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INDIGENOUS STUDENTS *and* MATHEMATICS: TEACHERS' PERCEPTIONS *of the* ROLE *of* TEACHER AIDES

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■ Abstract

This study examined teachers' perceptions of the role of teacher aides in mathematics classrooms in rural and remote Indigenous communities. Twelve teachers from three schools in rural and remote Queensland participated in the study. The results from the first year of the project indicated that there were differences in how these teachers worked with their teacher aides, particularly the specific roles assigned to them in the mathematics classroom, with non-Indigenous teacher aides being given greater responsibilities for student learning and Indigenous teacher aides for behavioural management. As a result of teacher aide in-service on mathematics learning, teachers' perception of the Indigenous teacher aides changed, resulting in each being given greater responsibility for student learning.

■ Indigenous students and mathematics learning

Many Indigenous students experience difficulties when learning mathematics (Bucknall, 1995; Howard, 1995). Four major factors appear to directly impact on Indigenous students learning mathematics, namely: (i) language, (ii) assessment, (iii) learning style, and (iv) the relevance of the mathematical activity. The language background of Indigenous students can have a major impact on all educational outcomes (Queensland Indigenous Education Consultative Body [QIECB], 2003). Added to this are the subtleties of the mathematics language, its particular linguistic twists and semantic meanings. While the majority of Indigenous students speak English as their own language at home (79.8%), this English is not necessarily the same as that commonly used by White teachers in everyday classrooms (QIECB, 2003). For example, students may refer to a tall man as a "long" man (Bucknall, 1995), words that have specific meanings in mathematics. Although it may appear to the English-speaking teacher that their Indigenous students speak and understand English well, in reality this may be far from the truth (Gledhill, 1989). Lowell et al. (1995) suggest that Indigenous students often guess what to do or say from the situation, or from one or two keywords that they recognise, and thus often mask the language difficulties they are experiencing.

Assessment practices may also impact on mathematics learning. In many Indigenous cultures, writing is rarely the first choice of communication (Shnukal, 2002), however, writing is often crucial to assessment in the classroom. Many Indigenous students commence and continue through school with poor literacy skills (Schwab, 1996; Smith, 1997). For these children, their low assessment results may simply reflect a lack of understanding of the question asked, or a difficulty in expressing answers in written form, rather than knowledge of the subject (Shnukal, 2002). In fact, our present national testing regime may impact on Indigenous cultures in ways that were never intended (Meanmore, 2001), such as reinforcing perceived racial differences in intelligence and low self-worth (McDonald, 2001), both consequences considered to be unfair and unjust.

Differing learning styles can also affect success in the classroom. It is believed that Indigenous students' preferred learning style is one of observation and imitation, rather than verbal, oral or written instruction

(Clarke, 2000; Collins, 1993; Eibeck, 1994; Jarred, 1993). Indigenous students have little patience with an atomised curriculum (Barnes, 2000), preferring a holistic approach to learning, appreciating overviews of subjects, and conscious linking and integration (Christie, 1994). By contrast, the history of mathematics education has been largely one of formal pedagogies with decontextualised knowledge (Maratos, 1998). It seems that an answer to Indigenous mathematics education appears to lie with the integration of mathematics into Indigenous cultures and experiences so that the power of meaningful contexts can be harnessed in learning (Roberts, 1999). This implies that mathematics should be taught to Indigenous students in a form that relates to their world and exposes the socio-cultural as well as the techno-cultural components of mathematics to their understanding (Graham, 1988). In particular, this may mean teaching mathematics as a new language (Roberts, 1999), taking account of aspects of Indigenous culture that have mathematical strengths (Graham, 1988), and providing more oral explanations and small group work. Thus, teachers, Indigenous teacher aides and local Indigenous communities have important roles in relating mathematics to the world of the student.

■ Teachers in Indigenous communities

Over many years, studies have indicated that most teachers in Indigenous schools tend to be young, inexperienced, ill prepared for Indigenous teaching, and willing to stay for only a short period (Gibson, 1994). This appears to be due to the difficulty in attracting experienced teachers to these localities as teaching in Indigenous schools has a reputation of being arduous and challenging.

Teachers arriving in Indigenous schools experience many difficulties, particularly with the language and are not there long enough to learn (Fanshawe, 1999). Tensions exist between what is perceived can be done and what needs to be done. Tensions also exist between proceeding immediately with what they have always taught in the past (traditional teacher-directed approaches) and teaching that takes into account Indigenous differences (e.g., child-centred group work) (Valadian & Randell, 1980). While preservice and in-service studies can assist to prepare teachers for Indigenous communities, if they are to adopt productive pedagogies and effective teaching and learning strategies, they require ongoing support (QIECB, 2003). It is suggested that many of these teachers do not enter these communities with the cultural capital necessary to appreciate concepts within Indigenous Australian societies, and they often bring attitudes, values and beliefs that must be deconstructed before they accept reality (QIECB, 2003).

A common belief of many of these teachers is that Indigenous students need not be taught any differently from their White peers (Cooper *et al.*, 2004; Eckermann,

1981; Eibeck, 1994) or should be taught using methods developed for low achieving White students. Thus many young teachers begin their journey, not understanding the milieu of the culture and the impact this can have on student learning. They often believe that teaching Indigenous students is no different from teaching other students; that is, not being cognisant of their particular needs (Beresford, 2001). In contrast, many teacher aides at these schools are Indigenous, older, more experienced, have strong commitment and connections to the local community and, according to Clarke (2000), should therefore be the key to teaching success in a school with Indigenous students.

■ Teacher and teacher aide partnerships

Opinions with regard to the efficacy of using all types of teacher aides in the classroom to assist learning and teaching have been divided for many years (Greenberg, 1967), particularly between those who are involved in teacher aide projects and those who are not. However, most modern literature concerning Indigenous teacher aides supports their classroom use to assist the teaching and learning of Indigenous students.

Greenberg (1967) refers to teacher aides being an advantage in meeting crises, enriching the curriculum and enhancing student achievement, while citing difficulties in class management, supervision, and evaluation as reasons for not allowing teacher aides an active role in the classroom. Literature with respect to Indigenous teacher aides identifies (a) acting as teacher and counsellor to both children and White teachers (Clarke, 2000; Jarred, 1993), and (b) providing a link to parents (Courtney, 1984) as the reasons for supporting the use of teacher aides in classrooms. The latter reason is particularly important because Indigenous parents commonly believe that members of the Indigenous community are best equipped to work with Indigenous students in education, training, and social and emotional development (Fitzgerald, 1981). In the strongest support, Indigenous teacher aides are seen as the key to success for non-Indigenous teachers in Indigenous schools (Clarke, 2000).

However, the use of Indigenous teacher aides is at best low in many Indigenous communities and has been for many years. There has been very little change from that in a large study in Cape York Peninsula described by Valadian and Randell (1980). A majority of Indigenous teacher aides were found to play a minor role in schools, serving as helpers for classroom preparation, providing limited supervision of small groups, and liaising with parents and community. This was despite the fact that all of the aides had better understandings than the teachers of the cultural and family background of their students and could communicate more effectively with Indigenous students and parents because they spoke the local Indigenous language fluently.

■ Focus of this paper

There is a paucity of literature with regard to how a teacher and teacher aide work together to support Indigenous students in learning mathematics. This paper begins to address this issue by exploring how teachers in rural and remote regions of northwest Queensland cater for Indigenous students within their mathematics classroom. It also speaks of how these teachers utilise teacher aides to assist them in this process, and whether these practices change when the teacher aides are Indigenous or non-Indigenous.

■ Methods

The research on which this paper reports is part of a three-year project studying the mathematics teaching and learning of rural and remote Indigenous students with the aim of enhancing mathematics learning outcomes for these students. Data were gathered from semi-structured interviews with teachers who participated in the first year of the project. The interviews were designed to probe the beliefs, attitudes and understandings of teachers, and focused on how teachers cater for perceived differences in everyday mathematics classrooms, and how they utilise teacher aides to assist them in this process. The researchers

visited the schools eight times a year. Each of these visits was of approximately one week's duration. The visits consisted of working with the teachers in the classrooms, offering professional learning support to the teachers and the teacher aides, and assisting teachers to develop appropriate mathematical learning experiences in collaboration with their teacher aides.

■ Sample

The three primary schools participating in the research in the first year of the study were situated in rural and remote Queensland. School A is a three hour flight from Brisbane, and School B and School C are within a three hour drive of School A. The size of the schools and percentage of Indigenous students attending each school varied. Table 1 summarises the demographics for each school.

Not all teachers participated in the interviews. The sample comprised of 12 teachers, 10 from School A, one from School B and one from School C.

Table 2 summarises information on teachers and teacher aides who participated in the project, including the length of time each teacher and teacher aide had been working in Indigenous schools, whether the teacher aides were Indigenous or non-Indigenous, and the level of schooling each teacher aide had completed. Six of the classrooms had the assistance of Indigenous

Table 1. Demographics of participating schools.

School	No. of teachers	No. of students	Percentage of Indigenous students	No. of teacher aides
School A	12	344	62%	16
School B	3	48	100%	4
School C	2	38	50%	4

Table 2. Demographics of teacher and teacher aides participating in the project in 2002.

School	Teacher		Teacher aide		
	Classroom (Year level)	Years working in Indigenous communities	Indigeneity	Years working in Indigenous communities	Highest level of schooling
A	1	1.5	Non-Indigenous	27	Year 10
	1-2	4	Non-Indigenous	2	Year 10
	1-2	3	Non-Indigenous	6	Year 12
	2	4	Indigenous	5	Unknown
	3	4	Indigenous	4	Year 12
	4	4	Indigenous	1.5	Year 12
	5-6	4	Indigenous	2.5	Year 10
	6	6	Non-Indigenous	6	Year 12
	6	4	Non-Indigenous	28	Year 8
	7	0.5	Non-Indigenous	2.5	Year 12
B	2-4	1	Indigenous	4	Year 10
C	5-7	5	Indigenous	1	Unknown

teacher aides and the other six had non-Indigenous teacher aides.

Most teachers in these schools stay an average of three to four years and initially came from large urban cities. After this time, they are eligible for a priority transfer to anywhere within the State. At the end of 2002, five teachers had left School A, one had left School B and one had left School C. By the end of 2003, a further three teachers, the principal and assistant principal had left School A, the principal and one teacher had left School B, and two teachers had left School C. For four teachers, their first appointment after leaving teacher's college was working in the Indigenous school. By contrast, non-Indigenous teacher aides tended to be at these schools for longer periods, with the average time being 11 years and 10 months (to the nearest month). However, the length of time Indigenous teacher aides were at these schools tended to be shorter, with the average period being approximately three years (to the nearest month). The trends in the highest level of schooling completed by these teacher aides were similar for both Indigenous and non-Indigenous teacher aides, with most having at least completed Year 10 or higher.

■ Instruments and procedure

Teachers participated in a number of semi-structured interviews. Each was approximately one hour in duration and teachers were asked to share various aspects of teaching mathematics and working in Indigenous communities. The interviews consisted of three components, namely, questions relating to: (a) teaching mathematics (e.g., their knowledge and beliefs about mathematics and mathematics teaching), (b) teaching in diverse communities (e.g., the challenges they initially faced and how they met these challenges), and (c) teaching with the support of teacher aides (e.g., how they use teacher aides in these classrooms and what they perceived to be the role of the teacher aide). The interviews were audio-taped and transcribed for data analysis.

This paper focuses on the third component of the interview, teacher aides working in conjunction with teachers in the mathematics classroom. The data reported in this paper predominantly have been extracted from the "end of year interview" with each classroom teacher, that is, at the conclusion of the first year of the research project. It focuses on the results of the following five broad questions:

- How do you cater for a diverse range of learners in your classroom?
- What is the role of the teacher aide in this process?
- Has this role changed throughout the last year especially when implementing your maths projects? If so how? And why?
- How do you and your teacher aide work together in your classroom teaching?

- What particular skills or status does your teacher aide have to assist the students learn mathematics?

As part of the research, teachers were also required each year to plan for and teach two mathematics projects of approximately two weeks duration, one on numbers and another on the operations. Before the planning commenced, the researchers spent a day with the whole cohort discussing the latest theories and practices associated with teaching these key areas of mathematics. The researchers then spent up to half a day with each teacher assisting them in their planning. The researchers also revisited the schools throughout the implementation of the mathematics projects. These follow up visits facilitated teacher reflection on their progress and assisted them to address any issues that confronted them. In this phase of the research, the focus was predominantly on the teachers' mathematical knowledge and creating appropriate learning experiences rather than how they could work more effectively with teacher aides. As the year progressed and in response to the perceived needs of the participating teachers and administration staff, in-service sessions were also held with the teacher aides. These sessions were of approximately two hours duration and focused on exploring the types of activities and mathematics language used to effectively teach numbers.

■ Results

The transcriptions of the 12 teachers were combined, analysed for commonalities and responses categorised. In particular, responses of teachers with Indigenous teacher aides were compared with those with non-Indigenous teacher aides. The findings of this analysis are reported under the headings: catering for diverse learners, role of teacher aides, and status of teacher aides.

Catering for diverse learners

The perceived lower achieving students in these mathematics classrooms tended to be Indigenous. All of these teachers were endeavouring to cater for a very diverse range of learners. As one said:

I cope with great difficulty. My lowest [student] is basically two years behind the rest, I constantly feel bad because I can't always get to him, because he is just so much lower than everyone else, so the way I cope with him, I tend to provide him with lots of photocopied work booklets, and he works with my teacher aide ... but a lot of the time I spend 5 minutes explaining something to him and he has to go off and work on his own - I feel so guilty.

This was a common feeling amongst the whole group.

As well as having a very diverse range of learners in these classrooms, these teachers were also coping with

very poor attendance rates at school. Again these tended to be the Indigenous students. In order to cater for these contextual issues, most teachers have tended to adopt a model that incorporates small group activity, with lessons commonly beginning with focused teaching. They believed this type of activity structure allowed for, as one teacher commented, "concentrated work to occur with the students that are experiencing difficulties or have not been present at the beginning of the unit". Some rotated the groups through a range of activities and others chose not to. Rotational groups also allowed opportunities for one-on-one teaching, as reflected by this teacher who stated, "Students who are having trouble stay with me and we work through it altogether, it's a lot easier you can see where they are improving or where they are having trouble". In some instances teachers and teacher aides worked with withdrawal groups.

Within this framework, both the role of the teacher and the teacher aide varied from classroom to classroom. Table 3 summarises the common model adopted by each of the 12 classrooms as they implemented mathematics lessons.

It appears the use of small same ability rotational groups was more prevalent in the lower and upper grades, classes with non-Indigenous teacher aides. Within this differing framework, the role of the teacher seemed fairly fixed, conducting focused teaching and working with groups. In the Year 6 and 7 classrooms at School A, the teachers were predominantly engaged with the withdrawal group.

One of the perceived difficulties with the rotational groups approach was the amount of work teachers were required to do with the teacher aide in order to ensure that they could run their group effectively. Many stated that they would appreciate their teacher aide having "some idea of mathematics so they could work more independently with the rotational group", a comment predominantly made by teachers with Indigenous teacher aides. The teachers realised they needed to create very detailed lessons in order that the teacher aide would appreciate the expectations and outcomes that should result from student engagement in the activity for which they were responsible. For some teachers, a very traditional approach to teaching was adopted in response

Table 3. Setup, teachers' role and teacher aides' role for teaching mathematics adopted in each classroom (*=classes with Indigenous teacher aides).

Setup and roles	Classrooms												Total
	Lower Years			Middle Years						Upper Years			
	1	1-2	1-2	2*	2-4*	3*	4*	5/6*	5-7*	6	6	7	
Classroom setup													
Small groups	■	■	■	■		■	■				■	■	8
Same ability		■	■	■		■	■				■	■	7
Rotational	■	■		■						■	■		5
Teachers' role													
Begins with focused teaching	■	■		■	■	■		■	■	■			8
Works with lowest ability group				■		■			■				3
Works with all groups on one activity		■	■				■	■		■			5
Works with a withdrawal group											■	■	2
Wanders the class and helps as needed					■								1
Teacher aide's role													
Works with lowest ability group			■					■					2
Works with all groups on one activity		■								■			2
Works with a withdrawal group							■				■	■	3
Wanders the class and helps as needed	■			■	■	■			■				5

to the "extra work" required. The lesson was teacher directed with the teacher aide simply roving around the classroom and assisting where needed. This model was adopted by five of the participating teachers, four of whom had Indigenous teacher aides. It was perceived that, with this approach, the lower ability students would tend to "get lots of teacher aide time".

Role of teacher aides

Mathematics teaching in the three schools tended to be a mixture of whole class explanation and practice and group work, often in rotations. As indicated by Table 3, the role of the teacher aide within these diverse class structures not only varied but was different for Indigenous teacher aides and non-Indigenous teacher aides. The non-Indigenous teacher aides tended to be allocated specific roles within the context of the classroom. These entailed working with: (a) the lowest ability group within the context of the classroom (one teacher), (b) one group on the same activity (two teachers), (c) a withdrawal group (two teachers), or (d) wandering the classroom and helping where needed (one teacher). The reasons for these choices seemed dependent on the perceived abilities of the teacher aides. As one teacher commented:

I take a group and she takes a group ... we used to swap but we found that was difficult on these kids ... I have a checklist for her and at the end of the week we discuss it.

In this instance this teacher believed that her non-Indigenous teacher aide knew as much as she did so "why not let her do the teaching", with the teacher planning the work to be implemented. This occurred in the Year 7 class at School A and the group was classified as the higher ability group. The withdrawal group consisted of children who were "not up to scratch ... taking them out and doing something that they are not quite up with" and was run by the teacher.

By contrast the roles allocated to the Indigenous teacher aides were working with: (a) the lowest ability group (one teacher), (b) working with a withdrawal group (one teacher), or (c) wandering the classroom and helping where needed (four teachers). Four of the teachers with Indigenous teacher aides espoused the crucial role that these aides had in the learning process. One teacher noted:

She knows which students will need help and which ones don't ... and ... she does a lot of work with the lower group because they have a relationship with her ... and because she is Indigenous.

The tasks they commonly undertook were "catch up" tasks; this was particularly crucial for students that had been absent for long periods of time. Only two teachers

spoke of the teacher aide communicating with them in a regular structured way, identifying students' progress and discussing how they could work together to promote student learning. As one of these teachers commented, "The teacher aide is crucial, I really appreciate the way that they can consolidate and extend the more independent kids". The two aides involved in these ongoing discussions were non-Indigenous.

School A has recently changed from a model where the teacher aides were moving from class to class to one where they are assigned to the one classroom with the same group of students. This has had a benefit for both the teachers and the teacher aides. As one teacher said, "they get to know the kids more and they're not swapping classes ... we used to have up to three different teacher aides a day". But there is a negative side to this model. As one teacher shared, "if they are away then you've got the same person away all the time". In two instances this caused teachers to rely less on the teacher aide's involvement in the day-to-day learning. As one teacher explained:

She's had a lot of time off ... and it's probably why I've moved away from groups ... I'd plan for groups and when she was away my day would go out the window ... I would get so stressed because I'd say what am I going to do now?

In both cases the teacher aides were Indigenous.

Participation in the research project has resulted in five teachers changing the way in which they operated with their teacher aide. In all five cases the aides were Indigenous. The teachers felt that their teacher aides "had gained in confidence". In one instance the role of the teacher aide has changed "from mainly doing the work with individuals to taking more of a leading role". For another aide the role had changed from "photocopying and helping with difficult art lessons to working with a group of students and explaining mathematical ideas to them". Another felt "giving the teacher aide more skills has allowed me to be more relaxed" and as a result the teacher aide had taken on more responsibility and acted more independently. Seven teachers believed that there had been no perceived change throughout the 12-month period, with one stating quite strongly that "I don't really agree with the teacher aide teaching ... I think there is a bit of an advantage taken here if you expect them to teach". This was never an aim of the project.

As a result of participation in the research the schools have taken on a more proactive role in encouraging staff to use their teacher aides more effectively. Initially this increased the time that a teacher set aside for planning and communicating with the teacher aides. As one commented:

Although it increased our time at the start it has made a big difference ... They are now taking away small groups and actually teaching them ... report back on which children understand the concept

and which ones need more work ... Quite often my teacher aide picks out the kids that need more work ... It is really a good help in the class.

associated with the non-Indigenous community. We have alliances in the town ... families don't talk to families ... She [the non-Indigenous aide] is not in with the ones I need to talk to".

Nearly all teachers surmised that the students did not experience difficulties understanding what was said. Therefore they felt that in most instances even the Indigenous teacher aides were not required to "translate" their instructions or discussions for the students. As one stated, "I have been teaching them for four years now ... Your accent kind of changes, even the way you say things". In the cases where teachers had Indigenous teacher aides, two (33%) were seen as assisting in this area, one teacher was unsure just how much translation occurred, and three were very sure that this did not occur. In one of these instances the teacher stated, "No she doesn't ... I think English is her first language". Another teacher believed that her relationships with the parents in the community were sound enough for her to speak with them herself: "I just speak with them if there is something to say to them". It is noteworthy that this teacher taught in the small fully Indigenous community. She felt that she mixed easily with this community outside the confines of school and thus had plenty of opportunities to communicate with the parents.

Four out of the six teachers with Indigenous teacher aides listed communicating with the community was an important component of their teacher aide's role. One commented, "she does a lot of mediating - like if there are kids that are not learning she will go and ring up those parents ... because she often knows them". Another stated that "when I had John [an Indigenous teacher aide] Indigenous parents were coming to John ... and John would tell me". It was also stated that Indigenous teacher aides were not only imperative for liaising between the school and the Indigenous

Status of teacher aides

Teachers were also asked what status they felt their teacher aides held in the classroom. Three main categories emerged from the discussions. These were: (a) behaviour management, (b) translating between teacher's language and Indigenous language, and (c) liaising with the Indigenous community. Table 4 summarises the frequency of response for each of these categories.

The trends that exist for the perceived status of the teacher aides in the classroom differed for the Indigenous and non-Indigenous teacher aides. With respect to behaviour management, teachers believed five out of six Indigenous (83%) and three out of six non-Indigenous teacher aides (50%) effectively assisted the teacher with this aspect of teaching. Some typical comments were:

She knows the routine ... goes through the process the same as I do ... They listen to her, she can tell them off and they do what she says.

For one of the Indigenous teacher aides, the teacher's comment was "because she is Indigenous the kids relate to her really well", and for another "she knows which ones need help and which ones are only mucking around, being silly". The Indigenous teacher aide who was perceived as not having status with regard to behaviour management was "only young ... only 21 ... She is improving". Interestingly in School C, the school situated in a small isolated and remote community, the teacher believed that "the main problems seem to be

Table 4. The perceived status of the teacher aide in each classroom.

School	Year level	Teacher aide	Behaviour management	Translating for the students	Liaising ² with the community
A	1	Non-Indigenous	No	No	No
	1-2	Non-Indigenous	Yes	No	No
	1-2	Non-Indigenous	Yes	No	No
	2	Indigenous	Yes	Unsure	Unsure
	3	Indigenous	Yes	Yes	Yes
	4	Indigenous	Yes	No	Yes
	5-6	Indigenous	No	Yes	Yes
	6	Non-Indigenous	No	No	No
	6	Non-Indigenous	No	No	No
B	7	Non-Indigenous	Yes	No	No
	2-4	Indigenous	Yes	No	No
C	5-7	Indigenous	Yes	No	Yes

community, but also for mediating between teachers and Indigenous students. This was particularly important in the upper grades as reflected in the following statement: "You get kids ... there are issues that come up ... they won't talk to you ... they'll talk to the Indigenous teacher aide ... this gives me insights".

■ Discussion and conclusion

Teachers participating in this phase of the project held a belief that there were no differences between Indigenous and non-Indigenous students and how they learnt mathematics. Some common comments were:

They are the same as the rest.

They are all children learning.

I don't see the colour when I teach.

This stance could reflect the questions asked as they may construe "seeing" a difference as a negative, racial comment. Many also were not aware of the local Indigenous community as they were "new" to the area, and thus had little understanding of the context in which they lived. The questions are what are these teacher's beliefs about equity and equality, how are they influenced by common societal values, and how do they impact on catering for all?

Many teachers did acknowledge that there were language differences among the Indigenous students, although in School C they believed that these differences were common to both Indigenous and non-Indigenous children. In this case, they perceived the distinctions simply reflected living in a rural and remote area of Queensland and the language commonly used by the community as a whole. The teachers who acknowledged the language differences for Indigenous students tended to be located in totally Indigenous communities. But in this instance, they believed that once they knew the common usage of the Creole words within the community, they could effectively communicate with the Indigenous students. This may explain why many teachers did not believe that "translating for students" was an important aspect of the Indigenous teacher aides' role. There was no recognition amongst these teachers that these words might have particular nuances and social capital attached to them that goes beyond the translation of the word as a simple idea, such as, the "shape is boney - the shape is thin" (Walkerline, 1990). Thus while it may appear that their Indigenous students understand English well, this may be far from the truth (Gledhill, 1989).

The pedagogical strategies predominantly used within these classrooms seemed to reflect "good" mathematics teaching rather than catering specifically for Indigenous students. The use of hands on materials and the establishment of group work in these

mathematics classrooms were in response to catering for a very wide range of abilities rather than a deeply held belief in socio-constructivist theories of learning. The groups did not reflect a belief that Indigenous students best learnt in small groups (Barnes, 2000), but were fundamentally created so that one-on-one teaching could occur within groups of similar ability. There was a recognition that intervention classes which traditionally occurred with these communities impacted on Indigenous students' self-concept, and hence the inclusion of these students in everyday classrooms and the adoption of "streamed" rotational groups. This model also allowed for "catch up" activities, for students who had a history of absenteeism, to be integrated into the everyday framework of the classroom.

From these teachers' perspective the issues that appear to be impacting on teachers and teacher aides working effectively together to enhance mathematics learning for Indigenous students were: (a) the perceived expertise of the teacher aide, (b) the extra planning needed to support the teacher aide in working with small groups, (c) the absenteeism of the teacher aides themselves, and (d) whether the aide is Indigenous or non-Indigenous. The teacher's use of the teacher aides in these classrooms appeared to reflect differing beliefs with regard to what each teacher aide was capable. Non-Indigenous teacher aides tended to be given more responsibility for student learning than their Indigenous counterparts. In fact, in many instances the Indigenous teacher aides were an under-utilised resource. In most cases they were not called on to assist in three of the major factors that are believed to directly impact on Indigenous student learning, namely, language (Bucknell, 1995), learning style (Christie, 1994) and the relevance of the mathematical activity (Barnes, 2000). This could reflect the fact that the majority of these teachers were beginning teachers who themselves were endeavouring to survive the cultural divide between urban, and rural and remote communities. Some were also trying for the first time to assert their status as a classroom teacher as well as dealing with very diverse classroom situations. Acknowledging differences between Indigenous and non-Indigenous students may simply be an added tension that they could not deal with at this stage in their profession. So while they were failing to acknowledge differences between Indigenous and non-Indigenous students, they held differing beliefs and values with regard to Indigenous and non-Indigenous teacher aides. It could be conjectured that these teachers did not enter these communities with the cultural capital necessary to appreciate concepts within Australian Indigenous society (QIECB, 2003), hence their lack of understanding of the roles that Indigenous teacher aides could adopt to effectively assist them in dealing with reality.

The differing status that these classroom teachers afforded to the Indigenous and non-Indigenous teacher aides needs further investigation. Interestingly, both the Indigenous and non-Indigenous teacher aides had

achieved similar levels of schooling, and yet the non-Indigenous teacher aides were considered to be more capable with regard to directing student learning and the Indigenous teacher aides were afforded greater authority when it came to behavioural management, especially when dealing with the Indigenous students. The professional development that occurred with the teacher aides certainly had a more positive impact on classrooms with Indigenous teacher aides than those with non-Indigenous teacher aides. Was this due to (a) the knowledge that these Indigenous teacher aides gained, particularly the ability to express ideas using mathematical terminology, and/or (b) their increased confidence with mathematics? Or did the professional development they participated in simply assist teachers to see these teacher aides in a different light. Thus some key questions are:

- What factors influence classroom teachers' value judgments about their teacher aides?
- Is it the confidence that they exude, the ability to talk the educational jargon, the authority and status they project? Or perhaps it's a combination of all three?
- How are these three dimensions affected by the length of time teacher aides have spent assisting in classrooms?

In the two instances where active dialogue occurred between teacher and teacher aide on a regular and ongoing basis, the teacher aides were non-Indigenous. Both these teacher aides were very experienced.

From this research, it seems the establishment of a healthy sense of Indigenous identity (Day, 1996) could enhance effective teacher/teacher aide partnerships. It is conjectured that this is supported by (a) teachers recognising and valuing the distinct cultural nuances of the communities in which they are teaching, (b) teacher aides being assigned to particular classes so that relationships can be established, (c) teacher aides being confident and knowledgeable about what they know about these communities and student learning, (d) teachers valuing the roles of Indigenous teacher aides in assisting to bridge the gaps between Indigenous and non-Indigenous students, and (e) teachers exhibiting enough self-confidence in their teaching that they are comfortable with letting go of their "authority" and allow others to participate in planning for and monitoring the learning. Missing from this story is the teacher aides' perceptions of the teachers themselves and how they can best work together to promote learning for Indigenous students. This is the focus of the second year of the research project.

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