comparison, the students' views on Rocky Hill were that, although they liked living there, they found it 'boring'. They expressed a desire that there be more to do for one living there:

> You go to school and it's not as boring, or hard, and you get one-on-one with the teachers … [but there is] not enough chances to do other things. (Student 1)

> The thing I like about it is when they have festivals and bands and that here … out-of-towners coming to do an activity. (Student 2)

School created curricula and the integration of ICT

At Rocky Hill the freedom of the school to develop its own curricula within the guidelines of the West Australian 'Curriculum Framework' (Curriculum Council, 1998), together with the teachers' knowledge of their students' skills and what motivates them, makes it possible to build resources and develop learning programs that motivate students to come to school and engage in learning activities:

> A big strength would be that we can focus on other areas and that helps with our attendance. Like our focus on sport and music, with the core subjects … the kids might not necessarily want to do it, you know. Kids don't come and go, "Yeah maths, maths today!" But they know we do maths in the morning and they know they've got to do that to get to the music and sports in the afternoon … I think a strength of this school is getting kids here. (Nathan, teacher)

> … we do a lot of investigation, we do a lot of hands-on things and the kids are benefiting from that because they're meeting the criteria across everything … because we do all those rich type tasks we can often achieve a few things, more than one thing at a time. (Nancy, teacher)

> … because they're very low in literacy and numeracy, you have to find a lot of other ways to get messages across or to get content across and I think that we're quite strong on ICT. We've got projection equipment, we've got laptops, we've got video cameras, lots of technology. We're looking at Smartboards as well. (John, teacher)

ICT has proven to be instrumental in the process of motivating the students. It was mentioned repeatedly by teachers and students as a strength of the school's learning programs. ICT skills in the use of a wide range of software programs are intentionally developed (e.g. word processing, PowerPoint, publishing programs, Internet searches). Furthermore, the visual and hands-on nature of these technologies are viewed by the teachers as appropriate to the learning styles of the students, many of whom lack literacy skills to learn effectively with more print-based learning materials.

The students' perspectives on the value of ICT within the curricula were in agreement with those of the teachers. They noted 'one of the best parts' (student) was that they used various publishing and presentation software to produce reports and brochures and also used computers to 'make our own website' (student), 'explore the Internet' (student), and 'get information off websites' (student).

In comparison to ICT, the science and mathematics curricula were not commented on by the teachers, parents or students with the same high degree of enthusiasm. There was a recognition that science and mathematics could benefit from being given more attention, particularly if supported with additional resources to implement engaging, relevant learning activities. Nevertheless, the students, while noting a desire to have practical, hands-on school activities like sport, computers and agriculture, did not express a desire for mathematics to be other than what could be described as a 'traditional' mathematics curriculum:

> [I'm] used to writing out of books and getting all the stuff out of books, like we did pi and stuff like that. (Student 2)

Students also expressed satisfaction with the mathematics challenge competition (often times tables) they did everyday 'like spelling but with maths … like when they have wrestling and they have tag teams' (Student 1) and 'a champion that wins out of the whole class' (Student 2).

Considering the value teachers placed on hands-on activities and the use of ICT within students' learning programs, it is not surprising that they viewed the allocation of funding for resources – material as well as those related to people – as an issue affecting student learning, the issue discussed next.

Suitable allocation of resources

Although staff did not in general view the school as lacking resources for teaching and learning, including books, software, materials, and computers, they did express concern and frustration with the restrictions placed upon resource funding allocation at state level as well as within purchasing policies:

> In a country area like this where you don't have access to the science materials, to be able to really make a laboratory on a computer where the kids can actually go in and manipulate chemicals and see what reactions are. But that sort of thing, in a laboratory-type environment on the Internet … getting your hands on it … you look at the price, it's fifteen hundred dollars to buy a program, then you have to buy the licence to put it on different computers. But to get that for an area like this would be of immense value. These kids could be right up there. (Nick, teacher)

> We aren't the same as a big metropolitan school, and laying some of the rules on us makes it very hard to resource it properly. Technology and things like that are very important to smaller schools to help us achieve the same sorts of outcomes because they can bring things to us that we can't perhaps create. … A lot of the funding things you can go for [are] very restrictive regarding high technology … they won't let you buy things like that, for some reason. (Nancy, teacher)

The allocation of funding for professional development was also of major concern to all the staff because they did not see it as sufficient for meeting their needs in relation to travel costs and teacher relief time. This is summed up clearly in the words of Nathan who reported he had clocked up over 6000 kilometres already that year, at his own cost, to attend 'required' professional development sessions [e.g. *Making Consistent Judgements* program]:

> I've definitely done lots of K's, so I get lots of tax back at the end which is good because the school doesn't pay me. I just pay for it all. … Yeah, the budget is just blown. … what they could do with schools here is really, really beef up our professional development budgets. … if you wanted to be a real tightwad, you could do it, but you know, I'd rather be a good teacher and be poor and go and do all these things. ... And then having support [is important] because if I'm away, because of the travel time, if I've got a maths PD in [regional city] it's basically a day there, PD two days and then a day back, so you've missed four days, you've almost missed a whole week to do a PD and who's covering my class? So that's an obstacle as well for excellence in the kids' learning. (Nathan, teacher)

Nathan's words reflect his valuing of professional learning as a teacher, and also his commitment to being a 'good' teacher. The dedication of the teachers was evident in their attitudes to their work, and in what they said about what they do as teachers living in a small, isolated town.

Teacher commitment and adaptability to the environment

The teachers' lives are challenging and demanding in ways different from those of city teachers. Their lives require a degree of personal resilience, resourcefulness, and adaptability which they perceive as much greater than for a city teacher. It requires them to be multi-skilled at school to work much more independently in their daily work, to be an active part of

the local community and to be flexible and creative in living in an environment with few basic services:

> You've got to put this hat on, that hat on, that hat, and you come up with, like, ten hats on. … We had a problem with our server, we couldn't get the Internet for three weeks. … I volunteered to help fix the server. It was going to cost a lot of money, money that we didn't have, so I had to fix it myself. So juggling teaching with computer technician support [is a problem]. (John, teacher)

> You've got a huge amount of other work to take on because you're in a small school with a small staff plus the community issues. It's expected that you would go out there and do something in the community so you're taking on this huge amount of other stuff as well. (Nancy, teacher)

> I haven't found a teacher, in this district, who didn't like the district, who does not like being here. I found that for teachers here, our job, in these areas, is basically teaching. You live the school. (David, Principal)

Novice teachers and teacher retention

With the exception of the Principal, all teachers at Rocky Hill were in their first or second year after graduation, and all expressed concerns about the challenges of being novices in a small remote school and how the common practice of placing new graduates in such demanding situations does not promote equity in educational opportunities for students. For example:

> If you take into consideration one of the schools that I did my prac at, where you've got teachers … [who] have twenty years worth of teaching behind them. That's a lot of shared knowledge that you can gather. … [I'm] brand new to teaching. I've experimented on the kids with doing different things and seeing what works and what doesn't and whilst that's part of a learning process for me, and in some ways it's a learning process for them, it is also a hindrance for them as well. If you had a seasoned teacher come up here and teach them for a year, [someone] who's got a wealth of filing cabinets to play with and also the years of knowledge that they've got, they could most probably come up here and do a brilliant program. But none of them want to come here and so these kids all get new graduates. Some are good, some are tragic. (Nick, teacher)

All the teachers also noted that attracting teachers to and then retaining them in small remote schools was an issue that extended beyond the school environment to the challenges of living and working in a remote community. Parents were also aware of the related living challenges for teachers, having experienced some of them themselves:

> When we need people it's just so hard. It's hard to get them here and it's hard to keep them here. Because it's hard enough living in the country anyway. … there's not enough understanding … there are some advantages but there's lots of disadvantages as well. They don't realise you can't just pick up the phone and hop down to the dentist or doctor. … I don't think the city people realise. (Elizabeth, parent)

In particular, the challenges associated with distance and isolation, and the need for teachers to have access to suitable housing, emerged as two prominent issues.

Distance and isolation

Small remote communities and small schools place teachers in environments in which they are professionally isolated. They do not provide teachers adequately with people-related resources, professional mentorship, or rich, spontaneous, professional sharing and discussion:

> I think an obstacle would be the isolation, you know, because by teaching maths myself, now that I teach high school maths, and not having any other high school maths teacher for 80 kilometres that way and 120 kilometres that way, I'm the only high school maths teacher in [Rocky Hill]. So there's no one to sort of bounce ideas off regularly. (Nathan, teacher)

> You've got that community [in a larger school] where you can actually sit down in a break and you pick the brains of all the other people. One of the things I would love to have is maybe someone to turn around to, just over a morning tea or coffee and say, 'What have you done in this area to gain success?' And they've got, like, ten, twenty years worth of trial and error that they can share with you, that might give you another idea. (Nick, teacher)

> It's three days for us [for PD]. We leave the day before and we come back the day after because we're hampered by distance, by the local environment. Kangaroos. You can't travel after dark. … if you do hit a roo you've lost your car for weeks on end, so then you can't go anywhere. So these things are very difficult for us. People planning PD need to look at these schools and how they do it. (David, Principal)

The need for better access to professional support and development was also recognised and emphasised by one of the parents:

> [I would recommend] more resources and things like that. Don't make it so hard to teach. … Help the regional schools out a bit more than what they are doing. Maybe get out here yourself instead of living in the city and coming out, flying out or driving out for a couple of days, doing your rounds and then going all the way back again. Be out here in the first place, you know, living amongst us. … Or at least be close, be in the local region, not down in Perth. (Elizabeth, parent)

Living environment – housing

If a teacher goes home after school each day to an environment in which 'they wouldn't be allowed to house prisoners or refugees' (Nancy, teacher), then it is little wonder that sub-standard housing was identified by the teachers as one of the biggest issues impinging, although indirectly, upon student learning:

> That's the biggest thing we could do. If we had decent housing for the teachers out here, we would retain our teachers and would improve the learning outcomes of the students, because they'd want to stay. (David, Principal)

> I had to live with a non-fully functioning hot water system for three months and a cooker that wouldn't work properly, and it does affect your teaching quality because a home's supposed to be a haven, it's supposed to be your castle. [It's] like, you finish work, then you have to do more work when you get home … I find I'm busy fixing, or trying to fight for things to get fixed. (John, teacher)

> Things like housing, housing is a big one. You'll probably get that from anyone. I talk to teachers, you know, in nearby towns, it's all housing, what it comes down to. Whether the houses are suitable and a lot of them in the area are not. So that is a killer and teachers will leave because their houses aren't up to scratch. (Nathan, teacher)

BUSH JUNCTION PRIMARY SCHOOL

It's coastal, it's close to Perth, has good facilities.

Bush Junction Primary School is located in the outskirts of a medium-sized coastal regional city (population approximately 30000) in the southwest of Western Australia. The locality of the school community is a housing subdivision approximately five years old, with the immediate area and the adjacent suburbs mainly comprised of new houses. There is a growing infrastructure of shops and local facilities.

The school is housed in a series of modern brick buildings spaced around a horseshoe-shaped grassed area. Each building is open plan in design and accommodates four class groups of a similar age range. Teachers generally work with one of the class groups and share a central area of the building. The school is relatively well resourced and equipped. Of particular note is that the school has a science coordinator, Anna[1], a situation not common in WA primary schools. Anna has organised the purchase and storage of a good quantity and range of equipment and consumables to support science teaching in the school.

Staff at the school, approximately equivalent to 20 full-time teachers, are of a range of ages and teaching experience. The school is a merit select school (i.e. appointment is by interview), but in reality many of the staff have been appointed via the Employer Initiated Placement (EIP) procedure by which vacancies are filled by teachers who are surplus in other schools.

Living environment

Parents and students had much to say about how they 'liked' living in the area, for the lifestyle and the physical environment. Parents commented on 'community' as a positive feature of the area and the school, with children being able to attend a local school with local friends. Further, both parents and students commented on 'trees' and other general natural features in their living environment they viewed as providing a quality lifestyle:

> We chose [Bush Junction] because it was closer than travelling 11 kilometres into town. And the small school was very appealing as well, and just to be local so the kids could have local friends. (Parent)

[1] Pseudonym

> They climb trees like we used to do. … the kids love the trees … I love the trees. (Parent)
> I like it here because I've got five acres and there's heaps of space to run around in and we have heaps of animals at our house and we've got trees and not much traffic. (Hilary, student)

> I like [Bush Junction] because it's like a close community and I feel safe and I like all the streams and that. (Female student)

The teachers also liked living in the area. Most had a 'country' background, either in their earlier lives or in their teaching experiences. The school and location presented an attractive situation for most of the staff, and since they had gained 'permanency' (i.e. not a temporary contract for a year or possibly less) they were planning to stay:

> It's coastal, it's close to Perth, has good facilities. (Heather, teacher)

> Teacher retention and attraction is not a problem. There are many teachers who are applying to come to this school because it has a very good name because we have a very supportive principal, staff and parents. (Melissa, teacher)

Professional collegiality and curriculum leadership

Teachers spoke repeatedly about 'flexibility' as a strength of the school. They related this to both the set-up of the teaching spaces and also to a feeling of collegiality and support throughout the school. The modern buildings had been designed to be open and this facilitated a collegial or team atmosphere as teachers and students shared spaces. One teacher suggested that the flexibility of space allowed her to meet the different learning needs of her class more easily. The other staff made similar comments:

> I think one of the strengths is the flexible working space. The ability to create larger, or smaller working areas through those doors. We could have the whole block open or we can have half of it or just one class. I think that flexibility of the actual structure allows us as teachers more opportunity to group the kids flexibly. So we can focus on the high fliers, we can focus on the kids that are struggling, we can have a larger group of kids that are doing okay and we can manipulate, move people around. (Anna, teacher)

> Well basically because it's a brand new school we've got the set-up, lends itself to all that we do. It's more open. You've got people next door that you can work along with and that opens your space up a lot more too. (Melissa, teacher)

The teachers also saw science teaching as a strength of the school, due to the curriculum leadership of a particular teacher (the Science Coordinator, Anna). They noted how their teaching had been enhanced and, by implication the students' learning, by the support received from the Science Coordinator. The Coordinator obtained resources, organised and maintained them, and provided support in teaching science:

> Science is great. The teacher in charge of science here has got the room so well resourced. I must admit I tended to not do science in past years but working with the teacher next door to me, we've just done science for the last three terms and it's been excellent. If you want to do something you go to the resource room and [Anna's] got it there. (Ella, teacher)

> It's becoming much more organised [science] … there's equipment that we [Pre-Primary] are able to borrow. (Kelly, teacher)

Teacher content knowledge

The complex area of teacher content knowledge in science, ICT and mathematics was seen by the teachers as a critical factor in helping children achieve their potential. In particular, the lack of, or limited knowledge related directly to basic science content information, especially in the non-biological areas, was noted as a hindrance to students' science learning. Teachers were not concerned with pedagogical issues related to science since they felt they had received sufficient professional development in these areas in recent years, but rather, they were unsure of their own understandings underpinning what they were teaching. That is, they were confident in *how* to teach but not as confident in *what* to teach with regard to science:

> Content stuff, that's one of the big things that I want to bring up in terms of science. … I think that's one thing that can hold kids back, if the teacher is not confident in the subject area that they're teaching … and there hasn't been PD available to up-skill teachers in that area. It's been up-skilling in teacher approaches and it's been up-skilling, now, in assessment. But it's kind of assuming that teachers have already got the content knowledge. (Melissa, teacher)

There was a similar feeling about limited knowledge in mathematics and in ICT. Lack of confidence, negative experiences, and lack of content knowledge restricted what a teacher could do to support students' learning:

> In maths there are so many books published, there are so many schemes out there that you can cobble together a program without actually having to understand an awful lot of it yourself. But that doesn't make you a good maths teacher … able to ask the right questions and support those kids when they're really struggling, by showing them a different way of doing things. … Same with ICT. It's a bit on par with science. People don't really have the skills to be able to extend stuff. They're really relying on the fact that the kids know what they are doing because they've got computers at home and have had time to play on it. I don't put ICT into my maths lessons and yet I know I should … but I am just not confident. (Anna, teacher)

Thus, professional development in fundamental knowledge was seen as a need by most of the teachers. The focus placed on science within the school by the Science Coordinator had highlighted science as an area for development, and this had led the teachers into acknowledging a lack of content knowledge, and had broken the culture of 'everyone assumes that you know all this stuff' (Anna, teacher). That science learning had been enhanced was also evident in the students' comments. They all enthusiastically stated they liked science, with one saying, 'We have a really cool teacher to do science with' (Neville, student). However, in comparison the students' general attitudes to mathematics were not positive, with most saying they did not like mathematics:

> I don't like maths. I really don't like division, subtraction, multiplication, fractions and all that. … because I'm not able to do them really good. (Female student 2)

> I don't like maths because I find it hard to take-away and divide and do all sorts of stuff. (Female student 3)

School created curricula

Teachers liked the 'freedom' of the Western Australian *Curriculum Framework* (Curriculum Council, 1998), which allows them to develop programs at school level that they see as appropriate for their students. Some admitted to an initial feeling that the *Curriculum Framework* was too general and broad, but once they became more confident with some areas, they then began to work with the necessary detail embedded in the related Outcome Statements documents (for example, Education Department of Western Australia, 1998). They did not want a specific, detailed syllabus, or something that is unnecessarily prescriptive with regard to what students should be taught:

> It [Outcomes Based Education] gives you such a wide variety of choices to go with what's interesting to the kids. You've still got to teach skills and use the outcome statements ... as an audit and you need the syllabus, you know, to be able to pick up the information. But to have to come back to prescriptive, you have to do this, this and that, like we used to, is horrible. (Katie, teacher)

> We've got the outcomes and when they first came out I thought they were too general but now, when I look at them, that's possibly why I'm enjoying teaching more than I did before because it was too specific. It was very book-orientated, it was very, alright you must do this, in my first years of teaching and I guess that helped me then, but now I like to have a bit of freedom. I like to say alright, they need to have these skills, whatever, and you can get there however. I'm doing Earth and Beyond, Life and Living [strands in the science learning area]. … So within that we're able to be fairly general with what we can do that's science. (Melissa, teacher)

Parents' and students' comments on the school's science, ICT and mathematics curricula focused more specifically on the nature of the learning activities provided. Mathematics was not perceived to be 'hands-on' or 'real' in the way that science was, with the practical 'everyday stuff' (parent) provided in science lessons leading to science being a well-liked subject by the students. Similarly, the variety of uses and the practical nature of the use of ICT, particularly for Internet research, were seen as positive aspects of the curricula. Both parents' and students' perceptions of and experiences with the school's science, ICT and mathematics curricula are highlighted in these comments:

> The maths could be more hands-on maybe and they would probably like it better, doing like shop systems where they've got to have change and money. And that might make it more interesting for them. (Parent 1)

> [to improve students' learning in mathematics it needs to be] more relevant, like the way they've tried to make the science really hands-on. Make maths hands-on. (Parent 2)

> I like science. I like hands-on stuff where you make stuff, and I like dissecting sheep's brains. (Stephen, student)

> I like science because we get to make models, like volcanoes, and use chemicals in them. (Female student 1)

> At school I use the computers a lot. I do Microsoft Excel, Moviemaker, Microsoft PowerPoint … Microsoft Word and the Internet for research. (Larry, student)

> I use the computer at school for research and emailing people for what we are researching. (Female student 2)

Distance and professional development

While Bush Junction Primary School is close to a regional centre, a regional university campus, and a District Education Office, teacher professional development remains an issue. The 'PD is focused on Perth' (Anna, teacher), and the time taken for travel is a problem in that most teachers are reluctant to drive so far. For teachers at Bush Junction, professional development has to be specific to the context of their particular needs, and it needs to be accessible in regular school time:

> It's like the PD is focused on Perth, which is where the bulk of the teachers are. That's fine, but for anybody else, travelling, it's hard work. … What about everybody else? And that stops people from learning new things because the travelling is too difficult. … You've got to be committed, keen and enthusiastic to, after your teaching day, put yourself through professional development. … If it was done during the school day, part of your up-skilling during the day, you wouldn't have any problems at all. Then it will be down to finance. Can the schools release teachers because you need relief teachers. … because to go to Perth is a whole day. You're not going to go after school to Perth, you're going to need the whole afternoon to get up there. People are going to think about driving back in the dark. All those logistical things. (Anna, teacher)

The effect of distance on learning opportunities for students was also noted by one of the parents in the context of what are easily accessible to the students as resources or activities to support or extend learning:

> Scitech [an interactive science centre located in Perth], yeah, we don't get a lot of that here and even the maths competitions and the science competitions [activities organised by the professional teaching organisations], you do have to go to Perth for. (Parent)

SEAVIEW CATHOLIC COLLEGE

Somewhere different to go.

Seaview Catholic College is located in a small northern coastal regional city. The journey from Perth to visit the school takes over three hours by commercial jet, or one must drive for two to three days. It is one of five schools servicing a local regional population of about 18000.

The school building is modern, less than ten years old, and well resourced. It is built in modules around grassed playing areas. The student population in K-12 is over 400 and there are 30 teaching staff. Two of the teachers provide curriculum support and one, who supports ICT, has introduced interactive whiteboards and a new computer laboratory with 25 new computers. The older computers are now used in classrooms throughout the school. Seaview once had additional funding in recognition of its Indigenous student population, but this was cut recently, eliminating specific endeavours such as a funded lunchtime homework support program.

Living environment

Parents and students spoke about great satisfaction with living in the Seaview area, and most planned to continue living there. Many had lived in the area a substantial period of time, in many cases all their lives and with previous family connections to the school, and most had no desire to live elsewhere. Parents referred to family histories or the lifestyle as factors relevant to their plans to continue living in the area. Students also spoke of how they liked the lifestyle, but they also often made reference to a desire for 'more to do' (Alice, student). The parents' and students' feelings about living in the Seaview locality are reflected in these comments:

> I've lived here all my life. It's my home town. … I chose this school for them because their father went through [Seaview] as a child. … I like the Catholic ethos of caring, sharing, … and being a Catholic school, teachers here go above and beyond. (Debbie, parent)

> I've lived here for about 14 years. I am originally from the city and just gravitated this way for work and whatever. In your little heart, it just gets into you and you just don't leave, do you. You hear of people coming for two weeks and ten years later they are still there. [It's] the lifestyle. (Sharon, parent)

> I like the cyclones and stuff. … I like the quietness, but I like being able to do stuff and there's not much to do here. (Yvonne, student)

> I enjoy living here because it's fun and you don't have to dress up just to go outside. Like, in the city you always have to wear shoes. (Scott, student)

In comparison, the teachers did not have a long history of living in the area, even though Seaview was no longer officially classified as 'a difficult area to get teachers to' (Susan, teacher). The period of employment at Seaview Catholic College for the teachers interviewed ranged from eight weeks to four years, with the average stay being two years. Thus, retaining teachers to live and work in the area was an issue identified by the teachers.

Teacher attraction and retention

The teachers interviewed had come to the school and the community for various reasons, including guaranteed employment, non-urban living, and travel:

> I saw an ad in The Age [a Melbourne newspaper] … and I wanted to come to [Seaview region] because I thought it was a transient population where it would be easier to meet people, as opposed to rural Victoria or somewhere like that. (Peter, teacher)

However, although attracting teachers to Seaview was not considered by the teachers to be a problem, retaining teachers was an issue. In the previous year 17 out of the 30 teaching staff had left. The average stay of teachers was cited as two years, due partly to a short-term employment policy of the employer (Catholic Education Office) by which contracts are offered for two years only:

> Retention is an issue, but maybe it's because management thinks they are only going to get two years from everyone and they view everyone as only a short-term proposition. Whereas if they changed their attitude, that people were going to stay longer, that might result in change. (Jennifer, teacher)

The lack of retention of staff was mentioned by some teachers as an issue affecting outcomes in science, ICT and mathematics. One teacher described how when teachers leave, their knowledge and resources leave with them. Another teacher described how this transience leads to things in the school happening in an unplanned, non-strategic way:

> A lot of things happen as a knee jerk reaction, because parents or someone says this is not happening or we need to do this. And so everyone jumps in response to that … instead of planning for that and how we can make it more workable. (Jennifer, teacher)

In contrast, the parents did not see staffing as an issue at the school, speaking instead of the commitment of the teachers to their work and mentioning features of the school they perceived to be strengths for supporting their children's learning:

> Small classes. There doesn't seem to be a high teacher turnover. Initially some of the teachers we get here are just starting off, they are in their first year out, but they stay and they gain the knowledge about kids, but also they want to be here. It's more than their job. … and also we have a specific teacher for computers. What more could you ask for? (Janice, parent)

School and community environment

Seaview Catholic College was chosen by many families because of its Catholic ethos and supportive community, and parents spoke with satisfaction about a positive school and community environment. The local Indigenous people are well established, they tend to stay in the locality, and the school accommodates students from some third generation families. Parents had high aspirations for their children and their education. They believed the school could provide the learning environment and personal support needed for students to achieve:

> Having teaching assistants from the community just makes that much difference because they know what's happening in the community. They know most of the children. They know what's going on in that child's life. … for the understanding. To break it down for how that child will understand. (Sharon, parent)

> I think one of the strengths around this school is the mix of Indigenous and non-Indigenous and the mix of male and female. There seems to be a really nice balance around that. (Rachel, parent)

Further, parents also emphasised how they saw the local community, its people and resources, as a valuable factor in supporting students to achieve:

> When it comes down to it, it's about how we educate and talk to our children about our values and what we would or would not expect of them, but how we would like to see them go. We can arm them with all the information, but literally it comes back down to their own choices. With this good community, community values, and good parents' values, and just the support, you know, our kids can go a long way. We've got a lot of role models in the community now that have been through and even been at [Seaview Catholic College] and now they are somewhere where our kids can look at them and say, "I want to be like them." … That's what this school is all about. You work for yourself and try to achieve higher than you think you can go. (Phillipa, parent)

Suitable allocation of resources

Teachers and parents described an unbalanced distribution of resources at Seaview, noting strengths in ICT resources, but inadequacies elsewhere. Teachers commented on a need for science and mathematics resources and how this was an obstacle to improving related student learning outcomes. Parents, however, did not seem to be as aware of specific curriculum resourcing needs. Their concerns were more broadly based, related to overall financial or people resources and how these affected student learning. This range of perspectives from the teachers and parents is evident in these comments:

> The kids are happy. Plus they've got the up-to-date technology. Everything's there. State of the art. A Smartboard. (Sharon, parent)

> Science and maths, we've got nothing to use to gain the kids' interest. So they just can't compete with ICT at the moment. (Peter, teacher)

> I think we have something like three or four calculators between 40 kids, so the resourcing is one of the big hurdles as far as science and maths goes. (Mark, teacher)

> One recommendation for education providers, especially to do with us, why change something that worked and provided opportunity not only for Aboriginal children but it also catered for and provided that support for non-Indigenous? And one being the homework centre. … We've actually put it in place because we know our parents want it happening. So we've actually got TAs and teachers giving up their time and not getting paid for it. Previously it was funded. (Debbie, parent)

This parent's dissatisfaction with the allocation of funding, and her confusion with funding decisions made elsewhere that do not recognise that Seaview, is 'different to the city and more developed areas' (Debbie, parent), were also reflected in views held by the teachers of funding decisions made by administrators elsewhere:

> The money we do have sometimes seems to get spent on some confusing things. … they spent a whole lot of money on projects which confused a lot of teachers when we're all sitting in staff meetings going, "But we need to be able to teach these kids. We need money to buy resources." (Peter, teacher)

The teachers also expressed dissatisfaction and confusion with professional development opportunities which they perceived did not meet the challenges of distance and isolation:

> On the other hand you can actually bring people up here. I've seen it happen heaps of times [elsewhere] … people come up and they have PD at the high school. They all share it [all the local schools, government and Catholic]. … or once a month, instead of staff meetings and all that sort of thing, we all just went and talked amongst schools. (Mark, teacher)

School curricula and curricular leadership

ICT was seen as a strength of the school in terms of helping students achieve their potential, and ICT resources have been updated by an enthusiastic ICT support teacher whose curricular leadership has contributed to teacher professional learning and to student learning:

> When I first came here we had no computer specialist and that was what a lot of us really fought for, we need somebody who is computer literate, who knows what they are doing, who can teach us. And we've been lucky enough to get someone. (Peter, teacher)

> … and specialist teachers for computing. And usually they do some of their own PD, just to keep up to date, so it's good. (Debbie, parent)

The students are involved in a range of ICT-related learning experiences. There is an e-club that runs after school, the computer lab is well resourced with 25 machines, and staff and students make regular use of two interactive whiteboards:

> The Smartboards have made a huge difference. Kids love them, teachers love them, kids love using them. Even if it is simple things. It's made a huge difference, and because we now have a Smartboard lesson once a week the kids get more access to what sort of sites are out there, and they want to use it all the time. (Linda, teacher)

Noteworthy here is that when the students were asked what they liked about using ICT they spoke exclusively of using computers at both school and home for playing games and Internet communication. They did not mention the use of ICT in relation to specific curriculum learning activities:

> I like games. Mainly I am on the Internet and mainly sending messages to friends. We have our own password [at school] for email. (Daniel, student)

> … going onto the Internet and playing games. (Alice, student)

When asked about their science and mathematics learning, students spoke about the types of activities they enjoyed doing. The teachers' perceptions of a lack of resources for science and mathematics were not reflected directly in students' comments about their experiences in these curricular areas. Instead they emerged indirectly in evidence. For example, students spoke very positively of particular science activities such as building volcanoes or analysing milk samples, while also noting they seldom did these sorts of activities. Further, with regard to mathematics, they described what they found to be enjoyable, valuable learning activities, and all these activities were based around 'paper' or 'book' resources:

> [I like] maths. 'Cause I like all the sums and everything, and some of the activities we do. … The activity we are doing now is to do with a school project. We have to do travel around Australia. We have to work out kilometres and all that. … I like doing the experiments. But we don't really do science at school. But one of the things we did was test the fat in different types of milk. (Lisa, student)

> I like sports and maths, and last day of school. … I like maths because of the activities … like mental maths and trying to see who has got the most right. (Matthew, student)

> We don't do science very often, but when we do I like volcano things. I don't really like classroom work because you're just sitting there and it just drags on. I like doing stuff. … [In mathematics] what we are doing at the moment is these sheets where we read, and then we have all these sums that we have to work out, … we get to work at our own pace. And with most set work you kind of think, "Oh yeah, I don't want to do this." But if we are given a whole lot and we can work at our own pace, we're like in competition with each other. … And you seem to do more work that way. You get more in the mood for it. (Yvonne, student)

Prominent in all these students' comments is that 'activity' oriented learning experiences are seen by the students as motivating, engaging and valuable to learning.

SANDY COVE PRIMARY SCHOOL

> There is no stimulation. Like they don't see signs, traffic lights, advertising. It is really just the nature of where we are.

Sandy Cove Primary School is in a remote northern coastal community, over 120 kilometres from the nearest town. The Sandy Cove 'community' has a population of about 150, with the school also catering for students who travel from several small Indigenous communities within driving distance. The school caters for K-10 students, most of whom are Indigenous, apart from the principal's children. Officially, the school has over 120 students enrolled but on average the school is attended by 70-80 students at any one time. The first term can reach an attendance of nearly 120 students, but after holiday periods numbers are more typically about 45-60 students. The school currently has ten teachers. There are support programs for ICT, and physical education and health, and there is a Teacher Librarian. Sandy Cove has five Aboriginal Teacher's Aids (ATAs) and a special centre for training them that is well resourced. This was established by a Catholic Sister who had previously worked at the school.

Student transience and the role of the 'community'

A main issue at Sandy Cove affecting student learning was student transience and lack of community involvement in the students' school lives. Attendance and student drift are the major obstacles to students achieving their potential:

> Drifting for students is an issue because students can be related as family, and family groups are important for people here, and they may be related to people throughout the peninsula or throughout the Kimberley. So it is not uncommon for a child to transfer out to a school miles and miles away for different reasons. … students take off and drift back from being away. (Andrew, Principal)

Teachers also noted that learning must take place in the classroom – it will not happen at home where there is generally a lack of academic stimulation or support. Thus, what happens in the community affects the school, as noted by both parents and teachers:

> There are personal community issues that seem to affect kids. Before, there used to be all this support from the community. Now there's business between family groups and that really affects the school. … And it can affect a child's learning. Like some of the kids don't come to school. They stay in the community. Or if they come to school they won't talk to any of the other kids. (Beverly, parent)

> … some kids are just not turning up … often due to issues that are happening in their homes. So they are not coming to school, due to not just us, but other issues. (Andrew, Principal)

Teacher attraction and retention

The four teachers interviewed had all chosen to be at this school for professional reasons. For the principal, it was his first posting as a principal and he was on a three-year contract. The ICT specialist had chosen to be at this school for longer than average, eight years, as he had enjoyed the challenge of working with ICT and the students. He was moving at the end of the year to set up the ICT program at a larger school in a larger town further north. The Teacher Librarian and the Years 5/6/7 teacher were a husband and wife team who had chosen to come to this area from Melbourne for two years after previously enjoying teaching in the Northern Territory. Other teachers who were not interviewed were new teacher graduates from places like Melbourne and Canberra, rather than WA, usually educated at the Australian Catholic University. Most commonly teachers stay for one or two years, but there are teachers who have stayed for much shorter periods, discovering that it was not what they had expected:

> Keep in mind the average is two years, perhaps even less. But some come and go. This year we have had two teachers like that. They come and see that this is not the life for them. They left before the end of the first term. (Andrew, Principal)

> It is a problem. Teachers will come here with very high hopes and think this is fantastic. But it is a different situation when you actually get here. We do get some teachers who stay for some time, like myself. And some very short term, when they suddenly realise what the place is like. They go, maybe after six months. (Kevin, teacher)

This departure of teachers, despite what was described as very good teacher housing and financial incentives, is because of 'culture shock' and the challenges of remote living and teaching:

> The other issues are probably more personal and social rather than educational. Adjusting to the community, adjusting and living. Having to make the adjustment that living in a rural community you have a very small group of people … and it has ramifications not just within the school because it is a small school. Even when you leave school you are still with those people. (Elaine, teacher)

Living environment

Sandy Cove residents, other than the teachers, have long term family connections to the area and a history of returning to the community after absences for schooling or family factors:

> My family is originally from here. ... My parents moved away from here and we lived in Wyndham. So my school years were up there. Then we finally came back as adults. Back to the community. So I've been here for a while. Over ten years now. (Cindy, parent)

> I stay out in a community called [Ridge Gully] about 20 minutes drive. I've been living in Perth and Bunbury. I used to live up here. I went to Perth and got homesick so came back. I will go to Perth to see my family and then come back. (Ryan, student)

> I have lived here all my life except for schooling in Darwin. (Beverly, parent)

> You can go fishing and all that. And it's more friendly. ... But I won't be here next term [for high school]. I am going to Perth [to an Adventist school]. Just me and my sister. (Leanne, student)

Although the parents spoke positively about living in Sandy Cove and said they would continue to live there, they and the teachers noted constraints of the environment that they perceived as a hindrance to students' learning:

> They have a wider variety of opportunities [at other schools] to choose from, whereas here it is limited or nothing at all. (Beverly, parent)

> They have work experience and things like that in the other schools [referring to apprenticeships and other opportunities]. More social things happen in the school too [other schools]. And that helps their learning. (Cindy, parent)

> … I would say the real obstacles are the lack of interaction from the wider community and the fact that there is no stimulation. Like they don't see signs, traffic lights, advertising. It is really just the nature of where we are. (Dan, teacher)

These general perceptions of restricted learning opportunities in Sandy Cove were inter-related to perceptions of what resources were needed to support student learning, whether they be material or people resources.

School resources and professional development

The teachers and parents emphasised the importance of the school creating curriculum learning activities that engage and interest the students and thereby broaden their experiences. To do this, however, requires money and other resources:

> One thing that I would say to the people in charge, whenever I ask for money to take my students for an experience outside of the community, they should jump at it. I have taken a group to Melbourne and we have been on camps, and these are the rich learning experiences. And you can just build your program around it and it is so exciting for them. But then I get so drained trying to raise money for it. I would say that is the one thing that I would like. … We have to provide stimulation. (Dan, teacher)

> I think we should be able to get more resources into our school. Available to us. Or even people that travel round and come in and take classes for different things. More of that sort of thing. So the science teacher is coming round and he could come in for a month or whatever and do that sort of work that other kids are doing in other schools. … A separate classroom for science. And then they can do their experiments and what not. And learn more in that one classroom. Not just being in a room and not having stuff to work with. (Cindy, parent)

Professional development was also something that the teachers and parents noted should be supported by educational providers if they wish to improve student outcomes in science, ICT and mathematics. Similarly to Cindy (parent) above, one teacher suggested that the quality of

professional development opportunities would improve if specialist people were sent to remote communities to help teachers:

> [My recommendation] would have to be for more support and PD … not going to Perth to do it, because you wouldn't drive to Perth for PD, and it is unfair on the people back here who have to do your work. And it is just too expensive for the school. … The PD would have to come here. It is much cheaper to move one person than all of the staff. (Elaine, teacher)

> One of the other things that could attract people is if we get more professionals to come up and actually do a lot more PD. We don't have the PD opportunities that people in the city have because of resources, distance, all those obvious reasons. I think if people were going to come up here and know that they were going to get quality PD that was going to be lifelong for them and career-wise, that would then be a good incentive for them to come up as well. (Andrew, Principal)

Locally created curricula and the integration of ICT

The ICT program running at the school was seen as a strength, as it was used as a motivator for the Indigenous students to attend school, with the laboratory open from 7.30 in the morning. Access to the Internet was an opportunity to open up the world to this remote community that, in the past, was closed due to its overall isolation and flooded roads during the wet season. Computers offer access to the outside world:

> I would recommend that children be given more opportunities and resources, for instance in the IT area. They are highly motivated by things like computers and they are able to work at their own pace. They get instant feedback from them and kids come to school early in the morning because the computer room is open. Anybody would say the best way to engage students is to get stuff that is interesting and if they are engaged then they will learn, so these are highly motivational pieces of resources. They are expensive but they are necessary, and if you look at the world, in particular the big picture communication and computing, and those sorts of skills are what makes everything tick. So without focus on these skills the students are being left behind. They must not be left behind because they are isolated. They must be given opportunities to compete and perform and achieve and be part of what is really happening in the big picture. So isolation should not be an obstacle, particularly in this day and age when you can be connected electronically. (Andrew, Principal)

> That's why the IT and the Internet are extremely good, because you still have access to the wider community. (Dan, teacher)

But, despite the emphasis on the ICT program, there had been inhibiting technical issues:

> I think [my recommendation would be for] better access to communication, so we are not going to have 'drop outs'. Better than the satellite, because with the satellite we still lose out, it drops out. … it's not reliable. (Kevin, teacher)

> [Getting] technical and qualified people for anything to do with computers [is a problem]. If you haven't got someone on staff, the expense to bring someone out to look at the equipment and to get someone out if something is wrong with the network is quite excessive. (Elaine, teacher)

While ICT had been a focus of the school curricula (as well as literacy), science and mathematics were not. As stated by one teacher:

> We have had visits from Scitech and another group from Canberra, a national science body travelling around Australia, has created an interest in science. But beyond that there is nothing happening in this school while I have been here to promote science and maths. Perhaps maths is the forgotten subject here. (Elaine, teacher)

The principal was aware of this issue, following a focus on literacy prior to his commencement at the school. Further, the Years 5/6/7 teacher had been addressing the lack of science curricula with regular science experiment days, and he was looking to buy a software program '*Maths 300'* to attend to the improvement of mathematical skills.

The parents' and students' impressions of the school curricula were in concordance with those of the teachers with regard to the regular use of ICT. Also similar was that they were limited in what they had to say about the effect of science or mathematics learning activities, except to describe a few activities. Parents' and students' perspectives on ICT, science and mathematics in the school are reflected in these comments:

> They are learning a lot of things on computer. Like they can do PowerPoints and things like that. (Cindy, parent)

> Every morning our class goes to the computers. … [I like] maths because it's fun. … Subtraction. Sums. I am good at sums. And some puzzles. … [Science] I like making volcanoes. And on Monday we are going to see how it erupts. (Leanne, student)

CONCLUSIONS

As noted in the Method section of this chapter, an initial finding from these four case studies was that it is essential to consider the holistic and contextual features of regional and remote schools. That is, global aspects of educational contexts can be fundamental to what schools are able to achieve regarding learning outcomes in science, ICT and mathematics. The conclusions outlined here therefore take into account this vital aspect of the case studies.

The key themes and issues from the four school case studies outlined here span a range of aspects concerning teaching in regional and remote schools in WA, including:

- living environment
- professional environment
- nature of community relationships
- student transience
- teacher attraction and teacher retention

- distance and isolation
- curriculum leadership
- teacher content knowledge
- school created curricula
- integration of ICT
- allocation of resources
- teacher professional development.

To some degree, all these key issues were in evidence at each school site, although between sites they sometimes were 'opposite' in nature and their effect upon teachers e.g., the 'desirable' living environment at Bush Junction versus the 'challenging' living environment at Rocky Hill. Again it must be noted that these factors are not independent of one another but instead could be described as an inter-connected web of contextual and educational features of a particular school and its community. For example, student transience and school-created curricula are integrally linked, as are living environment and teacher retention, and also professional development needs and the challenges of distance and isolation.

The issues can be viewed as being predominantly direct or predominantly indirect influences upon student learning outcomes in science, ICT and mathematics (see Table 3). However, as made explicit by the interviewees in their comments and recommendations, indirect influences are not necessarily of lesser importance because they are often pre-requisite to being able to develop and use factors that are direct influences. For example, student transience needs to be addressed; that is, students need to be attending school before teachers can provide appropriate learning experiences for science, ICT and mathematics. One way this is addressed by the schools is through locally created curricula designed to motivate and engage the students. Hence, the factors become inter-connected and mutually influential upon one another.

Table 3. Teacher-related indirect and direct factors affecting student learning

Indirect influences	Direct influences
• Living environment (including housing) • Nature of community relationships • Student transience • Teacher attraction and retention • Distance and isolation	• Professional environment • Curriculum leadership • Teacher content knowledge • School created curricula • Integration of ICT • Allocation of resources • Teacher professional development

Overall, the factors that emerged with strong commonalities across the four case studies lead to the following assertions:

Assertions related to indirect influences:

- The living environment has a major effect upon the attraction and retention of teachers to regional and remote schools, with the quality of housing of particular importance. Aspects of living within a small community are also of importance in that they impinge upon one's daily lifestyle.
- The nature of the community and the school's relationship with the community have a major effect upon what schools can achieve in relation to attendance and the students' valuing of education.

- The attraction and retention of teachers is a complex issue in that many factors play important roles, including the quality of the living environment, professional support, personal support for the challenges of living in a small community, the challenges and rewards of teaching in a regional or remote school, and the challenges of distance and isolation both professionally and personally.

Assertions related to direct influences:

- ICT is vital to schools and teachers. It is used to motivate students to attend school and to engage in stimulating and relevant learning activities. It provides learning resources, activities and opportunities that would otherwise not be available to students living in regional and remote locations. Schools need to be provided with suitable resources to enable these learning activities to happen.
- School-created curricula, developed within the context of the varying needs of the student cohorts, allow teachers to provide learning opportunities designed to improve student outcomes in science, ICT and mathematics.
- Curriculum leadership can play a vital role in school professional development through support of content knowledge development and related skills, through resource support, and through professional encouragement and modelling.
- Professional development for teachers in regional and remote schools is lacking because teachers do not have easy access to 'people' resources such as workshops or mentoring in an ongoing, interactive way. Professional development needs to be in context, and in this regard needs to be brought on-site – to the teachers at the schools. Schools in regional and remote locations need to be allocated additional professional development funding and related resources if professional development is to happen in a productive way.

REFERENCES

Curriculum Council of Western Australia (1998*). Curriculum framework for kindergarten to Year 12 in Western Australia*. Perth, WA: Author.

Education Department of Western Australia (1998). *Mathematics student outcome statements. Perth, WA: Author.*

Erickson, F. (1998). Qualitative research methods for science education. In B. J. Fraser & K. G. Tobin (Eds.), *The international handbook of science education* (pp. 1155-1173). Dordrecht, The Netherlands: Kluwer Academic Publishers.

Powney, J., & Watts, M. (1987). *Interviewing in educational research*. London: Routledge.

‘There's not enough offered to country areas and ... so much emphasis on going to Adelaide for PD’

Report from SiMERR South Australia

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INTRODUCTION

Schooling in regional, rural and remote South Australia is predominantly a government enterprise, with a few substantial non-government primary[2] and secondary schools in some major centres, and small Catholic primary schools in a number of towns. Many of the schools in the country are Area Schools which cater for students from Reception (R – the year before Year 1) to senior secondary. Some of these are in towns; others are located between towns (‘in the middle of nowhere’) to avoid fuelling local rivalries. Only in the largest centres are there dedicated high schools.

Many towns have a primary school, with students being bussed to a secondary school. Travel to school by bus is a fact of life for many young people in country SA. Some have up to two hours’ travel a day. Schools can be quite small, and whilst there have been some closures of schools, this tends to be resisted by the communities. Another limit to school closures is access – within reasonable travel time – to an acceptable alternative.

Indigenous students are present in most areas and schools, but tend to be a significant part of the student population in the north and west of the state. In the very north-west corner of the state are the Anagnu-Pitjanjatjara (AP) Lands containing around ten schools with virtually 100% Indigenous student. These schools have special arrangements within the government sector in terms of staffing, resources and curriculum. The four schools selected for focus group interviews are described below and in Table 4.

THE SCHOOLS

The Bay Area School

The school is located on the coast significantly more than two hours by road from Adelaide. The school caters for students from R-12, with a significant number of Indigenous students. The town has a population of around 4000 people supported by a number of local industries

[2] Primary Schools include Year 7 in SA.

including wheat farming, gypsum mining, salt mining, and commercial fishing. The school offers vocational education subjects like Aquaculture, Retail, Hospitality, Conservation and Land Management and Doorways to Construction.

Table 4. Schools and focus group participants

School*	Sector	Type	MSGLC Category	Student population	No. Teachers	No. Parents	No. Students
The Bay Area School	Government	Area School (R-12)	3.2 Very Remote	450	6	2	7
Flower Valley Primary School	Catholic	Primary R-7	2.2.2 Outer Provincial Area	68	6	3	8
Greenview Area School	Government	Area School (R-12)	2.2.2 Outer Provincial Area	239 (139 prim., 100 sec.)	11	6	8
Sandy Grove Primary School	Government	Primary R-7	3.1 Remote	438	5	9	10

* School names are pseudonyms

Flower Valley Primary School

This is a small Catholic parish school, catering for boys and girls from Reception to Year 7. It is situated in a rural community a little more than two hours by road from Adelaide. Horticulture, farming, tourism and winemaking are significant local industries.

Greenview Area School

Greenview is an Area School serving a stable agricultural region several hours' drive from Adelaide. Greenview itself is a small rural hamlet located between several more major centres. The school has a focus on agriculture, aquaculture and viticulture, and has its own boarding house for students taking the Certificate of Agriculture course (currently 15 residents). One unusual feature of the school is that numbers actually increase from year 9 upwards due to the influx of boarders. There were some 18 students in Year 12 in 2005.

Sandy Grove

The school is situated several hours' drive from Adelaide in a relatively large centre. Local industry is dominated by fishing and farming. The school community is characterised by cultural diversity, with a significant Indigenous population (12% of enrolments). The region offers a wealth of recreational activities including fishing, surfing, swimming and boating in local national parks and beaches. Approximately 60% of the students are School Card holders[3].

[3] This is the measure of socio-economic disadvantage in SA schools — the card provides funding relief for the costs of schooling.

RESULTS

How participants came to rural SA, and why they stay

Teachers

The reasons teachers gave for teaching in a rural/regional school tended to put them in one of two groups. A significant number of the first group are individuals who have lived in the community for an extended period of time (perhaps ten or more years), while others are relatively new to the community. In some cases this group of teachers was originally from this or some another rural area and wanted to live in a similar location:

> I grew up in the area, I went to Adelaide to study and now returned. I've been here for the last 13 years. (Year 7 male teacher, Flower Valley)

> Being a local, I just came back here I suppose. I enjoy the community and family and friends and a job came up, so I took it. (Secondary teacher, The Bay)

For others, the main influence has been the working life of their partners – either they moved to the town because of their partner's work, or they moved to the area as a single person and subsequently formed a life partnership with someone whose work keeps them in the area ('married a farmer'). This group clearly appreciates the 'rural lifestyle', with some teachers citing benefits of living and working in a small community that include being able to make a positive contribution. Juggling family and work needs was identified by some as being easier in a small community where both parent and child could work and attend the same school.

In general, this group of teachers currently choose to live and work in a rural area. However, many indicated that they would seek employment in the city should the needs of their children not be met as they progress into higher levels of schooling.

> I've been a teacher in the region for probably ten years and I've got four small children and I wanted to make my life easier as a parent, to be working in the same community as my kids were in, then I could see them both at school and I could work and be successful there. I am unsure as to whether I will continue to live here; eventually my plans are that I'll move back to Adelaide to offer other things for my children. (Female junior primary teacher, Flower Valley)

> I don't know if we'll be here forever and ever amen. It will depend on what our children do when they go to school in Adelaide, whether they need us down there or not. (Female primary teacher, who had lived in Flower Valley for 13 years)

The second group was characterised by newly appointed teachers who had lived in the region for a relatively short time (one to three years) and who did not see themselves as staying for an extended period. They are teaching in a rural/regional school because it is where they had obtained employment when they could not find a position in the city.

> I had an interview here and I was selected, it was the only school I was offered a job at, at the time, so I came straight from uni and I don't plan to continue to live here for ever, but I'll be here for another year or two I suppose. (Male middle primary teacher, who had lived in Flower Valley for two years)

> I took a year off uni and received this job in the country, and I don't plan to live here forever, but I plan to go overseas and work there and I'm not sure what to do after that. (Female junior primary teacher, who had lived in Flower Valley for two years)

In other words, they are teaching in the region more by chance than by design, and most said that they would move on after a couple of years. Clearly some teachers of this kind do stay on in the country. There is something of a belief that 'if a teacher stays for three years they are likely to stay permanently'.

Parents

Parents' reasons for living in country areas are generally related to lifestyle, employment and marriage. In some cases they have 'always lived here'. One set of parents had moved to the country for a change of lifestyle, with the availability of a particular type of school (Catholic primary) being pivotal in the choice of actual location.

> We decided to have a life change and try out the country, my husband was pretty keen to change work and change lifestyle, so that's why we came up to the country… Why did we make the choice of school we did? Well we were Catholic and wanted a Catholic school, that's the background I come from. One of the things we looked at in the towns … was accessibility of a school (Catholic) and the town we liked the best was Flower Valley, so that's why we came here. (Female parent at Catholic primary school, Flower Valley)

Several expressed views along the lines that the prospect of living 'in a large metropolitan city holds no favour' for them. In general these parents intend to stay living in the area, even though, in some cases, they are concerned about lack of choice in schools, given the lack of non-government schools in the area.

> …we're from Adelaide originally, my husband is actually from another rural centre … and we will try to continue to live here as long as work works out … schooling may end up being a bit of an issue … because we don't have a follow up school (Catholic secondary) that we can feed into and whether that proves to be difficult for us, we may have to transfer back, but we plan to stay. (Second female parent at Catholic primary school, Flower Valley)

> This is our home town so the kids naturally started their schooling here. We did consider sending them away to do their high school years, either private boarding school or much like I did. My son had plans of going to university at a very young age, that was his goal and in the end we decided if he was going to aim to go to uni he should be able to get the marks he needed from his own home town and we'd support him through his university years. (Parent, The Bay)

Students

Most of the students in the focus groups enjoyed living in a rural setting. They were able to enjoy locally-based activities and did not see themselves as significantly disadvantaged by isolation and lack of services in general. Some – especially those on farms or in very small communities – would like to live in the bigger centre in which their school is located as this would, among other things, avoid the long time to travel to school (45 minutes – one hour in some cases).

That being said, many of these students also indicated they would move elsewhere when they were older – perhaps to a capital city. This was because they felt that there was 'more stuff to do' in the city than in the country.

> I wouldn't really like to live here in the future, because there's not much shops, there's not much to do and it's too little a town. (Year 6 female, Catholic primary school, Flower Valley)

> I don't really live in Flower Valley; I live out from here. Well it's good because all my friends and that … live here but when I get older probably I'd rather move, somewhere like Melbourne or Brisbane or something… There are things to do here, but there'd be more somewhere else. (Year 6 male, Catholic primary school, Flower Valley).

For some, moving to the city would, in the first instance at least, take the form of being sent to Adelaide to boarding school from about Year 10.

> When you go away a lot you get, like, more responsible, 'cause like you go to work everyday and your Mum doesn't do your washing. (Primary Student, The Bay)

While students said that this 'makes you more independent' they were also aware of disadvantages of living away from home at a young age.

Perceptions of science, ICT and mathematics education in these schools

Teachers

Teachers in several of the schools noted that the staff was generally cohesive, with a 'strong sense of collegiality…many staff are willing to share skills, knowledge and equipment'. In one of the smaller schools it was noted that the size of the school made it easier to 'focus the curriculum', although at the same school there was some unease that mathematics and science, in particular, had been somewhat neglected as a result of the school's focus on literacy over several years. This 'neglect' of mathematics and science was also reported in one of the larger schools where there has been a focus on literacy, PE and health in recent years. Overall, a number of teachers feel that they are 'spread too thinly' and 'wearing so many hats' that their capacity and time to be involved in professional development and other projects is limited, even though they are aware of needs. These include middle years, not 'losing ICT in the integration process in the middle years' and, generally, upgrading skills in areas of perceived weakness such as science for a number of the primary teachers.

> In some ways I think there's a lot of those subjects, as a teacher, that you try and teach your best, but there're so many other things to teach in literacy and maths, and when you're talking about a junior primary class, everything sort

> of links in, so I don't feel that I'm probably doing my best in science. (Female junior primary teacher, Flower Valley)

There was something of a difference between the R-12 schools and the primary schools in relation to availability of resources. Whilst all were generally satisfied with the ICT resources (albeit with a sense in the largest school – The Bay – that teachers needed to do too much of the 'technical' work due to isolation). Teachers in Flower Valley (the small school) mentioned concerns about the lack of resources to teach science in the school.

> You probably find though that, because you haven't got the resources for the students, science might not be as exciting as it could be. (Female primary teacher)

> I think parents … are concerned that their children need numeracy skills and they need the ICT because they realise that's the way it works here, but science hasn't had much of a play so they're not, you don't normally get parents just saying "and how are they going in science?", it's always "how are they going in maths?, how are they doing in language?, how are they doing…?", you never get the science, "how are they doing in science?" it's always the big ticket items, "how's the computer going, how are they doing, what are they reading?" whereas science is sort of like the poor cousin. (Female primary teacher)

What all agreed on was that distance was an issue in terms of access to facilities located in Adelaide (e.g., Investigator Science Centre, Nature Education Centre, etc.). Teachers from Sandy Grove suggested that it would be more appropriate for these outreach organisations/centres to spend a more extended period of time in country centres. Teachers mentioned a range of locally initiated programs and activities. These included an agriculture program that 'provides a practical focus for students as well as underpinning science courses in the later years' (Senior science teacher, Greenview), local mathematics fair, programmed ICT time, linking science curriculum to the local community (oyster farming and aquaculture, viticulture). These activities reflect the schools' efforts to enrich their students' experiences in science and mathematics through their local efforts. The impact of programs that seek to utilise local resources for the learning of science, in particular, seems to be limited due to the teachers not having sufficient time to develop the links and build the possibilities into the curriculum. Hence, students' experiences of these opportunities and exposures are not linked in ways that help make what they have seen and experienced relevant to them.

Several teachers mentioned that class sizes were generally small. While this was clearly seen as an advantage in the compulsory years, it created issues of viability and quality in senior secondary. In The Bay, for example:

> The subject options available for Year 11/12 students are often limited. For example, chemistry has not been offered for 13 years. The on-site availability of biology, physics and specialist mathematics and mathematics studies[4] is determined by student demand from year-to-year. For example, students currently in Year 12 have to study biology via open access (where they speak with a teacher over the phone for 45 minutes per week). Students are then limited in their tertiary options. (Science teacher)

[4] These are the pre-tertiary mathematics subjects intended for students anticipating further study in the 'quantitative' sciences.

A further issue across both the schools with secondary components was 'the loss of kids to private city schools, not so much the numbers as leaders (lynchpins of the courses) who would encourage and support others'. (Senior science teacher, Greenview).

Access to professional development during school time[5] was a problem mentioned in all schools. The cost and time spent in attending sessions in Adelaide, and the difficulty of getting suitable (or indeed any) replacement teachers to cover their absence from school were the key issues in all schools. This is even the case in one of the schools with two permanent relieving teachers who are theoretically available to relieve for teachers absent at a professional development session. In practice, these teachers were most often assigned to contract positions (for a term or so).

> There's not enough offered to country areas and there is so much emphasis on teachers going to Adelaide (for PD) in school holidays, and 4:30 to 6:30pm every Wednesday for six weeks, and it's just not an option, not an option for me. I have a family and things like that; and I think there's so much offered in school holidays, which is great, but you're so exhausted in school holidays and you're thinking about what you're going to do next term, that it's just not viable at that sort of time. (Female junior primary teacher, Flower Valley)

In general, the more isolated schools found it difficult to attract staff, particularly those required to fill short-term contracts. As a result, teachers need to teach outside 'their area of expertise and this can be a real disadvantage to the students'. Distance can also result in lack of access to support services for students with learning needs and behavioural problems, and dealing with these students adds further to the things the school needs to do.

Teachers also highlighted some characteristics of the students that, in their view, militate against them reaching their full potential. In particular, 'the majority of students lose interest in science subjects by Year 9. Many of the students do not perceive a need for the study of science or mathematics.' Many Indigenous students do not have continuity in their schooling for a variety of reasons. This results in them doing a lot of 'one off' work and, generally, achieving well below their potential.

> I teach all the middle school – six, seven, eight, nine, and student drift is mainly an issue with the Indigenous students. They have a high mobility and transience from different communities in the area, so on any given day, I'll have maybe four or five Indigenous students on my roll but usually they won't be there. But every now and then they'll come … it's hard to get any consistency going with the students that randomly and infrequently turn up. I mean, you can't carry something on that the rest of the class is doing, so they end up doing a lot of one-offs. I don't think it benefits them a whole lot, but there's no other strategy you can do, unless you set something up that they can chip away at each time they do attend, which is what I'm trying to organise now. (Teacher, The Bay)

Parents

Parents seem to be supportive of the work and efforts of the teachers. Overall, the sense gained from parents' responses in all schools was that 'the teachers do the best they can in the

[5] This seems to be the preferred mode for professional development, with little support for 'two-hour, after school sessions' in at least one school.

circumstances'. They appreciate the efforts of most teachers and the effects of special programs established by the schools (e.g. agriculture program). While parents generally thought that smaller class sizes assisted their children's learning in the compulsory years, they see the same problems in the senior secondary level as recognised by teachers.

> The main problem is lack of access to many science and mathematics subjects in Year 11 and 12. Students are never certain what subjects will be available and may not plan on taking subjects such as physics. (Parent, The Bay)

Parents indicated that they were much more content with the mathematics, science and ICT programs in the primary years, based largely on the size of classes and the satisfactory level of student access to computers, although in one case (Flower Valley, the smallest of the schools) the lack of a dedicated science or mathematics co-ordinator resulted in a sense of isolation '… because you don't really know whether you're doing what other schools are doing'.

Like the teachers, when considering the secondary years, the parents were 'concerned about appropriately qualified teachers for specialty subjects, on-site teaching and other resources', the number of students who leave school between Year 10 and year 12 and 'the need for more flexible access to Open Access courses'. Some parents also felt that because there was not a wide range of employment opportunities in the area, students 'probably do not see a need to study science or mathematics'.

Some parents, particularly in the smaller primary schools, mentioned a lack of access to resources. At Flower Valley, a parent observed:

> … we don't really have … even a shelf for science. We don't have anywhere where they can set up experiments that take some time, leave them there or have special equipment to use that you couldn't use in the classroom.

For a number of these parents distance from Adelaide caused difficulties with other resources that could support teaching and learning in mathematics, science and ICT. They cited a number of activities such as science competitions, excursions, information workshops for parents etc., that were mostly held in Adelaide. The prohibitive cost of entering multiple competitions was also mentioned in one school.

The issues of attracting teachers to country schools, and retaining them, were not mentioned explicitly by the parents. The only comment about staffing was made in one school where the issue, for the parents, was something of the reverse – frustration that a teacher they see as under-performing could not be moved out of the school.

Students

The primary students' responses to questions about their experiences with particular subjects at school reflect what might be expected from their peers in the city.

For mathematics, they mentioned traditional topics such as decimals and fractions, but talked mostly about liking or disliking the subject – quite a number tended to dislike mathematics, although this was not universal. The Sandy Grove students indicated that they tend to like mathematics. Whatever their feelings for the subject, the students – like many of their counterparts in metropolitan centres – thought that teachers should '(m)ake maths more fun … turn maths into sort of a game', and cited examples of hands-on activities that they had enjoyed.

In discussing their experiences of science, this preference for hands-on activities was emphasised by several students. One said: 'I like science, and because I like making stuff and a little while ago we made phones out of cups and strings … and we did candles.'

Other topics mentioned by one group included sound, water, measuring time, making and racing land yachts, and the solar system. The emphasis on 'doing' was underlined by one student who suggested: 'I think we should just do experiments and not have to write it in our book, because you forget.'

Nevertheless, there was general agreement in all groups that they do not do science very often. Indeed, it seems that some younger students tended not to recognise that they were even 'doing' science. On the other hand they enjoyed doing the experiments and activities, and possibly saw that as the 'science', rather than acknowledging the science concepts that are associated with, and explored in the experiments. Their view was that if they were not doing experiments, then they were not doing science.

For most of the primary students, ICT was associated with working on the computer using software programs (e.g., Publisher, Microsoft PowerPoint), playing games and researching on the Internet. Many students said they had access to the Internet at home, although teachers at The Bay indicated that Indigenous students had significantly less access from their homes. Barnes (2003) reports that the use of computers can have a strong, positive effect on Indigenous students' learning. Finding creative ways to address the shortfall in home ownership of computers would thus seem to be a useful strategy.

One group described a structure for working with computers in class that is common in primary classrooms:

> …half the class will go on and then the other half will stay off and do work. We do that by pulling names out of the bucket. (Year 6 female, Catholic primary Flower Valley)

This group, unlike their parents, were somewhat dissatisfied with their access to computers at school and noted that 'apart from the library not every classroom had access to the Internet'.

Responses and thoughts about mathematics, science and ICT at school from the secondary students also, to a large extent, reflected those typical of students their age.

Mathematics was tolerated by some students and disliked by others. Attitudes to the subject were mainly practical with students generally feeling that they needed to do it. One student saw it as necessary and was determined to gain sufficient mathematical skills for a career choice. Most other students had little idea of the mathematics requirements of any career preferences.

Dispositions to science in school mostly ranged from neutral to negative. Various students expressed opinions about the focus of work in science lessons ('I'd like to have less notes to write in lessons') and questioned the practical value of science. The textbook was seen as 'boring' by one group, and teachers and students 'preferred the laboratory to the textbook'.

As with their primary counterparts, these students' experiences with ICT in their learning are mainly through using proprietary, generic software tools. Some instances of specialised software in mathematics were cited. Only at Greenview was there mention of an ICT specific component (as opposed to ICT being integrated as a learning tool across the curriculum)

though this was not offered as an option until Year 10. Access to computers for these students was satisfactory, but on the whole there was an impression that the use of computers in mathematics and science was not exciting, and students were not coming to appreciate the role of ICT in personal productivity in general, or in their own learning in particular.

The key area in which these students' experiences of mathematics and science in particular differed from those of their city counterparts was the small numbers in the senior classes. Students were frustrated by the lack of on-site access to some higher-level topics in mathematics and science, and the inadequacies of studying these by distance means.

Doing, and learning from science practicals was particularly difficult and in mathematics it was 'more difficult to get help when something is not understood'. Several of the students had been unable to take chosen subjects at school and study through Open Access College. This meant that they had one phone call with their teacher each week which they found inadequate. Lack of face-to-face contact made some aspects of studying difficult, for example, doing practicals. An advantage was small class sizes in Year 11/12 and easy access to computers. Lack of local technical help was frustrating when computers had problems, but the teachers managed to solve most of these.

One group also mentioned difficulties with computer reliability and the lack of local expertise to overcome these ('there is no-one available in town'). This was much less likely to be the case in the city and larger centres, as illustrated in this conversation from The Bay:

> Student: At the moment, the server keeps dropping out. They bought, like, two brand new ones.
> Researcher: And are there people in the town that are able to service them?
> Student: Not really. The teachers do it.

Educational aspirations for young people

Parents

Parents' hopes for their children's future varied from those with clear expectations of tertiary study, through to those whose aspirations were for their children to have some sort of trade qualifications (apprenticeship; traineeship). A small number 'didn't mind what their children wanted to become'. In general, the major goal was for the highest level of education attainable for the individual. Parents at Sandy Grove indicated that they want their children to have a selection of careers but were not concerned about which ones they chose as long as they wanted to do it. Although it was not a universal aspiration for their children, parents indicated that they would let them go to university if that was what they wanted to do. For the parents in Greenview there was a sense that educational aspirations were higher for girls than for boys.

It was of interest to note that one set of parents in Flower Valley, with definite tertiary aspirations, expect to move back to the city for their children's secondary education as they did not believe the local education provision would meet their requirements[6] due to the lack of a local Catholic secondary school. At the other end of the spectrum was a fear that a child would leave the local area for work or education. For this parent, keeping the child nearby seemed a more important outcome than educational attainment. In general, most parents accepted that many of their children would leave home for study or work.

[6] This family had recently moved *to* the country for the lifestyle advantages.

One parent noted that they have a child undertaking an apprenticeship, despite having had aspirations to go to university when at school. This young person did not achieve a high enough TER score to pursue that pathway. The parent believed that 'the difficulties of studying in a remote location without access to particular subjects and the need to study via open access… caused the low TER.'[7] This anecdote supports the views expressed elsewhere that young people can be disadvantaged in the senior years.

Students

Primary students were generally unable to answer questions about their aspirations, or did so from a fairly superficial base (footballer, pet shop owner, fashion designer, secretary, etc.).

There was more substance in the older secondary students' responses. There were those with particular pathways in mind (vocational and tertiary), and these young people had an appreciation of the need to take certain mathematics and science subjects while at school. In one case, at least, a student was taking a particular mathematics subject because he needed it for an apprenticeship, not out of any preference. Younger secondary students tended not to see science, mathematics or ICT as relevant careers.

Influences on learning outcomes in science, ICT and mathematics

Teachers

The focus groups elicited teachers' views on attracting and retaining good teachers in general, and good science, mathematics and ICT teachers in particular.

Some schools did not experience problems with attracting teachers, while others such as The Bay did:

> Researcher: Is teacher attraction or retention an issue in the school?
>
> Teacher 1: Attracting teachers, yes.
>
> Teacher 2: Attracting, yes. But we've got Jack as a prime example. If we keep them for any more than three or four years, we usually can't get rid of them.
>
> Teacher 2: But we've found with a lot of teachers that once you get them over the hurdle and get them into the community and get them known around the place, and that sort of stuff, then they seem to stay for a long time.
>
> Teacher 1: Yeh, I suppose in my first three or four years here, we'd probably have about a 40% staff turnover. That's not unusual to have, you know, up to a dozen new staff, and very few of those would have been permanent appointments; a lot of contracts. We also used to have a lot of contracts starting throughout the year which makes things difficult. We struggled to fill part-time vacancies and this is why, to a certain extent, we targeted Dick after his successful prac. He was from here, he had a successful prac, so we knew that he could teach, so yes, we grabbed him straight away. Sometimes the people that you're picking up through a general recruitment process have not been successful in obtaining jobs elsewhere, which makes it difficult. …a couple of years ago we had a new graduate in maths and science. She did

[7] While this was a comment across all subjects it was in part related to less access to science and mathematics subjects that tend to result in a higher TER scores.

> twelve months here and then got a position in a private school in Adelaide, so we spent a lot of time and effort getting that person up to speed in the way in which the school operates, and to lose those skills and expertise after twelve months…

In these cases, some of the suggestions included encouraging more pre-service teachers to do their practicums in rural areas, employers providing country incentives (financial, housing) and giving teachers in mathematics and science permanent appointments in their schools, rather than short-term contracts.

All schools except Sandy Grove reported problems with retaining new teachers for more than one or two years. For Sandy Grove, there had been a significant changeover 'a few years ago', but since then the staff had been quite stable. For this school the problems of staffing related more to attracting short-term contracts and relieving teachers.

Parents

In response to questions about the community's attitudes to science, mathematics and ICT, one group indicated that these subjects are not perceived as having a lot of practical uses in the community as a whole. Despite the parents' aspirations (as outlined above) another community was noted as giving:

> very little recognition to academic pursuits in science, maths, ICT. "Those people are just nerds." Most attention in the community is given to sport. (Parent, Flower Valley)

Other concerns raised indicated that the remoteness of the town diminishes opportunities and student aspirations. In these smaller communities there were few role models seen as able to inform and inspire young people in relation to careers that involve science, mathematics and ICT. In addition, concern was expressed that it was hard to keep good teachers since career opportunities for teachers lay in larger regional centres or in the city.

SUMMARY OF FINDINGS

The findings from these interviews need to be viewed in the South Australia context. The population is highly centralised in Adelaide, with no centres classified as 'Provincial City', that is, having a population between 50000 and100000. In fact, there are few centres of any significant size (say, pop. >10000). Even in the relatively populous regions, the density of population remains low in real terms. Hence, Adelaide is seen as the central – and only – repository of resources to support young people's learning in science, mathematics and ICT beyond what is feasible within the schools themselves. In many respects this is the current reality, as is the necessity for students to move to Adelaide to pursue tertiary study in these areas.

This, then, is the face of 'isolation' in this state – everyone outside greater metropolitan Adelaide or its close environs can be seen to be isolated, and these respondents perceive that they are isolated, in various ways. Clearly there are degrees of isolation that relate to distance from Adelaide, but teachers, students and parents in all these schools identified issues that can be seen as direct consequences of their isolation within the context of this state. While they are generally proud of their schools and what is being achieved, they feel that, because of their location, they are in some way inferior to schools in Adelaide.

Teachers in these schools felt they weren't aware of what was happening in education in mathematics, science and ICT. Their core concern was lack of access to professional development. Given that most professional development outside schools is held in Adelaide, the costs of travel – both monetary and in terms of teachers' time – are always large and in many cases prohibitive. The other practical constraint on their participation in professional development was the capacity of the school to replace them in their classes. In many areas of the state there simply aren't people available for casual relief teaching. This is a major constraint on participation in both in-school and out-of-school professional development. While on-line delivery of professional development may have the potential to overcome the issues of travel and associated costs, none of the teachers related successful experiences with this mode of professional development. Similarly, no teachers referred to professional associations, despite these organisations providing teacher support in a variety of ways. Clearly programs must be put in place to improve access to professional development and connections with professional organisations.

Staffing would appear to be critical for most of the schools, although it is true to say that the difficulties vary with the context and location of each individual school. For more remote schools, there are basic difficulties in recruiting and retaining appropriately qualified staff and having access to relieving teachers. Other factors can be staff 'complacency', often seen as a negative outcome of longevity in a school. Resources and materials appear to be a difficulty in smaller (primary) schools. Staff in these schools can also feel very 'stretched' as they try to work simultaneously on several fronts. In the face of the demographic challenges, it would appear that education systems need to examine new and novel responses to staffing concerns.

Several key findings emerged in relation to teaching and learning in these schools. Teachers in the two primary schools felt they did not have access to suitable facilities for science teaching and to advice to support them. This was not such a problem for teachers in the primary years in the Area Schools. They appreciated the access to facilities (including substantial numbers of computers in at least one case) and expertise that working in an R-12 setting provides.

Other more specialised resources, in particular, science education 'outreach' programs were highly valued for their capacity to extend and enrich teaching and learning in science. Again, however, isolation creates significant problems of access. Even when these organisations tour country centres it is found that the visits are too short to enable substantial gain in the students' learning and attitudes to science. Rural and regional schools must be supported in connecting the science that already exists in their surroundings with their curricular practices. This process should involve making links with local businesses and industry.

A core issue in the senior years is access to science, mathematics and ICT courses appropriate for students aspiring to undertake further study in these areas. In many cases the numbers are so low that studying these courses by distance mode is the only possibility. This was viewed by the teachers, students and parents as being inferior to learning in face-to-face mode. This seems to be a major factor in some families' decisions to send young people to boarding school in Adelaide and this, of course, further reduces the 'pool' of students in the senior years in these smaller schools. Nevertheless, there is emerging evidence of improved distance learning via new technologies.

The key concern in relation to the educational progress of Indigenous students is transience. From these findings the challenge for teachers and schools is to develop programs that account for the reality of irregular school attendance in these young people, and which serve

to maximise their progress. These students also tended to have less access to computers in their homes. Skills of Indigenous students with multimedia have been identified in other projects, but such depend on extensive access. Attention should be directed to appropriate curriculum and teacher practices for needs (including transience) of Indigenous students.

The parents involved in the focus groups had a similar range of aspirations for their children to those which might be found among parents in metropolitan locations. However, for those with expectations and hopes that their children would undertake higher education, there was a sense that the local provision may not maximise the chances of this happening and that boarding school (or moving to the city as a family) would be a better solution. Many parents also expressed the view that while achievement in sport is clearly celebrated in their communities, academic achievement attracts far less public recognition.

It was clear from these focus schools that many resources exist to support improved learning in mathematics, science and ICT. It will be important to provide communities the capacities to develop and utilize these resources.

REFERENCE

Barnes, A. (2003) *Voyage of discovery: Teaching and learning, whole school change and ICTs at Le Fevre High School, 1998-2002*. A report for Le Fevre High School and the Department of Education and Children's Services: Adelaide.

‘You don’t have other teachers to bounce ideas off’

Report from SiMERR Victoria

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EXPLORING BOUNDARIES

Whether breaking down data from national and international testing, looking at data concerning state examinations or participation in post compulsory science, ICT, and mathematics, or analysing the results of the SiMERR National Survey, two things are clear. First, students in rural Australia are significantly disadvantaged compared with their metropolitan counterparts. Second, the degree of disadvantage varies considerably depending on the degree of rurality (mainly conceived of as remoteness) and the nature of the school community. Causes of disadvantage include access issues such as cost of boarding schools or daily transport and quality issues arising from subject choice, educational delivery, educational opportunity, and resource provision (DEST, 2002; Stokes, Stafford & Holdsworth, 2000).

One of the issues to be considered when discussing science, ICT, and mathematics in rural and regional areas is the question of boundaries. The first type of boundary that is relevant concerns geographical divisions between metropolitan, regional, rural, and remote schools. There is considerable variation in the relative isolation of schools and the types of communities that they represent. Thus, there are related variables such as town and school size, proximity to major community facilities in major centres, and socio economic indicators that interact with the more obvious rural features of isolation and community focus. This all makes for a complex story. The choice of schools in Victoria for this study was made in order to reflect these variations. The effect of location on student learning and achievement is complex and is not easily predicted, and these interrelationships will form part of the analysis of data in this chapter.

The second type of boundary is between science, ICT, and mathematics, and the school curriculum generally. A lot has been written about the rural school experience, but the focus of the questions and the analysis here will be particularly on science, ICT, and mathematics. Nevertheless, many of the issues being addressed would apply to other areas of the curriculum, and the school culture in general, so teasing out subject-specific issues is one of the tasks of this report.

A further boundary often referred to in relation to rural education is the 'digital divide' (see, for instance, Cresswell & Underwood, 2004). This is not only a question of the availability of, and expertise with, computers and software – for both school and home machines – because Internet speed, cost and availability are the basis of significant equity issues in rural and remote communities (Besley, 2000). These forms of access also relate to the socio-cultural status and university education of parents – both significant factors affecting the likelihood of students having Internet access at home (Besley, 2000; James, 2002). This boundary is particularly relevant because information technology is generally seen as the medium that will lead to the 'death of distance' and to fuller participation of rural students, citizens, businesses, and institutions in the knowledge economy (Caincross, 2002).

This chapter reports the results of an exploration of rural school teachers', students', and parents' experiences related to life and education in rural Victoria. Six schools were studied, with three focus groups – of parents, teachers, and students – being conducted at each. A focus group was also undertaken with seven Victorian Regional Project Officers who are managing the *School Innovation in Teaching* initiative in science, mathematics, and Technology.

PROFILING RURALITY

The Victorian context

Victoria has 25% of Australia's population, with over 70% of the people living in Melbourne and its outer suburban areas; 34% of all Victorian students attend regional, rural, and remote schools; and 49% of the state's government schools exist outside Melbourne along with 50% of non-government schools. However, with only 3% of Australia's geographical area, Victoria has few regions that could be categorised as remote, and at the start of the 21st century there were only 67 students studying full time with distance education centres as 'isolated' students (HR&OE Commission, 2000).

The focus groups

In each of the six schools focus group discussions were held separately with parents, teachers, and students. Each group comprised between two and eight members. The issues pursued dealt with community characteristics; perceptions of science, ICT, and mathematics at the school; and views of the conditions for quality education in these subject areas. We also probed what these groups considered to be appropriate measures of success in these subject areas, i.e., their perceptions of the subjects' chief purposes, and asked groups to consider the differences – both positive and negative – between the rural and metropolitan experiences of teachers and students. Having attempted to capture details about individual cases, this analysis will attempt to identify patterns in the responses to determine the issues occupying the minds of these participants with regard to rural experiences of schooling in science, ICT, and mathematics.

In addition to the 18 school focus groups, a discussion was held with a group of seven regionally based Regional Project Officers (RPOs). These have been supporting schools and teachers with professional development provision and as critical friends, as part of the *School Innovation in Science* initiative and its Mathematics and Technology sequels. Because they interact with so many rural teachers, the RPOs are in a powerful position to provide insights into the teaching of science, technology, and mathematics in regional Victoria. This focus group explored issues of teaching and learning, effective programs and, in particular, professional development provision.

Profiles of the schools

The six schools represented in this study were chosen partly at random, based on convenience, but also on a wish to represent a range of school circumstances and to explore how different dimensions of regionality and rurality interact and influence student learning. The schools were all rural in the sense that they were not in Melbourne or regional towns, but they differed considerably in terms of size, degree of isolation from larger centres, types of community represented, and the degree to which each could be considered to be the focus of local communities, and in their proximity to a variety of geographical or human resources.

Laneway Secondary College[8] is in a town on the Victorian coast, remote from Melbourne but within a half hour's drive of other sizeable towns. The local population is about 5000. The school has a history of innovation in its Year 7–10 program and has recently extended to offering Victorian Certificate of Education (VCE: matriculation year) subjects. The local community is diverse, with fishing and tourist industries, increasing numbers of retired residents and a sizeable population on government support.

Echidna Secondary College is one and a half hours from Melbourne in a predominantly farming area. The school has an established VCE program. The area has a community of about 3000 people who chose it for lifestyle reasons and because of the relatively lower cost of living.

Madura Primary School is in a rural setting 15 minutes drive from a large regional city of 250000. It therefore does not suffer the same isolation as some of the other schools. Nevertheless, its situation is such that there are a number of issues relating to community, size, and location characteristic of the general outer-regional experience.

Rolling Primary School is located in an outer suburb of a large regional centre. The area is severely under-privileged with an extremely high incidence of unemployment. Social problems are very common and for many families unemployment has been endemic with parents and grandparents not working. There is a very high incidence of single parenting as well as separated and blended families.

Runningbrook Primary School is in a town of about 1000 people, more than an hour's drive from any regional centre. It draws Catholic students from Runningbrook and surrounding country towns as well as the mixed farming region. Many Catholic children in the area now go to their local state schools, so the school tends to attract those seeking a strong religious education and pastoral care. Although there are few disabled children, the school has six integration aides, and a heavy emphasis on individual reading tuition. Fewer families on farms and smaller numbers of children in families have also led to a declining school population. Socio culturally, the town is fairly homogeneous – predominantly Anglo-Saxon, with a good employment rate. Like many rural schools with between 50 and 90 students, the school runs three composite classes (P-2, 3-4 and 5-6).

Moorabool Primary School has a population that varies greatly (from a base level of 7000) because of seasonal influxes of fruit pickers and processors, many with immigrant backgrounds. The transient nature of these families has affected student learning as children come and go on a seasonal basis. Many go and don't return, or return confused and unsettled from being in a different education system. Consequently, for teachers there is a continual settling-in and re-establishment aspect that needs to be incorporated into their teaching program. Generally, children from these low socio economic families are not well supported

[8] School names and names used for focus group participants are all pseudonyms.

educationally at home and require extra attention from teachers. According to the teachers interviewed, this leads to a disproportionate amount of time needed by different student groups, as many children do not read well and can be disruptive.

THEMES ARISING FROM THE FOCUS GROUPS

A number of important features of these school communities emerged as a frame for understanding student learning in science, mathematics, and ICT in rural settings. Briefly, these features were:

- *The size of the school community*, which has an effect on personal relations, access to funds, the ability to provide curriculum variation, and the diversity of students' peer groups.
- *Location*, including proximity to community resources (such as museums, excursions and visitors to schools), to local businesses (with implications for resource access, and potential student project investigations), and to other schools and teachers (with implications for professional development opportunities, mutual support and student interaction).
- *The nature of the community*, including socio economic indicators that have implications for school resourcing, role models, support for students, and students' educational expectations.

On the basis of this study, the 'one size fits all' view of science, ICT, and mathematics experience of regional and rural schools cannot adequately capture the range of circumstances of teachers and students in these schools. Similarities and differences between ideas expressed in the various schools' focus groups are discussed below with reference to themes identified from the interviews.

Living in rural Victoria

Almost all the teachers and parents in the primary school focus groups had rural or regional backgrounds, as did the secondary school parents. The secondary school teachers, on the other hand, were nearly all from Melbourne or large regional cities. However, when talking about the reasons for choosing to live and work in regional or rural Victoria, or for sending their children to rural schools, a coherent pattern emerged.

The rural advantage

Overwhelmingly, teachers, parents, and students talked of the lifestyle advantages of regional living, and the sense of community. They mentioned the same factors identified by Education Queensland (2005): pastoral care and support from the local community, a strong sense of belonging and safety, and the potential for creative links to community organisations and businesses.

Parents focused particularly on the advantages of community support, for example, being known by shopkeepers; accessing babysitters and the pastoral care available for children. Parents and students mentioned safety as a significant advantage:

> Kids can wander from a young age. (Effie, Runningbrook parent)
>
> It's quiet. We can leave the back door open, can leave stuff outside. (Belinda, Madura PS student)

Students in particular talked of space and outdoor facilities. There is 'plenty of room and places to go' where they 'can race bikes', and 'the river is at the back door'. However, some regretted that there were 'not so many things to do' and 'better shops' in Melbourne, and mentioned the need to travel to regional centres 'for ballet and music classes' or 'to borrow books from the library'.

While some teachers had moved to the area to follow a partner's career, most mentioned the relaxed lifestyle, the proximity of home to work, affordable housing, and the advantages of country environments for bringing up children. For Moorabool and Madura primary schools, some of the teachers lived in large regional cities close by, and hence combined the small school working environment with home environments that were more metropolitan in character.

Attraction of rural schools

In keeping with the community-focused views of rural living, regional and rural schools were seen to offer advantages in this respect. For teachers, the close relationships forged with students, parents, and other teachers were cited, and comments about 'being acknowledged in the street and shops' were common. Teachers felt that 'you are part of their life, instead of just doing a job' and that parents were 'on board'.

Working in small schools was also seen to confer developmental advantages because of the multi-skilling entailed in taking a range of responsibilities. The support of staff was also generally held to be a strong feature of country schools, although two teachers felt vulnerable and 'needed more professional stimulation' because of very limited staff numbers.

> There's not enough staff to form a professional community to have really good discussions about curriculum matters and maths teaching. (Carol, Laneway SC teacher)

Teacher attraction and retention

In none of the six schools was teacher retention felt to be an issue. Madura and Rolling Primary Schools' teachers explained that it was hard to find positions in the areas because teachers tended to stay, partly because of the attractiveness of the area. 'There are thousands of teachers out there who would love a job here,' was a point of general agreement in a Rolling PS focus group.

> One of the reasons young staff stay is that staff are supportive and help one another. This is not so in city schools. (David, Laneway SC teacher)

> (Retention is) not an issue. We have got younger staff who tend to stay because of collegiality, homogeneity of staff. Some mix socially. It's not so far to Melbourne, and has good weather and wineries. A good atmosphere. (Graham, Echidna SC parent)

However, in several focus groups, longer-term employment in the same school was seen as a potential disadvantage. For example, teachers at Laneway and Echidna talked of having a core of older, more experienced teachers, and the need to attract and retain younger teachers, 'as it is critical to be able to offer ongoing positions to attract young staff with families'.

While teacher retention at the focus group schools was not a problem, the group of Regional Project Officers (RPOs) who deal regularly with Victorian rural schools also clearly spelt out problems of retention that echoed this feeling:

> (There are) serious problems with attracting and keeping teachers who are well qualified in the various sciences, maths, and IT. This not only affects quality of teaching, but expectations for students to study maths, science, and IT at higher levels. (Graham, RPO)

Of course, the situation varies considerably depending on the school and the region. It was mentioned by one teacher that 'well-qualified teachers of the enabling sciences are in demand in city schools', and they 'usually get to teach their favourite subjects at senior levels'. She noted the danger of considering teachers to be qualified to teach in all subject areas because 'kids are so easily turned off in middle school levels if teachers don't know the content and how to teach it well'. This raises the question of how best to attract and retain well qualified teachers of science, ICT, and mathematics to regional and rural areas for primary, lower secondary and upper secondary levels.

Similarly, student drift varied as an issue, with Moorabool PS and Rolling PS experiencing drift at disruptive levels because of seasonal work in the areas:

> (Drift is) fairly high – fruit pickers and seasonal workers. The children coming and going causes disruption. (Anna, Moorabool PS teacher)

> Some parents move to try to get work. Lots of split families. It has decreased in recent years, but still a big turnover. There is some seasonal work with spuds, orchards. (Bob, Rolling PS teacher)

At Laneway SC, drift was associated with transient families moving because of changing economic factors. In the other three schools drift was not an issue. These more settled communities were in agricultural and tourist areas where few seasonal workers were employed.

Student expectations

The quality of guidance for students and their parents to ensure that capable students undertook higher-level mathematics courses was another factor. This was noted by Bottoms and Carpenter (2004) as being a vital aspect of rural success. The teachers and parents who participated in the focus groups generally seemed to have high expectations in this respect.

Students' educational aspirations affect their subject choices and, in particular, they are not as likely to develop a keen interest in the enabling sciences (including ICT and mathematics) if they are not intending to undertake post-compulsory schooling and higher-level studies. Given this situation, it was pleasing to note that – contrary to the general perception of rural employment patterns – most students in the focus groups had expectations that they would undertake tertiary study.

Students in the primary school focus groups mostly imagined themselves in careers that involve TAFE levels of education[9] (carpenter, electrician, pilot) or had expectations of

[3] It could be that the students and parents invited by schools to participate were not representative, and it seemed that some bias did occur with the decision to ask articulate students, and a tendency to ask parents who were involved in the school to some extent.

university education (scientist studying extinct animals, teacher). Two who spoke about taking over family farms said that they intended to undertake agricultural science courses, and one said that she would study 'Management'. The secondary school students were planning on tertiary studies (e.g., biomedical science, sound engineering, massage or physiotherapy, graphic design, veterinary science). Only one student had 'no idea'.

James et al. (1999), in a survey of 7000 senior secondary students, found that such expectations arise largely from family and community attitudes and that these are more powerful in shaping rural students' aspirations than factors such as isolation and losing touch with friends. The parent focus groups exhibited a similar profile of expectation, with most mentioning university as the preferred option. Extracts from the Runningbrook PS group represent well the range of opinions expressed by parents asked about educational aspirations for their children:

> University – it is important to go, even if they come back afterwards. (Zahil)
>
> University …but it is up to them – we will support whatever they want to do. (Rhonda)
>
> Probably university or TAFE or the Forces. His brother and sister are both at university. (Peter)
>
> Agricultural college of some sort. (Janine)
>
> Year 11-12, then apprenticeship. He is interested in doing a trade. (Sana)
>
> I can't imagine him living in the city or working in an office – he's an outdoor boy. (Lita)

Kenyon, Sercombe, Black and Lhuede (2001), in a study of Australian rural communities, found that while few rural people have tertiary qualifications, they tend to see 'education as a conduit for ideas and innovative thinking that may ultimately impact on the family farms and rural communities' (pp. 34–35). This became the topic of short discussions in one focus group:

> He will own the farm one day, but we expect him to get a good education first. Farmers need to be well educated these days. He is interested in Chemistry or Vet. Science. … I take the kids to the city each year and they choose where to go – Scienceworks, museums, the zoo. We go to university open days as they get older, but we have to stay overnight. … The older ones stay with their aunty while they do work experience for school, so that they get used to the city and using public transport, and see a different range of job opportunities from here. (Runningbrook PS parents)

However, about 15% of students in Australia who plan to go on to university do not (Khoo & Ainley, 2005), and many subtle factors have an effect on actual outcomes. In this same school several parents and teachers thought that boys in particular might not consider tertiary education, because of a wish to play football:

> It depends if he wants to stay in the area for sport. Hopefully he will play for the local football team. (Lita, Runningbrook PS parent)

This is consistent with the statement by the Higher Education Council (in James et al., 1999, p.iii) which claimed that:

> … the pull of the local community and peer group, even of the local football team, can in some cases be the difference in deciding whether a young country person – particularly a young man – tries for higher education or not. More interestingly, such intangible lifestyle factors may have as much, if not more, sway than the more obvious factors such as cost and expense, and distance from home.

Almost all secondary school parents had university aspirations for their children. However, some talked about the difficulty of country students attending university in the city, away from home:

> It's a huge disadvantage for parents if children have to go to the city to study, and a huge social learning challenge for the children. City kids are wiser and more knowing – country kids would start in the city at uni with a social disadvantage. (Ron, Moorabool PS parent)

Because socio economic background is the major factor associated with variations in students' perceptions of the value of higher education across Australia (James et al., 1999), it was surprising that the educational aspirations of students and parents in the focus groups were uniformly high. At least one parent argued that financial considerations do not affect children's career aspirations:

> Kids don't think of the money side of things – it's not an issue as such. They see university as the norm. (Sani, Laneway SC parent)

More subtle influences of the rural school community in shaping students' aspirations are discussed in a later section. It was noticed that there were some differences between student/parent aspirations, and teachers' assumptions about these. For example, in a school where all children had talked about their intentions to undertake tertiary studies, and parents also had relatively high expectations, teachers generally agreed with a colleague's statement that 'The parents are generally employed in agriculture and service industries, and their children will have the same opportunities, so expectations are not high and the children are generally not striving for a different future.' Such statements supported Alloway, Gilbert, Gilbert and Muspratt's (2001) finding that rural teachers and parents are inclined to express more negative views than students about what lies ahead.

Science, ICT, and mathematics in these schools

The focus groups explored students' experience of, and attitudes to, science, ICT, and mathematics in their schools, as well as teacher and parent perceptions of current strengths in these areas.

Students' experiences of science and mathematics

Students were asked to nominate their favourite school subjects and, in particular, to talk about what they liked in mathematics and science.

The students generally expressed a liking for mathematics, or at least some aspects of it. Apart from popularity votes for topics ('I like division and multiplication, don't like algebra,

graphs, hate fractions'), there were two factors that seemed to feature in students' attitudes to mathematics. The first was satisfaction arising from success or feelings of competence:

> I'm good at it. It's easy. (Luke, Moorabool PS student)
>
> Assignments are good. We can go at our own pace. (Rota, Laneway SC student)
>
> I like maths in general but not the difficult bits. (Pauline, Echidna SC student)
>
> I like maths in secondary school because you can focus. (Dianna, Echidna SC student)

The second was students' appreciation of mathematics learnt in relevant contexts.

> It (a special program on 'Money Maths') relates to real life, it relates to business, it teaches you how to buy things; it's relevant to adult life. (Minnie, Rolling PS student)
>
> Mummification is good, at the moment (maths and science and SOSE integrated). (I like) the maths and garment design. (Simon, Echidna SC student)

When asked to whom they went for help with mathematics, the general consensus was first to their friends and then to teachers.

Science sat very differently in students' views. Primary students found it difficult to identify what science they had done, and often had to be prompted. This finding was in accordance with those of Goodrum, Hackling and Rennie (2001) who reported that science is often under-represented in the curriculum. One student claimed that they 'do not study science because they have no Bunsen burners'. For the children in one primary school, a visit to a secondary school science laboratory was an exciting occasion, but there was some indication that this didn't happen often.

Nevertheless, the students generally made it clear that they enjoyed the hands-on aspects of science, although in some cases poor behaviour deterred some teachers from including many opportunities. Comments included:

> The best thing was 'oobleck', and making icecream. (Freda, Madura PS student)
>
> We have science every second week. Experiments are great but we don't get to do many since if one person mucks up we don't get to do them. Kids are always stuffing up. (Madura PS student)

There was some recognition that rural environments offered a different focus for science activities, both at home and at school:

> I help Dad all the time with the scientific records ... cattle feed, medication, weight of the animals on their diets, bags per hectare, weed sprays – it's all on computer and we put it in the graphs and keep a scientific record. Milking too, and feedlots. (David, Runningbrook student)

The secondary students were all reasonably positive about science, with the Echidna SC group commenting particularly on a leaf hopper biological control project that they had done with support from CSIRO.

Teachers' and parents' views of school science and mathematics

For teachers and parents, the strength of staff and the capacity to plan and work together was a major theme in talking about the strengths of mathematics and science:

> Through IMYMS [Improving Middle Years Mathematics and Science – an ARC and Victorian Education Department jointly funded Deakin project] we are organised to share planning and resources across the cluster. … We have gone from text-based maths to problem solving activities. … The recent cluster based PD [professional development] has strengthened maths. (Madura PS teachers)

> (There is a) core of dedicated staff. Lately people retiring and younger teachers hanging in. Good conditions for them. … We've reviewed maths thoroughly over the last few years. Lots of hands-on projects, goal-based assessment. … Activity-based work in science and maths is part of every unit. (Laneway SC teachers)

> [The greatest strength is] being able to talk and work or plan with other teachers. (Carole, Moorabool PS teacher)

There was generally a feeling that in these rural schools there was closeness among staff and a level of mutual support that did not exist to the same degree in city schools. This advantage has been noted previously in US studies (e.g., DeYoung, 1987; Fan & Chen, 1999).

Parents also highlighted the quality of staff and smallness of the school as particular advantages. They pointed to the importance of the relation between staff and students.

> The school's greatest strength is the enthusiasm of the teachers. Maths and Science Coordinators are passionate about their work. (Sani, Moorabool PS parent)

> Teachers seem good in maths and science. Of all subjects these get the most homework. If kids want to push themselves they are supported. (Oprah, Laneway SC parents)

> The teachers try to get to know the family background so they can identify needs. (Sandra, Rolling PS parent)

> Staff know every kid. … It's more personal. (Echidna SC parents)

Nevertheless, there was some concern from parents in three primary schools that science and technology were not adequately represented, and were poorly resourced – an opinion shared by some of the teachers. One teacher commented that '… city schools are much better resourced because they have more parents and industries that they can get money from in fundraising and more school fees to buy equipment over the years'.

There was also a concern expressed in both primary and secondary schools that city schools would have more teachers with subject specialisations – a factor that supports day-to-day

professional development arising from sharing ideas, team curriculum development and lesson planning, and mentoring of new staff members. The existence of strong professional departments within secondary schools is one factor that leads to effective teaching (Ingvarson, Beavis, Bishop, Peck & Elsworth, 2004), so this raises a question of how such links could be made, and professional communities developed, within clusters of relatively small rural schools.

ICT and computer use

There was little evidence or mention of ICT courses in these schools and the depth of discussion on the use of computers varied considerably.

> ICT has varied. At the moment grade teachers take ICT and we struggle with resources for the lab. We want to keep computers in rooms. PD (on Intel) has impacted on all areas. Being close to [a regional centre] allows PD access. PD in ICT is run in the school. (Madura PS teachers)

> ICT is not driven by a teacher specialising in ICT, whereas all maths and science teachers are trained. (Rose, Echidna SC teacher)

> Students use the Internet a lot. … It's a good chance to use computers. … The *Maths 1,2,3* software sent home was good. (Madura PS parents)

Students provided the best evidence on the state of computer access in their schools and their home usage. Except for Rolling PS, most of the students seemed to have more access to computers at home than at school. With respect to school use, students talked about particular units of work.

> Year 7 Microworlds was really fun. … Computer studies is basic, boring – making a website, typing, Excel – but movie making was good [and] editing. (Echidna SC students)

> The computers here [school] are hopeless. Slow, slow. They break down all the time. At home we have fast broadband and a new model. (Samantha, Runninngbrook PS, student)

> [There is] poor access at home. One boy has Internet access (dial-up), one girl knows there is Internet access on their computer but is not permitted to access it. Others have no computers, or only very old slow ones but no Internet. (Researcher, Rolling Primary researcher report)

The frustrations of using computers at school was a common theme with students:

> The computers at school – they freeze, [it's] frustrating. … If you don't save, you lose work. There is a slow shutdown at the end of lunchtime and you can lose work. It can be very slow if there are lots of people, okay if not. … We got broadband wireless last year. (Echidna SC students)

> Don't get much chance to use computers at school. … If we use them at school, we use them for searching for information, typing, writing stories, games. (Rolling PS students)

School size was felt by some teachers to be a major influence on computer access. One primary teacher noted that in bigger schools there would be 'teachers with technical expertise and probably someone in charge of maintenance' as well as 'lots more software than we can afford'. On the other hand, at the small Madura Primary school, teachers were satisfied with the level of support provided through a cluster sharing arrangement and parental support:

> The technicians are fantastic; we have high level access for a half-day and low level access for two days ... we (also) have a parent who is an IBM worker. (Jill, Madura PS teacher)

Nevertheless, the students did have access to computers almost everyday at school, which corresponds with the finding of Cresswell and Underwood (2004) who noted little difference in access to computers between students in city and rural students across Australia.

Issues in science and mathematics provision

The list of concerns generated by teachers is at least twice as long as the strengths mentioned. There were numerous interconnecting dimensions of the rural experience that were regularly identified in all groups. These are described below, prior to a discussion of the ways they interact.

Remoteness

While special events such as excursions, visits by scientists, and mathematics competitions are not part of the mainstream curriculum, they do provide variety and can be effective in stimulating student interest and knowledge as well as illustrating practical applications. However, there are not many such options available to isolated communities (Murkins, 2001).

The six schools varied considerably in the degree of remoteness from Melbourne or large regional centres. The issue of remoteness came up regularly in relation to a number of disadvantaging factors. For teaching and learning it showed up in relation to difficulties in accessing community resources such as the Scienceworks museum (a well resourced interactive science and technology centre) and regular access to a range of visiting speakers. Remoteness also featured in determining students' levels of familiarity with science or mathematics-related sites or professions, and opportunities to explore future education pathways:

> [The Shire Office] is a long way for visitors so it is hard to get them here to talk with the students. City kids have all that close by (industries, justice, parliament, museums). (Alice, Runningbrook PS teacher)

> The facilities are not so good. There's no easy access to programs for students, for example, a genetics program at Melbourne University was 2.5 hours each way, and expensive. (Gillian, Echidna SC teacher)

> [One obstacle is] not having a Dick Smith's [electronics store] down the road, or a hobby shop. Staying up-to-date with movements; discipline knowledge is an issue. (Don, Laneway SC teacher)

> In terms of the avenue into post secondary, it's harder for rural kids to go to [university and TAFE] open days. (David, Laneway SC teacher)

> With classes, you can't walk to visit small businesses. … Bus costs are enormous so excursions are difficult. … The Scienceworks excursion to Melbourne was expensive even with the (state government rural) subsidy that we could get. Country kids usually have to stay overnight and for my parents that money is hard to find. (Madura PS students)

School Size

Size is a significant factor shaping school organisation as well as forms of teaching and learning in rural schools. In small primary schools, teachers teach up to seven grade levels, and rural secondary schools often amalgamate classes or reduce the variety of subject offerings. Lana, one of the RPOs, observed that 'composite classes are common in rural areas, and often unworkable'. This is particularly the case for higher levels of secondary mathematics, resulting in the potential for talented students to suffer from lack of 'performance cohort association' (Murkins, 2001).

At all secondary levels it appeared common to have staff teaching out of their areas of specialisation, a factor that encourages schools to employ part-time teachers to maintain flexibility. Unfortunately, specialist teachers of the range of sciences, as well as mathematics and ICT, are not often found in small towns. Focus group members commented on the fact that there were fewer staff to interact with than in cities and regional centres, and with part-time staff there were fewer opportunities to work in professional learning teams. In fact, the small numbers of both teachers and students affected teaching and learning in specialist areas:

> The use of part-time teachers is very common in rural areas, bringing some problems including no access to them on off days, little participation in PD, they cannot be used to cover absences for PD or excursions, and it makes a nonsense of forming teaching teams around subject areas. (Linda, participant in the Regional Project Officer focus group)

> You don't have people to bounce ideas off with [only] one teacher at each grade. You don't get the opportunity to liaise with other teachers from other schools, which can lead to isolation. (Madura PS)

For small schools, particularly in low socio-economic communities, it was held to be difficult to form a critical mass of academically committed students who could interact with and support each other. This was particularly an issue with the secondary school focus groups. There were some comments about classroom environments not being conducive to effective high level learning:

> In a small school, a few students who hate school can destroy opportunities of others. … Children can be stuck with the same peers all through school. (Runningbrook PS teachers)

> Having fewer high achieving kids is a major issue. … Kids can't afford to display aspirations to achieve. (Echidna SC parents)

> Children at higher levels have a problem – there isn't really a love of learning being fostered. (Madelyn, Madura PS parent)

> There's a large range of kids in ability and attitude. Middle-range kids miss out a bit. The school does well at the lower end but doesn't challenge high performers. In a small community, kids don't want to stand out – to be seen as nerds. (Chris, Laneway SC parent)

> Our school is laid back. They don't pressure us much. We're not pushed as much as city schools. Not much homework. (Laneway SC students)

> There are fewer kids for the opportunities available. The downside is no chess club for instance. They can't go to the museum or to art exhibitions. In the city you have a full range of resources like this and there is nothing to compensate here. (Echidna SC parents)

Influence of community characteristics on student outcomes

Student orientation to study and achievement was an issue that came up regularly in the focus groups. We have seen that university education seemed to be a common aspiration of students and parents in this study, but the question of student orientation and application to academic tasks was more generally held to relate to the nature of rural communities.

The concern that the nature of rural communities diminished student aspirations took a number of forms. These were associated with the lower socioeconomic profiles of rural communities and the lack of variety in industries and professions. The causes were seen to include parental aspirations for themselves and their children, parental ability to help students with their science and mathematics homework, and a lack of role models for science and mathematics-related employment:

> Role models for subjects are different. There is more access to role models in the city. The local community use technology, but they don't make it. The technology round town is not mainstream tech. Kids don't see the usefulness of maths – there's no history of jobs here that use maths. (Thai, Laneway SC teacher)

> Limited exposure to the full range of jobs and educational opportunities. (Carmel. Runningbrook PS teacher)

> Many parents model unproductive patterns of behaviour (focus on sport, acceptance of unemployment). (Jan, Runningbrook PS teacher)

The observation that rural communities often lack role models relating to science, ICT and mathematics is consistent with reports that rural students have 'fewer images from which to draw in envisaging what they might become' (Alloway et al., 2001, p. 249).

Several parents and teachers, though, expressed the need for parents to have higher expectations and to be supportive of their children's aspirations. Chris, a parent from Laneway SC considered that 'Parents and peers developing interests is critical in supporting practice in science and maths'.

Resources

Two types of resources were identified as issues in all of these rural schools. The first were community resources such as science centres, people such as scientists or other professionals, supply points such as for the purchase of electronics, local secondary schools to provide laboratory experiences or equipment, and local schools and teachers to provide or share professional development. This aspect was described previously as part of remoteness, but it also relates to community factors in that access to parents, local professionals and technological sites is restricted in regional centres with low socioeconomic features and/or a limited range of employment and types of business. Thus, many of the professions that a science/ ICT /mathematics background would lead to are simply not in evidence or available

in many rural communities so there are limited opportunities for drawing on local expertise and industry.

Nevertheless, the resource aspects of remoteness were not all in deficit. There were other sites and facilities mentioned that were more accessible for rural schools:

> Access to chemistry resources is a problem but there are good resources for biology for instance. We have units on aquaculture, environmental science. (Russel, Laneway SC teacher)

> We have advantages like trees, creeks, yabbies, farms, the Water Treatment Plant, etc. (Danah, Rolling PS teacher)

> Rural schools can get out more readily to look at salinity, erosion, geoscience, land care. (Danni, Echidna SC parent)

> There is sufficient flexibility to adapt the curriculum to a rural setting. In science this happens. For instance the marine park excursion, the camp at the Foreshore. Maths can be adapted also. (Lin, Madura PS teacher)

> My hobby is distilling ti-tree oil, and that has a lot of science, to grow the right type as well as distillery conditions and packaging. I could not do it in a city. (Bek, Runningbrook PS student)

It was also noted that there were opportunities that teachers did not take advantage of. One student claimed, for example, that he could teach his friends a lot of science from the work he does in dairying. Some teachers said that they had never considered linking up local industry and events to enrich their teaching, despite being able to name potential sites for science-based visits, guests and practical activities. This raises the question of practices that rural schools could adopt to improve the learning opportunities for and the aspirations of their students by building smaller communities' capacities for creating supportive relationships, new learning environments, and the efficient sharing of resources.

The second type of resource identified was equipment, particularly for the teaching of science and ICT. All of the schools felt that they had 'adequate' numbers of computers, but access to other sorts of equipment relates in a complex way to isolation as well as to community type and size:

> [Our] teaching suffers from a lack of equipment – stop watches, calculators, CDs, basic science equipment – that would be available in bigger schools. (Rhonda, Runningbrook PS parent)

> Finance is a problem. With a small school you can't run specialists. Fundraising is difficult. … The school is isolated from local industry and shops that would help with fundraising. … There is no real town or city to relate to. (Madura PS parents)

The interconnections among these various factors are discussed in more detail below.

Effective programs

The teacher and parent groups were asked to identify effective science and mathematics programs, and teachers were also asked about the professional development activities they felt had been effective for them.

School programs

Responses to the issue of remoteness from community resources can be seen in the programs nominated as effective. Teachers were more knowledgeable about the programs that were effective, but parents were also aware of such programs, and the views of the two groups were compatible and overlapping. Programs could be broken into two types: special events and longer-term pedagogical reforms.

Some special events, such as excursions, have been mentioned previously.

Regular visitors to these schools included the 'Mr Gizmo' science program, Science Works, and a planetarium. While the children had very detailed memories of travelling science (and other) shows, both parents and teachers commented on the rarity of these events and the difficulty of meeting expenses.

More encompassing and longer-term jointly planned curriculum and pedagogical reforms discussed by teachers highlighted the way that teams of teachers in rural settings can work with each other in the interests of students, in ways that would be more difficult for large metropolitan schools.

> The way we've organised maths this year with a coherent structure, planned as a team. There is a good feel amongst the team. … Kids here who are in danger of dropping out are local and teachers understand them – we can provide better following up and pathways. (Laneway SC teachers)

> The forming of teacher teams has been a good outcome of the school's integrated approach. (Ross, Echidna SC teacher)

Teacher professional development

Stern (1994) reporting on urban/rural differences in course materials and mathematics programs, found that rural teachers generally have less professional preparation or ongoing professional development. In the focus groups, a number of professional development initiatives were described that had been judged successful. Most schools seemed to have a regular professional development event, which was varied in its mode, from visiting experts, to sharing expertise within the school, to networking with other schools. Teachers talked of the difficulties of getting to conferences, but there was at least one description of the Mathematics Association of Victoria running a highly regarded regional conference. While noting the time and expense involved in travelling to major centres (often requiring overnight accommodation), they also spoke very positively about network meetings and cluster models of professional development. In general, while difficulties were acknowledged, there was not an impression given of an isolated and moribund set of teachers.

> We had new software provided by the Regional Project Officer (RPO). A PD session was held at a local café. (Ruth, Echidna SC teacher)

> The best form of PD is giving papers at conferences, but the concept is difficult for country teachers. Travel is difficult. … The Intel PD was successful. The 'gourmet' PD was good, with shared provision between local schools. … We signed up for four nights. … MAV came to [regional centre] with a full day regional conference. (Laneway SC teachers)

> A cluster 'muster' used to happen regularly, with six regional secondary schools but was stopped in favour of more focused PD. (Ruth, Echidna SC teacher)

> One teacher is involved in YELP, a program for accelerated learning which has really boosted our motivation and the children's. … It is Koori funded, and the area has been targeted in the state. (Moorabool PS teachers)

While teachers spoke positively about collegial support evidenced in smaller schools, they did concede that they can feel relatively isolated, usually with no colleague at their grade levels, or no other subject-area specialist with whom to share ideas. One commented that she craved more professional stimulation and the engaging pedagogical discussions that she had previously experienced in a larger school.

The regional project officers, who run professional development for large regions in Victoria, argued strongly for long term school-based professional development that matched school needs:

> PD needs to be school-based: learning in context. Projects need built-in assistance over a longer-term journey of changing cultures. Time release is needed to allow ideas to develop, reflection on progress, planning, etc. Facilitators need to go into schools. (Kate, Regional Project Officer)

> Some facilitators have become leaders in the field, providing new opportunities for teachers. (Lana, Regional Project Officer)

Professional development in Victoria is financed by individual schools. All government schools must have a budget line for professional development and there is a minimum dollar amount per teacher that must be expended per annum. However, this amount does little more than employ emergency teachers for two days per year. All government schools have a few 'curriculum' days, when the school is closed, and the teachers can undertake some whole-school development. These days may also be used for other purposes such as co-ordinated syllabus planning.

Images of success

The teacher and parent focus groups were asked what they would consider an appropriate measure of success for judging their school's science, ICT, and mathematics performance. The views of the two groups were very similar. First among the factors was the fostering of a love of learning, and interest and confidence in learning.

> Being excited is important – individual children are different. Some show more outward interest than others. Being eager to extend themselves at home, ask more questions. (Janine, Moorabool PS parent)

> Leaving primary school still liking these subjects. Enjoyment of learning and looking forward to high school. Basic skills for life (3 Rs). Different levels need catering for individual needs – each child needs to be challenged, and needs to achieve competence. (Karen, Madura PS parent)

This was coupled with emphasis on building up the necessary knowledge and skills to keep opportunities alive as well as helping students to achieve their goals.

> Kids should be conversationally knowledgeable and have their interests stimulated. They should have a positive experience, be confident to the point they are willing to take on VCE maths. They should want to learn and be positive. They need the basics of maths. (Danni, Echidna SC parent)

> Getting kids through to their goals. A mix of problem solving, modelling, hands on, skill is needed – for kids who choose physics or chem. – so that long term goals are met. Build the capacity for life long learning. (Chris, Laneway SC teacher)

> That all students can move into what they want – to open up choice. Skills and knowledge are both important. … An interest in science that will continue. … to succeed at VCE. (Echidna SC teachers)

Overall, while the focus group participants were aware of challenges in managing multi-age curriculum development, they were also aware of many and varied opportunities to offer relatively individualised learning contexts and to draw on their small communities in this endeavour.

DISCUSSION AND IMPLICATIONS

The factors described by the focus group participants do not exist independently. There are obvious interactions between approaches to and arrangements made for student and teacher learning. These include the effects of location (degree of remoteness), school and town size, and community profiles on student learning; manageable access to and uptake of different types of teaching, learning, and developmental resources and opportunities; and student opportunities, attitudes, and aspirations.

The range of discussions from these 19 focus groups demonstrates that, while there are broad themes that we need to address when dealing with regional and rural science, ICT, and mathematics education, there is considerable variation in schools' experience depending on a range of factors outlined above. To different degrees, these schools were advantaged or disadvantaged by location, by size, and by the nature of the communities they serve. Rural education is faced with a complex series of issues that have an immediate flow-on consequence for learners in those schools. The complexity is extensive and interwoven with issues such as student numbers in mathematics, science and ICT; attracting passionate, well-qualified and experienced teachers; resources; PD support; and facilities. These issues are not mutually exclusive – 'fixing' one issue may also depend on addressing another to successfully redress the inequity for learners in rural schools.

Many of the issues raised in the discussions are broader than the teaching and learning of science, ICT, or mathematics. Nevertheless, they are thrown into specific and sharp relief for these subject areas partly because of the particular demands of each. These subjects are perceived to be relatively difficult and prime measures of academic achievement because they are, in many respects, 'gatekeepers' for high stakes assessment and university entrance, and because their study enables access to so many occupations that are important for the development of Australia in general as well as rural and regional areas in particular. Thus,

they have the potential to pose particular challenges for communities without strong educational and professional histories.

The three main causal factors in these analyses have been identified as the degree of remoteness (with implications for access to resources), the nature of the local community (with implications for student aspirations and opportunities) and size (with resource and classroom culture implications). We need to understand these different factors better but, in particular, we need to promote research that seeks out productive ways to deal with these essentially rural circumstances and explore ways of supporting innovative practices in regional and rural schools generally.

Out of this study, we would nominate the following questions to be particularly worthy of further examination:

- What policies and practices can rural schools adopt to improve the learning opportunities for and aspirations of their students?
- How can schools increase support networks that will put students potentially interested in science, ICT, or mathematics in touch with appropriate role models and activities to stimulate their interest and build their learning capacity?
- What particular features of rural schools and communities can be productively harnessed to develop curricula and pedagogies that will engage and challenge students in science, ICT, and mathematics?
- How can rural schools attract and retain quality teachers of science, ICT, and mathematics?
- What modes of professional development are best able to support science, ICT, and mathematics teachers in rural (and especially remote) areas?
- What community circumstances and unique approaches lead to some rural and remote schools consistently doing better than the majority in broad-based test programs?

To answer these questions there is a need to identify schools or clusters of schools that are engaged in innovative and successful programs and that demonstrate high levels of student achievement and other outcomes, in order to explore the nature and causes of their successes. Once having identified parameters of successful innovation, there is a need to work with schools to develop robust models of rural practice that will address learning disadvantages currently experienced by students in regional and rural Australia.

REFERENCES

Alloway, N., Gilbert, P., Gilbert, R., & Muspratt, S. (2001). Factors impacting on student aspirations and expectations in regional Australia. Canberra: Evaluations and Investigations Programme, Department of Science, Education and Training.

Besley, M. A. (2000). Connecting Australia: Telecommunications Service Inquiry report. Report tabled by the House of Representatives Committee on Primary Industries and Regional Services. Canberra: Department of Communications, Information Technology and the Arts.

Bottoms, G., & Carpenter, K. (2004). *Factors affecting mathematics achievement for students in rural schools.* Retrieved December 15, 2005, from http://www.sreb.org/programs/hstw/publications/briefs/03V04_ResearchBrief_Math.pdf.

Caincross, C. (2002). The economic and social impacts of electronic commerce: preliminary findings and research agenda. http://www.oecd.org/dsti/sti/it/ec/ Accessed July 7, 2002.

Commonwealth Department of Education, Science & Training (DEST) (2002). *National evaluation of the Country Areas Program.* Canberra: Research, Analysis and Evaluation Group, Department of Science, Education and Training.

Cresswell, J., & Underwood, C. (2004). Location, location, location: Implications of geographic situation on Australian student performance in PISA 2000. Camberwell, Vic: Australian Council for Educational Research.

DeYoung, A. J. (1987). The status of American rural educational research: An integrated review and commentary. *Review of Educational Research, 57,* 123–48.

Education Queensland (2005). Rural and remote education framework for action 2003–2005. Brisbane: Department of Education, Queensland.

Fan, X., & Chen, M. J. (1999). Academic achievement of rural school students: A multi-year comparison with their peers in suburban and urban schools. *Journal of Research in Rural Education, 15*(1), 31–46.

Goodrum, D., Hackling, M., & Rennie, L. (2001). *The status and quality of teaching and learning of science in Australian schools*. Canberra: Department of Education, Training and Youth Affairs.

Higher Education Council (1999). HEC introduction. In James, R., Wyn, J., Baldwin, G., Hepworth, G., McInnis, C., & Stephanou, A. (1999). *Rural and isolated school students and their higher education choices* (pp. i–v). Canberra: AGPS.

Human Rights and Equal Opportunity Commission (HR&OE Commission) (2000). *Education access: National inquiry into rural and remote education.* Canberra: AGPS.

Ingvarson, L., Beavis, A., Bishop, A., Peck, R., & Elsworth, G. (2004). *Investigation of effective mathematics teaching and learning in Australian secondary schools.* Canberra: Department of Education, Training and Youth Affairs.

James, R. (2002). *Socioeconomic background and higher education participation: An analysis of school students' aspirations and expectations.* Melbourne: Centre for the Study of Higher Education, University of Melbourne.

James, R., Wyn, J., Baldwin, G., Hepworth, G., McInnis, C., & Stephanou, A. (1999). *Rural and isolated school students and their higher education choices.* Canberra: AGPS.

Kenyon, P., Sercombe, H., Black, A., & Lhuede, D. (2001). *Creating better educational and employment opportunities for rural young people.* Hobart: Australian Clearing house for Youth Studies.

Khoo, S. T. & Ainley, J. (2005). *Attitudes, intentions and participation. Longitudinal Survey of Australian Youth research report 41.* Camberwell, Vic: Australian Council for Educational Research.

Murkins, L. (2001). Encouraging a broader view of mathematics for rural students. In *A summary of Batemans Bay CAP District initiatives 2001.* Retrieved July 14, 2005, from http://www.cap.nsw.edu.au/2001_Initiatives/BBDistrict_Initiatives/bbinitiatives.htm.

Stern, J. D. (Ed.). (1994). The condition of education in rural schools. Washington, DC: U.S. Government Printing Office. (ERIC Document Reproduction Service No. ED 371 935)

Stokes, H., Stafford, J., & Holdsworth, R. (2000). *Rural and remote school education: A survey for the Human Rights and Equal Opportunity Commission.* Melbourne: Youth Research Centre, University of Melbourne.

‘The teachers give as much as they can, not as little as they can’

Report from SiMERR Tasmania

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INTRODUCTION

In Tasmania the study aimed to gather information concerning the following research questions:

1. What are the major concerns of Tasmanian parents, teachers and students in rural schools regarding mathematics, science and ICT education?
2. How can the mathematics, science and ICT outcomes of rural Tasmanian students be improved?

In relation to each of these broad questions, common themes among the responses of teachers, parents and students were of particular interest, as were differences that reflected the particular local needs of each of the schools and the differing needs of the various types of schools in rural Tasmanian communities.

Focus group interviews with teachers, parents, and students were arranged at each of four schools. The intention was to have approximately eight participants in each of these groups but this was not always possible, and was particularly difficult in smaller schools with small numbers of staff. At three of the four schools only a few parents participated. A staff member at one of the schools explained that it was always difficult to get parents to come to the school because many families lived relatively far away.

The students who participated were selected by their schools from those whose parents provided written consent for their participation in the study. They were not necessarily representative of the student population. For example, all of the participating students at St. Lawrence College[10] were in Years 11 or 12, and two of the students at another school were related to staff members. At Ashmore District High School (DHS), two of the eight students were in primary grades and each of the secondary grades (7-10) was represented. At Mt. Eden DHS there were three students in each of the primary and secondary sections of the school.

[10] All school names are pseudonyms

THE SCHOOLS

Considerable effort was made to involve schools that were as distant as possible from the major centres of Hobart and Launceston. The four schools that participated represent a range of Tasmanian school types (see Table 5). Two were District High schools, the most common type of school in rural Tasmania. These schools cater for both primary and secondary students, usually K-10, but with limited provision for students in Grades 11 and 12 in the more isolated contexts. Such provisions tend to be vocationally-oriented rather than being designed to prepare students for university study. The K-12 school in this study, Ashmore DHS, is located in arguably the most remote area of the state, where the local economy is underpinned by mining but with increasing reliance on tourism. The other District High school, Mt. Eden, is rather less remote but with its catchment area including parts of Tasmania's central highlands. Mossvale Primary is one of very few 'stand alone' primary schools that exist relatively distant from a major centre. Separate secondary schools are also unusual in remote areas. The secondary school in this study, St. Lawrence College, was located on the north west coast in an area that could be described as rural but the school is arguably the least remote of the four by virtue of being situated in a large town, although further from Hobart or Launceston than either Mossvale Primary or Mt. Eden DHS. St. Lawrence College was also the only non-government school involved in the study and the only school in which several of the participating teachers had mathematics or physics majors. Differing local factors, as well as the differing structures of the schools, meant that each faced unique challenges in meeting the educational needs of students in mathematics, science and ICT.

Table 5. Schools and focus group participants

School	Sector	Type	MSGLC Category	Student population	No. Teachers	No. Parents	No. Students
Ashmore DHS	Government	District High (K-12*)	3.1 Remote	295	4	2	8
St. Lawrence College	Catholic	Secondary (7-12)	2.1.1 Provincial City	666	6	7	7
Mossvale Primary	Government	Primary (K-6)	2.2.2 Provincial Area	59	5	4	5
Mt. Eden DHS	Government	District High (K-10)	2.2.2 Provincial Area	98	3	3	6

*Years 11 and 12 offerings limited, mainly VET

FINDINGS FROM TEACHERS

Reasons for teaching in rural Tasmania

A total of 18 teachers participated in focus group interviews. Table 6 shows their responses when asked where they had lived previously. More than 80% had lived in Tasmania all of their lives with approximately half of these describing themselves as coming from a part of the state outside the major centres of Hobart and Launceston.

Table 7 shows the approximate number of years for which 14 of the teachers had lived in the area in which they now worked. Almost half had lived in the area (and taught at the school) for less than one year and, of these, at least half were in their first year of teaching. In fact, with the exception of two of these teachers who had recently moved to St. Lawrence College

from interstate, the number of years in the area and length of teaching experience were essentially the same.

Table 6. Where teachers had lived previously (n=18)

This area	4 (22%)
Hobart or Launceston	8 (44%)
Other area of Tasmania	3 (17%)
Capital city outside Tasmania	2 (11%)
Rural/regional outside Tasmania	1 (6%)

Table 7. Length of time in area (n=14)

Less than 1 year	6 (43%)
1-2 years	2 (14%)
2-3 years	2 (14%)
5-10 years	1 (7%)
10-20 years	1 (7%)
20-30 years	1 (7%)
More than 30 years	1 (7%)

Table 8 shows the reasons given by 15 of the teachers for teaching in their present schools. The Tasmanian Department of Education (D*o*E) offers scholarships to a small number of teacher education graduates each year. Acceptance of a scholarship means a three year assignment to a relatively hard-to-staff school followed, subject to satisfactory performance, by permanence. In addition, scholarship holders are entitled to transfer to an area of their choice at the end of the three year contract. All three of the teachers who indicated they had taken up their current positions as a result of scholarships were in Ashmore DHS. The opportunity to take up a permanent position, other than via a scholarship, was the reason given by one third of the teachers. One teacher, who professed to liking a rural environment, had been motivated to move from interstate by cheaper land prices and had sought out a similar school to that in which he had worked prior to the move. The other teacher who had recently moved to Tasmania had done so as something of an adventure and lifestyle change.

Table 8. Reasons for teaching here (n=15)

D*o*E Scholarship	3 (20%)
Permanent position	5 (33%)
Came with partner	3 (20%)
Liked rural environment	1 (7%)
Already in the area	1 (7%)
Closer to home	1 (7%)
Life change/adventure	1 (7%)

Table 9. Predicted length of stay (n=16)

0 years (commute from Hobart or Launceston)	3 (19%)
1 year (then commute)	1 (6%)
Probably less than 3 years	1 (6%)
3 years	3 (19%)
Possibly 4 years	1 (6%)
Unsure	2 (13%)
Indefinite	5 (31%)

Sixteen teachers responded to the questions about how long they expected to stay in their current school, and their responses are summarised in Table 9. Just under one third of the teachers indicated that they had no plans to leave. Three of these teachers were at St. Lawrence College and one at each of Mossvale PS and Mt. Eden DHS. All five were long-term residents of the respective areas; all three of the teachers who had indicated that they came to the area with their partner were in this category. Coming to the area with her partner and obtaining permanency were both relevant for Susan. In her words:

> When I finished teachers college, St Lawrence were advertising for maths/science teachers and my husband and I both applied and we both got positions. We both were given permanency within 12 months and the Education Department weren't offering permanency so we have been here ever since, which is 20 years. (Susan, secondary teacher, St. Lawrence College)

Of the three scholarship holders, one indicated that he would consider staying for a fourth year, one was planning to leave after the required three years, and the third was considering forsaking permanency in order to leave before serving three years. Three teachers (two at Mossvale Primary and one at Mt. Eden DHS) had not moved from their homes in Hobart or Launceston. The distances commuted would have been between 80 and 120 km each way. One secondary teacher at Mt Eden DHS was planning to move back to Hobart for the next year and commute: 'It's too boring here for a young teacher to stay overnight.' His colleague who was already commuting said:

> It is not easy. It is a bit time wasting. It does add extra time to your day and you get tired from doing it but you can do it. (Dean, Mt Eden DHS)

In summary, teachers at the four schools tended to be relatively inexperienced, motivated to work in a rural school by the prospect of permanent employment, and not expecting to remain long-term in the area. This was particularly the case for teachers at Ashmore DHS. Teachers who had moved to the area with a partner or who had lived in the area earlier were more likely to stay beyond an initial three-year contract. St. Lawrence College was a Catholic school and also located in a relatively less remote area, both of which may have accounted for the relatively older, more experienced staff. This school also advertised nationally and promoted the lifestyle benefits offered by the area.

Strengths of rural/regional schools in helping students achieve their potential in science, ICT and mathematics

The strengths identified by the teachers fell into three categories: availability of resources, knowledge of students, and collegiality.

The availability of resources was mentioned as a strength by teachers in all four schools. Teachers commented on the relative ease of access to computer laboratories (Mt. Eden DHS), the availability of computers in classrooms allowing integration of technology in the curriculum (Mossvale Primary), the high standard of the science laboratories (St. Lawrence College), the availability of a laboratory technician (Ashmore DHS and St. Lawrence College), access to science laboratories for primary classes and hence the relatively greater amount of science teaching in primary grades (Ashmore DHS), and the availability of maths resources via a shared resource room (Ashmore DHS).

Teachers in three of the schools considered factors related to knowing students as individuals as a strength. In Mt. Eden DHS the teachers commented on the benefits of knowing the students' backgrounds and families, and of small classes that enabled individuals to be catered for. One teacher said:

> A very big factor would have to be in knowing the students – knowing their backgrounds and being in a small community, you know all their parents or most of them anyway and having a good rapport with the parents too. You are also able to help students individually and set up little programs and it is a lot easier to monitor. (Mary, primary teacher, Mt Eden DHS)

A teacher in Mossvale Primary explained that small student numbers meant that teachers could observe the development of individual students over a number of years, but that it did not always translate into smaller classes as numbers in cohorts fluctuated from year to year. At St. Lawrence College considerable effort was made to assess the abilities of students in order to assign them to an appropriate mathematics syllabus.

Teachers in Ashmore DHS considered the potential (although only partially realised) for close relationships with other schools in the area to be a strength. One teacher pointed to the joint planning that had begun in relation to the mathematics curriculum as an example of what might be possible. Teachers in Mossvale Primary believed that relationships among their small staff were 'positive' and saw this as a strength. Collegiality was also a major strength in the view of teachers in St. Lawrence College. They believed this was evidenced by the rapport and ease of communication among staff members in each of the mathematics and science teams. Teachers in the mathematics area agreed that the very structured mathematics program in the school made it very easy for new staff to 'slot in and carry on with the job'. This was especially appreciated by teachers who were not trained in mathematics or who were inexperienced. One such teacher said:

> … making myself more employable, giving myself extra skills. I jumped at the opportunity to have a crack at mathematics … absolutely fantastic in being mentors and helping me through that, but everything is very structured and very well laid out and it is quite easy to fit in. (Paul, secondary teacher, St. Lawrence College)

Similar comments were made about the science program in St. Lawrence College. Teachers in Ashmore DHS were positive about the willingness of local industry to be involved in the school.

Particular programs and initiatives were mentioned in positive terms in three of the schools. At Ashmore DHS, the Mathematics Relay competition organised in the local area by the Mathematical Association of Tasmania was cited as example of an opportunity to meet teachers from neighbouring schools and for students to enjoy mathematics in a non-classroom environment. A Grade 5/6 teacher had also offered a successful science option for students in those grades. The course had run over 20 weeks and used the science laboratories usually accessed only by secondary students.

St. Lawrence College had a learning enhancement program which allowed a second teacher to be present in some classes, and one science teacher, described by those interviewed as 'very passionate', was the driving force behind an annual science fair which provided an opportunity for students to conduct a small scientific research project. It was also common for teachers of senior grades in St. Lawrence College to offer additional tutorials after school to help motivated students.

The teachers in Mossvale Primary were pleased with the emphasis their school had placed on mathematics in recent years. This had included professional learning workshops and programs and the acquisition of additional resources for mathematics teaching. Teachers at Mt. Eden DHS also mentioned developments in their mathematics program and, in particular, the effectiveness with low achievers of ideas from the collection of booklets entitled *Mental computation: A strategies approach*. A particularly talented group of Grade 1 students were also being offered extended numeracy for a double period on Monday and Wednesday mornings, and a number of both primary and secondary students were involved in an online extension program, *Pegasus*, provided by the Department of Education. The program included interaction with students in other schools and focussed primarily on science but also included some mathematics activities.

Obstacles to helping students in rural/regional schools achieve their potential in science, ICT and mathematics

Teachers in three of the schools identified a lack of subject expertise and the resultant requirement to teach outside subject areas as a major obstacle to their students' progress in mathematics and science. It was identified as a problem in relation to mathematics at Ashmore DHS, science in Mossvale Primary, and both mathematics and science in St. Lawrence College. One teacher, qualified to teach SOSE, but required also to teach Grade 9 and 10 mathematics, described how even the availability of expertise among colleagues does not solve the problem:

> Even if [a colleague] had planned something really great, I can't necessarily follow my students' mathematical thinking in the same way that he can. The other day I completely misunderstood a student's strategy and I apologised to him afterwards because I thought I had made him feel stupid but it was just because it was something different and I think that if I was a maths teacher, I would … it would be better. (Andrea, secondary teacher, Ashmore DHS)

Teaching out of area represented an additional burden for beginning teachers. As one teacher at Ashmore DHS expressed it:

> It is certainly very trying … especially first year out when you have all the battles of just actually surviving first year, let alone teaching 9-10 maths as well. (Simon, secondary teacher, Ashmore, DHS)

The sole specialist mathematics and science teacher in Ashmore DHS, although confident about his mathematics content knowledge, confessed to a lack of pedagogical expertise particularly in relation to teaching mathematics other than from a textbook in Grades 9 and 10. In St. Lawrence College the difficulties confronted by unqualified mathematics and science teachers were linked to the high turnover of staff. One of the recent arrivals at the school commented that he was his Grade 8 science classes' fourth science teacher for the year. The effect of losing experienced staff was described as follows:

> It is really difficult because if you get a really good operator in one of those fields specifically and then you lose that person, obviously you are not just losing them but you are losing their knowledge base and they also understand how it works and they have that background knowledge of the students … (Peter, secondary teacher, Ashmore DHS)

Teachers in two schools were concerned about the low priority given to science. In Ashmore DHS science was not specifically timetabled. In Grades 9 and 10 students were required to choose two half-year investigation units that involved science, but in lower grades the inclusion of science was entirely at the discretion of the teacher with the result that students did no science at all in some grades, including the lower secondary grades.

The teachers at Mossvale Primary were conscious of their lack of expertise in science and commented on the lack of professional learning opportunities in the subject. They also believed that more resources for teaching science would be useful. In fact, although all of the schools identified the availability of resources as strengths, issues related to resourcing were noted by teachers in three schools as obstacles to students' progress.

In Ashmore DHS the teachers identified a need to better utilise the abundant resources they had and to develop a considered plan for the purchase of future resources. A particular lack was noted in relation to non-textbook resources for Grades 9 and 10 mathematics. Although appropriate resources for primary grades were readily available, there was a concern that teachers did not always know how to use them effectively. This problem related to technological resources such as digital cameras, and also to simple items such as counters. In the words of a primary teacher:

> We have got kids picking up maths resources and going "What do I do with it?" I think in a lot of cases staff don't really know the best way to use the resources as well … you can use these little coloured counters to count with, but what else can you use them for? I just don't think it is utilised enough. (Sam, primary teacher, Ashmore DHS)

Teachers at St. Lawrence College were alone in citing a lack of availability of computer hardware as an obstacle. They referred to the lack of computer laboratories and the inadequate numbers of laptops available for classes to borrow.

Secondary teachers at Mt. Eden DHS considered the greatest obstacle to students' progress to be the wide range of student abilities which was exacerbated by the need in a small school for composite classes spanning up to three grade levels. One teacher stated:

> I have got kids who are working at eight different levels, so that is eight lots of stuff I need to prepare and check up on. (Mary, primary teacher, Mt Eden DHS)

Teachers at Ashmore DHS also described their struggle to present a curriculum that satisfied the state requirements, that engaged their students, and also met the needs of the local community. The dilemma they felt is illustrated by the following quotes which also relate to the teachers' concerns about the low priority of science in the curriculum:

> We have mining as the major industry within the town and they have a huge need for people who are scientists to work there … they have a huge need for people who are educated in those fields and if we are not teaching them in those areas, we are actually letting them down and we are not just letting down the students but we are letting down the town itself. (Colin, primary teacher, Ashmore DHS)

> I think one of the dangers – talking about teaching them things that are going to be relevant to them as well – every time you bring up the mine or mining in some sort of topic, you are generally met with groans, because they seem to be well and truly sick of it. (Simon, secondary teacher, Ashmore DHS)

Attraction and retention of good science, ICT and mathematics teachers

Attracting and retaining science, ICT, and mathematics teachers was an important issue for teachers in two schools. Teachers in Ashmore DHS believed that over any three year period approximately 80% of the staff leave. Consistent with the reasons given for their own presence in the school, three of the four Ashmore DHS teachers regarded the provision of scholarships and permanency as important incentives for attracting teachers. They also believed that the provision of weekend accommodation, for nominal rent, in the major centres they regarded as 'home' would be helpful. They felt employers could do a better job of selling the benefits, in terms of both career opportunities and lifestyle, of working in a rural school. The teachers acknowledged that such measures would be effective for young or beginning teachers and that the attraction and retention of more experienced teachers was a much greater challenge. They saw an answer in the encouragement of more local students to continue their studies, become teachers and then come home. One way they felt that this could be achieved would be to offer scholarships to Grade 10 students. One summarised the message to such students as:

> Do your time and then there will be a job here for you. We already know that if you study well, you can do two years in college, four years at uni – in six years time you will be back here. (Sam, primary teacher, Ashmore DHS)

The teachers believed that this would also help to address the relatively low retention rates from Year 10 to Year 11 characterising their school.

One of the Ashmore DHS teachers felt that preparation to teach in a range of subject areas, rather than in a speciality, would make the experience of teaching in rural and remote schools more enjoyable and hence improve the chances of teachers at least completing their contracted times. In particular, she cited the difficulty of teaching mathematics in upper secondary grades with no preparation to do so. Professional isolation and a lack of support staff, in addition to the requirement to teach across a range of subject areas, were also regarded by one teacher at Mt. Eden DHS as a disincentive for mathematics and science teachers to stay in rural areas:

> For maths/science teachers to stay here there needs to be more support – externally. It would be great to have someone to help me in science, to get the classes ready, because I have to do it all, and not just in science but for maths, PE, MDT and computers as well. It would be nice to have contact with teachers from other schools, because I have no one to bounce ideas off. (James, secondary teacher, Mt. Eden DHS)

Teachers in St. Lawrence College also believed that employers could do more to sell the lifestyle advantages of teaching in rural areas, and could perhaps include free membership of a local gym or sporting club. They also suggested that more could be done in terms of relocation assistance and remuneration. One of the teachers cited generous financial incentives provided to teachers in some Canadian provinces and another referred to arrangements in other Australian states whereby substantial periods of paid leave are provided to teachers on completion of a requisite number of years of service in particularly remote

locations. They felt that an annual return flight to any Australian capital city would also be attractive and help to overcome the sense of isolation. One of the teachers also mentioned the relative difficulty of pursuing further study in rural and regional areas as a disincentive for teachers coming to such areas. Another commented on the availability of distance courses and on the potential for assistance with HECS costs to motivate some teachers to teach in rural and regional schools. The teachers in St. Lawrence College agreed that increasing the pool of qualified science, ICT and mathematics teachers from which recruits for rural and regional schools could be drawn would be helpful.

One of the teachers who had recently moved from interstate suggested that the two major fears in coming to a rural or remote location were:

> a) you are going to hate it and be trapped and it's hard to get out, and b) you are going to miss your family a lot. Now the first one can be overcome by saying to teachers, "Why don't you come and give it a go and if you are unhappy, we will call it quits after six months". (Paul, secondary teacher, St. Lawrence College)

He believed that offering teachers a six months no obligation 'trial' could be effective as this would be time for people to realise the advantages of the situation. It would also encourage more people to consider teaching in rural or remote areas.

Two possibly intractable disincentives for teaching in rural or remote schools were also mentioned. Both were likely to affect relatively experienced teachers more than novices. A teacher at Ashmore DHS described having one's own children attend the school as a potential problem, and an experienced teacher at St. Lawrence College observed that if one does settle into a rural community and remain in a school for many years, one's own children almost inevitably left to pursue their own careers. She regarded the difficulties with teacher retention as part of the broader problem of a lack of opportunities for professionals in rural and remote areas.

Teachers' recommendations

The majority of recommendations related to professional learning opportunities including opportunities to collaborate with colleagues, resourcing, and curriculum issues. Less frequently mentioned recommendations related to class sizes, provision for high and low achieving students, and teacher education.

Teachers in all of the government schools (Ashmore DHS, Mossvale Primary, and Mt. Eden DHS) made recommendations related to professional learning opportunities. Teachers in two schools felt a need for more professional learning in science, with those in Mossvale Primary also nominating ICT as an area in which they would benefit from greater support. The teachers in both these schools were also keen to have more professional learning delivered locally at the school or cluster level. The teachers at Ashmore DHS had been pleased with the support they had received in mathematics from Department of Education personnel. One teacher said:

> When our school has said that we have a problem with numeracy and that we need help, he has gone, "Right. I will come up and will run all these Pds", and that has been great. (Sam, primary teacher, Ashmore DHS)

The availability of relief teachers to allow participation in professional learning was a concern to teachers in Ashmore DHS and Mt. Eden DHS. Teachers in Mt. Eden described the

difficulty of getting relief mathematics and science teachers who could actually teach their classes something while those in Ashmore lamented the absence of any relief teachers at all. There was agreement that, after school hours, locally provided professional learning was part of the answer to these issues. Rather than funding teacher relief, the Education Department could fund professional learning providers to come to them for a number of after-school sessions. In the words of Sam:

> I am sure we wouldn't mind banking up our professional learning that we have to do after school and do it non-stop in one week after school just to make their time worthwhile coming up here. It would be cheaper for the school to pay for one person to come up and sit here for three days, have a look at the resources and help us out. (Sam, primary teacher, Ashmore DHS)

Several teachers at the three government schools mentioned the benefits to their practice of conversations with colleagues. In particular, teachers in Mossvale Primary believed that more time for collaborative planning would be beneficial. Those in Mt. Eden DHS who commuted to either Hobart or Launceston on a daily basis acknowledged the conflicting problems of difficulties with relief teachers for professional learning in school hours and the demands of commuting after extended hours in the case of after-school professional learning.

Recommendations concerning the curriculum were made by teachers at the three government schools, with most relating to the science curriculum. Teachers expressed a desire to have science more explicitly mandated (Ashmore DHS), more detailed with respect to exactly which scientific concepts they should teach (Mossvale Primary), and more opportunities to involve students in small scientific research projects (St. Lawrence College). Teachers in St. Lawrence College also believed that the time available for the teaching of both mathematics and science had decreased over the years and had made adequate coverage of the curriculum increasingly difficult.

Teachers in Mossvale Primary and Mt. Eden DHS expressed a desire for more resources, with teachers in the former describing a need for greater numbers of more up-to-date computers and more resources for science teaching. These teachers believed that small schools were disadvantaged in terms of resources because funds were allocated according to student numbers.

Other recommendations included a reduction in class sizes together with the provision of additional support teachers to assist with both low and high achieving students in primary classrooms (St. Lawrence College), and greater attention in secondary teacher preparation on curriculum units, particularly mathematics and science. They believed that this would enable new teachers to teach across the range of subject areas that they were often required to in rural and regional schools (Ashmore DHS).

FINDINGS FROM PARENTS

Living in rural communities

With the exception of one who had moved to the area from NSW three years ago, all 15 parents were long-term residents in their communities, having lived locally for at least 15 years and in most cases much longer. Two parents at St. Lawrence College said that they had moved to the area for work, one because of her husband's work, and another because he had married an ex-Tasmanian girl who was keen to 'come home'. One of the parents at Ashmore

DHS anticipated leaving the area in 18 months time because both of her children would be in senior secondary grades or at university by then, and hence studying in Hobart or further afield. None of the other parents had plans to leave.

Mossvale Primary and Mt. Eden DHS were the only schools in their local areas and none of the parents at those schools had considered sending their children further afield for their education. They liked the friendly, family-like atmosphere of a small school and the fact that 'everyone knows everyone'. One recalled positive experiences he had as a child attending a similar school. All acknowledged that they may have to send their children to Hobart or Launceston for their senior secondary years.

One of the parents at Ashmore DHS had chosen to send her children to the school for both their primary and secondary schooling, whereas the other had chosen the local Catholic school for her children's primary education. Her husband's Catholicism had been a factor in this. Her eldest child had just completed Year 12 at a private school in Hobart where they had extended family. She explained why boarding had been ruled out as an option in earlier grades:

> There was always the option of the children going to boarding school. My husband, himself, went to boarding school. He grew up in the north west of Tasmania and boarded from Grade 7 on, but because there was high school here in town I didn't think it was an option. I would rather have my children here at home but at Year 11, there was no Year 11 option at that stage. There still isn't – it's very limited, so he had to go away with all his friends to do Years 11 and 12. (Sarah, parent, Ashmore DHS)

At St. Lawrence College four parents mentioned that either they or their spouses were Catholic and this had influenced their choice of school. One mentioned that it was easier to send children to a school that all their cousins had been to. Of most importance to these parents, however, were factors such as the school's sound reputation in the local community, particularly its 'high standards'; the academic, sporting and cultural opportunities they believed it provided for their children; and the values, culture, and family 'feel' that they believed the school embodied. One parent expressed the latter in terms of her perception that there would be more children 'like ours'.

All of the parents were adamant that they did not want their children to be away from family until at least the senior secondary years, and only then if suitable local options were unavailable. A parent at St. Lawrence described the importance of family:

> I think most education begins at home. We expect teachers to finish it off. We don't expect teachers to initiate it. Part of a strong family is being involved with each other. We didn't contemplate sending ours to boarding school. (Bill, parent, St. Lawrence College)

Educational aspirations for their children

All of the parents valued post-compulsory education for their children and mentioned university as either a hope or, less often, an anticipated destination for their child. One parent was hoping her daughter would go to university but was keen for her son to have a trade. Another spoke about her eldest daughter who had spent five years at university but had been unable to find a job in the field she had studied and was now working in Hobart. Another qualified his university aspirations for his children by saying that he saw this as appropriate if they had the ability, and one mentioned concern about the costs involved. A parent at

Ashmore DHS described her concerns for her son's future and, in particular, the lack of local opportunities:

> I mean, you worry about your kids. When we left school, jobs were easy to find and now they have to stay at school. They can't just drop out in Year 9 or 10 and walk into jobs and end up bosses and stuff like they used to. It all depends. If Year 11 is here and it is going well then [son] will most likely stay here. But if it doesn't offer him what he needs – because he is talking about going to the Air Force. At least here you can keep an eye on them. (Cheryl, parent, Ashmore DHS)

The parents at St. Lawrence College agreed that it was important to respect their children's wishes about the choices they made in life, and their priority would be to help them make decisions and to keep their options as open as possible. They were also unanimous in not limiting their thinking about universities to the local institution, saying their choices would depend upon the availability of suitable courses.

Strengths of rural/regional schools in helping students achieve their potential in science, ICT and mathematics

Parents at three of the four schools believed there were advantages in having their children attend a smaller school. In particular, they felt that they knew the teachers and other students better and more of the teachers knew the children well. In two of the schools, smaller class sizes were also seen as a strength. One parent at St. Lawrence College explained that this allowed more opportunities for individual students, more effective and holistic pastoral care and, in the senior secondary grades, greater opportunity for one-on-one interaction with students.

Teachers were mentioned as strengths at two of the schools. A parent at Ashmore DHS said that her eldest child had an excellent mathematics and science teacher who had prepared him extremely well for these subjects at pre-tertiary level. Parents at St. Lawrence College were also very happy with the teachers currently at the school. One summarised their view by saying that, 'the teachers give as much as they can, not as little as they can', and that they encourage the students to do the same. Another mentioned the value of having teachers who had been in the school for a number of years:

> They are just good teachers and there is continuity there. They have been there a while and they know every trick in the book and they know how to get the best out of the kids. (Jan, parent, St. Lawrence College)

Maths and science teachers in the senior secondary years were particularly well regarded. The only mention of physical resources was a reference to the quality of the science laboratories at Ashmore DHS.

In terms of special programs they perceived to be valuable, the parents at Ashmore DHS mentioned a science show, possibly run by the CSIRO, that visited the school annually. At St. Lawrence College the science fair was a highlight. The parents described this event as giving students a love of science and an opportunity to apply their learning. They believed it exemplified the valuable links that existed between the school and the wider community. St. Lawrence College parents also mentioned a program that involved senior students working with younger children in mathematics, and involvement in mathematics and science competitions, describing them as worthwhile extension opportunities. Parents at Mossvale

Primary valued the parent help program that provided one-on-one support for children experiencing difficulties, and school farm was mentioned by parents at Mt. Eden DHS.

Obstacles to improving outcomes in science, mathematics, and ICT education

The most commonly mentioned obstacle was summarised by parents at Mt. Eden DHS as the lack of specialist teachers and the consequent requirement for teachers to teach in areas outside their expertise. The issue was mentioned, with slightly different emphases, by parents at all of the schools. At Mossvale Primary this problem was seen as possibly related to the fact that the school was very small and hence there were few teachers, of which none had any particular expertise or interest in science. As one parent expressed it:

> I think it is just not pushed for them to do that and being a small school they don't have a wide variety of teachers and if the teachers aren't trained or don't have an interest in science, I think that is the end of it. (Julie, parent, Mossvale Primary)

At St. Lawrence College the parents were aware that the school advertised nationally for teachers and sometimes had no applicants for maths/science positions. They believed the problem affected younger children more because the school deployed the expertise it had in the senior grades. In the words of one parent:

> I think it is often hard to actually get specific science and maths trained people, so sometimes we get someone here who is teaching a subject which is their expertise and they have to take a maths class … I know we have had job applications – like Australia wide – and had no responses. So there is obviously a shortage – I am not saying that 11 and 12 kids are more important, but I guess that is where we tend to put our expertise of teachers if we have to spread people around. (Margaret, parent, St. Lawrence College)

They also connected the shortage of maths/science teachers with the disruptions to students' learning that resulted from having several (up to four) different teachers in a year for a particular subject. They believed that continuity with a given teacher was particularly important in mathematics and science. At Ashmore DHS parents were concerned with the very high turnover of staff, which they estimated to involve up to 50% leaving in a given year (this contrasts with the teachers' estimate of up to 80% of teachers leaving in a year). They saw this as causing a major problem with continuity in terms of expectations of students in the school. As one described it:

> You have children who have problems and stuff like that, and the teachers that were here for three or four years know these children and know how to work with them and then you get the new lot – they don't know and all of sudden you have a few kids who are unsettled. You can have probably two in a class and that disrupts the whole class … (Cheryl, parent, Ashmore DHS)

The parents believed the problem was exacerbated by the high proportion of beginning teachers that came to the school. These were seen as energetic, progressive and enthusiastic, but without experience and coming into an environment where many of them felt terribly isolated. In addition, there were insufficient numbers of experienced staff to guide them and to pass on information about how best to cater for individual children in the school.

Inadequate funding or resourcing was also referred to by the parents at Ashmore DHS, Mossvale Primary and Mt. Eden DHS. At Ashmore DHS there was a perception that the computers were very often not working. The parents were not sure whether this was due to insufficient numbers of computers in the school or to the lack of technical support because of the town's location. The concern at Mossvale Primary was in relation to the lack of science resources that they attributed to the current teachers' lack of interest and expertise in the area. The parents at Mt. Eden DHS explained that their school had recently been reclassified and was now in a category considered less remote and hence eligible for less funding. They regarded this as unfair, pointing out that the school's feeder area extended considerably further from the nearest urban centre than the location of school.

Other perceived obstacles related to particular arrangements or practices in the schools. At St. Lawrence College there was some concern about the amount of time students, particularly seniors, spent out of class involved in such things as inter-school sporting competitions which often entailed significant travel time. The problem was exacerbated by the constraints on the length of the school day that were imposed by the schedules of school bus operators. As one parent stated: 'The education of children depends on the bus timetable!'

At Mossvale Primary the parents expressed concern about their perceived inability to help their children to the extent that they would like to, particularly in mathematics. Two of the four professed to having been very poor at mathematics when they were at school and all lacked confidence in the area. One parent recounted:

> My son brought home his maths the other day and I didn't have a clue, and even to look at how they are done – how did they get the answers out of that? (Anne, parent, Mossvale Primary)

They believed that support should be available to parents, perhaps in the form of notes for parents to accompany homework. In the words of one parent, 'Things have changed since we were at school.' Parents at one school were somewhat unhappy with the extent of support available to children with difficulties and also believed that such difficulties were often identified too late.

A parent at Ashmore DHS believed that children should be taught basic keyboarding skills to improve the efficiency of their use of computers. St. Lawrence College parents expressed concern about the expense of necessarily having to send their children away from home to study at university and at the relative lack, in small communities, of cultural resources such as museums.

Community influences on outcomes in science, mathematics, and ICT education

Parents at two of the four schools mentioned the relative difficulty of finding work in the area as a factor that influenced their children's educational outcomes. At St. Lawrence College the parents believed that the reputation of the school gave their children some advantage in the employment market, but added that most went to Hobart, Launceston or interstate to pursue their tertiary education and careers – to stay would require them to 'lower their expectations'. Most of the parents did not see the need for their children to leave as necessarily a negative. In the words of one parent:

> I think we live in a fairly conservative community, and I think it's healthy for the kids to get away – in terms of tolerance and celebrating diversity … there

> is a whole other world out there that they perhaps haven't experienced, or if they have been exposed to it, it has been with a judgmental attitude sometimes. (Stella, parent, St. Lawrence College)

Another St. Lawrence College parent described how growing up in a smaller community gave her children security and hence a degree of confidence, strength and stability that served them well when they went further afield. At Mt. Eden DHS the parents explained that the lack of work in the area meant the community was aging and the school was becoming smaller.

The parents at Mossvale Primary referred to the challenging socio economic environment of the area. This meant that not all families owned a computer or had access to the internet which, in turn, presented equity issues in terms of children's access to resources. In addition they believed that there was too little parental involvement in the school and that many parents simply left their child's education to the teachers.

At Ashmore DHS the parents spoke about the advantages of a small community in terms of developing their children's independence. They saw this as a function of the relative safety of the community and the small distances involved in getting from home to the various sporting and youth venues in the town.

Parents' recommendations

Recommendations from the parents related principally to teachers and ICT resources. Parents at St Lawrence College, Mossvale Primary and Mt. Eden DHS believed that recruiting more specialist teachers in maths, science and ICT needed to be a priority. One parent explained that this was important because teachers of mathematics needed to be able to identify and help students who were struggling, and that ICT teachers should be up-to-date with the field rather than just learning with the students. They saw a need to make teaching mathematics, science and ICT more attractive to young people. Another expressed what was needed in terms of teachers, as follows: 'We need enthusiastic teachers who want to teach those subjects – teachers who are passionate about teaching them.' At Ashmore DHS, the over-riding concern was retaining teachers beyond three years in order to provide greater continuity and a better balance of youthful enthusiasm and experience. They described the current incentive package offered to teachers as 'absolutely pathetic'. They also believed that the accommodation offered to teachers was sub-standard and certainly not suitable for a teacher to bring a family to. Sarah described it thus:

> They may have been fine when they were built 30 years ago or whenever it was, but in the city they wouldn't be living in that standard of accommodation so why expect them to do that here? … the young ones put up with it but if you were 30 or 40 or 50 plus and you have got a family, you are not going to bring your family here to sub-standard accommodation. So we are not going to get those mentors if that is the sort of thing we are offering. (Sarah, parent, Ashmore DHS)

Parents at Ashmore DHS, St. Lawrence College and Mossvale Primary believed that students needed to have better access to computers at school. The concern at Ashmore DHS was for increasing the reliability of the computers by improving the servicing arrangements. At St. Lawrence College there was discussion about increasing the numbers of laptops available for students to use in class, possibly by implementing some sort of hiring scheme to which all parents contributed. Concerns about equity underpinned the recommendation of parents at

Mossvale Primary that student access to computers at school in school hours should be increased.

Parents at St. Lawrence College wanted to see more mathematics and science in the curriculum and, in particular, believed that there should be more funding to provide 'exposure to outside things' in these areas. This could be achieved either by bringing people in or by taking students on excursions. It should be noted that these parents, and others at government schools, were supportive of the new Essential Learnings curriculum and regarded the willingness of younger teachers to embrace change as one advantage of having relatively inexperienced staff.

FINDINGS FROM STUDENTS

Advantages and disadvantages of living and schooling in rural and regional areas

The majority of students interviewed enjoyed living in rural/regional areas. Many students believed it to be an advantage to live where everyone knew one another. A close community was perceived to be safer, with people watching out for one another. Students at Mt. Eden DHS thought that it was relaxing to live in a rural community and it allowed them to pursue recreational interests such as fishing. In Ashmore DHS the opportunity to procure employment and work experience through the community network was also a positive.

> I have lived here forever. It is good. I love [this town] – it is great. Everyone knows each other like [girl] said and it is good that young people can go and get jobs and get experience in the workforce and then go off and use that experience in other places. (Felicity, secondary student, Ashmore DHS)

There were students who expressed some boredom with living in rural areas with 'nothing to do', however these were in the minority. Two students saw 'everyone knowing everything' as a negative. The inability to easily see your friends when they lived in more geographically isolated areas was also an issue, particularly for the students at Mossvale Primary. Nevertheless, many students stated that they wished to return to the area, or to another rural area following a period of time for study or after experiencing a change. For example, one student said:

> I would like to come back and live for a few years but I would like to leave for a few years and see what I really think of it after experiencing a whole lot of other things. (Alison, secondary student, Ashmore DHS)

The presence of family in the district was the main reason cited by those Ashmore DHS students who planned to return to the district. Students from St. Lawrence College were evenly divided, with half wanting to return to the area following completion of their education and the others wanting to move to a larger centre. The lack of facilities in the towns in specialised areas such as the Arts was also raised – students at Ashmore DHS spoke strongly on this issue. Some students travelled to pursue specific interests, but the time and expense involved were seen as major 'negatives'.

With respect to attending school in a rural or isolated area, students from all schools believed this enabled them to develop more positive relationships with teachers than would be possible in larger centres. Teachers were seen as friendly and people with whom they could talk. That

some teachers were family friends, or had contact with the students out-of-school, was also seen as a positive. Students from Ashmore DHS made reference to the number of younger or graduate teachers that taught at the school. This was viewed positively, with one student commenting:

> Like, they can relate – like we feel more comfortable around them because we can relate to them and where they are. They are good. (Felicity, secondary student, Ashmore DHS)

Students from all four schools also believed attending a school with smaller numbers gave them the opportunity for more one-to-one assistance.

Students from St. Lawrence College believed living in a rural area made it easier to be selected for special programs, with the National Science Camp given as an example. However, this was balanced by the greater expense involved in taking part in these opportunities. Tailoring courses to the interests of students, offering VET courses for example, was also seen as a strength.

Time to travel to school was mentioned as a concern for two students; others saw it as an opportunity to socialise with friends. Some students identified their responsibilities on the family farm and in paid employment as encroaching on time that was available for study.

Facilities and equipment were assessed as sub-standard by students in three of the schools. This included science equipment and classroom space. Students from the Government primary school were particularly concerned about the lack of classroom space to enable activities, such as practical science, to occur. They also expressed concern at having to share facilities with younger students. Access to up-to-date computers was also seen as inadequate.

A restricted choice of elective subjects was raised by students in all three schools with secondary classes. In Ashmore DHS this was ameliorated to some extent by the offering of on-line units. Nevertheless, students were less than satisfied with this form of delivery. They felt that lack of a teacher's physical presence adversely affected their concentration and, if they had problems, waiting for a response from a remote teacher often involved lengthy delays and consequently wasted class time. There were also concerns about the reliability of computers. The introduction of the Essential Learnings curriculum had also influenced the range of subjects available to the students at Ashmore DHS. In that school, students have the opportunity to choose three electives, with mathematics and science being among the options. It was not uncommon for students at each of Ashmore DHS, St. Lawrence College, and Mossvale Primary to transfer to a city school in secondary or upper secondary school in order to have a greater choice of subjects.

Aspirations for education and careers

All the secondary students interviewed had quite definite ideas about their future career directions. Students from the Catholic college, all Year 11, had aspirations in the science/mathematics field. The four male students nominated engineering, electronics, aquaculture and physics, with the female students all identifying careers in the health sciences (medicine, pharmacy, nursing and physiotherapy). Health science was also a career aspiration for students in the other two schools with secondary classes, and forensic science was nominated by two students. A further two students indicated interest in obtaining apprenticeships. All these students were aware of the necessary study involved in the pursuit

of these careers and were prepared to move intra- or inter-state in order to complete their education. One explained:

> I will go to college in Hobart and then, because there are no forensic science courses offered at uni, I have to go to the mainland and I thought that once I had done that I might come back to Tassie… (Sally, secondary student, Ashmore DHS)

The primary students were less certain of where their futures may lie. However, one intended to continue the family interest in farming. Working elsewhere, including interstate, was seen as a possibility by students in Ashmore DHS and Mossvale Primary, with those in Mt. Eden DHS less certain about moving out of the district.

Reflections on mathematics

Introduction of the Essential Learnings curriculum in Tasmania has seen some alteration to the way mathematics is taught in Government schools. All students interviewed currently studied mathematics, with the secondary students at Ashmore DHS studying both numeracy (as a component of their core studies or 'toolbox time') and mathematics as an elective subject. The latter subject is necessary to meet requirements for pre-tertiary study.

Overall, the students' attitudes to mathematics were positive, with students seeing mathematics as important. One remarked quite simply: 'I like that we know how to do it…' (Michael, secondary student, Mt Eden DHS)

At Ashmore DHS, four of the students interviewed cited mathematics as one of their favourite subjects. These students, together with several of their peers from other schools, expressed a liking for the challenging nature of the subject, the ability to apply mathematics to problems, and the sense of achievement in reaching a solution.

> …in doing Maths 4C, it has really challenged me and it is really great because I am not sitting there getting bored. And when I do figure something out it is an achievement and I feel really good about it. (Grant, secondary student, Ashmore DHS)

> …when you understand it, you get a warm fuzzy feeling. (Edward, secondary student, St Lawrence College)

Students who had experienced success in the subject were generally affirming of mathematics, however they held some reservations. These concerns related to being insufficiently challenged, needing to wait for other students in the class, or being asked to perform repetitive functions such as repeatedly writing out long methods of calculations.

Clarity of explanations from the teacher was seen as very important, both by students who enjoyed mathematics and those who saw it as important but not particularly enjoyable. Negative comments about secondary mathematics centred around a perceived lack of relevance of the material and not seeing how what was being learnt could be applied. The following are illustrative:

> The maths we are doing is pure mathematics and I can't see any practical nature or any way it can be applied in your life. That is making it difficult to study (James, secondary student, St Lawrence College)

> Ninety percent of what we learn in senior college seems to be learning it basically to prove we are smart enough to get into university… (Amanda, secondary student, St Lawrence College)

Mathematics was very well received by the primary students at Mossvale Primary – particularly algebra. They could also cite other mathematics they had participated in, including practical activities. Although initially equating mathematics with addition and subtraction, when prompted, students at Mt. Eden DHS also spoke about a broader range of mathematical activities which they had enjoyed. Primary students at Ashmore DHS were quite negative about the subject, finding it neither interesting nor challenging.

Reflections on science

Initial responses to studying science were unanimously positive from each of the school groups. The investigative nature of science was appealing, with students commenting on enjoying experimenting, investigating and looking for evidence. The primary students, who had experienced less science, also commented positively on the opportunity to experiment and to 'do stuff'. It was this opportunity to do practical activities that was cited most often as a reason for enjoyment of the subject. The ability to apply concepts used in science and to use these as a basis for explaining everyday phenomena was also a common theme in student comments:

> In science, one step is already there because you have already seen the things and experienced it before. It is now explaining why. It just takes everyday experiences and just explains it. (Edward, secondary student, St Lawrence College)

Negative experiences of science were essentially divided into three categories. The first concerned a dislike for what was termed theory, which also encompassed note-taking and remembering facts. The second issue, raised mainly in one school, concerned classroom management issues that detracted from students' ability to complete work. The third issue was that of resourcing practical science, again raised predominantly in one school.

> I think the science lab was built in 1978 so our science facilities are pretty much 30 years old, nearly. (Edward, secondary student, St Lawrence College)

Restrictions on subject choice also appeared to impede science, with one student expressing disappointment that it was not possible to study science in combination with his other electives.

Reflections on ICT as a subject

ICT was not taken as a separate subject by any of the students interviewed. Students at Mt. Eden DHS had previously taken this subject as an on-line elective but this had not continued during 2005. Nevertheless, all students said they regularly used ICT as a component of their other subjects. Their comments are included in the following section.

Reflections on using computers in school

The students generally felt they had good access to computers, both in their classrooms and, in the secondary and district schools, in computer laboratories. Computers were used as an integral part of class work, predominantly for Internet research and publishing. Students were confident users and familiar with a range of software applications. The opportunities afforded

by computers to assist research, access online resources and complete a range of different learning activities were appreciated by the students. Students at Mossvale Primary particularly enjoyed using game software in some subjects.

Computer use, however, was not without its frustrations. Problems with machines, including peripherals such as printers, were commonly reported. Speed of computers and the choice of operating platform were also mentioned. The other major issue raised, by the secondary students, was the inability to access many websites due to Internet filters:

> They have got Google Images blocked, so if we need a picture for a power point presentation we are doing for assembly or something, we can't… (Felicity, secondary student, Ashmore DHS)

> We can't access things like breast cancer websites and things like that… (Cassie, secondary student, St Lawrence College)

Almost all students involved in the focus groups had access to computers at home. For the primary students these were predominantly used for games, occasionally being used to complete work from school. The secondary students, although also using them for communication and e-business, reported regularly using them for research. Unrestricted access to websites on home computers was seen as an advantage.

DISCUSSION OF THE FINDINGS

In all cases the teachers, parents and students at the schools presented an essentially coherent view of the needs of students in mathematics, science and ICT. For example, where parents perceived a lack of expertise and interest in science among the teachers at the primary school, the teachers nominated science as an area in which they needed more professional learning opportunities.

The importance of teachers was recognised by each of the groups and parents and students were, with very few exceptions, appreciative of the efforts and expertise of the teachers at their school. Both teachers and parents recognised the need for teachers to have expertise in the subjects they are required to teach and were aware of the difficulties of recruiting qualified mathematics and science teachers which were exacerbated by being in relatively remote areas. They agreed that the current incentives offered to teachers to work in remote locations were inadequate and particularly so in the case of more experienced teachers with families. At Ashmore DHS, where this problem was most acute, the parents displayed considerable empathy for the plight of young teachers sent to their school and were far more forceful than the teachers in expressing their dissatisfaction with incentives that were provided and, especially, with the standard of accommodation provided for teachers.

The requirement to teach outside a subject area was a major concern for teachers and was also mentioned as less than ideal by some parents. Although one teacher (at St. Lawrence College) saw the requirement to teach mathematics while not qualified as an opportunity that would improve his employability, teachers elsewhere were more likely to regard it negatively. It may be relevant that St. Lawrence College was the largest of the four schools and unique among them in having very experienced and well qualified staff in subject leadership positions. Teachers at this school were very positive about the mentoring available to them and the structured mathematics and science programs that were in place at the school. This difference

highlights the importance of a balance of novice and experienced teachers in a school and the need for subject expertise at least at a leadership level.

The teachers were keen to be involved in professional learning to increase their expertise in mathematics, science and ICT, but also acknowledged the difficulties of accessing such opportunities when some commuted long distances from home to school each day and where relief teachers were extremely difficult to find. It is apparent that models of professional learning delivery that are effective in urban areas are not effective in rural and remote areas. There is clearly a need to explore different and innovative ways to meet the professional learning needs of teachers in rural and remote areas.

The contributions of individual teachers were mentioned by teachers, parents and students. For some parents satisfaction with the school seemed largely related to their perceptions of a single outstanding teacher. Highly valued programs such as the annual science fair at St. Lawrence College and the primary science elective at Ashmore DHS were the result of the commitment of particular teachers. In schools where the turnover of staff was relatively high, such programs were clearly at risk.

Parents and students were more concerned than teachers about ICT issues with the focus of their concerns relating to access and reliability. Although parents acknowledged that the internet was an important way of helping to overcome some of the disadvantages of isolation in terms of accessing resources and obtaining a broader view of the world, they did not see this as a substitute for having people actually come to the school or for providing opportunities for students to visit larger centres. Students also had reservations about the effectiveness of online learning and expressed a preference to interact with a teacher face-to-face.

Parents and students were united in their appreciation of the benefits of living in small communities that were perceived as relatively safe and nurturing environments. Parents were keen to see their children realise their potential in terms of education with the vast majority including university study among their hopes for their children. The students had similar aspirations and both parents and students valued family and regarded living at home as a priority. Nevertheless, there was universal acknowledgement of the need, at some stage, for children to leave home in order to pursue their education and/or careers.

SUMMARY OF THE FINDINGS

In this section each of the research questions that guided the Tasmanian study are addressed in turn. It is recognised that these conclusions are based upon the responses of a small group of teachers, parents and students and need to be seen in this context. The first research question was:

1. What are the major concerns of Tasmanian parents, teachers and students in rural school regarding mathematics, science and ICT education?

   A major concern of teachers and parents was the need to attract and retain suitably qualified teachers in mathematics, science and ICT. Teachers were also concerned about access to professional learning. Parents and students were concerned about insufficient access to, and the reliability of computers in their schools. These concerns were expressed, albeit with varying emphases, across the various school types and regions included in the study.

2. How can the mathematics, science and ICT outcomes of rural Tasmanian students be improved?

   Responses to this question concentrated mainly on the means of providing more and better qualified teachers and the means by which their continuing professional development may be ensured.

   In relation to attracting and retaining qualified teachers in mathematics, science and ICT in rural and remote schools, the evidence from this study suggests that:

   a. The pool of suitable qualified teachers in these subject areas from which teachers can be recruited to work in rural and remote locations needs to be increased.
   b. Current incentives to attract and retain teachers in rural and remote areas are inadequate and need to be substantially improved. In particular, incentives likely to be attractive to more experienced teachers who may have families need to be considered. Suggestions from focus group participants included the following:
      i. Substantial salary differentials favouring service in isolated areas
      ii. The provision of low cost weekend teacher accommodation in major centres
      iii. Upgrading of teacher housing, particularly that provided for families
      iv. The provision of regular airfares to an Australian capital city of choice
      v. Short trial periods with ready 'escape' options for teachers open to the possibility of working in these areas but afraid of being 'trapped'
      vi. Greater effort in selling the lifestyle benefits of living in rural and remote locations
      vii. Raising awareness of the availability of distance options for further study.
   c. There is some evidence that, in the short term at least, teacher education should include more curriculum studies in these subject areas and, in particular, mathematics, as an acknowledgement of the realities faced by beginning teachers in rural and remote areas.

In relation to the provision of professional learning for teachers in rural and remote locations, the findings of this study suggest that:

   a. It needs to be recognised that professional learning delivery models that are effective in urban contexts are often inappropriate for rural and remote locations. Important differences include:
      i. The difficulty of finding relief teachers in rural and remote areas
      ii. The increased time spent away from school necessitated by travelling to attend professional learning in larger centres
      iii. The time constraints imposed by extensive commuting to and from some schools by some teachers.

b. Sending experts to isolated areas to provide professional learning on-site, either during school time or after school hours over a series of days, is likely to be effective, and has been welcomed where it has been offered.

c. Teachers in rural and remote Tasmanian schools are likely to be inexperienced, to have less access to mentoring and to be in contexts where there is limited continuity in terms of programs and expectations. As a result, they need more professional learning opportunities than teachers elsewhere. Encouraging more experienced teachers to work in rural and remote areas would help to address this need.

In relation to concerns raised specifically about ICT, the findings of this study suggest that:

a. ICT, and in particular, access to online resources, is important for students in rural and remote areas but should not be seen as replacing the need for suitably qualified teachers.

b. There is a perception among parents and students in rural and remote Tasmanian schools that greater access to computers and to the Internet is essential.

c. Reliability of computers is a major issue which could possibly be addressed by the provision of local technical expertise and support or the provision of additional hardware.

‘If we don’t shout loudly, we might be forgotten’

Report from SiMERR ACT

Catherine McLoughlin
Sue Wilson
Jo Brady
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The population of the Australian Capital Territory (ACT) is about 320000, with the majority of people living in urban areas. It covers 2358 square kilometres, including the Jervis Bay territory. Because the ACT is regarded as having an urban population, its rural areas are often overlooked. These are located close to the NSW border in rural surroundings and have smaller schools catering for local children. Two such schools were chosen as part of the study. Both are located in Provincial Areas (MSGLC Category 2.2.1) and are distinctly different in size, community profile and other characteristics to metropolitan schools in the ACT.

ACACIA SCHOOL

Context

Acacia Primary is administered by the ACT Department of Education and Community Services (DECS) and has a current enrolment of approximately 63 students. The school is in a Provincial Area (MSGLC category 2.2.1).

In addition to the full-time principal, there are three full-time teachers (K-2, 3-4 and 5-6), a full-time Preschool Director and several casual and part-time staff. Ten teachers were interviewed, along with the Principal. Two separate focus groups were conducted with eight parents and five students.

The school has an Indigenous student population of about 60%, mostly from the local community. Many of the remaining students come from small surrounding communities within 15 minutes drive.

Teacher Interviews

The principal (who has previously worked in remote schools elsewhere in Australia) identifies quite serious problems associated with the school, particularly in relation to the Indigenous student population. While some are highly motivated and well supported from home, many are not. His first task, upon taking over the job, was to work to ensure that students actually ‘stayed in their classrooms’ during the school day. He identified significant

occurrences of split families, with students being raised by grandparents, and evidence of quite serious social and behavioural disadvantage.

Overall, the school is very well-resourced (although the computers were noted to be old and due for replacement). The staff are working to rebuild a sense of pride in the school and a sense of academic worth which has been lacking in recent years.

There are particular issues associated with being part of a system from which the school is geographically isolated. In fact, it is one of two schools in this system which is isolated, all others being quite closely located. This tends to lead to a feeling of neglect by administration and curriculum authorities – the principal noting that they really 'do not quite know what to do with us'.

Recent attempts had been made to initiate relationships with surrounding NSW schools and to take advantage of this support network. The school has also adopted much of the NSW curriculum, since the ACT School-based curriculum does not work well when there are so very few teachers with so little support.

Teachers also noted the problems associated with the pay differential between ACT and NSW systems, especially with regard to attracting casual teachers, who are '$50 a day worse off' at Acacia Primary than in local NSW schools.

Reasons for teaching in a rural/regional school

Nearly all teachers lived within 15-20 minutes drive from the school (the furthest coming from 50 kilometres away). Half were long-term residents of the area, the others having come from outside (including the USA, but mostly from Canberra or other cities). The majority indicated an intention to stay in the area. About half came with a wide experience of other schools and other systems; the other half were teachers in their first two-three years of teaching. All chose to teach at this school because of its location, either in relation to their own home, or the beauty and advantages associated with this region.

There were deliberate attempts to build a sense of community both within the school and with the local communities. One teacher noted that 'I was asked to come by the principal because of my connection to the local community?' Another 'started off as a parent helper' (and is now a teacher assistant), and one 'chose this school to teach because my children attend, and I have an affinity with the community'.

Strengths of the school in helping students achieve their potential in science, ICT and mathematics

All teachers referred to the 'small class sizes' and most to the excellent quality of the resources available. Small classes allowed them to adopt 'one-to-one strategies', and to 'assist those with learning difficulties'.

Particular note was made of excellent resources for science, mathematics and ICT ('smartboards are an excellent resource') and the NSW *Count Me In Too* early numeracy program. The adoption of NSW Curriculum documents was noted as a positive move by one, and small grouping and individualised approaches to both academic work and behaviour were positively received.

The local resources and facilities were highly valued, as were the Indigenous community resources associated with the local National Park.

> It's important to present a realistic picture of Indigenous issues and remote communities to student teachers – local knowledge is a great advantage, and encourage new blood for fresh ideas. (Teaching assistant)

Obstacles to helping students achieve their potential in science, ICT and mathematics

Student behavioural issues were highlighted as obstacles by several teachers. Behaviour was seen to be associated with problems of engagement and the need for appropriate resources and activities. Poor leadership in the past provided 'no sense of future directions and no-one willing to take responsibility for this', and behaviour management was generally poor. It was noted that the very small size of the school underpinned its failure to offer suitable older role models for appropriate behaviour and academic success. Social interaction was also seen as limited by the size of the school. One teacher remarked 'that a lot of people feel that their child misses out on social well-being when it comes to small schools'.

The transient nature of a substantial proportion of the population (short-term Government personnel) meant that children came and went, thus making ongoing success difficult.

Staff knowledge and expertise was noted in a negative light, especially with regard to science and mathematics, including a failure to adequately utilise local resource opportunities in this regard. While the school resourcing had previously been referred to positively, in this context it was noted that appropriate resources and teacher knowledge and skills in effective use of resources had proved less than desirable.

Views on attraction/retention of good science, ICT and mathematics

The need for balance between local teachers who know and relate to the community and its resources, and 'new blood with new ideas' was noted. Most teachers referred to the pay differential between the ACT system and the surrounding NSW system as a prime problem in attracting and retaining good teachers. The teachers generally appeared to demonstrate pride in their school, regardless of whether they were permanent or casual.

It was noted that the school needed to advertise 'the fact that we live in such a beautiful area. I don't think it would be hard to attract teachers here.'

Teachers' main recommendation

Not surprisingly, the main recommendation from teachers at Acacia concerned teacher support; the need to be experienced and able to access regular professional development opportunities. Essentially, there needs to be a sense of collegial membership of a professional community which attends to the varied needs – academic, social, behavioural and professional. Although this particular school is only 30 minutes from a large regional centre, in some ways it is as isolated as remote outback communities, since the administrative and educational support centre is geographically remote, and the school is only able to access such support with difficulty.

Parent Interviews

Several of the parents interviewed had children at the attached pre-school as well as the primary school.

Reasons for living in a rural/regional area and choosing this school

Only one parent (Indigenous) indicated that she was born in the area; all others had been in the area from 12 months to 25 years, with most indicating that they intended to stay due to the lifestyle and opportunities.

Most indicated that they had selected this school instead of other local schools because of its positive reputation and good resources (as an ACT school it was perceived as being better resourced than surrounding NSW schools). It was also perceived as being supportive and positive in the treatment of children.

Educational aspirations for their children

All parents indicated that they wanted the option of tertiary study for their children and most indicated that they expected that their children would take up this option.

Strengths of this school in helping children achieve their potential in science, ICT and mathematics

Small class sizes and dedicated teaching staff were commonly identified as contributing to successful outcomes in science, ICT and mathematics for this school. Also its proximity to the National Park was featured as a strength, making it easy to offer field trips.

Obstacles to improving children's outcomes in science, ICT and mathematics

Various obstacles were identified; including a 'lack of specialist qualifications or training in science/maths' and 'the disinclination [of teachers] to approach these disciplines'. 'Teachers' commitment to teaching and the school's behaviour policy (at the time)' were also suggested as obstacles.

Community characteristics, such as the 'small population', transience of students and parents', 'socio economic factors' and isolation from other schools were seen as further hindrances to improved academic outcomes.

Parents' main recommendation

The main recommendations of the parent group related to 'the strict promotion of these subjects (science, mathematics, ICT)'.

Recommendations also related to attraction and retention of teachers, including 'greater rewards (e.g., salary) for teachers calculated in terms of: responsibility, qualifications and willingness to go to hard-to-staff schools'.

A final interesting comment related to a perceived need to 'urbanise' the students. Some parents believed that 'as the students will inevitably need to go to regional or urban Australia', there was a need to familiarise them with travel to the 'big smoke' whenever possible.

This was related to the need for varied school experiences, particularity as parents saw their children and the community as changing and dynamic. While students need geographically appropriate schooling, they are not all being educated to stay in the region, and so need a range of experiences, not only in the community but in the wider geographical area.

Student Interviews

Advantages and disadvantages of living in a rural and regional area

All students lived in the local area, with the majority travelling only five minutes to school. The students cited it an advantage to live in the area because of the proximity to beaches. One stated that it is 'a beautiful place and it has got heaps of things you can do', while another found it boring. Most commented on the scenery, the wildlife and the National Park.

Most of the students intended to remain in the area. One knew he would move on because of his father's work. One boy would like to go to the city and another to Newbridge, a larger suburb nearby.

Aspirations for education and careers

At this stage in their lives the students had embryonic ideas about future careers. One girl wanted to become a lawyer or professional sportsperson as well as being involved in the nearby National Park, 'to make sure that no-one will interrupt our park'. Another girl wanted to be a zookeeper and another an Egyptologist, 'because you get to travel to Egypt and I like mummies and I like to write about history'. One boy aspired to become a computer expert, while another wished to do his Dad's job, 'working with machines and computers and get paid $50 a day [in the National Park]'.

Reflections on mathematics, science and ICT experiences

Several students found mathematics complicated, but half of the group enjoyed it. The students' responses to science ranged from enjoyment to loathing. One girl stated that she liked science 'because I find it very interesting, but we don't often do science at school because we don't get time'. Enjoyable aspects included group work and the students spoke of a project of making tin foil figures and floating them in water with weights on and competing against the teachers. Generally students did not see themselves engaging in science at home. Nor did they perceive a link between everyday activities in the home and projects at school.

The students used computers for Internet research and all except one had a computer at home. All loved the computers – 'They're the best.' One boy claimed there was little use of the computer at school and it was used for writing and Internet research. He liked computers because he knew 'a heap of stuff about it'.

BANKSIA PRIMARY SCHOOL

Context

Banksia Primary is located in a small village to the south of Canberra in one of the oldest settlements in the ACT. The school has consistently maintained an enrolment of approximately 30 students. The village consists of a general store, school, craft centre and church. Banksia Primary is in a Provincial Area (MSGLC Category 2.2.1).

The Primary School has a full-time principal, two full-time mainstream teachers, one part-time learning assistant and a Special Teacher's Assistant (STA) three days per week. All staff including the principal participated in the interviews.

The school has 27 students in two composite classrooms. Currently there are 18 in Years K-2 and nine in Years 3-6. Half of the students come from the immediate area. Some students

who could come to Banksia instead go to private schools by bus. The pre-school operates two full days per week and is integrated into the primary school. It shares an open plan classroom with the K-2 class. The pre-school teacher was interviewed with the staff and this added another perspective to staff comments.

Teacher Interviews

Reasons for teaching at Banksia Primary

Only two of the staff lived in the local community. The principal lived in Canberra and it was her first year at the school. The previous principal lived locally and moved schools because he 'needed a professional challenge'. The part-time learning assistant moved to the community and she started as a casual teacher, worked on contract, and then became permanent. The pre-school teacher came as a forced transfer. She was initially reluctant but now doesn't want to leave. She drives 25km each day to the school. The staff generally indicated a wish to stay at the school.

The teachers saw many benefits in the lifestyle and the opportunities for 'community type' persons to build relationships. 'It opens up a range of things socially and professionally' and provides a chance to build 'confidence as a teacher because of the smaller numbers'. In a professional sense, staff 'get to know the whole child, become less judgemental and more accepting, which makes classroom management easier'.

Strengths of the school in helping students achieve their potential in science, ICT and mathematics

Many of the children worked in small groups, and this supported them in the three discipline areas. The staff saw the benefits of having students in their class for three years as an opportunity to 'stretch, rather than cram'. They are able to make the focus different each year.

The school was well resourced for its size. The staff considered that the resources it had were comparable to bigger schools and that access to resources was good. The teachers saw the school as having a range of resources and emphasised the particular benefits for the students of the local natural resources. The school had just upgraded to broadband. As part of a move to enhance infrastructure the DECS will be providing more computers. The school had no space for a computer laboratory. The staff had mixed feelings about this. The learning assistance teacher who organised the library saw this as a benefit as 'they can be embedded in the classroom'.

The school had the advantage of being part of a cluster which led to opportunities to undertake professional development within the cluster. The principal stated that 'The cluster initiatives we are part of have enhanced [student] outcomes.' The staff had established a professional learning community characterised by informal discussions. Their professional development budget was larger per teacher than that of most other schools and they had used the time to look at other schools as well as do appropriate courses. The principal was seen as encouraging teachers 'to go and look at other schools, and we are encouraged that people come and look at our school'.

The professional development initiative was also seen as a way of attracting teachers and publicising the school which, despite its proximity to Canberra, was nevertheless seen as being 'rural':

> Attracting [teachers] can be an issue, and I think it is a false perception that it is a long way away and that it is not really a typical school and we get told "what do you do out there anyway?" (Principal)

There were many examples of successful initiatives cited by the teachers. The school uses *Count Me in Too* which is part of a system-wide initiative. The school is part of a very active cluster with a number of projects underway and the teachers felt that there is a lot of support if they need to talk. The cluster is also part of a multiliteracies project. They have shared grants with other schools from the cluster – for example on boys' education. Other activities included Peacemaker Day which was collaboratively planned (every student in every school in the cluster participated in activities) and transition activities which 'were very good for our students'.

Being part of the cluster has enabled the grouping of teachers into professional learning communities around *Count Me in Too*, multiliteracies and cooperative reading. Teachers have been part of groups which met and discussed issues. The principal commented that 'the leadership network throughout the school is excellent'. Occasionally the cluster is part of a collaborative grant application process.

Obstacles to helping students achieve their potential in science, ICT and mathematics

The staff agreed that student drift was a 'big problem'. In contrast, there were twice as many applications for pre-school places as places available. 'I don't have trouble in the preschool – parents don't seem to mind a rural start in education,' but historically it has been a tradition to send students to Catholic or Christian schools. It is a strong Catholic rural community. The pattern is to send students to Banksia for pre-school and perhaps one or two years of primary school, and then place them in Catholic systemic schools. As an illustration of this:

> Pre-schoolers are going to seven different schools next year from a group of 15. Five of them are going on to Banksia – which is good compared to previous years of two or three.

The trend of small rural schools being incubators for larger schools was noted by teachers.

> Occasionally parents take children out in Grade 5 or 6 to give them the experience of a larger school. For high school they really disperse, many go to private schools, and Deakin is also popular due to a trend that started a few years ago, based on friendship patterns. (Teacher)

The tendency for students to go to bigger schools to get ready for high school depends on the number of students in the senior part of the school. 'If there is a large cohort in the senior grade this happens less.'

Staff felt that it was easy to overlook science when learning areas were integrated. In the ACT schools can decide on the curriculum organisation and, as science is integrated with other subject areas, staff were of the opinion that it did not get enough emphasis. Staff perceived this as a common feature of primary schools where school-based curriculum is the general practice. They saw it as a subject that is 'easy to do superficially, but harder to set up the inquiry model'. They saw that science is easier than mathematics to integrate 'because it is based on real life' but also agreed that 'it is easier to miss, too' since there are 'fewer people to cover everything and not as much strength in every single area'.

The difficulty of keeping abreast of the rapid changes in ICT was emphasised by staff. One related issue is the question of how staff members who are not comfortable with ICT can be supported, and the pressure that is put on a member of staff who is very competent in this area to try to support other staff. This member of staff found it difficult that there is not a centralised computer laboratory facility, as she spends time 'running between two classrooms'.

Another difficulty is obtaining relief teachers when required. Because of 'the paddocks and the river, people see us as remote'. They are only five minutes further on than the nearest school but 'relief teachers don't come'. The teachers see that there is a 'barrier in people's perceptions'.

The teachers felt that another factor which can affect student progress is parental aspirations. Some parents say that students don't need academic progress because they are just going to work on farms. Others just send them to school to have fun. Twenty percent of the children in the school are from farms. The principal felt that the teachers were 'trying to promote change in a culture that doesn't want it'.

The pre-school teacher was concerned about the lack of ICT support staff. She observed that there is one person for the ACT who has the job of providing support for 70-80 pre-schools.

Views on attraction and retention of good science, ICT and mathematics teachers

It was generally agreed that attracting staff was a difficulty and that the problem was due to the perceptions that people had about distance and isolation. The reality of the situation is seen as being different from the general perceptions. The release teacher believes:

> It works well with what they do at Banksia, because if someone called me to do the lunch release for two hours, I wouldn't do it, but you can stay a full day because they work it with the other teachers' release and I get a full day. Other schools in the system do not do that.'

Some schools offer two hour blocks of work because that is what most schools are doing.

The staff felt that the ACT education system did not promote their school. They saw a need to 'promote the school in the wider community so that they have a better understanding of what Banksia offers.' They also saw the need to promote the school 'to our system (DECS) as a very viable option to families and staff'.

The pre-school teacher spoke about how her own perceptions had changed since arriving at Banksia: 'I guess when I think about it I didn't want to come because I thought I'd be very isolated, but it's a lot better than other preschools.'

Main recommendations

One of the recommendations from the staff was based on their experiences with a workshop which emphasised group dynamics:

> Something that was wonderful, that we did at the beginning of last year; [was] learning how to work as a small group and how to communicate well. At a smaller school if one person is not getting on and working it can be a disaster. New teachers can't always walk in and know how to handle the social situation.

More professional development support in this area would be regarded favourably and would help all staff to work together more productively.

The staff also suggested the need for a focus on science, 'like we had before in maths and ICT, and that has succeeded'.

Teachers emphasised the need for personnel support for teachers, 'rather more equipment', for mathematics and science. The exception was ICT where they felt 'you need more equipment'.

Parent Interviews

Several of the parents interviewed had children at the attached pre-school as well as at the primary school.

Reasons for living in a rural/regional area and choosing this school

Only one parent indicated that her family had recently moved to the area, for lifestyle reasons. Another had moved to the area when she married a farmer and had lived there for 15 years, and hoped to continue living there. The other parent, a father to two children at the school, had moved from Sydney 13 years earlier.

Two parents indicated that they had selected the school because of its proximity and because it was the *local* school. One parent added that he knew the school well as a community member and liked it. A third parent had moved her son to Banksia because he was:

> Unhappy at his old school – it was too large. Here it's a nice community and he is able to make friends. It is flexible, offering more opportunity in areas that are of interest.

All parents commented on the environment and the safety factor in the school and the connectedness to the local community: 'I think it is a wonderful environment. We are very, very fortunate that it gives the kids a good grounding.'

Strengths of rural/regional schools in helping children achieve their potential in science, ICT and mathematics

Parents mentioned a number of strengths in relation to the school, in particular, its flexibility, the multi-age classes and the opportunities for children to be extended. For example, one commented that the multi-age class 'allows him to be extended, and he is good at maths and IT and can work above his grade level. At a bigger school he may not get the same attention.'

The third parent remarked that the resources for ICT and the teaching of ICT were not adequate and that the children were not ICT literate due to lack of expertise in the school. On the other hand it was stated that the school provided a good environment for teaching mathematics, as students could put many concepts into practice.

Obstacles to improving children's outcomes in science, ICT and mathematics education

Parents identified a number of obstacles, including the need for teachers to become more ICT literate. Parents perceived that teachers needed to be more qualified – 'More able to implement especially the IT stuff, because it moves so rapidly.'

Other concerns were raised about the standard of science teaching and that change was needed to ensure science was given greater emphasis. All parents thought that science was not taught as a separate subject, but integrated and related to matters in the environment. For example, the impression gained by one parent was that 'When they are doing science they don't necessarily refer to it as science to the children – they say projects, etc.'

Parents were, however, supportive of efforts to integrate classes, levels and subjects, all of which contributed to a positive and supportive teaching environment:

> Integration works with pulling it all together. They've got a wonderful rapport in the class. Older kids helping the younger kids, a supportive environment – helping each other.

Parents' recommendation

The main recommendations of this group related to increased professional development to improve teachers' skills and in particular, their confidence.

> A lot of teachers lack confidence in certain areas. I think teacher training has a lot of emphasis on the skills, and stresses teachers out and affects their confidence. Professional development needs to focus on the confidence as well – big thing to work on.

Another parent commented that she would like to see more emphasis on the teaching of maths, science and ICT, and more resourcing in the form of computer hardware.

Student Interviews

The majority of students lived outside the village and travelled from nearby ACT suburbs. Six students aged between six and nine were interviewed: two girls and four boys.

Advantages, disadvantages of living in rural and regional areas

Only one student lived in the town with the other five living in nearby suburbs; only one student walked to school but the others travelled by bus for 5-10 minutes.

All students would like to live in the area because of the quiet and natural beauty. Those living in nearby suburbs would have preferred to live in the area and contrasted the lack of pollution in the school environment with their place of living. One student had moved from an ACT suburban school because of the difficulties of a larger school and now had many friends.

Own aspirations for education and careers

Career aspirations for students included animal-related activities such as two wishing to be horse riding teachers, one a vet and another a ranger. One wanted to be a paleontologist, because 'they study the life, they dig up bones and stuff and because they usually go around the world'. One boy wanted to be an artist because he enjoyed drawing and painting with his mother.

Reflections on Mathematics (positive and negative)

The younger students enjoyed 'pluses', 'minuses', 'challenges' and 'times tables'. One student liked doing fractions – 'They're pretty easy.' Assistance with mathematics is given by friends, the teacher or parents while some students use a calculator when in difficulty. Several

relied on older students sitting near them. One girl claimed to just work it out independently and gave an example of working out the nine times table.

Reflections on Science

The younger students claimed not to do any science in school but rather did it for homework. When prompted they spoke of projects such as planting things at home, water waste and measuring the rain gauge.

> Don't do science, not really. I drink water and look at the gauge. (Peter, student)

> I only do things liking waste and saving water. Always wait till the dishwasher is full before turning it on, so that you don't waste water. (Susan, student)

Reflections on using computers at school

All students enjoyed working with computers. These activities appeared to centre on games. According to the students the computers were used as a reward after set work was completed, and all were very keen to use the Internet. One recalled using computers for art activities with photos and one spoke of doing spelling activities. Students were aware of special games and one engaged with virtual pet fish.

> I like to use the computer. If the teacher says we're allowed on the computer, everyone rushes for it. (Sally, student)

There was a shortage of computers in the Grade 3-6 room with two computers for 18 students while the other class of nine students had five computers. It appeared that while computers were available there was little integrated use of such within the curriculum and no specialised assistance with technology.

Summary

Banksia Primary was perceived by parents, teachers and students to have a lot of advantages in offering a sound education for students. This was partly because of its small size, where teachers could get to know the whole child, and where there were few problems with classroom management. The preschool was well integrated into the primary school and seen as advantageous in offering a quiet rural environment for the early years of schooling. Many Catholic families in the area were happy to start preschool and maybe even K-2 in a rural school but then moved children out in Grade 5 or 6 to give them the experience of a large school. The problem of student drift in the later years was seen as an issue to be addressed. Barriers to achievement in mathematics, science and ICT centred on a number of areas:

1. The need for a stronger focus on science, as opposed to the current integrated approach which does not have a strong focus on teaching scientific concepts and processes.
2. The curriculum was seen to be in need of reconsideration, integration and planning, and to indicate how to integrate mathematics, science and ICT into the curriculum.
3. In-servicing and professional learning opportunities for teachers in the school were considered to be essential as many teachers, although generalists, lacked confidence in teaching many different subject areas.
4. Resources, in the form of better ICT equipment and an improvement in the computer-student ratio, were considered essential.

5. Attracting teachers to the school was considered to be a problem, largely because of the size of the school, and the perception that it was different, and not a 'typical' school. The school also found it difficult to get relief teachers because of its distance from the metropolitan area.
6. Teachers and parents believe that the small size of the school, while providing a safe and caring environment, was detrimental in at least one respect, i.e. lacking a voice that would be heard in the ACT Department. As one teacher said: ' If we don't shout loudly we might be forgotten.'

‘Not just another face in the crowd’

Report from SiMERR New South Wales

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INTRODUCTION

More than 6.7 million people, or one third of all Australians, live in New South Wales. Of these, about 75% live in the 2.5% of the state referred to as the Greater Metropolitan Region (GMR), comprising Sydney, the Illawarra and Lower Hunter regions (Department of the Environment and Conservation, 2003). The rest of the population live on the coastal strips outside the GMR (10%), and in the regional and rural areas of inland NSW (15%).

The SiMERR NSW team visited four schools located in these regional and rural areas, interviewing teachers, parents and students about their perceptions of science, ICT and mathematics education. This chapter presents and discusses the results of these interviews, providing detailed and contextualised insights into what these groups identified as key issues affecting educational outcomes in the three subject areas.

The chapter begins with a description of the schools, their communities and contexts. The three subsequent sections present and discuss the responses of teachers, students and parents to the interview questions. The final section presents a summary of the findings, along with the SiMERR NSW team’s reflections on those findings.

THE SCHOOLS

The four schools present a cross-section of those in rural and regional NSW. While not necessarily representative of all schools in these areas, each was nevertheless typical of one common type of school. Willow Central[11], St. Peter’s Primary and Rainforest High are among the 77% of non-metropolitan schools located in Provincial Areas of NSW. St. Theresa’s College was chosen both as an example of the 18% of non-metropolitan schools located in Provincial Cities, and also to contribute the perspective of students, teachers and parents associated with a single-sex rural school. A Remote Area school was also approached and agreed to participate, but unfortunately the SiMERR team was unable to take up this

[11] All names are pseudonyms

opportunity due to difficulties with timing and logistics. Remote Area schools make up 5% of all non-metropolitan schools in NSW.

Two of the schools, Willow Central and Rainforest High, are located in the northern hinterland of NSW. St. Theresa's College and St. Peter's are in central and central western NSW respectively. Table 10 outlines the relevant characteristics of the four school schools.

Table 10. Schools and focus group participants

School	Type	Students	System	MSGLC Category
Willow Central	Central (K-12)	Coed.	Government	2.2.1 Inner Provincial Area
St. Peter's Primary	Primary (K-6)	Coed.	Catholic systemic	2.2.1 Inner Provincial Area
Rainforest High	Secondary (7-12)	Coed.	Government	2.2.2 Outer Provincial Area
St. Theresa's College	Secondary (7-12)	Girls only	Catholic systemic	2.1.1 Provincial City

Willow Central School

Willow is a small, isolated rural town about 110 kilometres on winding roads from the nearest large centre, a regional city with a population of 23000. The town is surrounded by picturesque farmland, extensive tracts of forest and towering rainforest and spectacular mountains. The population of the Willow locality is about 1000. The town was once a centre for dairy, beef and timber industries. Since de-regulation of those industries, however, many dairy farms have been abandoned and there remains only a small-scale timber operation in town. Consequently, the socio-economic profile of the town is relatively low. The school is a modern, mainly brick construction, with an enrolment of 233 students from Kindergarten to Year 12.

St. Peter's Primary School

St. Peter's Primary School is located in Plains, an historic rural town with a population of approximately 2000 people about 50 kilometres from the nearest large centre, a regional city with a population of 36000. It is located in a rich agricultural shire which produces fine wool, wheat, grapes and fruit, beef cattle and fat lambs. St. Peter's Primary School is a Catholic systemic school for students from Kindergarten to Year 6 with an enrolment of 76. The school is located on a hill overlooking the town. In addition to St. Peter's Plains also has a government central school catering for students from Kindergarten to Year 12.

Rainforest High School

Rainforest is a rural town with a population of approximately 3000 nearly 45 kilometres from the nearest large centre. It is close to World Heritage listed national parks and its economy is based on primary industries including beef, dairy and timber. Like Willow, de-regulation of those industries has had a serious effect on the town and the recent loss of the major industry, a timber mill, means that unemployment rates for the town are very high. Rainforest has government primary and high schools and a Catholic primary school. Rainforest High School has an enrolment of 499. It is centrally located beside a river on the main street in the town.

Students from Years 7 to 12 attend the school, consisting of several two-storey brick buildings.

St. Theresa's College

St. Theresa's College is located in Barton, a regional city with a population of approximately 30000. Barton has a wealth of education facilities, including a university campus, an institute of Technical and Further Education (TAFE), a Conservatorium of Music, government and non-government primary and secondary schools including several secondary boarding colleges. Educational facilities are the largest employer in the city but, in addition to being a service centre for primary industries, there are also several large manufacturing industries located in the city. St. Theresa's College is a Catholic systemic girls high school with an enrolment of 620. It is located a few kilometres from the central business district and is surrounded by extensive playing fields.

TEACHER PERSPECTIVES

Most of the teachers interviewed have lived in the local areas for an extended period of time, typically eight to 20 years. Some were born or had grown up in the area, others had moved there from metropolitan centres. Even though the majority live within their school's district, many of them live in larger centres, smaller villages and on rural properties some distance from the town or village where their school is situated. Nevertheless, 'I still feel a part of the community,' reported a teacher from Willow Central School. It is not uncommon for teachers to drive 20 to 50 kilometres to school, taking from 15 to 45 minutes depending on road conditions.

Reasons for teaching in a rural/regional school

The main reason for initially working in the region was availability of employment. Margaret, a teacher at St. Peter's Primary School 'came up here on a maternity leave position for a year' while Philip, at St. Theresa's College, 'came for a promotion'.

Others, such as Bridget at St. Peter's Primary School, followed their hearts: 'My husband secured a job here so we moved for his work.' A number of the female teachers married local farmers. Incentives to stay in the area then followed through buying a property or going into a business with their partners.

Commitment to staying in the area was strengthened through family ties, either because of parents or in-laws or because the teachers had started families of their own. A teacher from Willow Central School explained: 'I've got two little kids and I want to bring them up in this school environment – a small country school.' For those who moved to the region from cities, the advantages of country living quickly became apparent and the short stay became permanent. According to many, country living provides a 'back-to-roots' lifestyle where one can 'enjoy the best of both worlds' and, most importantly, develop a sense of community. A teacher from St. Theresa's College commented:

> There is certainly a community out in the country that you just don't get (in the city). We've been happy with what we have been doing out here and we've started to raise a family.

This process of evolving motivations for moving to and settling in a rural community was well illustrated by Roberta, a teacher at St. Theresa's College:

> My husband was the romantic attraction. We won't be going anywhere because we run a property, we like the lifestyle and it's a good place to bring up our children. It's the community: it's very friendly and doesn't have the pace of life down in the big smoke.

The school is a focal point of many rural areas and this same sense of community is reflected in the school dynamics. Close relationships are formed with professional colleagues, creating a good atmosphere at school and with parents. Brian described Willow Central as:

> A nice small school, where you can know all the kids and you get to know their parents and their families. It's a good place. People say 'G'day' to you in the street, you're not just another face in the crowd.

The teachers also felt that they developed closer ties with students through involvement outside school time. Job satisfaction was clearly linked to 'the culture of the school'. Frances, from Willow Central School, also remarked on the links between job satisfaction and student attitude:

> I like teaching kids from rural areas, they just seem happier, They get lots of fresh air or something. It's a family atmosphere I think.

Not all teachers, however, fitted this pattern. A minority saw their present situation as temporary. For example, David saw his current school, St. Peter's, as one step in the promotion ladder:

> I was teaching (overseas) and my contract finished. I was looking for a position that was starting in Term 4 back in Australia. I'm open to opportunities.

Others felt that they were stuck in their present situation, a situation over which they had little control. Having moved to the bush under a transfer system that subsequently changed, they felt that they had no hope of ever getting back to a city. Betty, at St. Theresa's College admitted that 'had I known that, I wouldn't have come in the first place'.

It is important to emphasise that while a minority of teachers were quick to point out the disadvantages, most were enthusiastic about the advantages of living 'in the bush' and appreciated the 'strong community (and) strong ties to the place'. In addition to this strong sense of *identity* there were striking comments relating to the idea of comfort. As Genevieve put it, 'Coming back into Willow, you just feel comfortable.'

Staffing issues

Although generally positive about rural lifestyle and communities, some teachers believed that limited community facilities contribute to a sense of isolation, especially among young teachers from larger centres. Barbara from Rainforest High explained that 'there's nothing here really for (young teachers), unless you're married and wanting to settle down'. Teachers also recognised that rural areas do not provide the lifestyle that most young teachers desire. Established teachers are positive about their rural communities being good places to live and to work, but recognise that the issue of isolation is exacerbated by lack of facilities such as medical and banking, and by limited social opportunities. The smaller towns, such as Willow,

even lacked 'a decent cup of coffee' and the price of fuel 'is five or ten cents [per litre] dearer' than in the metropolitan areas, so there is a feeling of financial disadvantage.

Nevertheless, another teacher at Willow Central observed that the isolation was 'to our advantage in a lot of ways' because students are insulated from some of the less desirable city influences, and there is strong family and community support for the school, though not always for the academic side of education.

According to the teachers, the lack of community facilities and school resources, the high workload expectations and limited professional development opportunities exacerbate the problem of attracting young teachers to country towns, and also make it difficult to retain them.

> It's a problem attracting new teachers into the profession because they come into a school situation with so many demands that they find it quite stressful, and there is not a great deal of support. (Barbara, Rainforest High School)

Barbara went on to explain that an early career teacher or trainee teacher from a city would experience 'a huge culture shock' in Rainforest. Nevertheless, teachers were positive about the quality of pre-service training and the energy that young teachers could bring to the schools. Barbara felt that school students:

> Need role models (and) innovative ideas. Young teachers are learning these as they're coming through their training and implementing them. What they bring to the school is a vibrancy.

Sadly, the teachers recognised that the attrition rate of early career teachers was quite high. According to Bill at St. Theresa's College:

> The retention rate is very poor. Thirty percent are leaving within the first two years of teaching. If we're going to lose that many young teachers, we're not going to be able to staff these schools in the future.

Consequently, a predominance of older teachers is seen to have negative consequences for the school and for the students. A comment by Jane from Rainforest High reinforced this issue:

> The profession is ageing. (The students) don't see the younger maths teachers and the younger science teachers around enough to relate to them.

A related issue was the shortage of specialist teachers trained to teach some Year 12 courses, especially Extension 1 or 2 mathematics. At St. Theresa's College, Bill explained that the lack of specialist mathematics teachers had resulted in a situation where the subject was being taught by 'teachers who have not been trained to teach maths, but have come from other teaching areas and become maths teachers by default'.

Teachers' suggestions for attracting and retaining staff in rural and regional communities

It was thought that raising the profile of the teaching profession would assist in attracting young teachers to the profession and then to country areas. Bill from Rainforest High explained:

> Making it more of a profession is a big issue. Saying it's a desirable profession to be involved in, as opposed to a dumbing down of the profession. Seeing it as a job that is actually worthwhile.

Another suggestion for attracting teachers in rural/regional areas was to compensate for the isolated country service by providing extra leave, as is the practice in more remote western locations. Financial support could also be provided, as suggested by Anne from Willow, in the form of 'a fairly attractive locality allowance' which would compensate for the additional cost of travel associated with taking leave and with gaining access to basic facilities such as medical or banking.

A third suggestion was the creation of pre-service opportunities in rural schools and in-school support to encourage early career teachers into rural areas. Barbara from Rainforest High suggested that rural education could be a focus in pre-service courses 'to give more of an understanding of what rural areas actually do have to offer'. This training, she felt, could include 'the opportunity to do a practical in a rural area, in a nurturing environment with a family or somewhere that cares'. While some schools do have mentoring programs, these could be developed to become more proactive in retaining young teachers. Barbara went on to explain:

> The support system within the school for new teachers coming in – that's crucial. So within the school we have to recognize that and build up a support team.

Given the concerns about workload mentioned above, the teachers recognised that a support scheme such as this would need to include centrally designed modules for successful local implementation.

As a balance to the perceived isolation of country areas, benefits such as cheaper housing and strong community support for growing families could be used to promote teaching in rural areas. Such measures would demonstrate the financial benefits for teachers in terms of the lower cost-of-living in general, and housing in particular.

Advantages for student learning in science, ICT and mathematics

The teachers were proud of the strengths of their schools. They felt that close school and community ties, small school size and, in most cases, small class sizes resulted in good rapport and close working relationships between teachers and students. Other benefits of the smaller schools (St. Peter's and Willow) included good communication between staff, easier transitions for learners from primary to secondary programs and the development of innovative programs and activities in schools.

The closeness of the school community facilitated the development of good rapport between teachers and students. This had a positive effect on school harmony and meant that students were more comfortable approaching teachers for assistance.

> I think there's a great rapport between the students and the staff – they get on very well. They're very close, to the extent that staff give up a lot of spare time to work with them. And kids give up things to come in and work with teachers. (Bill, Rainforest High School)

Such an environment has clear benefits for learning:

> The strength of little schools is the supportive, caring, secure learning environment, and I think that's evident in every classroom. I think the children feel safe here, happy to learn, happy to take risks, happy to give things a go. (Mary, St. Peter's Primary School)

Local resources were also valued. These provided a context for student learning which thus supported theoretical concepts. Barry, at Willow Central, described how 'we take the kids up to [a] National Park. Once they go there and come back you keep using those experiences [that] the kids can relate to.' At St. Peter's Primary School, Bridget described a local fossil museum, noting the importance of taking 'the time to look at what is in our own backyard and utilize our own environment'. Nevertheless, teachers also recognised the limitations of local resources and experiences and commented on the difficulties and expense of transporting students further afield.

In addition, teachers felt that smaller schools and smaller classes allowed them better to cater for individual differences. Such environments gave students confidence to participate in a wide range of experiences, rather than specialising in one area of endeavour they favoured or were good at. According to Jim at Willow Central, another advantage for students at smaller schools was the enhanced communication and cohesiveness between staff and a willingness to assist each other:

> Everyone's in the one [staff] room and you find out a lot more of what's going on in other people's classes and other people's faculties and subjects.

Especially applicable to central schools was a sense of continuity, with an almost seamless transition from primary to secondary department. Jim elaborated:

> In a central school, primary students get to know the staff and students from the secondary section of the school so transitions from Year 6 to Year 7 are not difficult.

The teachers identified a number of initiatives, programs and practices that they believed made a positive contribution to student achievement, including hands-on and challenge-based learning experiences, the production of teaching materials specifically designed to meet the students' needs, across KLA and integrated approaches to teaching, team teaching, external competitions that stimulated student enthusiasm for learning, and a peer support program.

Competitions, particularly those external to the school, were seen as great motivators for the students, and also helped them to adopt or recognise statewide standards of achievement. Nevertheless, the cost of participation in a competition, or travel to an event, was seen as a factor limiting participation in competitions and other worthwhile educational experiences, especially for students from low socio-economic communities.

Obstacles to student learning in science, ICT and mathematics

Despite the many strengths of rural schools, teachers identified a number of issues which created obstacles to student achievement. These related to curriculum, professional learning, ICT, student diversity and socio-economic status, access to extra-curricular activities, family aspirations, and competition from larger centres.

Obstacles related to curriculum

Students in rural, regional and isolated areas have life experiences that are, to a significant extent, different from those of their metropolitan peers. This is not always appreciated by curriculum and examination designers who sometimes assume that all students have certain educational experiences and express themselves in certain ways. Teachers raised this 'hidden curriculum' in several contexts, including assumptions implicit in Higher School Certificate (HSC) examination papers. There was a perception that HSC examiners from the metropolitan area sometimes have certain presuppositions about the experiences, the forms of expression, and the discourse that students bring to the examination. As John from Rainforest High stated bluntly: 'The questions are biased towards the experience or lifestyles of city kids.'

Teachers felt that senior students were particularly disadvantaged due to restrictions on the variety of subjects available at HSC level. The staffing formula used in larger metropolitan schools does not work for small rural secondary schools. For example, Barry at Willow Central explained:

> In the smaller schools, you need to have another look at the staffing formula. What works in a big school shouldn't necessarily be the formula in a school like this. It has to be staffed according to the needs of the school.

He also stated that the limitations caused by an inflexible staffing formula are then manifested in restricted curriculum opportunities for the students with 'kids not being able to choose, especially in the senior years, the full range of subjects that they might get in a bigger school'.

Obstacles related to ICT

Teachers also identified aspects of ICT that created obstacles to student achievement. The lack of computing resources was seen to be a substantial problem in rural schools. Computers are often not readily available or accessible for teachers. At Rainforest High, John conceded 'this is the worst resourced school as far as technology for staff'. He noted a similar situation in the classrooms. 'The standard of the equipment in the classroom [is very poor]. We should have computers in the classroom.' There were also problems with the standard of technology for accessing the Internet. Bridget, from St. Peter's reported that 'The Internet connection here is really, really slow. Anytime that we've done any research on the Internet here it takes too long to do.'

Concern about ICT resources, however, was not just about the lack of appropriate equipment but also reflected the lack of suitable computing personnel. There were several serious concerns about the workload of maintaining the school's computers and network, which was often in addition to a teaching load. This was a huge task, and demanding in terms of time, energy and stress.

> We need a technician in every school to maintain computer networks. A teacher who has been trained to teach shouldn't be expected to turn into an electronic whiz. We're really fortunate here. We've got a very interested parent who looks after and administers our network and totally has autonomy. But without him we would be totally stuffed up. But the scary thing is we're not going to be fortunate for that much longer. This interested parent's children are ready to leave Year 12. Every other business employs network technicians. The Department of Education doesn't and it's madness. (Barry, Willow Central School)

While the Internet is increasingly being valued as an information resource by city students and teachers, teachers such as John at Rainforest High noted that there were severe limitations on its use by rural students due to the low number of families with Internet-enabled computers: 'A large proportion of kids don't have computers at home here.' The 'low socio economic background' of many students was cited as one reason for the limited availability of computers. Teachers at Willow Central estimated that up to '50% of the kids don't have a computer' at home. There was also concern about the 'painfully slow' download speeds at Rainforest, a problem that teachers believed also helped explain the low home computer use. They claimed that the local infrastructure allowed only a single phone line in most houses. In homes with computers and Internet access, competition from siblings and parents for online time and from 'more than one member of the family wanting to use the telephone', students' opportunities to use the Internet for home research were severely restricted. It should also be noted that Rainforest had no local public library and therefore no library Internet access. Very few rural towns the size of Rainforest have Internet access available from libraries or Internet cafés. The public library at Willow has only three computers with Internet access, while Plains Library, which is only opened three school days a week, has two.

The slow download speeds and lack of broadband access also affected teachers. Barry noted regretfully that Willow does not have broadband and is unlikely to have it anytime soon.

Obstacles facing Indigenous students

While recognising that rural schools generally have smaller class sizes, some teachers maintained that even smaller groups were needed in order to encourage and foster academic achievement by Indigenous students, enabling them to complete Year 12. The belief was that smaller class or group sizes would facilitate the practical activities that students respond to:

> When you've got Aboriginal kids working in small groups you can get them working. … They're lost in a large group. A fair few of those low ability kids are Koori kids. If they get lost then you lose them next year and you won't get them back. If you keep them going through 9 and 10 you've got that bigger opportunity of keeping them going through 11 and 12. (Barry, Willow Central School)

The benefits of hands-on and challenge-based learning activities were expounded by Robyn at Willow Central who observed that Indigenous students in particular 'perform well at practical tasks but not at non-practical or more theoretical tasks'. In Robyn's experience, students need and respond well to concrete approaches to learning, to hands-on and discovery approaches, to integrated or across KLA approaches, and to problem or challenge-based learning. In effect, she added, teachers respond to student need 'so you present things in a way that they understand'. This was illustrated by links of the Aboriginal children's families with a local trucking company which served as an example of putting theoretical concepts into a concrete framework with which children identify.

Some teachers explained that they had created their own resources and support materials for teaching Indigenous students. Jim at Willow Central described how:

> We've gone away from using a textbook [in maths]. We try to do our own booklets that are sort of specific to what they're doing, and get information from a number of different sources.

In addition to tailoring the booklet content to the students' needs, Jim commented that the students had 'ownership of their booklet', and for 'a lot of the Koori kids and other kids it's

theirs. They've got ownership of it and they've got ownership of the work in it.' The notion of ownership of work and learning has sound theoretical support but clearly the creation of the booklets was time-consuming and increased teacher workload.

Obstacles related to professional development

Teachers in rural schools recognised the need to maintain their expertise through professional learning. However, they considered that there were several ways that they were disadvantaged in this regard, creating in turn obstacles to student success. Jane at Rainforest High was emphatic that 'teachers need professional development in rural areas . . . I need it so that I can help improve the outcomes for my students.' David at St. Peter's Primary School noted that, while there seemed to be professional development opportunities in literacy, 'not one on maths and science has ever been offered'. There was also a concern that many small rural schools had only one maths, science or ICT teacher, making it difficult for professional dialogue.

Teachers also highlighted the lack of access by rural schools to a pool of casual or relief teachers, placing a huge imposition on teachers:

> I have nobody within a 200 mile radius that I can call on as a casual teacher who can teach physics if I want to have a block of time or long service leave. I'm sitting on long service leave that I don't morally feel I can take because every year I have Year 11 physics and I have Year 12 physics. (Martin, St. Theresa's College)

Teachers were therefore disadvantaged when seeking to engage in professional learning activities, either in school or at other centres. The lack of casual relief teachers also meant that access to leave was difficult for teachers committed to student achievement.

These difficulties with professional learning adversely affected the integration of ICT in schools. The lack of professional learning in ICT, explained David from St. Peter's, resulted in a 'lack of confidence' with teachers often only 'one step in front' of the students. Bruce at St. Theresa's College complained that 'we are given great computers but I have never had professional development on how to use a computer'. Because of the lack of professional development, he felt that older staff members 'don't feel comfortable with ICT, so they're not willing to implement things because they're scared of it'. This is compounded by the demand for limited ICT facilities, typified by the situation at Willow Central School:

> We've only got one computer lab. You're wanting all classes to use the lab so it's impossible. Teachers book in to use the room and it's pretty hard to get in there. It can be very frustrating. (Robyn, Willow Central School)

Furthermore, teachers such as Bruce at St. Theresa's College commented on the need for full-time support personnel to maintain ICT, since 'having a part time ICT person just doesn't work'. ICT support was often an 'extra' duty for a teacher and some schools relied on volunteer work by parents.

Obstacles related to providing extra-curricular activities

Teachers reported that students attending rural schools often missed out on educational experiences that those in larger centres took for granted. The tyranny of distance was exacerbated by the high cost, or lack of, transport, especially in economically disadvantaged communities. The result was a paucity of school excursions and loss of opportunity for the alternative, hands-on activities that the teachers saw as valuable in creating context in

learning experiences. Concerns about distance and cost of transport were far reaching and included access to learning opportunities and resources, students travelling to sporting or extra curricular activities, and teacher professional learning.

Teachers at isolated schools, such as Jim from Willow Central, would like access to a bus. 'Having our own bus, we could just say "right, we're going here today or we're going there".' Lack of transport 'cuts down on some of the activities that we could probably do'. He made further observations about issues related to travel and distance:

> Providing transport and some funding when you're trying to take kids away on excursions would be really valued. We're getting more and more low socio-economic parents who don't have vehicles suitable to put on the road. The parents who have got the time to go, who are unemployed or otherwise unengaged, don't have the vehicles to do it, and the parents who can afford the cars haven't got the time because they are working. And it's a big thing trying to provide the kids with those experiences, even just getting out of [Willow], because there are kids who haven't ventured further than [the next town] and some kids who haven't ventured out of [Willow] before.

Obstacles related to family aspirations

Teachers felt that community attitudes, combined with a lack of experiences and role models at various levels, affected the goals and aspirations of students. Community attitudes at Rainforest were summed up by Barbara: 'They grew up here, they like it. There are not a lot of university type jobs in the town. Why aspire to things that you won't need [in order] to live in [Rainforest]?' According to Martin at St. Theresa's College, the lower parental aspirations were reflected in school priorities: 'There just doesn't seem to be as much time or commitment to rigorous subjects.' Teachers at Rainforest High reported that there are parents who say, 'I never got an education, what do you need one for? I still made it so why can't you?' and that this attitude rubs off on students who 'tend not to see that there is a world outside' and who 'pull the reigns back on themselves. [It's] their confidence in what they think they can do. They're holding themselves back.'

For many families, academic studies are not afforded a high priority. Schoolwork and homework often lose out to competing family and student priorities. At Rainforest High Jane provided examples where the rural life took a higher priority. 'Students will tell me, "I've got to go and kill pigs every night this week"' and where sport also took a higher priority: '[a student can't do homework] because he's in a football team so he has to drive from here over to practise two nights worth of football for some comp. and stay with his uncle'.

Obstacles related to competition from larger centres

Teachers acknowledged that there was a perception among parents and students that private schools in larger centres offered better subject choices and enhanced HSC results, and that this led to a 'brain drain' from rural high schools. At Rainforest High Bill noted that the number of students involved in this shift could be large: 'We're losing three bus loads of kids out of town everyday' and these students tended to be 'the more academic kids'. In a similar situation, teachers at St. Theresa's College said that local students attending schools in the larger centres were 'the brighter kids who are wanting to do maths and sciences'. Robyn at Willow Central noted that this loss of students could in turn lead to a reduction in subjects available to the remaining students, 'especially in the senior years'.

Summary of obstacles to student achievement

Rural teachers identified many substantial obstacles to students achieving their potential. In particular, they drew attention to the 'hidden' curriculum, which they saw as being biased toward the implied understandings in HSC examinations and against rural students who bring different experiences, forms of expression and discourse to the examination. The limited opportunity for professional development, and the associated substantial costs in time and travel were other major concerns. These difficulties were exacerbated by a lack of specialist casual teachers to take over classes.

The inflexible staffing formula was seen to increase the obstacles for rural students by limiting the number of specialist teachers and therefore limiting the number of specialist subjects that could be offered by some of the smaller schools. Two issues that appear to be linked are the unsuitability of some subjects to meet student need and future employment preparation as well as student and family aspirations. Arising from and exacerbating many of the obstacles was the perceived benefit of larger schools that have the physical and human resources to offer a greater range of subjects and course pathways.

STUDENT PERSPECTIVES

Living in a small town

Students were generally positive about living in a small town. They thought it was comforting to live in a place where they knew people, where people knew them and where they didn't get lost in a crowd. 'It's open and, like, it's easier to know everyone,' said one Year 5 student from St. Peter's Primary School. Another agreed: 'It's just fun to grow up in.' On the other hand, some students also acknowledged that sometimes a limited range of entertainment in the town could be a disadvantage – 'It does get boring.'

Attending a small school

The benefit of living in a small community flowed on to knowledge of staff and students at school. 'Most of the teachers are friends with our parents and all that sort of stuff . . . and we're friends with their sons,' explained Tom from St. Peter's , who also added that at his school 'you know everyone's name'.

The students generally appreciated being recognised by teachers and other students, and therefore had a deeper sense of personal identity within the school. Toby from St. Peter's explained that 'they'd know you as a person instead of just knowing your name'. This sense of identity had clear implications for instruction since, as this student explained, 'the teachers . . . get more understanding of the work you're doing. It's a small school so you get more attention.' Students at Willow Central School agreed that 'the teachers have more time for us', and students at Rainforest High described how teachers would help students out of school hours. 'Our teacher, he's so committed, he is coming into school tomorrow (Saturday) to teach us because we're so behind and he will be doing workshops in the holidays, so that's the best thing.'

The significance of good teachers at the schools visited by the SiMERR NSW team was expressed on several occasions and in relation to several subjects. Students at Rainforest High School spoke very positively of their mathematics teacher:

> He can explain stuff really well. Other teachers they explain it to you and you don't get it . . . and you can't ask another student because they don't know either. If you don't get it when he explains it, he simplifies it even more.

While increased individual recognition was generally seen as an advantage, there were also disadvantages. Being at a smaller school meant that students could not avoid the teacher's attention. One Willow Central School student admitted that 'sometimes it's kind of a bad thing because you get asked more stuff' in class.

Intriguingly, the students felt that, because teachers knew them, they were 'less sort of stressed and [more] relaxed'. When asked to elaborate, Melanie from St. Peter's also noted that the teachers were 'a lot less stressed down here 'cause they only have to prepare like 16 sheets instead of 40 or 50'.

Students did identify some ways in which they felt disadvantaged in comparison to those in schools closer to large cities. One student at Rainforest High School commented that 'our library is not that great', while others referred to resources beyond the school. Rebecca from Willow complained that:

> We don't have museums that we can go and look at . . . big libraries, and people that know stuff about it so we could go and ask them. You can't here, because everyone here knows about animals and that's about it.

Kate, a senior student from Rainforest High, noted that 'you can't really get to things like in the cities . . . like libraries and computer centres'. Kate went on to explain that access to resources such as museums and specialist instruction was a particular issue in Year 12, since:

> You notice a lot of seminars going on in Sydney about the different topic-related things. I actually travelled to Sydney for one of them and there were a lot of people there from Sydney, I was the farthest away. But there are not that many run around here, you don't have those extra seminars.

Travel time

There was a range of travel times for students but, in most cases, these times were relatively short – between three and ten minutes. Students living on farms some distance from the school had the longest times but 40 minutes was the longest reported to the SiMERR NSW team by students at any of the schools.

Leaving town for different schooling

There was some evidence of a flow from rural schools to boarding schools in metropolitan or larger centres. At St. Theresa's College students agreed that living in a place like Barton, which has a university, influenced their educational pathway: 'because the Uni's here a lot of people just go straight from school to Uni . . . I guess it's just easier'.

Career and future opportunities

The students believed that many of their peers wished to stay in rural and related careers. The secondary students, however, described their interest in a range of different careers, many of them not directly related to rural industry such as human resource management, forensic science, vet science, photography, the media, law, mechanics, agriculture. Students said that

their choice of place to live in the future would be guided by their career (even if it were agricultural work). All agreed that they would not be happy about leaving their home towns for study or for employment.

Computers and Internet access

There was consensus that access to computers at schools was generally satisfactory. At Rainforest High School students described difficulties when other classes were booked into the computer rooms but also noted that, on request to the Principal, a laptop is made available to any student to assist with the completion of specific tasks:

> That's the rule for everyone. You just have to ask, that's the thing, going out and asking . . . if you don't have a computer at home as well. They take that into huge consideration.

Students at all schools believed that Internet speeds were sometimes slow, particularly when there were a number of students trying to access the Internet at the same time. Ben from Rainforest High remarked: 'Room 13, don't even bother going there, if you've got a class booked in there you just sit there and talk because it's half an hour just to get logged in and get on the internet.' While this was seen as a problem, a more pervasive issue was the use of computers with older operating systems and limited memory. Even at Willow Central School, where the computers had been recently upgraded, the students noted that 'we've got all new ones now, (but) it would be better if we had a bigger common server'. At Rainforest High students described a frustrating incident in which 'right at the end [of the lesson] we got told save it and print it out. We couldn't save it, and the printer wasn't working.'

It seemed that the major use of computers was for gaining access to information in subjects such as geography and history and for word processing assignments.

Studying ICT

Students studying ICT subjects noted that programming was difficult and that students who did better at this subject were those who used computers extensively at home. They also noted that, for this subject, faster computers with more memory would make their study easier. When asked what would make ICT easier, students at Willow Central School responded 'stopping the computers from being so slow'. At Rainforest High School, Tanya described how she had been forced to pull out of an ICT elective because there was not a teacher available to teach this subject.

Studying mathematics

Students recognised the importance of mathematics. 'You need it if you go for a job or anything,' explained Robyn from Willow Central, who seemed to particularly appreciate the certainty of the subject. 'I like that in maths I can just give one answer, like it's just an answer, it's either right or wrong.' There seemed to be no particular pattern regarding students' attitudes to mathematics; some did not like it, while others enjoyed it. It was sometimes hard for students to explain why they enjoyed mathematics. 'I dunno, I just like it,' said a student from St. Peter's Primary School. Unsurprisingly, though, students who enjoyed the subject were also those who seemed to have success at the subject. Meg from Willow Central declared, 'Well I love all of maths. It's my favourite.' When asked why mathematics in particular appealed to her, she replied 'probably because I'm good at it!'

Studying science

Students appreciated the practical aspects of the subject and consistently mentioned how practical activities such as experiments made science a more enjoyable subject. This was expressed clearly by Tom from St. Peter's when discussing different aspects of the science curriculum: 'And like you can just see everything he's talking about in biology, instead of like radio waves. You've got to imagine them first.'

Willow Central School students commented on the outdoors activities provided at their school; lessons held at the creek to illustrate relationships in biology. Rainforest High School students also commented favourably on excursions to local national parks.

Choice of elective subjects

Some students believed that subject choice, particularly for senior students, was limited and skewed towards agriculture-related courses. 'It's not that good; it's more agriculture, visual arts. I wanted to do Tech. Drawing, but you can only do a minor in it because there are not enough students that want to choose it,' said Michelle from Rainforest High School. Her friend added, 'I wanted to do oceanography and they don't choose anything for geography, they have all the rural (courses).' These students believed that this emphasis on rural electives was due to the number of students wanting careers in that industry:

> Because we vote for what subjects we want, a lot of the people who live out here want to do agricultural things, but all the people who want to go and get a job in the city or something, they just have to work around what the other choices are. (Rachel, Rainforest High School)

While a few students were not happy that a particular elective choice was not available, in general, students were undertaking a range of electives and seemed reasonably satisfied with the choices offered by the school. When asked about the range of choices, Anna, a senior student from Rainforest High, commented that she 'thought it was pretty broad'. However she went on to explain that just because a subject was offered did not mean that it would necessarily be taught in the preferred mode:

> I had to do a subject by correspondence because the school wouldn't run legal studies for five people, but it would run chemistry for four. I was a little annoyed about that. So I had to do it by correspondence but that didn't really work out. It was too hard, and my teacher didn't really care.

PARENT PERSPECTIVES

The parents interviewed had lived locally for periods varying from 12 months to 45 years. The most common reason for settling in the area was because one or both parents were locals. Wendy from Rainforest, for example, 'moved here from Brisbane … and married a local'. Others came to the country because of their spouses' employment situations. Typically, these parents were originally from bigger towns or metropolitan cities. Another common reason was the attractiveness of the rural lifestyle. Dan, a parent with two children attending St. Peter's, moved from Sydney 'by choice [to] run a local business'. Others, such as Bob at Willow Central, moved locally 'because Sydney is a rat race … it's a better life up here'. Similarly, other parents were looking for the advantages of raising a family in a small rural area where there was a sense of identity with the community and the advantages of a safe environment.

Educational aspirations for their children

Parents' aspirations were heavily influenced by their children's demonstrated abilities, career preferences and available options in rural areas. Parents expected academically able children to go to university. For example, Wendy from Rainforest commented that her daughter 'is doing exceptionally well in her classes … she's going on to university'. Other career plans discussed by parents included a traineeship in accountancy, a Bachelor of Information Technology, a forensic science degree, and entry to a police academy.

Parents who considered university study to be beyond their children's present abilities still expected them to finish Year 12. Mark from Rainforest predicted his son Jim was 'not going to have further education, maybe a traineeship. I've got a daughter in Year 10 [who] is going to Year 12 (but) doesn't want to go further.' Maureen at Willow Central had similar expectations for her children; '[Helen] is in Year 11, she wants to do Year 12 in TAFE [and John] is sort of not the genius he's just tagging along but I think he'll go to Year 12 … he might go onto TAFE.' Recognising the importance of post-secondary education, these parents encouraged their children to complete Year 12 before considering a TAFE option.

A third variety of educational aspiration was for children to complete Year 10 but switch to a TAFE education, a traineeship or farming before returning to Year 12. Parents saw working on the family farm was a common option for children who weren't going on the university.

Strengths of school in helping children achieve in science, mathematics and ICT

Parents perceived several strengths of education in rural schools. These strengths could be described within three broad categories – characteristics of the teachers, characteristics of the school itself, and characteristics of the community.

Characteristics of the teachers

Unanimously, parents agreed that the greatest strength of their schools were the experienced teaching staff who, according to Bert from Willow, 'know the students and know the parents'. Furthermore, the teachers were considered to excel in their teaching subjects. Bert went on to explain that teachers showed commitment and love for teaching and the school because 'they want to be here . . . because they love the place, they're going to do their best at it'.

Consistent with the comments of teachers, parents such as Bert felt that rapport between students and teachers increased students' motivation to learn. He noted the benefits of teachers' involvement in community activities – 'the children get to be with them outside of school'. 'The teachers get to know the kids individually and can help them along,' commented Janet from Willow.

Parents further noted that the teachers' ways of teaching and having open discussions really encouraged students to learn. 'The kids don't even know that they're learning,' observed Maureen from Willow, who considered this approach to suit the Indigenous students in particular.

Overwhelmingly, parents believed that the greatest strength of a school was whether or not it had experienced, quality staff with effective teaching strategies, good rapport with students and established support systems to assist students.

Characteristics of the schools

Parents believed that a number of school characteristics advantaged their children. These included the small size of the schools (where applicable), their safe and nurturing atmospheres, and the teaching philosophies of staff. First, the smaller size of schools like Willow Central and St. Peter's was seen as benefiting learners. Overwhelmingly, parents perceived that teachers in small schools were more accessible and approachable by students both inside and outside school. Small class sizes enabled greater opportunity to address students' individual strengths and weaknesses, and encouraged development of supportive peer relationships thus developing learning and personal values. Janet from Willow, believed that 'smaller classes equal greater individual attention [and] a more nurturing environment', leading to academic improvement. Beth from Plains pointed out that 'students' strengths and weaknesses are picked up more quickly here because they get more attention than they would at a larger school.'

One consideration with smaller schools is the need to have composite classes, although no parent was critical of this arrangement. Beth, a parent at St. Peters, perceived composite classes to be beneficial in that 'they do not isolate gifted and disadvantaged students. Instead they are re-grouped with older and younger children ... it sort of evens out the level a bit in that respect.'

The second characteristic was the proximity of the school to homes or places of employment. At Willow, for example, Bob described how 'we picked the school … [so] there'd be no bus rides. I've got a job here and the kids come to school here.' Having a school located conveniently close to homes or work was vitally important to these parents, not only for logistical reasons but also for economic reasons, as explained earlier by the teachers.

The third characteristic was the safe learning environment within the schools. Parents, such as Maureen from Willow, preferred a school in a location where 'there's no temptation like arcade galleries [as] in Sydney'. Because Willow is a Central school, parents also believed their children were less likely to 'get lost in the system'. They felt 'the transition from Year 6 to Year 7' was easier, since 'the kids move up together'.

Finally, parents considered the schools' teaching philosophies to be important characteristics. Crucial aspects of this philosophy for Dan, at St. Peter's Primary School, were the establishment of better provisions for special needs education and the emphasis on attracting quality staff. 'Our eldest daughter has special needs,' he explained, and 'the teachers were prepared to address those issues. Also the philosophy of the school allows it to attract a higher calibre of teaching staff.'

Another St. Peter's parent preferred a school with a more holistic approach to addressing both the strengths and weaknesses of a child's learning. In such a school, the staff were 'willing to try and develop [the strengths] and notify parents of the weaknesses compared to the other schools where on a larger scale they just can't do that.' Without doubt, the abilities of schools to provide special education, to nurture children's strengths and address their weaknesses were important factors, especially for parents of primary children.

Characteristics of the community

Parents believed that a significant positive characteristic of rural education was the strong sense of community. As evidence of this they described how the teachers offered after-school assistance free of charge and in their own free time. For example, Janet described how 'they have the Homework Centre' at Willow Central . 'That's just staff giving up their time for

anybody after school.' It was a similar situation at Rainforest High. 'The majority of our teaching staff are really good, really willing to get in there and push the kids.'

It was this same strong sense of identity with the community that drew the locals back to the area if a choice to leave was considered. Marj at Rainforest described what had happened when they moved their children from a small rural primary school to a large regional secondary school. 'The first day [Carrie] just dropped, came home in tears, couldn't decide what she was doing.' In response to this unfortunate experience, the children were taken out of the large regional high school and enrolled in the smaller local high school. 'We moved down here and they all blossomed.' Marj went on to explain her belief that being connected, developing supportive peer relationships and feeling a part of the school, 'is a really important part of why students can succeed at school … [Mara] is connected with this community and this school … its part of her personal values.' She concluded that the positive effects on her children's achievement at school can be attributed to a feeling of relationship with the community. 'It's the connection they have with the community … both my kids have decided to stay in Rainforest.'

Parents from Willow discussed the harmonious relationship developing between the Indigenous and non-Indigenous communities. Maureen observed that 'the whole attitude is just fantastic there [in the Aboriginal Mission] . . . I think it's what helps the non-Indigenous and Indigenous together is that attitude . . . it's a long road to go but you've got a fantastic starting point compared to other places.'

Programs and practices that help students achieve in science, ICT and mathematics

Parents were asked to suggest programs or practices they recognised as helping their children learn science, ICT or mathematics. They were able to identify a number of programs such as *Mathematics Enrichment* and *Count Me In Too*, and initiatives such as mathematics and science competitions. It appeared that the schools utilized a number of literacy and numeracy programs to supplement classroom teaching and, in particular, to meet the needs of disadvantaged students.

Beneficial school practices included school-organized sessions to inform parents of new curriculum development and to share information from teachers' in-service days (e.g. *Six Hats Program*) 'which is great because it lets us know that they've been to an in-service'. Open classroom sessions on literacy (e.g. *How to Teach Your Child to Read*) and numeracy (e.g. *Count Me In Too*) were seen as useful by Willow Central School parents, as were the weekly visits to TAFE by some children. A popular practice at Rainforest High School was the 'Homework Book' which parents liked 'because it can pinpoint where the students are having problems'. Furthermore, parents felt that teaching strategies in the classroom demonstrated the accrued benefits of ongoing teacher professional development.

Parents further noted that these refreshing ways of teaching seemed to result in substantive learning as evidenced by their own children's exciting descriptions of fun ways of learning in primary classrooms. 'All this hands-on stuff (in science) is fantastic … and maths is taught to them in a way that is fun,' commented Sue. With the evident excitement in classroom learning, Sue and others perceived that it must be related to the 'training the teachers do … keeping (them) up to date and refreshing them helps'.

Obstacles to improving student outcomes in rural and regional schools

Obstacles to the achievement of student outcomes could be broadly organised into three categories relating to geographic location, community, and ICT.

Obstacles related to geographic location

Geographic obstacles were those where parents believed that achievement of student outcomes was made more difficult as a result of the isolation of those communities. Parents explained how excursions to museums and science fairs were expensive and involved long travel times. For example:

> If you're in the city, you're closer and you've got more hands-on stuff. Because we're remote from a regional centre it costs us more to get our kids there, whereas regional and city school kids often walk over to various places for excursions. (Bob, Willow Central School)

Overall, the remoteness of the areas made it expensive for rural children to have more excursions on a regular basis. Nevertheless, excursions were seen as an important component of school education, and one which 'definitely enhances the understanding and the reality of the project, rather than sitting in the classroom'.

For some farming families, long travel times between home and school were another obstacle, particularly if children took the bus. '[The] children get up at the crack of dawn and get home exhausted,' observed Marj, whose children attended Rainforest High School. She described how parents simply drove their children to school, or 'carpooled with a neighbour so we actually have less travelling time, and in more comfort'. Leaving home early, travelling on a bus and arriving at school only minutes before classes began was a situation perceived by some parents to adversely affect learning and possibly contribute to disruptive behaviour in classrooms. 'By the time they get here, they're not really ready to start school,' Marj concluded.

Distance from an office of TAFE was perceived by Bert as another obstacle, especially for parents whose children aspire to go to TAFE 'because we've got to travel to get to someplace … It means leaving home to do TAFE studies, which then becomes quite expensive.'

In summary, the majority of parents felt that isolation was an obstacle to excursions and other extra-curricular activities. Those living out of town also felt that distance from school adversely affects students' preparedness for a fruitful day of learning, particularly after a long and often bumpy bus ride.

Obstacles related to the community

Parents commented on the negative aspects of living in a relatively low-income community, a factor many felt affected the number of excursions a rural school could offer. Dan, from Plains considered that having so many low-to-medium income families in the district 'does impact the children'. Another community-related obstacle was the low participation rate in teacher-parent sessions by low income parents and Indigenous community members. '(More) Aboriginal parents should come . . . there's not enough Aboriginal parents participating . . . [but] we have a lot of non-Aboriginal parents who don't turn up either,' asserted Maureen from Willow. Parents from Plains viewed the poor attendance at St. Peter's parent-teacher sessions as a function of smaller communities where parents were struggling to balance work and home concerns, such as caring for sick children.

Another issue in rural communities, identified by Janet from Willow, was related to the diverse needs of students at the school. She described this as a tension between 'having small groups where the kids get individual attention in the classroom' and having 'less social contact'. Diversity of student need was raised as a community-related obstacle by other Willow parents. With regard to Indigenous students, the consensus was that '[Aboriginal] kids are behind the eight ball from day one . . . We've got to encourage them to come to school.' Parents believed that due to inequities both in school and the workplace, Aboriginal students appeared to have negative attitudes. Bert, an elder of the Rainforest Indigenous community, acknowledged this, noting that 'you can't blame them . . . you've got to think how they're thinking . . . It's a harder life for a black fella than it is for a white fella.' The poor educational outlook for Indigenous students was exacerbated by the prevalence of single parent families. Like Bert, Maureen's advice for teachers of Indigenous children was, 'You've got to be mindful of where they are from.' She elaborated on her belief that the absence of a father figure at home meant that young solo mothers were often 'struggling with the kids (and) need all the help they can get'.

Overall, the medium-to-low socio-economic status, coupled with the remoteness of a community, created obstacles such as high travel costs and infrequent excursions, and limited access to some educational opportunities. Indigenous attendance and attitudes to school were also seen as complex and significant issues which the communities at Willow and Rainforest were trying to address.

Obstacles related to ICT

A lack of specialist ICT teachers and access to computers during off-class times were perceived by parents as significant obstacles to students achieving their potential in ICT. This was a particularly important issue for parents with children undertaking ICT courses for the HSC. Parents explained that, in general, technical and specialised services in rural communities were expensive and not easily accessible when the need arose. There was often very slow Internet access at rural schools, unlike other large regional schools. Ready access to computers during off-class times was seen as a problem in rural schools, but the scarcity of specialists to teach and support ICT was overwhelmingly seen as the greatest problem.

Parents' suggestions for improving student outcomes in science, ICT and mathematics

Parents made several suggestions for being able to better meet the needs of students in rural schools.

Suggestions for addressing the needs of diverse groups of students

There was a range of views on how schools should address the diversity of student academic ability. One suggestion related to the establishment of graded classes. Some Rainforest parents suggested that slow learners and disruptive students should be put in 'a special class for those that need all that help … because they're slowing down the whole class'. However, other parents from Willow suggested that 'the slow learners might benefit from having smarter kids in the class, but removing the disruptive ones more than the slow learners would help'.

Some parents observed that, while the needs of slow learners and advanced students seemed to be adequately met, the middle-ability students appeared to be ignored most of the time. 'They're plodding along, they're passing … but they don't get any attention, so we need to be able to spread (attention and resources) out a little bit more.' Other parents, such as those from Plains and Barton, suggested that there should be suitable local secondary schools for

their gifted and talented (GAT) children in rural areas, otherwise 'GAT students go to city schools.'

Parents also made suggestions regarding policies and resources in schools. One of these was that there should be equity between schools; that the same opportunities should be offered to each child across different schools.

Finally, parents believed that any learning difficulties experienced by children from single-parent homes and disadvantaged backgrounds needed to be addressed sensitively if they were to achieve their potential in school.

Suggestions for increasing curriculum access

Recognising a need for specific expertise in subject areas such as mathematics, science and ICT, parents suggested making available grants to primary schools such that they could have at each school a single teacher who has expertise in these areas. This would contrast with the current practice at primary schools where all teachers are subject generalists.

With regard to excursions, some parents suggested that the federal and state governments need to consider the effects of distance on students' access to the opportunities their city counterparts have. This may include exhibitions and activities being sent out to regional areas. Dan, at St. Peter's Primary School explained that 'the Government needs to come up with a program of regionalizing Australia. They need to start to really address those issues.' He recognised the importance of resources such as 'Virtual Tours of Questacon', but also of having other solutions not based on ICT.

Suggestions for improving student engagement

There was some concern about the poor behaviour of some students, and the effect of this behaviour on student learning. To minimize disciplinary problems in classrooms, parents at Rainforest High School proposed that 'there need to be some consequences for lack of respect'. These parents felt that it was a basic societal and cultural problem of lack of respect. 'It comes down to respect, it really is respect.'

SUMMARY AND REFLECTIONS

The teachers, students and parents in the focus group schools identified a variety of issues they believe affected the quality of science, ICT and mathematics education available in their local areas. All three groups felt the sense of community to be a strong element in providing a safe and nurturing environment for education. They acknowledged the significance of their schools, particularly the role they play as barometers of the health of their communities. Parents, teachers and students recognised the benefits of smaller classes, greater personal attention and sense of belonging characteristic of smaller rural schools. Regardless of the circumstances by which they first arrived at the schools, many of the teachers were enchanted by the locale (and in some cases the locals), the connections they were able to make in the communities, and the satisfaction of working with children who represent a big part of any small community.

The students also acknowledged the sense of belonging and security associated with living in a small town, and were aware of the networks linking themselves, their teachers, and parents. The parents considered these characteristics to benefit the education of their children. In particular, parents associated with the smaller schools believed that the teachers knew their

children well and were able to provide greater individual attention than would be the case at larger, more impersonal schools.

All groups identified obstacles to achieving student potential in science, ICT and mathematics. The teachers recognised that, especially in the smaller communities, it was difficult to attract and retain quality teachers due to the relative lack of services and the costs of travel. Secondary teachers were aware that this problem is exacerbated by the overall decline in the numbers of science and mathematics teachers. They suggested a number of financial and professionally supportive strategies that could be implemented to alleviate this problem. In terms of improving student outcomes, the teachers suggested that curricula and examinations be more sensitive to the experiential differences of rural and urban students, and that staffing formulas be reviewed in order to provide equity of educational opportunity to students, regardless of location. The parents did not raise staffing issues as an obstacle, a finding that suggests they were less aware than teachers of the problems outlined above. Students undertaking HSC courses appeared to be more concerned about staffing as it sometimes affected the range of courses offered at their schools.

Teachers identified a number of ICT-related difficulties they believed would be less common in metropolitan schools. These included slow Internet connections (especially with a number of students logging on at the same time), insufficient technical support personnel, and in some areas, low levels of student access to computers at home. The parents and students were familiar with these problems, especially the need for technical support, and the lack of specialised teachers to take senior ICT courses. Students generally seemed satisfied with school ICT resources, except in the context of classes accessing the Internet.

Teachers and parents felt that the costs and travel time associated with remoteness from large centres affected the quality of teaching and learning. The teachers believed that suitable professional development opportunities were rare and difficult to access, and acknowledged a significant need for such opportunities in order to improve their ICT skills. Both teachers and parents recognised the financial and logistic difficulties involved in providing students with extra-curricula learning opportunities, including excursions. These difficulties were more acute in areas of low socio-economic status.

Teachers and parents raised a number of issues concerning Indigenous students. The teachers suggested practical-based approaches with smaller groups would have greater success in improving educational outcomes. The parents at Willow and Rainforest believed that greater involvement in the school by the Indigenous community might change the attitudes of Indigenous students to school. Teachers and parents, including Indigenous parents, acknowledged the complexity of these issues, but were willing to try new approaches.

Overall, the views of the teachers, parents and students interviewed by the SiMERR NSW team were generally consistent with what has been reported in earlier studies (Human Rights and Equal Opportunity Commission, 2000; Vinson 2002; Yarrow, Herschell & Millwater, 1999), suggesting that many of the obstacles identified in these reports still remain. In particular, the difficulties associated with inadequate staffing and ICT support, and the relative disadvantage experienced by these students with regard to accessing learning opportunities and senior courses, need to be addressed if they are to have the same opportunities as their city peers to achieve their potential in science, ICT and mathematics education.

REFERENCES

Department of the Environment and Conservation (2004). *New South Wales State of the Environment 2003*. Retrieved March 2006, from http://www.environment.nsw.gov.au/SOE/soe2003/chapter2/chp_2.1.htm

Human Rights and Equal Opportunity Commission (2000). *'Education access': National inquiry into rural and remote education*. Sydney: Commonwealth of Australia.

Vinson, A. (2002). *Inquiry into public education in New South Wales: Second Report* September 2002. Retrieved August 2005, from http://www.pub-ed-inquiry.org/reports/final_reports/03/

Yarrow, A. Herschell, P., & Millwater, J. (1999). Listening to country voices: Preparing, attracting and retaining teachers for rural and remote areas. *Education in Rural Australia*, *9* (2), 1–12.

‘What makes a good teacher? They have respect for our culture’

Report from SiMERR Queensland

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DEMOGRAPHICS AND DIVERSITY

Queensland is a large, diverse state and, not surprisingly, the rural and regional schools cooperating in this study demonstrated this diversity. To classify schools as rural or regional really only serves to say that they are neither urban nor suburban, and the differences between schools in this category are much greater than differences between them and city schools. The nine schools studied for this report sample the diversity of communities and school structures, but they cannot be considered as representative of all rural and regional schools in Queensland.

We faced two problems related to diversity in providing an overview of the state of science, mathematics and ICT in rural and regional Queensland: the diversity of schools, and the diversity within schools. Combined, this meant that it was not possible to ensure that such a small study would provide a representative sample of the views of parents, students and teachers about these three learning areas. Nevertheless, our case studies have provided rich data that allow exploration of the important issues for education in these schools as well as indicating areas for further research.

Diversity between schools

The study deliberately sought out diversity within the school system in three important areas: the communities served by the schools, the economic and cultural contexts of the schools, and the age groups served by the schools.

Communities

While the study was limited to communities of fewer than 25000 people, communities approaching that number were very different from communities of half that size which still served as regional or educational centres; and these were very different from communities where a primary school was a major, or *the* major focus of the community. Both primary and high schools for this study were drawn from each group (see Table 11), although it was difficult to locate high schools that service very small communities.

Economy and Culture

The geography and ecology of Queensland is diverse, with coastal communities well connected to a ribbon of large regional centres along Highway 1, inland communities linked to smaller centres to the west of the Great Dividing Range, and island and Indigenous communities without bitumen access to any major regional centre. Again, high schools and primary schools were drawn from each of these three types of community.

Age Groups

The study encompasses the schooling needs of students from early primary to late secondary. The schooling system within Queensland includes schools that service primary levels (P-7) only, schools that service secondary levels only (8-12) and those that bridge the primary-secondary divide (P-10 and P-12). Since each situation has its own unique features, we chose to include schools of each type. We also endeavoured to select schools by clusters, where one was a feeder for another school in the study or cooperated with another school, to provide a means for participants to compare and contrast their experiences of schools.

The Schools

Table 11. Schools and focus group participants

School[12]	Sector	Type	MSGLC category	Student population	No. Teachers	No. Parents	No. Students
Frigate Island Secondary	Government	8-12	3.2 Very Remote	340	5	7*	7*
Frigate Island Primary	Government	P-7	3.2 Very Remote	457	3	3	-
Talawa Island Primary	Government	P-7	3.2 Very Remote	147	5	5	8*
Mimosa Secondary	Government	8-12	2.2.2 Outer Provincial Area	298	8	4	7
Osborne Primary	Government	1-7	2.2.2 Outer Provincial Area	21	1	3	21*
Arial State School	Government	P-12	3.2 Very Remote	285	2	-	6*
Banora State School	Government	P-10	3.2 Very Remote	65	6*	4	12*
Sawtooth Bay School	Government	P-12	3.2 Very Remote	650	6	1	8*
Blackrock State School	Government	P-10	3.2 Very Remote	326	3	2	21*

*More than one focus group involved

[12] pseudonyms

Frigate Island Secondary is a government high school servicing a community of islands (population 2480). The population of the islands is primarily Indigenous but there is also a large number of public servants and their families, usually on two or three year secondments to the area. A large proportion of the students come to the school from surrounding islands. Some come by boat daily while others board in accommodation adjacent to the school. A TAFE college and a University outreach campus are available on the island.

Frigate Island Primary is a government primary school servicing the main island of a group. It was a feeder school to Frigate Island Secondary, situated nearby. A Catholic primary school also serviced the island. As in Frigate Island Secondary, the students were primarily Indigenous, but there was also a significant number of children of seconded public servants from the surrounding area.

Talawa Island Primary is a government primary school servicing an island community. It was a feeder school to Frigate Island Secondary but a considerable distance from that school. The students were almost exclusively Indigenous and the staff included several teachers and aides from the community.

Mimosa Secondary is a high school in a medium sized regional centre (population 8990) on the coastal seaboard about an hour's drive from the nearest major regional centre that contains several private boarding schools. Popular tourist destinations are located nearby. The school is fed from a number of government and non-government primary schools within the town and government primary schools (including Osborne Primary) in the surrounding agricultural areas.

Osborne Primary is a one-teacher primary school in the centre of a small landholder agricultural community. While the school is the only apparent sign of a town, its students are drawn from agricultural families within a few kilometres. The teacher/principal is a secondary-trained science teacher.

Arial State School is a regional school with a secondary department in a pastoral centre (population 1590) in the west of the state. The town has a number of government departments, although in recent years several have been relocated to a larger centre about two hundred kilometres away. The railways and a medium-sized engineering firm mean that mathematics, ICT and science command a higher profile in the town than might otherwise be expected.

Banora State School is a small regional school an hour away from Arial State School in the same pastoral country (population 342). There is little commercial activity in the town and the school is the major focus for the area. There are roughly 60 primary students and seven secondary students. The secondary students are bussed to Arial State School one day each week. A number of students from Banora State School choose to transfer to Arial State School at the end of Year 7.

Sawtooth Bay School is a government school servicing a large mining community usually accessible by air and road (wet season permitting). The population is estimated at 3000 depending on the time of year and mining workload. It has a significant Indigenous community. Education Queensland configured a college out of four different schools across the district. Sawtooth Bay School is the largest campus in the centre of town and provides early childhood through to senior secondary schooling. Many of the Indigenous communities send their students to board in the town to complete senior studies.

Blackrock State School is a small government school servicing an Indigenous community accessible by road (wet season permitting) or by air. The community and surrounding area record a population of approximately 1000 people. The school has a significantly young population but caters for a vocational and academic stream for older students. Students either move to Sawtooth Bay School or go to boarding schools in Cairns, Townsville, Toowoomba or Brisbane.

Diversity within schools

Even for relatively small schools there is a wide diversity of perspectives within the local community. Of particular importance in the schools we visited were differences in the language and culture of families that make up the community and the duration of their residence therein.

Culture and Language

A number of the schools visited had large Aboriginal and Torres Strait Islander enrolments (Frigate Island Secondary, Frigate Island Primary and Talawa Island Primary). For the majority of these students English was a second language. Within the same class, however, there could be students who were the children of public servants transferred to the area for one to three years and who spoke only English. Mimosa Secondary had a substantial group of students from Indo-Chinese ethnic groups whose parents came to the community for farming. The students spoke English as a second language with a range of fluency.

Duration of residence

Predictably, the Aboriginal and Torres Strait Islander communities in the schools described above were concerned that local issues should be addressed in the local curriculum, while the short term residents were concerned that their children would easily integrate into other schools following future transfers. Similar situations occurred in other areas (Osborne Primary, Arial State School and Banora State School) where the community was composed of a mixture of long-time residents running agricultural and commercial businesses, mixed with short term residents where the income earners were public or private employees with little intention of staying in that location.

Diversity in the sample

The sample comprised three sub-groups: students, teachers and parents.

Students

Since we were interviewing students on the school sites, we were unable to access students who did not attend school. In particular, students who rely on distance education were difficult to reach. However, we did manage to include past students of distance education (and several parents) who were able to make comparisons.

Schools may tend to select more articulate students for interviews and often these students can be more academically successful than other students. However, in several cases (Osborne Primary and Banora State School) we were able to interview the entire cohort and in one case (Mimosa Secondary) our sample was drawn from the non-academic stream.

Teachers

Teachers in the study reflected the full range that might be found in rural and regional schools. New teachers were present in all schools visited except Mimosa Secondary, the high

school in the larger centre, and the one-teacher school (Osborne Primary). We were able to interview experienced teachers in each school. A special situation arose in Frigate Island Secondary, Frigate Island Primary and Talawa Island Primary where a number of teachers had entered the profession through alternative routes, and in one case without formal qualifications.

Parents

Since parents were co-opted by the school, most of their focus groups tended to include those who were most often in the school (such as teacher's aides and assisting parents), those who interact most with the school (such as members of the Parents and Citizens Association), and those who were available during school times (such as non-working parents). Thus, it could be anticipated that these groups would be most familiar with the working of the school. Familiarity, while resulting in more reflective, informed comment, may give an overly optimistic view of communication between the school and the community. Selection of parents by convenience may exclude the voices of those who, for whatever reason, feel detached from the education system.

WHY HERE?

Choice or no choice?

Small communities have only one primary school (Talawa Island Primary, Osborne Primary and Banora State School). Larger communities have only one high school (Frigate Island Secondary and Arial State School). Even in towns with more than one primary school, church-run alternatives may not be considered acceptable to some parents (Mimosa Secondary). So for most parents in the schools visited choices were accepting of the local school, sending children to boarding school (which is not an alternative for very young children), using distance education or relocating the family. Our sample included individuals with experience of each practice.

Frequently parents perceived the choice between local or distant schooling as the choice between a local, friendly, caring environment with lower academic standards and fewer curriculum options and a distant, large, impersonal environment with more academic opportunities. This is discussed further in the section 'Where are you going?' below. Three sets of motivations were offered by parents and students for 'staying local': lifestyle, economic considerations and community support.

Whatever the size of the primary school, or its relative remoteness, the vast majority of students interviewed during this study lived within five minutes of the school. This was also generally true in secondary schools, although at one island school accommodation was provided adjacent to the site for students from more remote islands, while students from nearby islands commuted by ferry.

Lifestyle choice

Students and their parents in all the communities visited rated the lifestyle of the area highly. Feeling 'isolated within the community' revolved more around proximity to family and friends. This was equally true for teachers.

Family stability

Family stability was an important factor in school choice for parents and students in each community:

> Well, this school is the only state high school in this place; we never considered private schools and we never considered boarding because we didn't want to destroy our family life – which we thought it would. (Parent, Mimosa Secondary)

For some students it was seen as a negative factor, since 'there is not that much opportunities up here and there is not much freedom to get away from my family'. (Student, Frigate Island Secondary). But most valued the support gained from their families. This was particularly important to the Torres Strait communities visited (Frigate Island Secondary, Frigate Island Primary and Talawa Island Primary) despite there being a general expectation that students would eventually go away to boarding school or higher education.

Safety in the community

Most small communities were considered to be safe communities with low crime rates by students and their parents:

> It's a lot safer than cities and stuff and you can practically do whatever you want here. There's not like bad people to like hurt you and stuff out here, all the people are nice and that. (Student, Arial State School)

> You can move freely. You can do what you want to do, go where you want to go. (Parent, Talawa Island Primary)

This was not always true in all communities.

> Yeah, alcohol and other things there. Where [B] will go [C] will go but he'll come home – you'll give him a time limit and the time limit is 11 o'clock and he's usually home 'bout the 10 o'clock mark. So, you know, he's made his own decisions that it's getting a bit rough or the Police have turned up and he's opted to come home. (Parent, Sawtooth Bay School).

Freedom

In the agricultural communities visited (Osborne Primary, Arial State School and Banora State School) the students and their parents linked the safety of their small communities with freedom. The students reported feeling less restricted in their leisure activities, while their parents felt this freedom gave them life skills that would be unavailable in larger communities: 'The bush is able to give them what they want and also teach them other things that you can't learn in the cities, and that's independence.' (Parent, Banora State School)

Safety in the school

An appreciation of the family-like support within the small school, coupled with a fear of bullying in larger schools, was important in the primary schools visited. The students in the smallest schools reported the highest levels of satisfaction with the social support of classmates and teachers: 'I like little schools because at big schools they've got other kids that you don't know and they like bully you around.' (Student, Osborne Primary)

Parents reported similar observations, but in terms of the recognition given by teachers and students to the individual social needs of their children. One parent from Osborne Primary commented that 'mainly because here they relate to the students and the teachers as a family. There's no differences there, there's no trouble, there's no problem.'

As with safety within the community, this was not universal.

> Teasing and fighting, turning around, getting up the teacher, stuff like that. The teachers here, they do their best. Maybe it is the attitude they have, behaviour at home and they bring it to school instead of leaving their behaviour at home, then pick up another behaviour at school. (Parent, Sawtooth Bay School)

Economic Factors

Family employment

Some parents selected the school because of their employment situations – the students went to school where the family had work. While this was particularly important for primary students it appeared to be less so at the secondary level where an appreciable number of parents reported planning to relocate to larger centres when their children reached secondary school age.

Different demographics and different needs

The focus studies suggest there may be quite different factors influencing choice for subsections within a single community. Families of public servants and those with similar occupations who have been seconded for specific short-term periods expected to move to larger centres where their children would attend state schools. Children of people with ongoing businesses in the area expected to remain in the schools or other educational institutions in the area. This was less noticeable in communities where funding was available to send their children to boarding schools. Some isolated communities favoured specific boarding schools for their children.

WHICH TEACHERS?

Parents and teachers both had strong opinions about what made a good teacher for rural and remote schools, but the views showed considerable divergence. For many parents the important part was forcing experienced teachers to come to the country, and the mark of good teachers would be whether they settled permanently:

> If they are fully committed, they will stay longer. You need the older ones, not the younger ones because the younger ones are only experiencing the lifestyle up here and once they have seen it, they have done it, they are going to go. They are not going to stay. (Parent, Frigate Island Secondary)

For the teachers it was a matter of who should be enticed to the country, and how frequently they should move between schools:

> I think one of the better strengths that our school has possibly comes from one of its problems – its high staff turnover. With that, what that does for us in a positive sense is that we never get bogged down with teachers that are here with long periods of time and who are caught in teaching the way that they did 15 years ago and not changing. (Teacher, Frigate Island Secondary)

Systemic control

For most teachers who grew up in larger centres, systemic control was critical in their decisions to teach in a rural or remote school. Control was exerted through a range of incentives and disincentives.

Incentives

New teachers were appreciative of the various financial rewards offered by the educational authorities to teach away from major centres.

> There are financial incentives to stay here; it's cheap accommodation and I'm on $30 a week rent; electricity's paid for and all you do is spend your money on socialising and so it's a good place to get an investment property somewhere where I want to go. (Teacher, Arial State School)

In some cases teachers considered it an opportunity to develop their professional competence in ways they thought would be difficult in the more regulated environment of a larger centre:

> In the area I'm teaching, Marine Studies, there is a huge amount of potential here. There are things that can be done here. There are opportunities I wouldn't get in any other school. Its because of the accessibility to funds from being up here. There is no way in another school I could … we are looking at, for example, getting something like a sea cage of barramundi next year at the pearl farm up around the island. (Teacher, Frigate Island Secondary)

Disincentives

Nevertheless, the majority of new teachers were motivated by the requirement for all teachers to undertake country service:

> I got sent here by Education Queensland. I was at uni last year, so for some reason I'm quite unsure of, I ended up here. They rang me up and said there was a job up there, and I wasn't sure whether I would get offered another job so I said OK. … I was actually in shock because we number our preferences, like one to thirty and this was my last preference, so I don't really know what happened there. (Teacher, Frigate Island Secondary)

Teachers generally considered that the time spent 'in the bush' would be limited to something close to the mandatory period. For example, two teachers who expressed enthusiasm about their experience during our interviews celebrated, later that day, the imminent completion of their required time and forthcoming return to a suburban school.

Locus of control

Whether motivated by carrots or sticks, teachers needed to feel that they were in control of their employment opportunities by choosing the place, the timing or the duration. As one teacher at Banora State School concluded: 'The rent's good and you can save a lot of money but, realistically, you're trading off lifestyle for money and it's up to you whether you think it's worth it or not.' Some experienced teachers chose to return to a rural or remote school because they retained tenure in a suburban school and therefore did not feel that they would be trapped into staying:

> I was here for four years in the late eighties. This time I have come under a program called Remote Area Relieving Teacher Program which is part of Partners for Success where it encourages senior teachers to come back to isolated schools under the same conditions as a transfer but you get a guarantee of going back to your base school. (Teacher, Frigate Island Secondary, shortly before leaving, but planning to return in a few years time).

External Factors

While the conditions of employment within the school were important to most teachers in this study, factors beyond the school frequently had the most influence on them.

Relationships

Teachers from other areas, particularly young teachers, were often separated from friends and family for extended periods. This was a major consideration for them:

> I've been here three years now. I moved from the Sunshine Coast. It is my first posting as a qualified teacher up here. … I have enjoyed it ever since. I don't really want to go but I want to go home for my family. … Yeah, I miss my family and friends. (Teacher, Talawa Island Primary)

Within small communities these teachers shared more with colleagues and were often recognised as an homogeneous bloc within the local community:

> The town gets divided, you've got your engineers, you've got your teachers, you've got the railway, nurses, and you're stereotyped as who you are. It's like the other day, he wants the teachers down at the club more often so it's a bloc of people he wants in there to help support the thing. (Teacher, Arial State School)

This in turn isolated teachers from the community. For their part, the parents wanted teachers to be active in local events both in the non-Indigenous and primarily Indigenous communities. Two parents in Talawa Island Primary commented:

> What makes a good teacher? They have got respect for our culture and they understand our culture. We have got a lot of cultural things, and they respect that and understand that. That's what makes them really good. They will take time to put into our culture too. Like, have a go at our culture and just trying to work with our culture in the school, trying to have it in the school too. (Parent, Frigate Island Secondary)

> Or even in the community when there is a tombstone opening or a funeral or anything, they turn up. The teachers show their respect. They turn up. They get involved and help out and stuff like that. (Frigate Island Primary)

Social integration often appeared more important to parents than teaching ability or discipline knowledge. Most new teachers felt poorly prepared in university for this. For example, 'Nothing you learn in uni prepares you to teach in a remote school. The teachers who come out here either make it or don't make it.' (Teacher, Banora State School)

Teachers in the community

Teachers who had grown up within the community felt they received the support of the community and felt their personal history in the community assisted their work. In contrast, teachers who did not come from the community reported various levels of oppression resulting from their inability to escape the classroom after hours.

> Yeah, you've got to be prepared to be involved in the community, prepared to put in the extra hours because it's not just school stuff that we do. Some of the other teachers either do swimming or they do after-school sport and all those things because wherever you go you see kids from school or their parents will bail you up and want to talk about their kids because they can, because we socialise with them. (Teacher, Banora State School)

Parents felt that teachers needed to be part of the community and take part in community activities, but often failed to recognise that the teachers were actually separated from other important networks, including their own families.

Activities

Teachers from outside the local community came to the school not only with a set of social relationships, but also with a history of activities and interests beyond their teaching. Often these interests did not match those of the local community, but in some cases, such as fishing in island communities, it was an attraction of the school. 'Good resources and the fishing is unreal, that is what basically I was concerned about. So I said "yeah, I'm going".' (Teacher, Frigate Island Secondary) Conversely, where teachers did not share the activities of the community they were criticised, but where they did value the local opportunities they could be criticised for not taking their teaching seriously enough.

How long?

A major concern for parents in many schools was the rapid turnover of teachers, even within the school year, that resulted in disruption of the teaching program and disadvantages to their children.

> We are always like a dog I think, chasing its tail. We have got a huge turnover of staff again. Luckily we have got some good staff to stay behind, but we just never seem to be able to catch up because we have got so many different staff members. (Teacher, Sawtooth Bay School)

It was the view of the parents that the longer teachers stayed, the better they were for the school and the community:

> It's not always a positive place because of change; not everybody wants the change. The type of teachers we get in the school also may not be embraced by the community, not deliberately but because people are constantly coming and going. Often the community is not as open to that because you know, as soon as I put my arms around and hug you, you're gone and they've got to start all over again. (Parent, Frigate Island Primary)

Local communities favoured long-term teachers, but it was noteworthy that teachers lose the special entitlements that are used to induce them to rural and remote areas if they stay for more than a certain time!

Experience

Inexperienced teachers treat rural service as a rite of passage:

> If I want to get home to the Sunshine Coast and maintain my position down there it is what you have to do, and so I just went. My frame of mind was to go and do my remote service and then come back home and take it from there. (Teacher, Talawa Island Primary)

On the other hand, parents were dismissive of new teachers and felt that too many inexperienced teachers came, and then left, before they were fully competent. Experienced teachers who choose rural or remote schools frequently do so as a temporary lifestyle change. Parents appreciate these teachers, and some have made major impressions on the schools in their areas. Particularly useful in one school cluster was the secondment of a senior mathematics teacher whose responsibility was as an agent of change providing professional development within the cluster, rather than acting as a single classroom teacher or administrator.

Cycling teachers: cycling curriculum

The continual turnover of teachers (one primary school parent reported seven teachers for her child in one year) can lead to disruptions in the curriculum, with new teachers re-teaching the same material or assuming prior knowledge. This seems to be particularly prevalent in the ICT area:

> I know one particular teacher that was new to the school [who] thought the kids would know what he was teaching, but they didn't so he then had to go back and revisit it and then continue on. New teachers come in not knowing where the kids are at [is a problem]. (Parent, Sawtooth Bay School)

Local Indigenous teachers serving in Indigenous communities felt supported by their communities and able to relate to them.

> Yeah, it has been sensitive as well, because certainly for my end it needs to be that network to other teachers that come into the region to understand the do's and don'ts and the customs and the ways of the community… And how the families here will see an Indigenous teacher as that person to provide consultation to family members. I guess it's partly the reason I am here at this point. It is most important, the extended family in the region. (Teacher, Talawa Island Primary)

Cycling teachers: static resources

The cycling of teachers also leads to inefficient use of resources. A teacher may have a well-developed, and well-resourced unit of work (often created following attendance at a Professional Development offering) that falls into disuse when he or she leaves the school:

> There is probably one thing, the turnover of teaching staff, that always forces issues here. For example, we have got in the science room kits that have been put together obviously by a person who is very keen with science. They have got together kits in the past but because that person has left, those kits don't look like they have been touched very much in the last few years and the knowledge about them even being there often isn't passed on. (Teacher, Talawa Island Primary)

RELEVANT CURRICULUM

Three themes emerged when participants discussed the science, mathematics and ICT taught within the schools:

- whether the contexts should be local or broader
- whether the approach should be to teach 'the basics' or allow students the opportunity to become involved in their own investigations
- what curriculum extensions were currently offered by the school.

Viewpoints were frequently so different between teachers, students and parents that it was sometimes difficult to believe that the three groups were talking about the same set of experiences. This disparity will be discussed further in the section on communication below.

Mainstream or local?

Many parents, particularly in the Indigenous communities, were aware of the need to provide an academic education that would prepare their children for life in larger centres. This was invariably termed 'mainstreaming'. However, schools were also required to provide practical skills that were of value within the rural community. The majority of parents in the Indigenous island communities both wished their children to obtain university education but also to continue to live in the community. Their children were much more ambivalent usually assuming that, as adults, they would live in large cities. Non-Indigenous secondary students in the regional towns seemed more likely to aspire to local apprenticeships. At the same time, some teachers suggested that there was a failure to appreciate life beyond the local community.

> Because we are isolated out here they don't know what it's like outside. They don't realise that at all the other schools they still have to write and read and listen to the teacher, all those sort of things. I think they could never go into the real world to competitions or anything like that … They just have no knowledge of life outside [this town]. Yes, they can go out on a property and ride motor bikes and round up cattle and do all of those things and probably tell you how a GPS, a Global Positioning System works and they can probably gut a 'roo in however many minutes, but they just have no knowledge of any of that other sort of stuff like different life skills; and they are terrified of bigger towns. (Teacher, Banora State School)

Some schools were highly innovative in providing academic content, particularly in science, with one island high school providing science classes that included outboard motor maintenance, barramundi and crayfish farming, and a primary school that was preserving its own piece of rainforest and had its own agriculture plot. Often these innovations were able to utilise external expertise with considerable skill.

> With the marine science I get [name] and [name] from James Cook University but also the CRC [Cooperative Research Centre] and the DPI [Department of Primary Industries], I integrate a lot of their stuff into my class. We do the CRC seagrass watches through my senior marine studies classes. We regularly visit the DPI Fisheries guys. We are going next week. We are going to Cairns for four days to visit their aquaculture facilities at Innisfail and Cairns as well as the DPI research places. There have been a few places, like JCU, which has an interest in a couple of my students to

> share areas in aquaculture and marine science once they finish school. There is a guy there at DPI Fisheries… in Cairns who regularly comes up and talks with my kids. And all the kids are extremely interested. (Teacher, Frigate Island Secondary)

English as a Second Language (ESL)

A particular issue for parents and teachers in primarily Indigenous schools was the need to cater for the majority of students for whom English was not the primary language. 'There are examples of high attendance but low outcomes so it is not just that. You have to address the issues of these kids coming here where English is not spoken by these children.' (Teacher Sawtooth Bay School) There was an awareness of the need for smaller classes and support staff to assist teachers to prepare materials for these students.

> Down in Brisbane, Cairns or wherever they don't see how many ESL speakers we have … we are very, very different because 90 per cent of our kids have English as a second language, so then when you are talking about class size and how we can actually improve the student outcome in any subject, then …you are struggling when you have got 25 kids …EQ have this special formula for staffing. They use that formula when they are sending teachers out to school ... in migrant education, the ratio is 1:15 or 1:12 so why are we different even though our kids don't speak English; English is a second language. So why can't we have that formula in our schools? (Teacher, Talawa Island Primary)

English as a second language was frequently cited as a reason for poor performance in science in these schools.

> When they do the Years 7, 5 and 3 tests, the kids from here haven't achieved any outcomes because of the understanding. Because their English is a second language and they find it difficult to understand what is written. (Parent, Talawa Island Primary)

Activities, or learning the basics?

While many teachers were trying to make their subjects as relevant as possible, the recurrent theme from parents was the need for more time to be spent on 'the basics'. 'Basics' were seen as working through standard textbooks which parents felt would provide a visible benchmark to compare their children's performance with those of city children.

Rote learning of mathematics

The parents' perception that there was insufficient attention being paid to basic skills was particularly true in mathematics. This was related to the widespread perception that students were performing below the level of their city counterparts.

In many schools worksheets were the main form of activity in mathematics, but there were noticeable exceptions. A small one-teacher primary school divided the class into multi-age workgroups to perform measurements and calculations using the opportunities available outside the classroom and schoolyard. The similarly innovative use of the local environment by the seconded high school mathematics specialist has already been mentioned.

Both parents and teachers generally viewed mathematics as an aid to shopping calculations but in some cases parents had carefully considered how mathematics (and ICT) could be

integrated into essential business skills as situated learning. One difficulty seemed to be that teachers, particularly novices from large centres who expected to stay for only a short time, would be unaware of the contexts that could be used in these programs.

ICT as time on the computer

ICT was seen by many students as time on the computer:

> Oh, we just mainly use the computers when we're doing assignments … if anyone needs to use it in a lesson, the teacher will just let us go to the computer lab and do research and we've got the Internet and everything. It's good because it's a change from writing down stuff. (Student, Arial State School)

In all schools visited almost every child had one or more computers at home with (usually broadband) access to the Internet. These were used to download and play music and games, write assignments, and talk to friends in chat-rooms.

Computers at school were generally used to write assignments, look for materials on the Internet, and prepare power-point demonstrations. ICT teachers often lacked formal training, but this did not prevent them providing creative relevant programs. In one island primary school the teacher's interest in meteorology translated into a computer-linked weather station. In a high school the business teacher was contemplating using an accounting package to teach business skills during computing lessons.

Science as activity

Despite being mandated within the curriculum, science was sometimes not taught in schools – a situation not unique to rural and remote schools. Where it was taught, teachers chose traditional content themes that were rarely specific to the physical or cultural environment of the school. Although some situations lent themselves to local perspectives, the challenge was not taken up. In one school the study of dinosaurs used generic worksheets while omitting any reference to the world-renowned local palaeontology.

One primary school student did not see school science as relevant to his future. 'You don't need to really know science and stuff like that for electrician … because science is like being a science teacher or something like that and that's what I don't want to be.' (Student, Arial State School) This same student enjoyed pulling video players apart at home, but did little practical work at school: 'I have science at 10 o'clock in the morning, so we don't do prac.'

Where there was a failure to capitalise on local scientific teaching opportunities, it may have been the product of transitory teachers who were not aware of local content and expertise that could be used in classrooms, or of existing materials and programs developed by previous teachers.

On the other hand, it may be due to the inexperience of teachers who have a limited science background, and a limited range of teaching strategies upon which to draw.

In one primary school where the experienced teacher/principal had a secondary science background, the curriculum used the local agricultural industries, the surrounding rainforest and a variety of other regional resources to make teaching relevant to the students. There was evidence that students benefited from this approach:

> What they learn at school sort of comes home and they're using it all the time. Anything that they do learn here they do bring it home and they're using that to share information. They do challenge each other … because of what they learn here because [principal] does try to put in a lot of hands on. (Parent, Osborne Primary)

In secondary schools, science was generally taught by trained science teachers. As mentioned in the previous section, some of these schools provided rich, locally-relevant programs.

> Marine studies is really easy to do … we can talk about things, about crayfish or the [local area] and what is happening in the last ten years and they can tell stories of their parents, get them involved in say marine conservation. What are we going to do about it? And I'm telling them, 'Look you are the people of the future, you are going to be making decisions and if you understand this you will deal well with this.' Also showing them that what they are doing leads to somewhere as well. They will do the seagrass watch stuff or the scientist will come and will be telling them, 'This is the path you can take to do what we are doing for a job in the future, but you need to do this and this.' Other people come in and tell them what they are doing. They feel pretty good about that. (Teacher, Frigate Island Secondary)

Curriculum extensions

Parents and teachers both regarded curriculum extensions as important. These took the form of visitors to the school, and excursions by students away from the school.

Visitors

Schools in larger regional centres and those serving Indigenous communities seemed relatively well-served by visits, according to teachers and students, although not all provided adequate student involvement. Schools in smaller centres, felt less well provided for.

Excursions

Regional and rural areas are not devoid of local resources for excursions and many schools in our sample made use of them. However, teachers and parents are keenly aware that their local communities do lack diversity of resources and some of the more attractive opportunities for excursions provided by government and industry. 'It does take a lot of time getting a trip organised, I went to [regional centre] last week and it is a lot of work … it took like three or four weeks just to organise that.' (Teacher, Talawa Island Primary)

The teachers felt that their students faced significant disadvantages, both in cost and time, to utilise these resources. 'Accommodation is probably the killer; it's always pretty expensive to put 30 odd kids or 20 odd kids somewhere.' (Teacher, Banora State School) Visits to centres needed to be financed by the extended community, and it was seen as the teachers' role to coordinate the fundraising.

> They'll fund travel, as in the bus and hire of the bus to a certain point and accommodation to and on the way back if you've got to stay somewhere overnight while you're travelling … the rest is pretty much put in through the P&C; the kids pay and the school pays and fundraising. It's a drain on the community too. This year it was about an eight thousand dollar camp and we got fifteen hundred from PCAP …and then the rest has got to come from the community and it's a big job. (Teacher, Banora State School)

Visits normally involved extensive and expensive travel and accommodation with travel time lost from other school activities. As a result, excursions tend to be timed for administrative convenience rather than pedagogical effectiveness. Many schools visited did offer a range of curriculum extensions, particularly in science. In some cases neither students nor parents associated these extensions, particularly those involving camps, with the core subject matter taught in the schools. This may be partly attributed to the need to juggle administrative and pedagogical priorities.

RESOURCES

None of the focus groups felt that resources were an issue in mathematics, but funding, materials and professional development were all issues for science and ICT.

Participants considered the Internet to be an essential research tool, largely replacing the library. As stated earlier, virtually all the students in all schools had access to computers at home, and almost all had access to the Internet. Students frequently complained that computers within the school were slow, or that they had limited access to them. These concerns were not always shared by their teachers and may simply indicate unrelated issues. For example, Internet access from a laboratory with an entire class simultaneously accessing a single site will be slower than for an individual accessing that site from home.

Distances between high schools can make it more difficult, but not impossible, for schools to buy expensive science apparatus that might be shared for occasional use by each school within a cluster.

> I think we do extremely well with what we have and we have some nice pieces of glassware and stuff, but it would be lovely to have a few pieces of scientific equipment that the kids might see on a CSI show and yet a lot of them are way out of our reach but even to have a piece of equipment at this school and a piece of equipment in a school in [nearby town], that we could access on a field trip or something would be a really good thing. (Teacher, Mimosa Secondary)

Special funding

Various forms of special state and federal funding are being used by schools to obtain equipment for science and ICT. Teachers were generally satisfied with the amount of funding available to purchase general use items. ‘The curriculum areas just buy whatever they want but we’re very, very well resourced.’ (Teacher, Arial State School)

Material Resources

Installing and maintaining (ICT)

A major concern for all teachers charged with responsibility for computers was the related issue of hardware and software maintenance. They found it relatively easy to find information about computing equipment (in contrast to science equipment), but it was not possible to get expertise for non-standard installations or repairs. In many instances the departmental technical support staff have vast distances to cover and thus fly or drive in only irregularly:

> Our technician, our official school technician is a district technician who goes from [place] which is many ks down that way up to Doomadgee and all the way down to Birdsville. That's his area. And he's got to cover all of the schools in that area and it's just ridiculous to expect one person to do it. [name] will only get him out when she thinks it's something she can't fix. I think we're one of the better schools in the area at getting access to him. And the other schools, well they call him up and can't wait but he's got such an area to cover that it takes him ages to get to them. (Teacher, Arial State School)

As a result, the available equipment may lie idle for extended periods causing disruption to the teaching program.

> To do something as simple as a printer is not working from the server, and it could be down for about two to three weeks, because the tech was busy with the other schools in the [area] …You can't print out your work… I've known teachers to assess tasks by actually doing it on the screen, because they couldn't print it out. (Teacher, Talawa Island Primary)

Some towns had half a dozen or more government departments relying on their own technical staff, each covering roughly the same range of over a million square kilometres. Teachers suggested that aggregating maintenance across departments would provide more than one full time technician for the town, although they also recognised that 'we've got the problem that government departments don't talk to each other'. (Teacher, Arial State School)

Ownership of Science resources

During interviews in several of the schools visited teachers discovered from other staff that their school actually owned a range of science equipment of which they were not aware. Sometimes a teacher who developed a program failed to leave sufficient documentation on how it could best be used. Furthermore, teachers tended to feel more comfortable formulating their own units of work and so were reluctant to use material that they felt appropriate to another teacher's style or expertise. In these circumstances it may be more cost-effective for teachers to be given limited ownership over their teaching resources. It would also mean that teachers arriving in rural and remote schools may have materials available immediately.

Equipment was expensive to obtain. A teacher (Talawa Island Primary) remarked:

> The cost. For example, a third of anything we buy goes in freight…. The replacement costs of resources. The cost of buying storage equipment for example is just very extravagant, to buy cupboards here, to get them sent up by freight.

Additionally, teachers, particularly new teachers, found difficulty in finding equipment especially in the area of primary science. There were few experienced resource people available and they found it difficult to find time to scan the Internet to find suppliers for simple items like thermometers and magnets. They suggested a central Internet catalogue of science and other school equipment suppliers, rather than materials, be maintained centrally.

Human Resources: Professional Development

The teachers generally felt confident in their ability to do a good job with their classes, but felt hampered by difficulties in obtaining professional development and support staff.

Professional Development

With some exceptions, teachers were not unduly concerned about the finance available for professional development, but they expressed varying degrees of concern about what form the professional development might take and how it could be accessed by rural and regional teachers. This was raised as an issue relevant to teacher registration requirements in Queensland as the state moves to a system of mandatory professional development.

Extra time and extra money

Unlike professional development in large centres, in rural and regional schools the teacher has to be released for travelling time, usually at least a day each way, but sometimes more depending on plane and boat schedules, as well as the time of the workshop. Costs of travel, accommodation, subsistence and extended relief teaching are much higher, and the teacher's workload in preparing lessons for the relief teacher is much greater than for city teachers. The availability of suitably qualified relief teachers is also a difficulty. These factors combine to discourage teachers from applying for professional development.

> Some schools really, really struggle with spending that money …because people don't want to go away. Because for us to go to regional [centre], that's a three day trip because it's a day to get there, we go there for our PD for one hour, we have to overnight, and then we drive home the next day, or drive to [place] and then come home. So that's three days for what could be a two hour conference. (Teacher, Arial State School)

Content or process?

Teachers could be Heads of Department and be required to prepare programs of study for the whole school despite teaching outside what they perceived as their area of expertise (such as science in primary schools) or in rapidly changing subjects (such as secondary ICT). 'I'm freaking out a bit because I'm teaching the technology elective subjects… but I'm normally teaching just general, across English and science and maths. … hopefully I'll have a PD next year.' (Teacher, Arial State School) These experienced teachers felt a need for more professional development in disciplinary content, as opposed to educational policy and curriculum structure:

> In my maths as a teacher, never once have I actually had any in-service in maths. So as in computer literacy, all of that has been off my own bat and never, like rarely if ever, has there been one available nearby. (Teacher, Mimosa Secondary)

Primary specialist teachers

Parents and teachers in the primary schools felt that science would be better taught by specialist teachers, and that the lack of this specialist knowledge within the school was putting their children at a disadvantage. For example: 'We have probably let the science area go, wrongly so, but that has been an area where I think the children have missed out a little bit.' (Teacher, Frigate Island Primary) Other teachers preferred a model where a visiting science teacher-in-residence could provide ongoing support for all staff.

Support Staff

Teachers, and to a lesser extent parents, highlighted the need for additional rural and regional support staff in five key areas:

Relief Staff: While there may be funding for relief teachers, the reality for many of the more remote schools was that there were no qualified staff available. For example:

> Sometimes we … have the funding but we don't have supply teachers, so if we have the funding, we have got some PD happening but we can't send teachers down because then we have no replacement teachers. (Teacher, Frigate Island Primary)

This did not seem to be an issue in the larger regional centres.

Computing Technicians: Both primary and secondary schools frequently had specialist ICT teachers, but none had the exclusive services of a computer technician. As a result the ICT teachers reported working out of their field of expertise as technicians while struggling to maintain the quality of their teaching:

> Money for [equipment] is no problem, it's just getting the people in there. We had the same problem at [town], 680 kids there and there were four computer rooms plus all the admin network and no official technician – it was the Head of Department, Technology … and they were just lucky they had a student who was great with all that stuff … but that's what it boils down to as a teacher… it just gets too much. (Teacher, Arial State School)

ESL: In schools with high proportions of Indigenous students, the teachers and parents stressed what they felt to be a desperate need for specialist ESL teachers to support the classroom teachers and to provide assistance in program planning. No school visited had support of this kind.

Aides: Several of the schools with large Indigenous populations had teachers' aides and tutors from the local community. These were valued and served an important function both in bringing the school and community together, and in dealing with cultural and linguistic barriers affecting the children's learning. The aides felt the training provided by the universities to be extremely valuable and in some cases provided a route to upgrade to full teacher registration:

> It was a young program, a process of getting the Indigenous teachers ready to become qualified teachers [and] certainly attracted Indigenous teachers to come into the Dip Ed or the BEd. At that point I saw it as a …chance in a lifetime to fulfil my dream and after several years as a teacher's aide and assistant teacher working at the [small island] school, and the opportunity came there and then so I took it without any hesitation at all, and had marvellous support from people. (Teacher, Talawa Island Primary)

Visiting seconded experts: A number of schools have made use of special funding to provide experts such as artists-in-residence or mathematics innovators. These teachers, when freed to collaborate with teachers throughout a cluster of schools, were appreciated by other teachers and the local community. For example:

> I know that the coordinator from the high school came over to my Year 7 class and has done a couple of sessions with them and that has proven to be extremely successful. So that sort of develops and keeps developing. I think next year that will be an extremely successful program. (Teacher, Talawa Island Primary)

COMMUNICATION

Parents were concerned about their children's education, but were often unwilling to become actively involved with the school. As previously reported, this cannot be attributed to distance between school and home. However, as we found when schools tried to arrange meetings with parents, most had commitments during the day.

Communicating systemic change – dialectic or directional?

Parents in Indigenous communities were reluctant to commit to their children's school until the teachers showed their involvement in local cultural events. Teachers often realised this expectation:

> I think initially you get involved in the community by doing a lot of listening. That is what I did when I first got here. I did a lot of listening making sure that when there are events on, whatever it might be, NAIDOC Week or Mabo Day or those other things, that you don't just sit at home, or whatever, and do nothing. That you try and get involved and that is how you meet different people along the way. (Teacher, Frigate Island Primary)

For other teachers who do not involve themselves in the community there is an element of unidirectional communication where the teachers see their role as telling the community about education department policy on the macro level, and how their child is performing on the micro level. In contrast, parents wanted to make suggestions as to how the school could better serve their child's individual needs by contributing to school curriculum policy.

Success does seem to follow where teachers find ways to collaborate with parents. The principal of one island school with a particularly productive dialogue between parents and teachers, attributed the success of the relationship to a tragedy within the community where students' poor behaviour in school mirrored the friction at home and in the community. A joint meeting away from the school where the teachers and parents collaborated to form a new behaviour management policy, created a bridge that has been extended with the employment of teachers' aides from the community.

Teachers as part of the community?

Parent evenings were not well attended in most schools visited. Their formality seemed out of place for some parents when teachers could be more easily approached in the shop or on the street. However, less experienced teachers who grew up in larger centres found this informality threatening.

> …it's pretty intense coming into a small community and having to deal with those parents, not only do you meet them in the shop but you socialise with them and you get attacked, you do get attacked – and these young teachers find that very hard. (Parent, Banora State School)

This is not without reason. Teachers of long-standing in a community related stories of how young teachers became ostracised as early as their welcoming barbecue through ignorance of community expectations.

> You can have preconceived ideas about what sort of time you'll have and it's very much two types of people come out – one person comes out, goes straight over to the barbecue, meets everyone and has a great time. Another

> person comes out, goes to the same barbecue and bags country living … And we just say right, … okay, if that's the way you feel, it will be a while before you get another invite to a barbecue. This other person will say, 'Let's have the barbecue at my place next time' and that's the difference. You've got to come out with the right attitude. (Deputy Principal, Arial State School)

Indigenous parents did not welcome new teachers until they had participated in important cultural events. At the same time teachers who had not lived in rural and remote communities often felt that they had little in common with the community and tended to form their own cultural groups. This in turn isolated them further from the local community which they felt was insular and inward-looking. The most effective way for teachers to become part of the community was to form close relationships with members of the community. 'Yeah, you've got to be prepared to be involved in the community, prepared to put in the extra hours because it's not just school stuff that we do.' (Teacher, Banora State School)

FUTURE PLANS AND ASPIRATIONS

Parents and students across the schools had expectations as diverse as could be imagined in any large city school. As might be expected, primary school parents and children were relatively vague about future plans, and parents were most concerned with their child's social development while at school.

By secondary school, however, there was much more awareness of employment-related purpose amongst parents and teachers. Students in specific schools appeared to form blocs of academic or trade orientations. Schools where teachers repeatedly stressed the high academic performance of their past students provided large blocs of academically-orientated students with ambitions to study scientifically-linked careers in medicine, pharmacy, veterinary or forensic science. Where teacher focus groups concentrated on the trade possibilities (or limitations) in the town, the students seemed more inclined towards considering apprenticeships.

This may indicate that teachers were in tune with their students, or it may suggest that teachers are influencing student choices. Whichever is the case, it was noticeable that teachers tended to use deficit models to describe trade careers. Parents on the other hand cited the economic returns in non-academic occupations, such as, ''roo shooting [where] they earn probably twice as much a year as a teacher does, and a teacher's been to uni.' (Parent, Banora State School). They felt the university education of teachers blinded them to non-academic careers: 'We introduced agriculture college … it was great for the students but the biggest boost there has been the teachers seeing what these kids' jobs might be. The teachers here perceive all kids must go to university … and that's not the case.' (Parent, Banora State School) However, a teacher at Arial State School claimed, 'We also have flexibility with our senior schooling too, we encourage kids to take non-tertiary pathways.'

Reasons to stay in rural communities

Where teachers indicated that they intended to stay in rural and remote areas for a prolonged period it was because of lifestyle, fear of inadequacy, and family. Many liked the relaxed lifestyle and recreation opportunities, such as fishing. Sometimes teachers raised in rural areas expressed doubt how they would cope with the stress of city teaching.

> That has been my challenge and I still have to adapt myself to set a goal in order to apply to get that opportunity to go down south and teach in the metropolitan schools, down in Brisbane. It would be a big challenge for me. (Teacher, Talawa Island Primary)

Teachers raised locally had their family and social networks in the area, while some, particularly women, married into the local community.

Where parents indicated they intended to stay for a prolonged period it was because of lifestyle, business and family. Among non-Indigenous parents, those with established businesses were most definite about staying. Indigenous parents cited family and history as reasons to stay.

Students indicated that they would stay where job opportunities were available. Many of the students seeking trade qualifications were expecting to gain employment through family or friends in the district. Family and friends were another important reason to stay, although many primary Indigenous students were expecting to go to the same boarding school as their peers.

Reasons to leave rural communities

Where teachers indicated that they intended to leave rural and remote areas it was because of lifestyle, professional opportunities, and family. Most important in all schools were family reasons. Young teachers reported putting relationships on hold for the period of their country service. Young teachers from the suburbs missed the organised sport and other recreational activities of the city. Many felt that during country service they lacked opportunities to develop networks within their discipline and throughout the profession.

Experienced teachers often came to the area to give their own children an experience of the lifestyle, but intended to return to the city where there were more choices for their children's secondary education.
Likewise, parents who expected to move often cited perceived opportunities in city schools that they did not feel would be available in their nearest rural school, and were prepared to relocate the family so their child would have access to a city school. For instance:

> We have a boy in Year 9 we would like educational opportunities for him. We are concerned about that. He has more choices down south and probably a higher standard of education in high school.… Also he has peers that are very academically able and we would like him to achieve the highest standard he can. Here he is towards the upper end of the academic group but down south he wasn't at the top end in subject areas, so we are wanting him to push himself a little harder while he is at school here. (Parent (who was also a teacher), Frigate Island Primary)

A move to the city was perceived by parents and students as having a number of specific academic advantages. For example TAFE opportunities were available, and some high schools had incorporated articulations into their programs when the range of TAFE and university courses available locally was felt to be limiting. Furthermore, city high schools were believed to offer more courses and to have a more academic orientation than local schools. For example:

> I was talking to parents who had sent their children to private schools and that's how I gauged the standard …because sometimes there's a problem with what teachers in private schools teach and what the teachers here are teaching our kid. (Parent, Mimosa Secondary)

City schools were also seen by parents as offering easier access to more interesting resources outside the school and as being bigger, newer and faster: Parents and students believed that city schools had bigger, better equipped science laboratories, and faster computers with more up-to-date software.

Finally, a few parents identified the greater capacity of city schools to provide special needs support. For example, a parent of a child with an intellectual disability praised the rural school for the individual attention given to her child. Nevertheless, she intended moving her child to the larger school to utilise the special education programs available. At the time of the interview she was driving the child to the next town to attend a mathematics program. She explained that if she were unable to drive him he would not be able to access the program.

Educational choices

Parents and students envisaged, or had tried, a number of alternatives to maximise what they saw as the educational opportunities. These included moving the child, moving the family, moving the school, or accepting the local school.

Move the child: Parents who were intending to move their children to boarding school came mainly from Indigenous communities where funding was available. In these areas the private boarding schools actively recruit in the area. However, one principal pointed to the high drop-out rate of students (said to be 50%) from the surrounding Indigenous communities who went away to boarding school, but returned within a year. Non-Indigenous parents interviewed considered boarding school beyond their means.

Move the family: A number of parents without established businesses planned to move to a larger centre when their children reached high school or university.

Move the school: Several families had tried, or were trying, distance education. In each case the mother took on the role of home tutor, sometimes resulting in additional stress within the family.

> I found it a challenge, I found it horrible and yet I found it rewarding … Horrible because they wouldn't work for you. They wanted to be out with dad all the time. I had two boys and they both had learning problems and they just hated it and we hated each other at times and we loved each other at times and it was probably the best thing I've ever done. (Parent, Banora State School)

There was no feeling that the student suffered from lack of social contact with peers or 'direct' contact with the teacher.

> The maths program at School of Distance Ed. is really very good. They're issuing the kids with textbooks and one-on-one teaching and if she ever had any trouble, they were there to help her work through that problem and she could learn to understand it more …And she feels a lot more comfortable because she actually gets to know the teacher one-on-one and it's a bit more

> personal than what they would get in a big classroom with the other kids. (Parent, Frigate Island Primary)

Accept available schools: While some parents and children interviewed were intending to continue their education in larger centres, there were many parents and children who were satisfied with what their school had to offer and would continue to support local schooling. For example:

> I have sent my children away to a boarding school and they had exactly the same subjects as this school has and my children had one party the whole time and didn't study and the other boy got very sick and homesick so we brought him home. And that's why I've chosen to bring them in here and drive in and out every day because I'd rather have my children at home with me. It was really hard. I thought, at the time, that this is what they both needed, to go away and grow up and to send them together so they had each other but it was probably the worst decision I've made in their schooling life. I'm one of the lucky ones, I have a choice and I choose to come here. (Parent, Banora State School)

In many cases parents felt that country life also made their children more self-reliant and independent.

RECOMMENDATIONS

While recognising the implications of the limited sample in this study, the SiMERR Queensland team are aware of the consistency of many findings with what has been identified in other research. On the basis of our findings, we suggest that education authorities consider the following recommendations:

Which teachers?

Recommendation 1: Seconding of specialist resource staff to school clusters. This appears to be particularly important in primary science and ESL for Indigenous communities. Science resource teachers could be centred in the local high school, but provide professional development for a cluster of adjacent primary schools. Allowing experienced teachers a two-year secondment with a reserved place would be attractive to enthusiastic teachers who want to 'try something out'. It could also be attractive if it were linked to promotion.

Recommendation 2: Provide project-based 'Scientists in residence'. A similar concept has been successful with artists-in-residence in Talawa Island Primary, and informally in Frigate Island Secondary, which created a partnership with university marine scientists. These resource personnel would not need to be teachers. They could come from universities, industry, or government departments (for example using an agronomist to help a school create a cashew industry in the Torres Strait where the trees grow wild).

Recommendation 3: Ensure remote allowances for teachers are not time-restricted to encourage experienced teachers to stay in rural and remote schools.

Relevant curriculum

Recommendation 4: Encourage collaborations between parents and teachers to create teaching modules. Communities contain considerable local expertise that can be used to enhance mathematics. There are numerous studies of situated cognition that could provide direction. *Small Business Mathematics* (including ICT) or *Farming Mathematics* would be examples. Teachers could provide the learning pedagogy and parents the case studies in these collaborations.

Resources

Recommendation 5: Resources follow the teacher. Where teachers develop units of work and collect materials for it, they should retain control over those materials, on transfer, while they stay employed by the same body. This would reduce the wastage of resources. This would not be applicable where the content is specific to the school.

Recommendation 6: Share ICT technicians on a town rather than a departmental basis. Many towns could share a technician between their hospital, school, roads and other government departments. This would make technical assistance more readily available and make the local community more sustainable.

Recommendation 7: Cluster primary feeder schools with the appropriate secondary schools for specialist subject support. Many, but not all schools do this to some degree. High school science, ICT and mathematics teachers should be provided with release time to work with primary schools in the area. This would improve communication between the high school and the community and provide expert support for generalist teachers in the primary schools.

Recommendation 8: A central database of school equipment suppliers should be maintained. This would enable teachers quickly to find suppliers for primary science and mathematics in particular.

Communication

Recommendation 9: Include parental expertise into contextual curriculum development. As with Recommendation 4, parents have expertise unavailable to teachers who have been in the district for only a short time. Collaboration would enhance ownership of the school by the community.

Recommendation 10: Show how 'the basics' are being taught. Parents are often not aware that students' projects are teaching the more familiar generic skills. Schools should consider attaching explanatory sheets with homework for parents to explain why the project is important to the students' education.

Recommendation 11: Communicate information about student achievement. If parents are not provided with accurate information about the achievement of their children in the school in relation to other students in the state, they may rely on inaccurate or irrelevant information, such as that from the more sensational media outlets.

Recommendation 12: Disseminate local innovation to the community. Schools cannot assume that students will inform parents of the activities of the school. Rural and regional schools need to promote actively the many exciting and innovative things happening therein.

‘To improvise and be innovative in the way you teach’

Report from SiMERR Northern Territory

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The Northern Territory (NT) is characterised by space, distance and low population densities. Comprising just one percent of the Australian population, and 20% of the continent, the unique demographic and geographic profile of the Northern Territory presents specific issues and challenges for education. About one person in four is of Indigenous descent, and 60% of these reside in remote communities spread across 1,346,200 square kilometres. Approximately half of this land, including 87% of the coastline, is owned by Aboriginal people. There is a broad range of distinct language, culture and clan groups based in different regions.

The capital, Darwin, has a population of approximately 70000, 10% of whom identify as being of Indigenous descent. The population of Darwin’s satellite, Palmerston, is approximately 24000, while Alice Springs, the major centre in central Australia, has approximately 26000 residents, 18% of whom identify as Indigenous. The other regional centres, Katherine, Tennant Creek and Nhulunbuy, have populations less than 10000 with more than 24% Indigenous residents (Australian Bureau of Statistics, 2005).

The Northern Territory has the youngest population profile of any Australian state or territory with 40% of those under 14 identify as Indigenous. Population growth is increasing faster in Indigenous communities than in the non-Indigenous population (Northern Territory Government, 2005). Indigenous students comprise 38% of the total student cohort. Thirty-nine percent of students in the Northern Territory speak English as an Additional Language (EAL). However, in some regional and remote areas this proportion is much higher so that in some schools almost all students are EAL learners.

Primary and secondary education is provided by the Department of Employment, Education and Training (DEET), the Association of Independent Schools Northern Territory (AISNT) and the Catholic Education Office (CEO). As the major education provider, DEET administers 151 schools and employs 3700 full time teaching and support staff, with a focus on quality lifelong education for all students, particularly Indigenous. The AISNT represents 12 religious and independent primary and secondary schools in major, regional and remote centres which include major boarding secondary schools that attract students from across the Northern Territory. The Catholic Education Office manages ten schools in major and regional centres, five in remote Indigenous communities and two in remote Indigenous outstations.

PROFILES OF SCHOOLS IN THE STUDY

To explore issues affecting the teaching and learning of science, ICT and mathematics in the Northern Territory, focus groups with teachers, students and family members were conducted in late 2005 and early 2006. The focus groups were undertaken with school communities in two primary schools, one secondary school and the secondary school section of two schools that offer education from transition to Year 12. The selected schools represent government and non-government sectors and are characterised by varying degrees of remoteness and Indigenous student populations.

Desert Rose Primary School[13], classified as a Remote Area school (MSGLC category 3.2), is located in a town approximately 300 kilometres from Darwin. It provides classes from transition to Year 7. Special programs available at the school include life education, computer studies, physical education and music.

Wallaby Primary School is located in Darwin (MSGLC category 2.1). The school is organised into upper primary and early childhood departments and has approximately 300 students. This government school has a culturally diverse student population with significant populations from Indigenous and migrant backgrounds. The school's specialist areas include English as a Second Language, Information Communication Technology and Art.

Goanna Community Education Centre is a Remote Area School (MSGLC category 3.2) with a student population between 101-200. This bilingual community school caters for students from preschool to Year 12. All students have English as an additional language and bring a high level of Indigenous cultural practice and understanding to school. English and Indigenous languages are used in the school. The school is currently involved in developing quality education programs for students who are already, or in the process of becoming bilingual and bicultural.

Brolga Secondary School is a Provincial City (MSGLC category 2.1) school with student population between 601-700. This government school is based in a regional centre and has a learning centre that offers a modified program including accelerated learning for high achieving students and a special education centre. The school caters to students from Year 8-12 and has an added focus on middle schooling, English as a Second Language and Information Communication Technology.

Frilled Lizard Secondary School is classified as a Remote Area School (MSGLC category 3.1) with a student population between 201-300. This non-government school is located in a rural area and offers classes from transition to Year 12 across several campuses. The focus group interviews were conducted with senior secondary school students. The school incorporates Indigenous education programs to encourage the involvement of Indigenous people in the school.

[13] All names of participating schools and individuals used in this report are pseudonyms

LIVING AND TEACHING IN A RURAL/REGIONAL SCHOOL

Teachers

The majority of teachers interviewed had originally lived and trained outside the communities in which they were currently teaching, generally coming from interstate regional and capital centres. Very few had previously lived in major or regional centres in the Northern Territory. The teachers noted that their decisions to change schools tended to depend on the proximity of the school to a major centre, its reputation, whether it had a stable core of long term staff and opportunities for staff to develop their areas of interest. Few of the schools involved had been able to develop and maintain a core of long-term staff, a common experience across NT schools. Long-term staff were defined by parents and teachers as those staying between ten and 25 years in the one school. Most of the teachers had been in their current schools for less than five years. Generally, the more distant a school was located from a major centre, the lower the average length of time teachers had stayed in the school. They tended to move for promotion or family reasons, but in either case they were concerned about the difficulties involved.

> The cost of living is higher than in some areas, if there was some way of reducing that cost burden that would tempt and encourage people out here. (James, teacher)

> If you want any (mathematics or science) department to go ahead, there need to be more incentives for people. To make the change, there are (considerations such as) their family, shipping, etc. There's bugger all for that …once they're here we do bugger all to retain them. (Mike, teacher)

Of some locations it was said: 'Rentals are really hard to find … people need to hit the ground and feel comfortable.' Teachers also noted the negative financial effects experienced when any transfer between schools was not supported by their own or their partner's employer.

Many of the teachers planned to stay in the NT system for 'a while', as they liked the lifestyle of a small community, the atmosphere and supportive environment. Furthermore, they felt the education system had been good for their children and they enjoyed the professional challenges and experience in their schools:

> I like the Northern Territory, like the lifestyle. (Kim, teacher)

> I can't see myself teaching in a big city school after this…I don't think I'd like it because I enjoy the smallness. (Jane, teacher)

> I really enjoy teaching in this environment because you are in a very isolated community and you don't have to go far to get out of town. You do get to know the kids quite well, particularly in a school like this where it's quite small as well. (Mike, teacher)

Teachers tended to have a broad range of educational backgrounds and experience, due in part to their many places of origin, teaching institutions attended, and the fact that they were often required to work in areas of need in schools rather than in their area of expertise. The latter factor was linked to a lack of positions directly related to their specialty areas (either in their

schools or elsewhere) and the transient nature of employment in the NT. Teachers noted the negative impact of these situations on students:

> As a team, the staff do socially support each other, personally support each other…we have had to combine classes…people take on huge workloads … students are sometimes adversely affected by what we have to do. (Mike, teacher)

> Continuity of content – when teachers change so often – is terribly confusing. There needs to be some serious thought given to increasing the salaries of the people who are teaching in science, maths and ICT in an attempt to recruit people who are passionate about the subject into teaching. (Terry, teacher)

Families

While families lived locally, close to the children's schools, many had originally lived in eastern states and other parts of the Northern Territory and a few had been overseas for a period. The high transience levels typical of NT regional areas were reflected in the families' experiences and histories. Transience was often linked to employment opportunities or transfers. Families liked living in the rural areas where populations are small and people knew each other. Indeed, after leaving, some families had chosen to return to these areas where possible. Choice of schools was based on proximity to home, programs offered and reputation.

Students

Students were positive about the regional areas in which they lived and the schools they attended because they knew people, their friends were close by and they felt safe. They also felt they had a lot of freedom to be involved in activities related to sport or visiting local natural attractions like waterholes and shops. Students placed a strong emphasis on sport across all sites. As Robert (teacher) noted: 'In a small community like this, sport is highlighted a lot more than in a city area.' However, for many students, participation at a competitive level was limited by distance and cost of travel.

Most students lived close by their schools, less than ten minutes travelling time, and either walked to school, rode bicycles or were dropped off by car or bus each day. Students generally liked school since it offered opportunities to spend time with friends. They enjoyed areas of personal interest which were spread across the curriculum. Science, ICT or mathematics featured as preferred study areas at schools where one of these was a particular focus of school activity. The majority of students planned to leave their current town in the future and go to Darwin or major centres on the east coast of Australia when they were older. They identified places that had a wider range of opportunities or interests, particularly the Gold Coast and its theme parks, or Brisbane.

EDUCATION AND VOCATIONAL ASPIRATIONS

Families

When asked about their post-school aspirations, many students expressed the hope that they would become a sportsperson, particularly a football player or cricketer. Students and parents who identified trade-based occupations as goals for the future were fairly evenly distributed

across sites. These roles included working on oil or gas rigs, being a butcher, chef, actor, dancer, babysitter or dirt bike rider. A minority of students were interested in professional occupations such as lawyers, pilots, zoologists or veterinarians. The majority of parents expected their children to complete Year 12, noting, in particular, the value of including vocational training course in the secondary curriculum. Several parents identified university attendance and trade qualifications as future aspirations for their children. For example:

> My oldest will probably do something scientific. He's very curious about nature, (the youngest) will probably be the motor mechanic or builder. (Grace, parent)

> I did my degree…whereas my husband only went as far as Year 10 and got an apprenticeship. I'd love to see my kids with a degree, whereas his focus is maybe more the trade way. (Jade, parent)

The students all had several potential careers in mind and were able to describe a range of steps in their educational and vocational preparation. These included developing practical skills, competing at high level, being healthy, and attending university as essential in their preparation for the future. Senior secondary students noted there were many opportunities for work that conflicted with completing school, and that relationships with people can be more useful than qualifications to get apprenticeships and work. This observation was supported by teachers' comments.

> I've had kids in Year 12 in their fourth year of work. Any one of these kids can get a job down the street any time they want, so obviously it's quite different to city areas. (Robert, teacher)

STRENGTHS OF RURAL/REGIONAL SCHOOLS IN HELPING STUDENTS ACHIEVE THEIR POTENTIAL IN SCIENCE, ICT AND MATHEMATICS

Teachers

Teachers described school strengths in ICT, mathematics and science in terms of the pedagogy and professional support available in their schools. Key features of successful approaches included:

- using a team approach (particularly emphasised by staff)
- communication between staff
- having a champion with a particular interest that is promoted in the school
- supportive pedagogy relevant across discipline areas
- integrated curriculum
- access to meaningful professional development
- access to effective resources and celebration of success.

In the larger high schools, discipline-based staff formed teams and had developed coordinated approaches that worked from their knowledge of students, teaching and learning and their specialist expertise:

> There is a general feeling that we are doing it tough and we are isolated. This tends to make people work together a lot better…there's an element of creativity that comes out in that situation. You have to improvise and be innovative in the way you teach. (James, teacher)

Of particular importance to teams was access to staff with strong ICT skills, experience in a range of delivery modes across all types of abilities and age groups and the chance to test their ideas. In smaller schools teams formed around a commitment to an issue or area of interest. These groups usually had an advocate, a teacher who had particular interest or expertise in the area and a commitment to be innovative and to develop new approaches in the school. Such teachers had the opportunity to pursue this commitment through the principal's and school's support, evident in curriculum, pedagogy, organisation and consequent gaining of external funding to develop that area of interest. Programs that were maintained had the following characteristics:

- a core group around a person with a particular interest
- across-school involvement and planning
- school activities and staff showing enthusiasm and commitment for the topic
- staff supporting each other, particularly sharing their resources at short notice
- identified funding over an extended period
- celebration of success
- inclusion of families and community in the program through communication and involvement in activities.

The professional conversations supported the development of specific strategies for teaching and behaviour management that had been effective in classrooms. For example:

> I think the greatest strength is the extremely strong professional and personal rapport between staff … the experience amongst staff, the approach to students on the basis of support … that reflects itself in the quality teaching and the equality of teaching we have at the school. We are a very close faculty, the strengths are we have strong specialised skills…range of delivery across all range of types and ability groups. (Mike, teacher)

> We do make a point of confronting each other and taking the time to talk about stuff. Sometimes you inspire each other by the swapping, changing and enthusiasm for different stuff that we use. (Kim, teacher)

The importance of effective communication in supporting team members was stressed, since it maintained teachers' focus on what can be achieved rather than what cannot be done. Staff described their approaches as encouraging a shared dialogue where they could discuss professional issues in a personal and friendly environment. These professional conversations are important for developing programs and pedagogies. The teachers described small rural schools as having strong links to the community. In these schools staff felt the focus was on individual students and their place within their community.

> I like it being a small school. (You) pretty much know all the kids …and the kids generally get to know you pretty quickly. (Robin, teacher)

Teachers found that successful outcomes were those that made learning relevant and engaging. In some schools teachers focused on ensuring children had the tools to access and use information that they need to know, rather than emphasising only knowledge transfer. The

success of this approach was evident in students' outcomes and engagement in a range of schools and programs.

> The successful part of the science curriculum is getting kids to accept things aren't black and white, to inquire and to give (them) the skills to do it. They're lifelong skills. (James, teacher)

Human and physical resources were identified as key supports by teachers and students. Special education teachers, who supported students, were considered invaluable, and teachers described their role and influence as highly significant in developing the curriculum, supporting students and achieving high-level outcomes.

> One of those strengths is a special education teacher who will teach children who need a push to get to their potential. What's special…(is) the way the teachers treat all the kids, it's not about what you can't do it's about what you can do. (Robert, teacher)

Schools had an emphasis on upgrading computer technology. One school had upgraded classrooms to accommodate multimedia technology and teaching – a popular move with most teachers and students. Teachers expressed concern about needing professional development in using ICT and adapting their teaching to use the equipment effectively. Also important was in-house training, along with having a well-stocked resource room. This aspect of ICT use is considered later in the chapter.

External funding was an important resource for developing the infrastructure and necessary professional development.

> The cost of PD becomes expensive too. If you want to go to a conference it becomes expensive; if you want to run an excursion that becomes expensive too. In these sorts of places people would feel more confident if they were upskilled in an area and could bring that back into their maths or science class. If they felt they were getting lots of rewards and confidence from PD by being here, they might tend to stay longer. (Terry, teacher)

Students

The students' positive comments tended to reflect their school's subject area specialisation. Some saw ICT as an area they wanted to learn about, and one that they enjoyed. In particular, they appreciated innovative programs, flexible student-centred delivery and using multimedia and graphics programs. Most students enjoyed computer classes and used the computer to play games, conduct research, explore the Internet, type, do homework, write stories, make slide shows and access email. The majority of students had computer access at home superior to that of the school. Students were generally positive about mathematics where it was hands-on and relevant. Many students described enjoying mathematics games, algebra and learning timetables and valued being challenged and learning new ideas. Students who had trouble seeing the relevance of particular areas or needed a lot of additional assistance tended not to enjoy those classes. While this may appear self-evident, it supports the teachers' focus on good teaching and learning practice. Students felt their learning was assisted by teachers, parents, tutorial assistance, hands-on activities, independence and their calculators. Students enjoyed science classes and made particular reference to the hands-on aspects of classes. One school had classes with Questacon and CSIRO scientists and talked about enjoying working with materials that exploded making volcanoes and firecrackers:

> My daughter doesn't like science but, gee, she loves the Helix program. Bringing that sort of stuff into the school…it's great for the kids. (Lyn, parent)

Families

Parents preferred schools where staffing had been stable over a long period. Some students were sent to schools outside the local area to broaden their experience, but most had since returned to the local school, as these were smaller and better met their needs. The influence of a 'good teacher' was considered by parents to be of prime importance in achieving good outcomes for students. The parents also discussed the positive effect of teachers who were enthusiastic about ICT, mathematics and science. Families noted the positive outcomes of programs that were integrated, had consistently good teaching, low teacher turnover and were supported by good facilities. These included computer mini-laboratories in classroom for easy access by students. Specialist programs where teachers communicated well with families increased their understanding and support of such. These programs were seen by parents to improve students' attitudes to school. Features of effective programs included:

- making the ICT, science and mathematics curriculum explicit throughout students' education and the school's activities
- having specialist teachers to demonstrate and professionally develop staff
- better communicating teaching methods and improving parents' ability to follow-up in the home
- being involved in competitions to improve the profile of a discipline in the school and community.

Examples of successful programs

The themes around successful programs consistently reflected the importance of good teachers who are developed and supported to achieve their goals and who remain in a school for long periods. The other theme clearly evident was the opportunity to develop positive approaches based on best practice models of teaching and learning relevant to the local context. These were supported by the programs exemplified below.

- Mini-computer laboratories in classrooms and multimedia-designed and equipped classrooms.

- Development of an ICT focus for the school through targeted programs funded by NTDEET, CEO and/or community funds which invested in infrastructure and professional development and resulted in innovative programs being conducted in the classroom.
- A mathematics out-of-school program that supported secondary students who wanted additional help and, staffed by teachers, had been very successful in improving students' outcomes, the relationships between teachers and students, and staff-developed initiatives.

- Boys in Education Lighthouse had provided a withdrawal program for boys that has resulted in their returning to class, participating, and achieving well in the classroom.

- The ALFHA (Accelerated Learning for Higher Achievers) program designed to group and meet the needs of gifted and talented children has had particular success in mathematics, science, English and social science education.

- A range of hands-on experiences in science. For example, students visited Questacon in Canberra, conducted experiments with CSIRO, participated in Double Helix which conducted a number of popular activities in schools and conducted experiments in 'Labs on Legs'.

- Popular online sites including Reskids.com and Cahoots (American online programs).

OBSTACLES TO HELPING STUDENTS ACHIEVE THEIR POTENTIAL IN SCIENCE, ICT AND MATHEMATICS IN RURAL/REGIONAL SCHOOLS

Teachers

The teachers identified several obstacles to implementing science, ICT and mathematics curricula in their schools. These were mainly related to inadequate resources to implement programs effectively and according to best practice, the transience of teachers and students, and the shortage of appropriate staff.

ICT-related obstacles

The preferred pedagogy of teachers was to learn through relevant and real-life experiences rather than focusing on stencils and teacher-centred instruction. Integrating ICT into the school classroom on a weekly-to-daily basis was seen as a positive approach but limited by the availability of computers. Computer access for the most part was hampered by a lack of spontaneous access to computer laboratories as most of the time was booked in advance for classes. This made integrated or impromptu ICT teaching difficult. Having functional computers in sufficient numbers in every classroom was, in turn, limited by the availability of hardware, software and technical support. In addition, the lack of teachers with knowledge of how to resolve hardware and software problems limited the educational effectiveness of ICT. Teachers identified a lack of confidence, knowledge and skills in ICT as major obstacles to its efficient and regular use in classroom teaching and learning.

> I'm not as confident as I'd like to be and wasted a lot of my computer time this year… things are moving too fast for me to pick up. (Linda, teacher)

> If I'm teaching older children, I will be challenged computer-wise because I (only) do what I have to do and I know what I need to know. I wouldn't go and play… I never played a computer game, I use it because I have to for work. If I would have someone encouraging me to use it more for fun… it would be good. (Kim, teacher)

Teachers and students had different emphases in relation to ICT; teachers used ICT for work, while students used computers for games. Different levels of knowledge about and attitudes towards the use of ICT thus emerged. Some teachers incorporated students' knowledge and peer teaching into the curriculum, recognising their students' computing knowledge as superior to theirs:

> Another obstacle is teacher's knowledge of the hardware… And technical support… you just get frustrated when you could utilise it (ICT) better. (teacher conversation)

> Part of our ICT problem is the infrastructure, some of our hardware is really dated, so it's difficult to use. We've moved a long way down the track, but we've a long way to go … (East coast schools) are light years ahead. (Mike, teacher)

> I'm of the belief (ICT) is going to be integrated across the Year 9 curriculum next year …if you are teaching any subject you should be able to integrate ICT into that subject area. (Robert, teacher)

Science resourcing obstacles

The science curriculum provides an opportunity to develop and implement hands-on activities which are particularly effective with children who are experiencing difficulty with literacy concepts. Access to physical resources is a particular challenge in rural areas as they are difficult to buy locally and must be ordered and transported from afar. For example:

> My biggest obstacle is the physical hands-on resources that go with (science). They're very expensive. When we used (a specific kit) the first time it was great, but the second time (with improvised equipment) didn't work. Because we're so remote it's a trip to Darwin to go and get the stuff. (Linda, teacher)

Some of the solutions staff identified included Double Helix and 'Labs on Legs' which supply a range of materials for experiments. These programs have been successful, but it is difficult to replace used components which often have a short 'shelf life' in the extreme NT climate. Ordering materials takes considerable long-term planning; a pack of activities that can be resourced via the local supermarket would be useful. The heavy reliance on science shows like Questacon are inspiring, but not well integrated into the curriculum and schools need to be able to access these resources when they are available.

> Schools rely on visiting Science shows…everyone's going to do science right now. (Robin, teacher)

Transience

The schools are affected heavily by transient populations of students and teachers. In some schools this can represent up to 50% of the student population and is due to armed forces' posting cycles, seasonal and casual work patterns, community life and cultural requirements. Appointing relief teachers can be difficult in regional centres where there may be limited experienced people locally. These circumstances make school planning difficult:

> We do have a big turnover of staff here. It's almost disastrous for the Year 12 class, for example, to change teachers half way through. (Simon, teacher)

> The caravan park has a big impact. Over this year, I probably had a turnover of about half the class. They're all caravan park people - that turnover is seasonal. (Sally, teacher)

As a response to transience one school has developed a mathematics curriculum that is consistent across the school and this has been particularly effective in introducing new

teachers and students to the curriculum. The reliance on individual teachers to develop the curriculum is affected by high staff turnover. Changes in student numbers can also have a drastic effect on staffing numbers and maintaining specific programs. It is often difficult to recruit staff with the right expertise thus resulting in teachers regularly teaching outside their discipline areas, particularly in science, ICT and mathematics:

> In the maths and science area there (are) just too few teachers available. When you're already in an area like this, where you are isolated, it's hard to (get) people. You're really pushing it up hill to get enough teachers out here and that's what really impinges on kids, the change over of core maths teachers. Every year affects the kids so badly. (Robert, teacher)

The teachers called for student drift to be considered in budgeting structures and formulae in order to ensure schools are not disadvantaged by influences beyond their control.

Community dynamics

Community involvement in school activities varied considerably across schools, affecting fundraising, payment of student fees and support for student activities and studies. Schools in the NT have multicultural populations resulting in many students speaking English as an Additional Language, for many as a third or fourth language. This brings diversity to the school and requires different ways of working that celebrate that diversity as a strength and involves parents who come from different experiences and have different expectations of schooling. In one school peer pressure and lack of attendance had a significant adverse effect on student participation and learning. Racist behaviour is intimidating for students and contributes to their lack of attendance or participation. The teachers felt there was a need to develop staff to cater for diversity in the classroom and school.

Students

Older students did not like boring classes which they described as those where the work was not creative and involved using stencil sheets, copying work or work that is meaningless and not contextualised. They preferred work that allowed them to show initiative and negotiate their learning. Secondary students wanted their work to be relevant and were frustrated with mathematics that was based on applying algebraic equations. Older students were frustrated by the science curriculum's focus on theory and writing reports and preferred to be involved in practical work. The majority of students at all ages had access to better computers at home and used them for a broader range of activities. School computers were described as either being too slow or often not working at all. The students' comments about computers were consistent with those of their teachers – technical support to fix faults takes a long time and there are usually some computers not working in many schools, frustrating their efforts.

Families

Families identified the need for improved teacher resources and professional development to improve and support teachers in meeting the needs of students. They felt that teachers need greater support to work with students' abilities, develop hands-on activities and use flexible strategies in their teaching. Supplemental support in specialist areas, with behaviour management and with children with additional needs through effective staff assistance was also considered important. Families wanted programs that were consistent across the whole schooling experience, including primary and secondary schools and noted that the lack of follow-up on ICT and mathematics in later years of schooling had resulted in students losing their passion for these subjects. One major obstacle noted was high teacher turnover,

particularly as this had a significantly negative effect on students' learning during the school year.

> Children's opportunities for success in maths are being (affected) because of the teacher turnover, the loss of teachers who are long term and really know their stuff. (Sam, parent)

> My son just failed Year 11 maths because he had five maths teachers this year. (Lyn, parent)

Families wanted to have better communication with schools through the use of clear assessment requirements, homework that reflected class work, and descriptions of what was happening in class and the programs being implemented. One group noted that the use of mathematics textbooks meant parents could follow and support students' progress particularly through changes of teacher.

VIEWS ON ATTRACTION AND RETENTION OF GOOD SCIENCE, ICT AND MATHEMATICS TEACHERS

Across the Northern Territory, in all educational systems and at all levels, many teachers of ICT, mathematics and science were not teaching in their specialty areas. They suggested a number of strategies to better attract and retain ICT, mathematics and science teachers. These included providing financial incentives that are not available to staff in major regional centres – including fuel, rent and food subsidies. Some suggested teachers in rural areas should be eligible for two airline tickets to fly home annually (available in past Commonwealth-based agreements). Travel subsidies were seen as helpful by some, but most wanted the subsidies made more widely available and for education authorities to recognise the cost of travel in and between regional centres. Parents noted that while they were able to get subsidies through other organisations such as the RAAF, these were not available to teachers.

> It's not an attractive (place) … not (because of) the place or the children. It's the things you don't get here, as opposed to other organisations (that) classify the area as remote. When a teacher gets here, what do they get? Nothing. There's no incentive for them to stay. (conversation between parents)

There are some subsidies currently available to remote teachers in the Northern Territory. One suggestion to encourage staff to stay was a mortgage subsidy for those who commit to stay long-term. Staff also needed better availability of relief teachers to enable them access to professional development activities, as these usually involved being away from the local area. Staff also wanted additional access to professional development in their specific areas of expertise, as well as in ICT, managing diversity, and conflict resolution. However, 'Opportunities for professional development are difficult to get to, because you need someone to cover your class.' (Kim, teacher)

Reflecting the values placed on lifestyle in a small community, a number of teachers suggested that communities establish groups of people who assist new staff to feel a part of the community and encourage them to stay.

> If you've got a (local) community of your own it makes a big difference. (Robin, teacher)

The teachers also recommended that education authorities and others encourage teachers to understand the benefits of working in smaller schools, including increased opportunities to take on more responsibilities and higher-level positions. They felt this to be particularly important, as staff leave looking for higher-level positions. Some staff preferred a model that developed a career path and then encouraged them to take on a mentoring role, sharing their expertise across a number of schools. Teachers noted two important factors in improving retention rates – a focus on improving behaviour management to make learning possible and investment in the stability and reputation of a school as a positive learning environment. Successful programs take a long-term view of staffing and are therefore linked to stability in leadership and teaching positions.

RECOMMENDATIONS FOR IMPROVING STUDENT OUTCOMES IN SCIENCE, ICT AND MATHEMATICS

Teachers

Teachers made a number of recommendations with regard to pedagogy and resources. They wanted a three-year, or whole school continuum of learning established to improve the mapping and pathways undertaken by students. They felt that this strategic and outcome-oriented approach provided a proactive way of interpreting the curriculum consistently as well as managing change in the school, staffing and students enrolments.

A number of teachers commented on the need to develop and access expertise through shared agreements. This could be achieved through developing a cluster of specialist programs that include ICT, mathematics and science and the relevant specialist support staff who provide in-service programs and appropriate resources. Schools would identify their area of focus for a year and share access to a specialist 'bank'. As each school developed its expertise it would become part of the professional development support for other schools.

Teachers sought access to better resources to assist them to teach in innovative and hands-on ways. In ICT this means mini-computer laboratories in classrooms, or a bank of laptops and relevant technical support, professional development in order to stay abreast of technological developments and their integration into the classroom. Mathematics and science teaching were best supported by access to resources needed to integrate the curriculum effectively and make activities meaningful to students and increase the hands-on nature of their teaching and assessment. A package of activities that can be undertaken with locally available resources would assist teachers. This concept is also related to accessing funding and industry partners such as CSIRO.

Students

In the future students would like to have more games and hands-on activities in classes. These include use of computer hardware and software by using speech recognition, choice in their mathematics activities, large scale hands-on science activities such as Questacon or CSIRO programs, and rewards for mathematics activities. Students identified the need for better ICT infrastructure, technical support and access to ICT on a regular basis. Mini-computer laboratories in classrooms were identified by some students as a positive way to improve their learning. Students also preferred interactive and self-directed work in all areas.

Families

Families stressed the importance of small class sizes and individual attention through additional help in the classroom as keys to improving outcomes for students. One recommendation was for increased funding for support staff, including teachers' aides and relief staff. They wanted teachers to have adequate professional development and to be open to new strategies for teaching students effectively i.e. hands-on activities and ICT integration into the curriculum. Continuity of curriculum and staffing were also identified as key areas of focus for schools. Families wanted programs to be communicated well to parents so they could continue to support schools and their work. Secondary parents wanted schools to link the learning and content that occurs in schools with that in tertiary education. Parents recommended focusing on the basics of education – handwriting, literacy, numeracy and behaviour management to enable schools to develop environments conducive to learning in all areas.

INDIGENOUS EDUCATION

Indigenous education is integrated into all schools in the Northern Territory. As such, all of the issues above are relevant to Indigenous students, communities and staff in provincial and remote areas and schools. Indigenous students represent 38% of all students, a proportion that is steadily increasing. Across the Northern Territory there are 985 Indigenous communities, 54 Homeland Learning Centres and 183 schools (151 public and 32 private). Three quarters of all Indigenous students are enrolled in the 118 schools located outside the main cities of Alice Springs and Darwin. Forty-one of these schools are staffed by between one and four teachers. In urban and remote schools 38% of students use English as an Additional Language, with 75% of these identifying as being from an Indigenous background. The range of different languages students may speak is illustrated by the 104 Indigenous languages and dialects registered by the Northern Territory Aboriginal Interpreter Service. In many remote schools all students speak English as an Additional Language. (Northern Territory Government, 2005)

In order to improve outcomes for Indigenous students, the Department of Employment, Education and Training (DEET) is focusing on increasing the provision of secondary education in remote areas and including alternative pathways such as vocational education, accelerated literacy programs, partnerships with Indigenous communities and the Indigenous Community Coordination Pilot at Wadeye.[14]

This section explores one Indigenous school - Frilled Lizard Secondary School - and its surrounding community.

Living in regional and remote areas

Students in this remote community described the importance of living where they were close to their families and friends and linked to Aboriginal-owned and managed land. When asked why they chose to live in remote areas, they replied:

> Because we've got friends and families around here and we've got our own home land. (Kelly, student)

[14] Details may be found at http://www.deet.nt.gov.au/education/Indigenous_education/ and http://www.deet.nt.gov.au/

> Because it is (Aboriginal) land … hunting and fishing. (Tony, student)

The students enjoyed being involved in community activities such as hunting, fishing, playing sport, going to the Blue Light disco and going to school. For the future, the students aspired to careers in their community, including teaching or being a principal, being a musician, working for the government in local community and ranger organisations or offices, being a shopkeeper or a mechanic. They were aware of the stages of education involved in these careers and were influenced by seeing Indigenous staff working in a variety of local organisations and by a small cohort completing Year 12 recently. Students were able to attend secondary classes which focused strongly on career development. Composite classes allowed students to work through programs at their level and included those who were aiming to complete Year 12 over the next one-to-four years and those preparing for vocations.

Teachers lived in the community and in a local township. There was a high turnover of staff at all levels relating to a number of issues including a lack of appropriate housing. This resulted in people living in substandard conditions or being unable to access housing at all. The sustainability of successful programs had been challenged by staff turnover and the lack of certainty about the future. Staff commented about the effects on morale and student outcomes of stopping programs that had encouraged students to be involved and experience success.

Some of the obstacles in undertaking focus groups in remote school communities exemplify many of the issues in educational provision for these schools. There were significant changes in leadership and senior staff mid-term; schools' funding formulas are based on student numbers that fluctuate every year, resulting in a lack of security for specialist teachers and the school programs. Many Indigenous community members are employed in the school in positions ranging from principal, teachers, linguists, literacy support specialist and teacher's aides. Generally, local community staff are unable to access DEET housing and live in crowded and substandard housing in their own community.

Provision of mathematics, science and ICT education

To participate in the remote secondary provision the school has had to move from a thematic, integrated workshop approach to learning offered in blocks to a discipline-based curriculum. Students study a limited range of subjects taught by a cohort of teachers across the secondary school. The subjects are limited by the availability of specialist teachers, appropriate resources even at a basic level, and their integration into the bilingual program. While secondary students have interrupted histories of education, and classes include many students with low levels of Standard Australian English literacy and numeracy, Indigenous students generally have strong and extensive understandings about their languages, cultures, environment and community business. The curriculum then is trying to meet the requirements of the mainstream education system by preparing students for active involvement in the future of their community.

With a considerable focus on improving enrolment, the school has 14 students in Year 9/10 and 20 in Year 11/12 composite classes. This has improved from four senior secondary students in 2005, a difference which demonstrates the volatility of enrolments in many regional and remote Indigenous schools. Delivery is undertaken by a team of Indigenous and non-Indigenous teachers in a bilingual and bicultural program that recognises and values Indigenous and non-Indigenous knowledge systems.

Students are currently working through the NTCE Stage 1 and 2 in a planned program over semesters 1 and 2, 2006. The program emphasises tasks to support students' ability to make influenced decisions in daily activities in work, home and society in general and is developed in line with the community goals and priorities and the local community Action Group which includes senior Indigenous community members and staff. The integrated curriculum is displayed in a large, shared space in the school. The science curriculum recognises students have had little or no exposure to Western concepts of science but have a wealth of knowledge about science through cultural involvement and living in their country which is not profiled in the Northern Territory Curriculum framework. Students have access to their family and community's knowledge and understanding of the biological world which has many layers of meaning and is a reference point to develop skills to work scientifically and represent biological concepts in a scientific way.

ICT is integrated into courses where possible, rather than being studied as a discrete unit of work. There is a lack of up-to-date ICT hardware and software available to students, by far the lowest standard across all schools involved in the study, and no Internet access. The computers are not compatible with each other and regularly do not work. While the school has money to pay for a technician to install Internet connections to classrooms, it is unable to attract a tradesperson to the school as it competes with a nearby mining company. The ICT content work and assessment is based on current investigations and projects in other discipline areas. Students are keen to use computers more in their studies and recognise the adverse effect of poor quality equipment on their studies. The majority of students have no other access to ICT and use computers at a basic level related to the standard of computers available.

In the maths curriculum students are studying two themed areas – earning and spending and measurement. In the measurement stream students are designing and building cane toad traps. Once these are completed, students will work with local rangers to trap cane toads and then collect and analyse data about toads as part of their mathematics studies. This course of study will include relevant mathematics and scientific concepts, practices, processes and communication genres. Cane toads are a study focus as their arrival in the NT is threatening the ecosystems and cultural life in the region. Through this study students will add to their Indigenous scientific knowledge and process by also learning how to work scientifically as defined by the Western tradition. This will include developing skills in the relevant literacies and ways to reflect on these processes. They will also work with local resources and organisations. The earning and spending theme involves students planning and implementing a trip interstate. Students are preparing the budget, planning and undertaking fundraising and then booking and participating in the trip. In the science curriculum, students are focusing on horticulture, environmental mapping and interpreting students' environmental awareness. The lack of resources available in many schools was evident, for example, up to date maps, protractors or scientific calculators. This approach combines Indigenous and Western understandings of the environment, horticulture and their interpretations.

This section of the report has outlined some of the issues in Indigenous education, but further study would be required to present a deep understanding of the complex issues in Indigenous education across Northern Territory schools. Addressing these issues involves a long term, consistent, well-resourced and integrated approach to education that is sufficiently flexible to recognise and reflect the Indigenous community's knowledge, business aspirations and realities. The involvement of local Indigenous community members in the solution with sensitive and knowledgeable non-Indigenous educators, government and non-government agencies is an essential component of this approach to achieve a positive future for Indigenous education.

CONCLUSION

Underlying the positive approaches in science, ICT mathematics were a set of key activities including appropriate and targeted infrastructure and professional development, integrated curriculum, targeted programs and staff working in collegial teams. The catalysts for initiatives and team development included encouraging individuals with particular interests, and involving specialist staff, management and the whole school and local community members. Students also emphasised the importance of actively leading their learning, engagement in flexible and relevant curriculum and approaches across all subject areas. Their interest and engagement in ICT was evident in their appreciation of mini computer laboratories in their classrooms, as technology was accessible throughout their learning experiences. Educators and families have worked to develop innovative and effective approaches through teamwork and focusing on what can be achieved through local support and accessing wider networks.

Northern Territorian educators, families and students clearly valued and recognised the advantages of living, working and learning in regional and remote areas. They also identified and shared many of the challenges that are part of the realities of living in regional and remote areas. Some of the challenges included the transitory nature of lifestyles and careers across the NT, the lack of specialist teachers, housing availability and financial support, and the impact of these factors on learning and schooling. Their effects are significant and influence educational outcomes across schools and learning areas. Addressing these challenges essentially calls for increased long term planning and security, effective infrastructure and professional development across the spectrum of schooling.

Elements that could be described as challenges have been integrated into the whole school system to the benefit of students, schools and families. This study demonstrates the importance of incorporating the diversity of local languages, knowledge, skills and experiences into the classroom and curriculum. Nowhere was this more evident than the Indigenous classrooms that effectively incorporated Indigenous and Western knowledge and properties as part of complete and successful programs. Evidently, developing pedagogies, resources, curriculum and support processes that incorporate stakeholders as essential and expert has the potential to improve outcomes for regional and remote educational communities across the NT. This evidence challenges accepted understandings about regional learning and offers opportunities for future educational policy, theory and practice development.

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REFERENCES

Australian Bureau of Statistics. (2005). *Regional Statistics, Northern Territory 2005*. ABS Catalogue No. 1362.7. Retrieved March 18, 2006 from http://www.ausstats.abs.gov.au/Ausstats/subscriber.nsf/0/65E36CA8D1CE91B9CA25705800756CF0/$File/13627_2005.pdf

Jones, R. (2000). *Development of a common definition of, and approach to data collection on, the geographic location of students to be used for nationally comparable reporting of outcomes of schooling*. Report prepared for the MCEETYA National Education Performance Monitoring Taskforce. Unpublished.

Northern Territory Government, (2005). *Indigenous Territorians: Fact Sheet,* Department of the Chief Minister. Retrieved March 20, 2006 from http://www.nt.gov.au/dcm/publications/ntfacts/200511Indigenousterritorians.pdf

Indigenous Education. (2005) *Ministerial Statement*. Retrieved March 28, 2006 from http://www.deet.nt.gov.au/education/Indigenous_education/

Department of Employment, Education and Training, Northern Territory website http://www.deet.nt.gov.au/

CONCLUSION

The SiMERR hub reports provide a wealth of detail about rural school education in general, and science, ICT and mathematics education in particular. The geographical and educational contexts are too diverse to allow comparisons, although a number of recurrent themes can be clearly discerned in the report. To a large extent, these themes are consistent with those identified from analysis of questionnaire data in the first phase of the National Survey.

Staffing

There was a clear convergence of opinion across states/territories and school types that rural schools offer real advantages to students and teachers. They are seen as friendly, safe and caring places, where teachers and students are familiar with each other and pastoral care plays a big part. There is a sense of belonging to, and identifying with, the school and community. Parents are generally appreciative of the quality of their children's teachers and feel teachers are able to provide students with a greater degree of individual attention than would be the case at larger city schools.

Teachers feel there are genuine professional advantages to working in rural schools, where they are challenged to be more flexible, show more leadership and greater responsibility than would be possible in larger schools with more established staff. This is particularly the case for younger teachers who are on a steep 'learning curve'. Many teachers feel that their rural experience may also be of advantage to them in terms of promotion or permanent employment. A further advantage is the sense of collegiality reported by teachers in many states and territories, a quality arising in some cases from shared adversity.

In the smaller scale of rural towns there appears to be a strong sense of identity with the school and the community. Teachers and parents recognise each other in town, and there is potential for creative links between schools and community organizations and businesses. For many young teachers from the city, rural communities and schools represent an adventure, with the challenge of an unfamiliar learning environment. The impression from these reports is that rural communities provide a cheaper alternative to working in the city, with inexpensive accommodation and, in some cases, a package of financial incentives. There was some agreement that education authorities do not do enough to promote the positive aspects of rural teaching.

Despite these advantages, all research teams except SiMERR Victoria reported difficulties in attracting and retaining quality teachers to the study schools. The annual turnover rates varied substantially, depending upon a range of factors including degree of isolation. The staffing difficulties appear to be particularly acute for secondary teachers of science, ICT and mathematics, a finding consistent with the results from Phase One of the study. Several of the reports expanded on the lack of continuity and leadership resulting from high staff turnover. In five of the reports, teachers, and in some cases, community members, commented on the absence of effective orientation and mentoring programs for beginning teachers. Interviews in six of the reports raised the issue of improved incentive packages to attract both young teachers and experienced teachers with families, and to encourage them to remain. In at least two cases (WA and NT) the incentives would need to include improved housing. Other suggestions for attracting teachers included a greater emphasis by universities on rural

experience for pre-service teachers (SA, NSW, Qld), longer term appointments (SA), and an extension of the period for which current incentive packages apply (Qld).

Professional Development

The sense of professional isolation was apparent in all the reports. Teaching is essentially a gregarious endeavour, and the need to 'bounce' ideas off other teachers was expressed in several studies. Yet the situation of many of the teachers conspired to stifle opportunities for informal professional development, such as sharing ideas and advice. It is ironic that in the current system, the further away teachers are from centres of professional support, the fewer colleagues they have to consult with and, in many cases, the less experience those colleagues have had.

The studies reported a similar situation with regard to formal professional development opportunities. The extra time required to attend city-based professional development was inversely proportional to the availability of relief teachers to cover their classes. The additional costs required for travel and accommodation add to these obstacles. Teachers, and in some cases, parents suggested that a good start would be the provision of professional development funding commensurate with real costs to schools and individuals. Several states and territories have introduced online professional development options, although in South Australia at least, this strategy was felt by some teachers to have limited success at present. An alternative suggestion from the West Australian study was to bring more experts to rural areas to conduct professional development in context.

Resources

Concerns about resourcing focused on two areas – science materials and ICT support. Many teachers saw city primary schools as advantaged in being able to access science resources from local high schools or share resources among nearby primary schools. Unfortunately, rural primary schools do not always have these options and yet funding formulas in some states do not take this into account.

On the other hand, teachers in two states (Qld and SA) considered that resources were sometimes wasted or underused in schools with high teacher turnover rates, due to the lack of continuity of staff and knowledge about local resources. The development of strategies to maximise the usability of available resources was suggested as a priority.

There was a general agreement that rural schools require improved access to technical staff in ICT. Even schools with reasonably new equipment were hampered in maintaining the serviceability of computers and peripherals. Teachers with expertise in this area were required to devote valuable time to maintenance and technical work since technicians were few and far between. A suggestion from two of the reports (SA and Qld) was for strategic alliances between government departments (e.g., police, health, education, etc.) in maintaining and repairing technology, rather than having technicians employed by each of these departments to cover the same, large, districts.

Teachers in three of the studies emphasised the motivational value of ICT among Indigenous students. Concerns about low school attendance highlight the importance of exploring ways in which ICT, rich tasks and activity-based science and mathematics can best serve the educational needs of Indigenous communities.

Learning Experiences

Parents/caregivers, students and teachers in several of the reports emphasised the capacity of small schools to provide students with individual attention from teachers. Parents/caregivers in particular felt that teachers in rural schools were able to monitor the progress and address the individual needs of their children at the primary level. This appeared to be all the more important in predominantly Indigenous communities where the strength of community relationships influenced rates of attendance.

The cost, distance and time associated with excursions to conventional resource centres such as zoos and museums were regarded as the biggest obstacles to providing extended learning opportunities. Visits by mobile resources and outreach programs, especially for science, were appreciated, although in some cases they were a rare occurrence. Four of the reports (Vic, Qld, SA, WA) commented on the brief, one-off nature of these experiences and, in some cases, questioned their educational value in current form.

The more remote schools praised the flexibility of school-based curricula as suiting the specific needs of students. In states/territories where this flexibility was not available, teachers decried the inappropriateness of mandated, city-centred curricula, calling for greater recognition of local contexts and for the opportunity for contributions by community members. Again, this concern was greatest in schools with large Indigenous populations (Qld, WA, SA, NT) where it was considered that culturally and contextually appropriate curricula would increase attendance and better suit the transient nature of the student population.

Another commonly reported limitation on student learning experiences was the lower number of course options available to students in small rural secondary schools, particularly in the senior classes. This was generally due to the smaller number of specialist teachers available to take these classes and the difficulties of running classes with very low numbers of students. Composite classes, while regarded by some parents as a positive experience in lower grades, were not seen to be suitable options for seniors, and several of the studies reported a drift to city schools among senior students.

While school factors such as staffing, professional development, resources and learning experiences might be associated with the lower student achievement in rural and remote schools, interview respondents also pointed to parental, community and teacher expectations and aspirations as affecting student outcomes. In addition, a number of respondents considered that the lack of a critical mass of academically committed students, able to interact with and support each other, reduces the likelihood of students achieving their academic potential in these subject areas.

Final Comment

Implicit in the interview data is the mindset of many rural teachers, parents/caregivers and students who recognise a single location (e.g. Perth, Adelaide) as the font of education, the repository of all resources and professional development, the destination of excursion pilgrimages, and the seat of university learning and pre-service education. This is a missionary perspective, with teachers as the missionaries, trained in the city, supported by the city, travelling back to the city for PD sabbaticals, and in many cases hoping to eventually return to the city. Education authority is based in the city, exams are set and marked in the city, and syllabuses are generally designed by and for city residents. Rural teachers are often ‘out of the loop’ with regard to professional development opportunities and, in the words of one South Australian interviewee, ‘aren’t aware of what is happening in education in mathematics, science and ICT.’ There is a perception among many parents that city schools

provide a superior education and that senior students benefit in moving from rural schools. In the more populous states this centrality is dispersed, with regional universities providing centres for teacher professional development, outreach, and teacher education. However, in other states and territories this is not the case. While this missionary perspective prevails there can be little sense of ownership of educational endeavours by rural people. Instead, there is sometimes a sense of alienation, and perhaps even condescension felt by teachers in rural areas.

It is problematic to submit general recommendations based upon case studies and this is not the point of this document. Nevertheless, the issues that emerged here are in most cases consistent with the findings from Phase One of the National Survey and are addressed in the recommendations of that report. In particular, any consideration of the breadth and interconnectedness of issues raised in the case studies leads to a recognition that concerns about rural education in science, ICT and mathematics cannot be addressed by limited, piecemeal approaches, but need to consider the wider context of rurality. The development of a National Rural Education Strategy, with the roles outlined in the National Survey Report, should be the next step in recognising and addressing the concerns of teachers, families and students in rural Australia.