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AN AUSTRALIAN PERSPECTIVE

Abstract

The importance of building educational partnerships between families, schools and communities is increasingly acknowledged since family and community involvement in education is thought to be associated with children's success at school. Yet there are discrepancies between the rhetoric of policy documents and the practice of family and community involvement in education. This paper draws on a large Australian study to critically examine different perspectives on numeracy education partnerships, with particular emphasis on the extent to which the needs of educationally disadvantaged children were being met. We elaborate a framework for analysing key features of educational partnerships, and then use the framework to compare the features of effective numeracy education partnerships represented in two case studies from our study. The case studies highlight different ways of initiating partnerships, different perspectives of stakeholders, different numeracy practices, and different ways of responding to cultural diversity and geographical isolation.

HOME, SCHOOL AND COMMUNITY PARTNERSHIPS IN NUMERACY EDUCATION:

AN AUSTRALIAN PERSPECTIVE

This paper explores issues arising from research on educational partnerships between families, schools and communities in contexts where diversity and disadvantage impact on children's numeracy learning and achievement. It is widely recognised that parents and families are the primary educators of children and are responsible for laying down the social and intellectual foundations for their learning and development. This assertion is also grounded in the education research literature, conveying the clear message that parental and community support benefits children's learning, including their numeracy development (Cairney 2000; Epstein, 2001; Horne, 1998).

Numeracy education has become a high priority in Australia, and the government policies and strategies formulated to address this area typically capitalise on the need to build partnerships with homes and communities (e.g., Department of Education, Training and Youth Affairs, 2000). This position on partnerships is consistent with the description of numeracy proposed by Australian mathematics educators: "to be numerate is to use mathematics effectively to meet the general demands of life at *home*, in paid *work*, and for participation in *community and civic life*" (Department of Employment, Education, Training and Youth Affairs, 1997, p. 15, emphasis added). Such an approach to numeracy implies that it is the responsibility of all members of society – schools, families and communities – to ensure that children gain not only mathematical knowledge and skills, but also a repertoire of problem solving and decision-making strategies needed for intelligent citizenship in a rapidly changing world.

Yet there are discrepancies between the rhetoric of policy documents and the practice of family and community involvement in education, as current partnership models disregard how families' material and cultural conditions and feelings about schooling differ across social groups (deCarvalho, 2001). These were some of the issues we addressed in a national research project that investigated home, school and community partnerships in children's numeracy education. We analysed features of effective partnerships in the elementary school and pre-school years, with particular emphasis on the extent to which the needs of educationally disadvantaged children were being met. In this paper we draw on two of our case studies to discuss characteristics of successful numeracy education partnerships for Indigenous communities and rural families in regional and remote parts of Australia.

## EXAMINING THE CONCEPT OF "PARTNERSHIPS"

Epstein (1995) defines home, school and community partnerships as exemplifying a relationship between "three major contexts in which students live and grow" (p. 702) and in which shared interests in and responsibilities for children are recognised. In addition, Funkhouser and Gonzales (1997) state that successful partnerships involve the sustained mutual collaboration, support and participation of school staffs and families at home and at school, in activities and efforts that have a positive effect on the academic success of children in school. Because home, school and community represent the major overlapping spheres of influence in children's education and development, researchers and practitioners call for their collaboration as partners who "work together to create better programs and opportunities for students" (Epstein, 1995, p. 701).

*The Role of "Home" in Home-School Relations*

While recent shifts in educational policies are partly based on the recognition that good relationships between parents and schools benefit students, consensus has not been reached about how these effective relationships should be achieved, who holds responsibility for what, and where power and control should reside in making educational decisions. Despite the frequency with which the concept of "partnership" is employed, its manifestation in practice often differs from the rhetoric of educational initiatives. Cutler's (2000) historical study of connections between home and school in American education demonstrates that recognition of parental influence in children's education in practice has been often blended with the construction of parents as adversaries who are either uninvolved and irresponsible or overly demanding and intrusive. This idea echoes with Sarason's (1995) view that the present governance structures of schools define, and indeed limit, the nature and scope of parental involvement. Parents are usually invited by schools only when it is needed, and staff of some schools want parents to be involved only in specific ways and at times determined by the staff. In particular, low-income parents often feel and are treated as "less" than the professionals in schools (Fine, 1993). In relation to mathematics education in the USA, Peressini (1998) found that accepted roles for parents were constructed as ranging from spectator to partner and from the deterrent to catalyst of mathematics education reforms.

Mismatches between home and school environments and failure to recognise parental diversity can create barriers to partnerships (Crozier, 2000). Also, because numeracy events embedded in the everyday activities of families or communities (such as budgeting, shopping, scheduling, playing games, measuring or building or designing things) are less visible than numeracy events taking place in school mathematics classrooms, the school can conceive of the

home as a subservient context in which the numeracy concepts and skills taught in school are to be practised and reinforced. The emergence of family numeracy programs has gone some way towards connecting home and school practices by involving parents and children together in meaningful mathematical activities (Horne, 1998). However, the various stakeholders in children's education may still have divergent perspectives on what constitutes partnerships and what their roles should be.

*The Role of "Community" in School-Community Relations*

Socio-cultural researchers define "community" as a "community of practice" – that is, a group of people engaged in an activity driven by common or closely intersecting goals and interests (Wenger, 1998; Wenger, McDermott & Snyder, 2002). In pursuit of these goals and interests, they employ common practices, work with the same tools or resources and use specific discourse. Communities constitute social contexts and meanings for learning as people participate in social practices. Knowledge is integrated in the doing, social relations and expertise of these communities. Furthermore, the processes of learning and membership in a community of practice are inseparable. Because learning is intertwined with community membership, it is what lets people belong to and adjust their status in the group. As participants change, their learning and their identity – relationship to and within the group – also change. Therefore, communities constitute the most powerful learning environments for children, creating potential for their development as children engage in social practices with others.

This approach to learning suggests that teachers need to understand their students' communities of practice and acknowledge the learning students do in such communities (Saxe, 2002; Sfard, 2002). Drawing on communities' funds of knowledge can capitalise on cultural diversity and overcome any mismatch between students' home environments and the culture of

school. McIntyre, Rosebery and Gonzalez (2001) argue that minority and poor children can succeed in school if classroom practices give them the same advantage that middle class children have – instruction that puts knowledge of their communities and experiences at the heart of their learning. In the view of these researchers, learning mathematics is more than structured individualised cognition; it is also dependent on the social and cultural situation and values of the learner.

Community partnerships focusing on numeracy issues do not usually do so exclusively, and Hexter (1990) points out that community-based programs deemed exemplary for their interventions in support of educational access are often based on more than numeracy. Such partnerships usually take a more holistic approach, as in the instance cited by Goodluck, Lockard and Yazzie (2000) of a bilingual Native American school district in Arizona: the conceptual framework is centred more globally on issues of difference and disadvantage. In Australia, Stanton (1994) identified conflicts between "white" school practices and Indigenous values, and described a community-based and community-focused program with a curriculum organised around the symbolic, societal, and cultural components of culturally sensitive mathematics. As Kahne (1999) points out, the most important aspect of community programs is the development of long-term relationships in support of positive social change.

## RESEARCH DESIGN AND METHODOLOGY

The design of our research project consisted of three phases. Thr first phase began with a questionnaire survey of education organisations and parent and community groups throughout Australia, complemented by a national email survey of elementary school principals, to obtain information on the distribution and scope of current programs and practices. A total of 499

surveys was returned and analysed. The second phase comprised interviews with key personnel

in the central offices of the government and non-government education sectors in each Australian

State and Territory. This allowed us to identify 38 programs or initiatives that connected schools

with families and communities to support children's numeracy learning. From these we selected

seven exemplary, sustained numeracy education programs that were the subject of detailed case

studies in the third phase of the research. Two researchers collected data from each case study

site over a period of three to six days. Methods included: observation of classrooms, school

staffrooms, teacher-parent interactions, and families in their homes; interviews with teachers,

school administrators, support staff, and parents; and analysis of teaching materials, policy

documents, and evaluation reports.

Our framework for selecting and analysing the case studies was developed from the

method we used to record and categorise key features of partnership programs identified from the

interview phase of the study. The analytical framework takes into account:

- different ways of initiating and funding partnerships and their implications for parental
  and community involvement in numeracy education;

- stakeholder perspectives on the links between schools, families and communities;

- attention given to the needs of educationally disadvantaged children;

- the nature of numeracy practices.

The first dimension of the case study analytical framework classifies relations between

educational systems, schools, families and communities in terms of how partnerships are *initiated*

*and funded*. *Top-down* partnerships are initiated and sponsored by an education system with

uniform program goals and processes across schools. *Top-supported* partnerships rely on an

education system for some overall sponsorship or coordination, but schools design and control

the program. *School-generated* partnerships are initiated by a school independently of an education system, although this may involve resources available from the system. *Home or community-generated* partnerships have their origins in these sectors and are designed and implemented with input from families and community members. Clearly, partnership initiation strategies and funding regimes are bound up with issues of power and authority in stakeholder relations.

The second dimension of the framework recognises the different *perspectives of stakeholders* on what constitutes partnerships and what their roles might be. We classified these as school-centred, family-centred, or community-centred. For *school-centred* perspectives we drew on Epstein's (1995) work on home-school partnerships to describe six ways in which schools understand the roles of families and communities: parenting, communicating, volunteering, learning at home, decision-making, and collaborating with the community. Less attention has been given to the ways in which families and communities might understand their connections with schools and with each other, and this in itself is suggestive of power relationships between these groups. We drew on available literature in this field (James, Jurich & Estes, 2001; Jordan, Ozorco, & Averett, 2001; Katz, 2000; Keith, 1999) to identify a range of family-centred and community-centred perspectives on partnerships and roles. The following *family-centred perspectives* describe how families might see their connections with schools and their communities:

- creating supportive learning environments at home;
- providing parental support for the child and articulating parental aspirations for the child's education;
- promoting parents as role models for the value of education;

- recognising home practices that support numeracy development;

- organising parent-directed activities that connect children to out-of-school learning opportunities;

- initiating parent-child discussions and interactions about school related issues and activities.

We propose that the following *community-centred perspectives* describe how communities might see their links with schools and families:

- initiating community-driven school reform and curricular enrichment efforts that seek to improve local schools;

- developing school-business partnerships;

- developing school-university partnerships;

- offering community service learning programs;

- offering after school programs;

- offering more extended programs that target children's and family numeracy (e.g., the Family Maths program).

The third dimension of the framework looks at ways of responding to diversity and educational disadvantage by identifying the *groups of students targeted* by the program. These include students from Indigenous (i.e., Aboriginal or Torres Strait Islander), non-English speaking, and low socio-economic backgrounds; students in geographically isolated locations; and low achieving students deemed to be at risk of failing to meet State mandated benchmarks for numeracy performance.

The fourth dimension of the framework identifies numeracy practices in each case study. We operationalised the description of numeracy quoted in the introduction to this paper by

looking for evidence of three aspects of numerate practice and the type of knowledge associated with each (Willis, 1998). To "use mathematics", students need to have *mathematical knowledge* of concepts and skills. Using mathematics "effectively" requires that students have *strategic knowledge* to enable them to choose and apply mathematical concepts and skills that are appropriate for dealing with unfamiliar problems. Using mathematics effectively "to meet the general demands of life" reminds us that numeracy is context-specific because mathematics is embedded in everyday situations. Thus numerate practice requires *contextual knowledge*, and school mathematics needs to be aligned to the kind of authentic problem solving situations that individuals regularly encounter in their lives (Boaler, 1993). Because each Australian State and Territory develops its own mathematics syllabus, we drew on the source document that influenced syllabus development across Australia, *Mathematics – A Curriculum Profile for Australian Schools* (Curriculum Corporation, 1994), to elaborate on the three aspects of numeracy outlined above. This document emphasises not only mathematical content (organised under the headings of *Number, Measurement, Space, Chance and Data*, and *Algebra*), but also the development of strategic and contextual knowledge and the variety of real life contexts in which students may choose and apply mathematics (elaborated under the heading of *Working Mathematically*).

We selected the final suite of seven case studies to sample a range of partnership initiation strategies, stakeholder perspectives, and target groups of students. In the remainder of the paper we analyse two of these cases, one an innovative approach to improving Indigenous children's access to pre-school education in remote communities, and the other a long standing program that provides distance education to children of rural families.

THE MOBILE PRE-SCHOOL PILOT PROGRAM

The Mobile Pre-school Pilot Program develops pre-school programs and materials to distribute to Indigenous children aged 3-5 years in remote locations in Australia's Northern Territory. Previously there was no access to pre-school education because of the small numbers of children in each community. (The government's funding formula for staffing schools required enrolment of at least 12 children in any one centre in order for a qualified teacher to be employed. However, most remote communities are too small to satisfy this requirement.) This is an example of a top-supported partnership in that it is government funded but without the requirement for uniform implementation across all sites in the Northern Territory. Our investigation of the history of the program also revealed that many elements were originally, and continue to be, community-generated, thus increasing family and community participation in making educational decisions. Although the partnership does feature school-centred perspectives on the roles of families and communities, it derives its strength from community-centred perspectives, especially the role of local communities in deciding whether and on what terms to accept the program and in gaining financial and social benefits from their participation.

The aim of the program is to increase enrolment, attendance, and participation of Indigenous children in remote areas and prepare them for formal schooling through pre-literacy and pre-numeracy activities. Materials consist of a variety of play activities and items such as painting materials, puzzles, counting, colour and shape matching games, picture story books, play dough and block construction as well as larger equipment like tricycles, prams and dolls, climbing and sand play equipment, packed into large (90 cm × 50 cm) plastic containers. Materials are developed and organised by trained early childhood teachers who prepare and store the materials in their home bases and transport them to surrounding areas by light aircraft or off-

road vehicles. The play-packs are often compiled around themes such as transport, communication, colours, and insects, and are rotated between sites weekly or fortnightly, depending on the contingencies of visiting the site.

Teachers travel with the play-pack and introduce the materials to the local teaching support officer (TSO). The TSO in most cases is an Indigenous person chosen by their community to take on the role of organising and running the pre-school sessions in their area. When teachers visit individual sites they introduce the materials in the play-pack to the TSO, explaining how each item might be used. The TSO bases his or her work in the ensuing week or fortnight on the new activities provided in the current play-pack. Teachers circulate between locations, which are grouped into clusters for organisational and planning purposes. This paper deals with our case study observations in the Arnhem and Katherine regions. In the Arnhem Cluster we visited the communities of Yirrkala and Dhalinybuy, and in the Katherine Cluster we observed operations with the Bulman Indigenous community.

*Observations of the Partnership in Operation*

Pre-school is usually held in the morning three to five days per week, for about two hours, with a morning tea break half-way through. TSOs lead sessions with the aid of parents who follow the TSO's lead in helping the children to use the materials. Older siblings may also attend and help, and younger siblings, if present, take part in the pre-literacy and pre-numeracy activities. Food for morning tea is provided by the teacher on her visiting days and shared with others from around the community.

In Yirrkala the pre-school is run in combination with the child care centre on their premises. This was an organisation of convenience as the child care centre had lost numbers, and the principal of the local school, when faced with a similar issue, had decided to relinquish his

pre-school teacher. When the Mobile Pre-school was established, it joined forces with the child care centre for their mutual benefit. Dhalinybuy has a one-teacher school in which classes are taught by a qualified Indigenous teacher. The Dhalinybuy pre-school was conducted outdoors on a large woven mat under a shady tree. The Bulman pre-school worked in conjunction with the primary school and used one of its rooms, and an open covered area.

At all the sessions we were able to observe, the visiting teacher was present and set the agenda, with support and help from the local TSO. Where the pre-school was closely associated with a school, the teacher there also played a significant role. Parents were present in a fairly liminal fashion but community support was clearly crucial, especially in deciding whether the program was to operate in their community or not. For instance, when the TSO at Dhalinbuy, who is also chair of the local school council, appealed to his community for someone to take on the TSO role he was told "No, you be the teacher". The clear implication was that community people senior to the TSO made this decision. Overall, the visiting teachers are cast in the role of experts in the field who make suggestions to the local TSOs and encourage them to adapt the program for the week to immediate circumstances. Without direct observation of days when the visiting teacher is not there it is impossible for us to say how roles are negotiated in that event. Good personal relationships between the visiting teachers and the community members seem to allow for a certain equity in the partnership, thus reinforcing the trust between participants that seems to be crucial for the success of the program.

There is a dynamic interchange of activity and communication among people at all levels of local community and in the organisation of the pre-school program. The visiting teachers are very familiar with the Northern Territory and have known the people in the communities and in the educational and child care organisations for many years. Communication occurs

predominantly by word of mouth and the play-pack is a means of providing materials that people in local areas may use and adapt in their own ways. In the Arnhem Cluster, the teacher relies on the TSO and other parents for translation between Yolngu (the language of the local Aboriginal people) and English. In the Katherine cluster, more English is spoken, though Kriol is the home language. Since the TSOs and even the teachers are intimately involved in everyday affairs in small communities there is a transparency between the program and the community that facilitates communication about routine details and individuals. Communication among teachers and TSOs is maintained not only by weekly (or at least regular) personal visits but also by bi-semester or bi-term workshops in the central location (Yirrkala or Katherine) where the program is assessed and future plans are made. Participants at this level can also telephone each other regularly. This is successful only because the main actors all share a long history of commitment to early childhood education and the welfare of the communities concerned.

*Numeracy Practices*

The pre-numeracy activities we observed are typical of those conducted in mainstream Australian pre-schools, and aimed to develop number, measurement, space, and chance and data concepts (Curriculum Corporation, 1994). Active play with puzzles and toys such as cars required shape and colour matching as well as sequencing and counting. Songs and stories provided reinforcement of the language used to make comparison, describe size, shape and sequence and discuss ideas about chance and uncertainty. Games such as "Follow the Leader" addressed sequencing, following instructions and counting. Neither strategic nor contextual numeracy knowledge were a specific focus of this program. In fact, it is tempting to argue that many of the toys and activities provided may not have been meaningful for children whose everyday experience was living on Aboriginal homelands. Several puzzles made use of cars, trucks, traffic

lights and all the accoutrements of city-based transport. It is not that the children are totally

unfamiliar with such things, but there is not a close fit between red double-decker buses

represented in the puzzles and the minivan that serves as a bus in their local community. Of

course this lack of "relevance" would also be an issue for other Australian children whose life

experiences are not represented by the play activities and materials provided to them.

Nevertheless, as we discuss below, local people insisted that children needed to become familiar

with the world beyond their own communities.

*Context and History of the Partnership*

Indigenous education in Australia has been complicated by the history of colonisation. Many

studies have documented the damaging effects of attempts to transplant an education system that

embodies quite different epistemologies, attitudes and normal behaviours into Aboriginal

communities (Folds, 1987). In recent years "two-way education", taking something from both

western and Indigenous culture, and adapting it to local conditions and aspirations, has become a

popular catch-cry (Harris, 1990; Malcolm, 1999). However the pressures of mainstream culture

are hard to resist, and the task is further complicated by the fact that every Aboriginal area,

indeed every community, has its own history and hence its own needs and aspirations. The sites

we looked at here are informative in this regard.

The Yolngu of Arnhem Land were among the last Aboriginal groups to have been directly

affected by colonisation. These were largely confined to the operations of a small Christian

Mission until, in the late 1960s, bauxite began to be mined on the Gove Peninsula. This was

sanctioned by government without consultation with local Yolngu landowners. Legal disputes

over this issue led ultimately to the emergence of land rights and native title as political issues in

Australia, in part because of the tenacious engagement of Yolngu elders who realised that their

culture was threatened by such incursions of the State and that in order to battle them they had to find ways to speak across the cultural abyss between white and Aboriginal people (Williams, 1986). In order to do this they had to understand non-Indigenous epistemologies, law and politics. As a result western-style education has long been considered necessary to Yolngu people in pursuit of their own cultural agendas. However, acceptance of the education has been regulated according to local culture. Like Aboriginal people elsewhere in Australia, the Yolngu want to hear what this education has to say, but they want to decide for themselves how to use it. This includes a determination to maintain local languages and the patterns of life associated with residence in small communities on homelands, while having regular schooling in English, as it is in mainstream schools.

Aboriginal people in the Katherine area have by no means suffered the degree of dislocation and disruption as people in other parts of Australia but they have a different history from the Yolngu. Bulman is a case in point. Here relationships had been built up over generations between cattle ranchers and local groups. While these were certainly not entirely voluntary or favourable to Aboriginal people, they allowed continued contact with country and a compromise way of life that came to be seen as valuable for many. In the late 1960s or 1970s the local cattlemen made it impossible for their Indigenous staff to remain on the property and these people walked off and set up Bulman near to one of their sacred sites. Because of the long history of living alongside other Aboriginal groups but being forced to conduct much daily business with English speakers, the local languages are not much spoken now. Instead, the home language is Kriol, a new Indigenous language with an English lexical base and an Indigenous grammatical structure. The aspirations of this kind of community are commonly more like those of the mainstream. While ownership of their own land and the right to make decisions regarding it will

always be important, a good life is seen to include settled employment in jobs that require mainstream education. Although there are intermittent programs attending to the original languages of the Bulman students, there are none that take account of the fact that the home language is Kriol. While this community appears to value and desire mainstream education, their relationship to it is very different from that of the Yolngu.

The Mobile Pre-school program has been running for a relatively short time in its present form; however, it is based on nearly a decade's work by teachers and communities, and its success is intimately tied up with this long lead time and strength of personal commitment and relationships between participants. In the latter half of the 1990s discussion started on the desirability of providing early childhood education to all Aboriginal children, especially those in remote locations. In general, these discussions were initiated by teachers but in all cases proceeded through lengthy and careful negotiations with communities. With collaboration between staff in education and other government departments, and with the active help of community teachers and women's centre staff in some communities, the concept of "pre-school in a box" slowly evolved. It seems that all of the central participants, from the program officer in Darwin (capital city of the Northern Territory) to the mobile pre-school teachers in the regions, as well as some of the community members, have been involved in the program from very early planning days. Before that they all enjoyed positive and longstanding relationships with communities and this depth of history undoubtedly is important to the success of the program.

What appears to have been a fairly informal arrangement at first could be expanded only with substantial funding. This was lobbied for and gained throughout 2000-2001. The difference between this program and previous ones seems to lie in its greater flexibility. One previous model was to equip a vehicle with all the necessary pre-school equipment and a teacher, who then

toured remote communities. This meant that each community was seldom visited and had little opportunity to have input to the program or ownership over it. The present scheme provides extensive support to communities who are substantially left to run the daily activities of the pre-school.

In the case of individual communities, there appear to be several ways in which they became participants. In some cases they heard about the program visiting another community and asked about joining in. Sometimes influential people (usually women) in the community instigated discussion of pre-school as a good thing and urged the council or other community body to explore options. In others, the suggestion came from teachers, although communities had ways of electing not to participate. Once a community decided to participate, workshops were held to inform community members about what was involved and seek interested people to act as TSOs. The existing relationships between teaching staff and communities were felt to be crucial in this process as they are in the continuing mentoring relationships between regional pre-school teachers and TSOs.

*Significance of the Partnership*

Successful government intervention in Aboriginal communities, whether in matters of health, education, social order or employment, is always likely to be fraught. A common criticism is that such services are simply ways in which the State continues to colonise and oppress Aboriginal people by imposing cultural values and behaviours on them that are unwanted and inimical to social and cultural health. For this reason, special care has been taken by those organising this program to take account of the sensibilities of the participating communities. There was no evidence that communities or families were unwilling partners in the program.

This partnership is significant primarily for the success of its articulation of school, home and community sectors in pursuit of better educational outcomes for children. This program demonstrates the truth of arguments in the literature that success depends on sustained mutual collaboration, support and participation of education personnel and families at home and at school (Funkhouser & Gonzales, 1997; Kahne, 1999). There is also a substantial and unusual sharing of decision-making power between teachers, TSOs and the community. Although this program has been in operation for a relatively short time, it depends on exactly those sorts of relationships built up over many years. It demonstrates that such essential relationships cannot be mandated from outside nor built up overnight, but depend on trust and mutual respect which can only be gained over time.

## DISTANCE EDUCATION FOR CHILDREN OF RURAL FAMILIES

Distance education in the Australian context is a well established, formal educational partnership between state-based education departments, schools, parents and students. Through distance education contexts we are able to investigate how teachers and parents (through their dual role of care giver and academic supervisor) establish learning partnerships in situations where decisions about *what* is learnt is dominated by education departments and teachers (that is, *top-down* models) and yet the manner in which learning environments are established is strongly influenced by parents. Distance education fosters learning cultures where the boundaries between "home" and "school" learning become blurred.

Although Distance Education outcomes and syllabus documents are identical to those of regular schools, the context in which learning takes place is quite different from traditional school settings. These home settings tend to range from formal classrooms, where designated areas are

created in the home to mirror regular classrooms, to informal arrangements where students learn seamlessly throughout the day through interaction with learning materials and engagement with their supervisor. Learning materials are distributed from a Distance Education Centre (school) each fortnight, with a supervisor (usually a parent) responsible for establishing a learning environment and providing an opportunity for students to complete the designated activities over the two week period. The classroom teacher, who physically could be thousands of kilometres from the student, relies on satellite or radio communications to interact with individuals and small groups of children for approximately two hours per week. Consequently, the home supervisor plays a significant role in the delivery, construction and modification of learning activities. It is important to note that parents are always referred to as "supervisors" rather than "teachers" despite the central role they play in the learning process.

*Observations of the Partnership in Operation*

This case study is of a Distance Education Centre in a rural setting in the state of New South Wales. We visited the homes of some of the students enrolled with the Centre and attended a residential mini-school associated with it, as well as interviewing teachers at the Centre. It is typical of most distance education services in that teachers at the Centre are provided with standard materials from a central publishing unit from which they then select according to the needs of their students. Materials are sent out to homes where parents supervise the child's learning. In fact the parents are doing much more than making sure the student works through the material. They organise the home and its routines to make learning possible through setting aside a classroom area and fitting learning activities into the child's day in ways that develop good work habits while attending to the needs and personality of the child. They commonly are very

active in guiding children through the learning and finding ways to make links with everyday practice and experience which enhance its meaning.

Students are meant to have a weekly telephone conversation with their teacher, but in fact some of the families in this study had no telephone line and no reliable mobile telephone connection. It takes great persistence from everyone involved to maintain the partnership under such circumstances. Even greater difficulties arise when computer or satellite links are used to link partners. Where Internet access is available the download rate is frequently so slow as to make it virtually useless. Audio tapes are the most common form of delayed two-way communication and one family described them as "pure torture". They are used to give feedback, but the delay between doing the work and getting the feedback reduces their efficacy, as well as the fact that such communication is inherently stilted.

Teachers also visit students' homes so as to get a better understanding of their circumstances and how they might affect learning. Because parents are unfamiliar with the appropriate educational goals and standards for children at various ages, particularly with their first or only child, teachers also help by describing what counts as achievement and how fast it should be attained. In this kind of partnership the main roles for the teacher are as assessor of student progress and the nature of their problems and as the planner of learning activities. Teachers appear to be aware of and sensitive about the expectation for them to be expert, even in areas in which they feel less so, such as technology use. They defined a good partnership as one in which the home supervisor could negotiate their role as other than parent while respecting and trusting the teacher and following the teacher's program.

In fact parents do significant work in creating successful learning opportunities for their children. Parents are uniquely well placed to know what kind of routine works best for their

child, but there is still a struggle in most cases to make it happen every day in the face of many distractions. The issue of finding learning in naturalistic activities was one that preoccupied many parents and stimulated much innovation. Sometimes these activities related to routine matters in the everyday environment such as working in the kitchen or fencing, but sometimes they related directly to the needs of the students. For instance, we were told of one mother who was innovative in adapting learning objectives and materials to the very specific needs of her autistic son, for whom the standard materials were never suitable.

Many parents say they lack confidence in mathematics and rely very heavily on teacher encouragement in applying the materials provided and developing them for their child. While parents who are novice supervisors try hard to follow the syllabus exactly as it comes from the Centre, experience and the advice of other home supervisors often lead to more innovative approaches. Parents tend to rely on each other to get a sense of whether or not their child is competently moving through the syllabus and achieving the expected outcomes. Impressively, the classroom teachers actually encourage and foster this form of sharing in subtle but quite powerful ways. Organisational strategies identified included the maintenance of a web site and ensuring that home supervisors have the telephone number of other supervisors who are relatively experienced or have children of a similar age.

One of the most effective ways of promoting engagement among supervisors was through centralised mini-schools that brought teachers, parents and children together two or three times per year. These face-to-face sessions are of critical importance to both the supervisor and teacher because they provide opportunities for the stakeholders to engage in conversation about teaching and learning. Mini-schools usually last for about two days and one night, and are held in a central venue such as a school, caravan park, or property of one of the parents. While the students

complete educational activities, supervisors meet to discuss their struggles and successes and learn better ways to help their child in the classroom. These mini-school experiences provide an opportunity for students to further their development in all curriculum areas and are an excellent forum for isolated students to socialise. There was a feeling that the mini-schools were an ideal way to meet new parents in an environment outside the school-based activities. Strong friendships developed as a result of the mini-school – with these friendships important both for "friendship's sake" and as a support mechanism for supervisors.

In this case study the material resources mediate the partnership to a very significant degree. They are the physical link between all the stakeholders and the site of contestation between them. These printed materials have inherent difficulties, especially in the remoteness of their content from actual use. Their form and content embody decisions made in a central publishing and curriculum unit remote from all the partners. Teachers told us they would like to have the learning modules in electronic format so that they could modify and recombine elements of them to suit individual student need, but this is not permitted by the central unit. This may be the reason why teachers are quick to encourage supervisors to share ideas and extension activities, while seeming reluctant to take up those ideas themselves.

From the parent perspective, there is confusion and uncertainty over the best use of materials. Apart from the printed module materials, children are supplied with CD-ROMs, some have access to web-based resources, and a large box of physical aids is provided. Parents commented repeatedly that the box of physical learning aids was impressive but that they lacked confidence and guidance in using them. In one case, the box was observed to be buried under piles of paper and old schoolwork. The teachers, on the other hand, assert that the parents do know how to use the materials. This illustrates a problem common to many of the partnerships

we studied. Teachers tend to believe that telling parents what to do covers their communication responsibilities and parents are hesitant to reveal what they understand to be their own ignorance by asking for detailed instruction. This is not helped by the use of mathematical terms like "subtraction" without a gloss to illustrate for supervisors what an everyday example might be. While the materials, especially the physical materials, ought to bridge this gap between abstract concepts and experience, manipulables such as blocks and coloured counters have relatively little resonance with the actual environment. The materials are themselves an abstraction caught somewhere between objects that have real world use and symbols on a page.

*Numeracy Practices*

Although students work with the same mathematics syllabuses as their classmates in regular schools, the home supervisors are able to modify activities to accommodate their own learning contexts, create their own learning materials, or use everyday events and experiences to explain mathematical concepts. Rather than working through the units as given, supervisors may purposely select topics to take advantage of numeracy learning opportunities within the children's home environment. This results, for example, in spatial and measurement activities being integrated into real life contexts long before number concepts are moved beyond pencil-and-paper representations. From a numeracy perspective, mathematical and contextual knowledge and competencies are often developed hand in hand when children learn via distance education. It seems likely also that transforming standard learning materials into contextualised activities may contribute to the development of strategic knowledge as "working mathematically", especially in terms of investigating, conjecturing, using problem solving strategies and applying and verifying (Curriculum Corporation, 1994). An example from the case study, involving a family building a mud brick house, serves to illustrate this point. In the context

of making mud bricks, the supervisor and child can *investigate* whether they have enough clay and straw to finish building a wall, *conjecture* as to what would happen if they used more water in the mix, use *problem solving strategies* to make some trial bricks with different proportions of ingredients, and *apply and verify* by calculating the amount of ingredients needed and building the wall.

*Context and History of the Partnership*

Distance education is a long standing practice in Australian education, enabling children who live in geographically isolated areas to attend school. Nevertheless, there is some evidence to suggest that students in rural and remote settings remain disadvantaged by their location (Ryan, 2001). Dockett, Perry, Howard and Meckley (1999) compared the perceptions of Australian parents in rural and remote locations and those of city parents regarding what is important in young children's transition to school, and found differences associated with the particular effects of geographical isolation, school and class size, the nature of local communities, the form of distance education, and the nature of transition programs. Similarly, du Plessis and Bailey (2000) reported that isolated parents recognize the educational disadvantage their children suffer through their geographical location and that parents thus want realistic and effective resources to support education programs for their children. Provision of electronic materials could go some way towards meeting this need but material infrastructure is in itself an issue for this partnership in the Australian context.

*Significance of the Partnership*

Some educators have commented that mathematics experiences in and out of school can build on and complement each other (Masingila & de Silva, 2001) when various learning cultures are recognised and celebrated. In distance education the home environment is less of an out-of-

school context and can therefore more readily foster and develop students' learning and practice. The home supervisor had an influential role in the construction of the teaching and learning processes being implemented to support young students' numeracy development – with the influence being much more dramatic than the classroom teachers envisaged. The dynamics of the learning environments were significantly different from traditional classroom-based contexts, with the supervisor having the strongest influence over the way in which pedagogical practices and learning outcomes were presented to children. The supervisors were able to establish strong connections between in and out of school engagement and actively attempted to create such contexts even though the blurring of these boundaries created other challenges.

It seemed to be the case that the home supervisors were more committed to developing authentic learning experiences than the students' distance education teachers. Although the teachers had a good understanding of each child's home context there were few examples of curriculum modification to cater for individuals' needs or interests. The dual role of the supervisor (as both parent and teacher) provided opportunities for the reconstruction of learning activities that were embedded in personal contexts and their capacity to access a range of authentic artefacts helped establish powerful and rich learning environments despite their limited knowledge of the curriculum. It could be argued that the distance education teachers did not appreciate the supervisors' willingness to modify learning tasks or recognise their capacity to enhance these learning situations. As Sarason (1995) argued, the structure of schools delineates the nature and scope of parental involvement and can create mismatches between the home and school environments. The failure to recognize parental diversity can cause barriers within these relationships.

DISCUSSION

The aim of this project was to identify the features of effective numeracy education partnerships involving mutual collaboration and participation of children with their families, schools, and communities. We draw on the two case studies presented here, together with data from our national survey of elementary school principals, interviews with education government and non-government education system personnel, and the other case studies we conducted, to discuss these partnership features with respect to the roles and perspectives of stakeholders and ways in which partnerships responded to diversity and disadvantage.

*Stakeholder Roles and Perspectives*

This issue is concerned with the extent to which partnerships were school-centred, family-centred, or community-centred. Almost all of the 38 programs we identified in our interviews emphasised school-centred perspectives on partnerships, and the most common feature of these programs was the emphasis placed on enhancing *communication* between teachers and parents (cf Epstein, 1995). Distance Education would seem to offer greater than usual prospects for two-way home-school communication, and to some extent this was what we observed. Mini-schools provided an excellent opportunity for parents to share ideas, and home visits helped teachers to understand their students' daily circumstances. However, effective use of communication technologies such as telephone and the Internet – and even very basic technologies such as audio recordings – proved to be problematic in terms of improving learning. Also, although the home supervisors were often very innovative in adapting and creating materials, the teachers rarely incorporated this feedback into their standard practice, thus undermining any potentially positive effects of two-way communication.

We also found in our case studies some evidence of the roles that family and community members may play in supporting children's numeracy development. The Distance Education case study illustrates a distinctly family-centred perspective on educational partnerships. In terms of the analytical framework we introduced earlier in the paper, the parents as supervisors *create supportive learning environments at home* and *recognise home practices that support numeracy development* by finding numeracy learning opportunities in the children's everyday contexts. The distance education teachers also foster this family-centred perspective in a number of ways, for example, by ensuring that supervisors have the telephone number of others parents who are relatively experienced or have children of a similar age. Isolated students and their parents are also brought together through mini-schools and camps to share ideas, and these opportunities for communication between parents in their supervisory roles appear to be crucial in helping them to devise practices that support their children's numeracy learning at home. Distance education seems to offer a unique context for family-school partnerships in that parents take on a role that gives them responsibility for negotiating individual curriculum modifications with their children's teachers and fellow supervisors.

The Mobile Pre-school Pilot Program highlights the significance of community-centred perspectives on educational partnerships, in this case the ways in which community involvement can contribute to *educational reform and curricular enrichment*. The program has had positive outcomes for schools, teachers and communities consistent with the benefits of community-centred education programs identified by Kahne (1999). For example, the local communities benefited because of the new jobs created by the program. This is a direct financial benefit but also a social benefit in that community members are given positions of trust and responsibility,

their opinions are listened to (in fact eagerly solicited) and they thus provide a role model and exemplar of one kind of success and one kind of use for education for others in the community.

*Response to Diversity and Disadvantage*

Around 18 % of the programs we identified through our national email survey and interviews with education authorities targeted children from Aboriginal and Torres Strait Islander backgrounds, and some of the programs for which we were able to obtain more detailed information tried to respond to culturally different ways of knowing mathematics. Yet it is important to recognise that cultural difference does not necessarily translate into different numeracy goals and practices: the Mobile Pre-school Pilot Program case study reminds us that Indigenous parents and communities also have legitimate reasons for valuing Western numeracy practices. Significant in this case was the way in which the program was offered to communities on their terms rather than being imposed as a "solution" to a perceived deficiency in children's numeracy learning outcomes. Involving parents and community members as cultural gatekeepers in making decisions about teaching resources and learning activities can also lead to subtle shifts in power relations: the Mobile Pre-school pilot Program was only rolled out to those communities who agreed to have it, thus returning power to the community.

Children in geographically isolated locations were less well served by the numeracy programs (10%) reported in the email survey. Our case study of a Distance Education Centre demonstrated that, in rural contexts, the very nature of the remoteness, isolation and restricted opportunities for communication gives parents (as supervisors) a dominant role in the learning process. In these circumstances supervisors established authentic problem-solving contexts for children to acquire knowledge and skills in situations that were meaningful and relevant to their personal experiences in both school and out-of-school contexts. Distance education, where

children are both at school and at home, also has the potential to break down, or at least blur, the traditional barriers that exist between teachers, learners and parents. However, because too many of the partnerships exist out of necessity (remoteness) rather than a desire to create a different set of relations between the participants, the presentation and representation of "mandatory" curriculum content tends to be the dominant discourse of most interactions – with the teachers attempting to ensure that numeracy is adequately covered and understood (by both parents and children alike) while parents (as supervisors) are constantly seeking assurance and attempting to keep up with changes to curricula. It seemed that the distance education teachers were caught in a position of power that prevented them from acknowledging the very substantial contribution of parents to their children's learning.

## CONCLUSION

In the field of home, school and community partnerships there is no consistent agreement about the meaning of the terms "partnerships", "parent involvement" and "community involvement". Many different kinds of activities fall within this field. In addition, the stakeholders in these connections between home, school and community may hold conflicting perceptions about numeracy, and about their roles and the roles of other stakeholders. In studying effective partnerships in numeracy education, the importance of relationships, mutual trust, and respect developed over an extended period of time was a theme that emerged from our case study analysis. This essential goodwill cannot be created entirely by funding or targeted programs, and programs such as the Mobile Pre-school Pilot Program and Distance Education in rural Australia owe their success to a long history of cooperation and joint enterprise centred on the welfare and education of children, their families and communities. It was also noteworthy that some of the most effective partnerships we identified for our case studies were not initiated as numeracy

programs but took a more holistic approach (cf Hexter, 1990). Our research indicates that building strong home-school-community partnerships around children's learning in general can lay the groundwork for numeracy-specific learning. In culturally diverse communities we would suggest that partnership building is of paramount importance, and should precede – or at least accompany – the introduction of educational programs that seek to initiate children into numeracy practices that are valued but different from those of their home culture.

Finally, we would warn against inferring that the term "partnership" implies that there should be similar contributions from, and roles for, all participants. This was especially salient when considering the roles of parents and teachers in educational partnerships. While we found plenty of evidence that parents genuinely care about their children's education, it was equally clear that not all parents want to be actively involved in all aspects of schooling and many see their role as primarily a supportive one. Perhaps the most productive way forward is to focus on what each participant – parent, teacher, community member – can bring to the partnership that will make best use of their diverse expertise, backgrounds, and interests in supporting the child's numeracy learning.

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