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AUTHORITY AND ESTEEM EFFECTS OF ENHANCING REMOTE INDIGENOUS TEACHER-ASSISTANTS' MATHEMATICS-EDUCATION KNOWLEDGE AND SKILLS[1]

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The interaction between Australia's Eurocentric education and the complex culture of remote Indigenous communities often results in Indigenous disempowerment and educational underperformance. This paper reports on a mathematics-education research project in a remote community to support Indigenous teacher assistants (ITAs) in mathematics and mathematics tutoring in an attempt to reverse Indigenous mathematics underperformance. It discusses teachers' and ITAs' power and authority within school and community, describes the project's design, and summarises the project's results in terms of affects and knowledge. It draws implications on the relation between ITA professional development (PD), affect, esteem, knowledge, authority, teacher-ITA partnerships, and enhanced Indigenous mathematics outcomes.

For the last six years, we have been visiting remote communities to work with schools in an attempt to reverse the mathematics underperformance and low retention rate of Australian Indigenous students (MCEETYA, 2005; Queensland Studies Authority [QSA], 2006). We have found that a typical remote Australian Indigenous classroom has two staff members, namely, a young inexperienced non-Indigenous teacher and an older experienced ITA from the community (Cooper, Baturo & Warren, 2005; Warren, Cooper & Baturo, 2004). The teachers lack PD in Indigenous education and in working with another adult while the ITAs lack PD in how to assist the teacher educationally; the teachers usually leave the school after two years while the ITAs tend to remain. Thus, long-term projects with teachers in remote communities are problematic and led us to believe, like Clark (2000), that sustainable progress in remote school requires ITAs to be given a more central role in teaching.

ITAs find that Australia's highly Eurocentric education system (Rothbaum, Weisz, Pott, Miyake, & Morelli, 2000) lacks cultural understandings and clarity, leaving them with undefined roles and a sense of disempowerment even though they often hold positions of authority and esteem within their own communities (Matthews, Watego, Cooper & Baturo, 2005; Sarra, 2003). As a consequence, we find that most teacher-ITA interactions are impoverished and unjust (Sarra, 2003; Warren, Cooper & Baturo, in press) and fail to take account of the ITAs' strengths (Cooper, Baturo & Warren, 2005). For this reason, we have changed our research focus from teachers to ITAs. This paper analyses the first research project[1] we undertook with ITAs.

POWER AND AUTHORITY IN SCHOOL AND COMMUNITY

Weber (Haralambos, Holborn & Heald, 2004) claims that *power* is realisation of will against the resistance of recipients, and *authority* is power legitimised by recipients.

He identifies three types of authority: (1) traditional authority which is the "taken for granted" or consensual authority given to a role (such as "teacher"); (2) charismatic authority which comes from the special personality qualities of authority figure; and (3) bureaucratic authority which is based on legal structures (such as schools) (Haralambos et al., 2004). Table 1 (extended from Warren, Baturo & Cooper, in press) summarises these types for non-Indigenous teachers (called Ts for the table) and ITAs within *school* and *community*. The classifications depend on non-Indigenous teachers' and ITAs' roles in these two very different social structures.

Table 1: *Authority types, Teachers and ITAs in school and community*

Authority type	School		Community	
	T	**ITA**	**T**	**ITA**
Traditional	✓	✘	✘ unless long-term or comm. role	? depends on family status
Charismatic	? depends on T	? depends on ITA	? depends on T	? depends on ITA
Bureacratic	✓	✘ unless role part of school structure	✘ not present	? depends on comm. status

Commonly, the teacher's authority comes from the school (traditional and bureaucratic authority), while the ITA's authority comes from the community as most are respected community members or elders (predominantly traditional authority). This leaves many possibilities: (1) the most likely is for an ITA to have high traditional and, possibly, charismatic authority within the community, but no bureaucratic authority within the school; (2) an ITA with little community respect and poor charisma can have little authority in and out of a classroom; and (3) an ITA with strong community authority can have this authority transfer to the school.

We also take cognisance of Foucalt's (1991) notion that power is a relation in which *knowledge* has effect. This is supported by Warren, Baturo, & Cooper's (in press) findings and Smith's (2002) arguments claiming that education generally improves authority, particularly for race. Smith also argues that Black Americans have less authority because they have less training, accreditation and status attainment. This includes *job authority* (the authority most at risk in terms of race) which is especially psychologically rewarding because it brings status inside and outside the workplace and is related to job satisfaction, personal identity and self esteem (Ardler, 1993).

THE "TRAIN A MATHS TUTOR" RESEARCH PROJECT

The project's aim was to develop ITAs as mathematic tutors for underachieving Indigenous students (Baturo & Cooper, 2006). It was a qualitative interpretive action-research collaboration incorporating Smith's (1999) decolonising methodology exhorting "empowering outcomes with the secondary (Grades 8-12) and primary schools (Grades 1-7) and the local Council within a remote Aboriginal community in

which we had worked for three years. Our hope was that the project would provide an educational (rather than the usual behaviour management role) for the ITAs and to reverse Indigenous students' mathematics underperformance.

Participants. Eleven ITAs volunteered for the project (7 primary, 4 secondary), representing almost all the ITAs from both schools, a huge personnel investment. They were "long-term, local residents, mostly women, who work part-time for modest wages … often parents or grandparents of students" (Ashbaker & Morgan, 2001. p. 2). Most feared mathematics, had received little PD in its teaching, and lacked understanding (only one could fully understand 3-digit numbers at the beginning of PD); their role in classrooms had been behaviour control. The PD took place in community buildings – PD sessions in a brand new council training building; lunch at the community centre. The tutoring trials took place at the secondary school with Years 8-10 students who lacked understanding of 3-digit numbers.

The Aboriginal community in which the research was sited was established in the early 20th century and set up by forcible removal of Aboriginal people from their traditional lands, many of which were more than 1000 km away. Until the late 1970s, the community was owned by the government and run by white staff. At the end of the 1970s, without training or preparation, the community was given to the Aborigines to run through a council. The community is made up of more than 10 different cultures making it difficult to get consensus on many issues. It shares the common problems of remote Indigenous communities: poverty, substance abuse, violence, poor health, low life expectancy and incarceration (Fitzgerald, 2001).

In the year before the project, the students' mathematics performance was below that of other similar Indigenous communities. School attendance was < 30%, behaviour was out of control in most classrooms, all Grade 2 students failed to meet State minimal standards, and many secondary students could not meet Grade 3 standards. The young inexperienced non-Indigenous teachers taught white urban mathematics with little or no Indigenous contextualisation (Matthews et al., 2005) to give relevance and build pride. However, the new primary-school principal was just about to set up a school renewal program based on the successful methods of Sarra (2003).

The PD program. The program was based on two main assumptions: (1) ITAs, being long-term community members, would be familiar with community mores and language, able to meet the students' cultural needs, and the schools' key to stability (Baturo, Cooper & Warren, 2004; Clark, 2000), and (2) the PD should be "2-way strong" (we hoped to learn, from the ITAs, about Indigenous contextualisation and language in which to embed teaching). It was developed from three clusters of principles (Baturo & Cooper, 2006): (1) *mathematics/pedagogy* – teaching for structural understanding (Sfard, 1991) using kinaesthetic learning with materials and developing informal and formal language (Baturo, 2003, 2004); (2) *PD* - using train-trial cycles (where ITAs trial their ideas with students) with just-in-time support and reflection (Baturo, Warren & Cooper, 2004) and enough time set aside to do all at the detail required; and (3) *social* – experiencing success (Clarke & Hollingsworth, 2002),

building group cohesion and ITAs' identities (Sfard & Prusack, 2005) as tutors; and working in a positive learning space (Skill & Young, 2002).

Procedure. A mathematics-education manual was produced for the ITAs (see online report – Baturo & Cooper, 2006). The PD program ran four hours a day Monday to Thursday for 4 weeks. Week 1 provided the mathematics and pedagogic background for the tutors while Weeks 2 to 4 focused on providing the tutors with particular mathematics and pedagogic skills for crucial transition points in teaching whole-number numeration. Weeks 2 to 4 were organised so that, every second day, the aides could trial, with actual students at risk with respect to mathematics, the numeration activities they had learnt the previous day. Even though the ITAs knew us very well, they were reluctant to attend as (they later told us) they were nervous of "doing the big maths". However, once they had experienced a session, they attended regularly. Lunch at the community centre and reflection sessions were made social occasions where ITAs and researchers could build personal relationships and group cohesion. The material to be trialled with students was designed to motivate and to ensure successful learning.

The PD sessions, tutoring trials and reflection sessions were videotaped and field notes were written. At least 4 researchers were present for each PD and trialling session –one researcher taught while the others observed (PD) but all were available for intervention, if required, during the trials. Although some informal demographic data were gathered prior to the PD, we felt that we could not risk full pre-interviews with the ITAs because of the fragility of early attendance. We were also unable to undertake individual post-interviews with ITAs due to the remoteness of the site and the difficulty in organising times. However, we were able to undertake a collective post-interview.

Analysis. We evaluated the project from observations of, and informal discussions, with the ITAs during PD, trials and reflections, and audiotaped follow-up interviews with teachers and principals. In particular, we used a 5-point rating scale (1 low and 5 high) to jointly assess (all ratings were negotiated between 2 researchers) the ITAs at the beginning and end of the program in terms of: (1) mathematics and tutoring affects and beliefs, and (2) mathematics and pedagogy knowledge, and tutoring skill

RESULTS

Attendance and empowerment. The project was successful in terms of these ratings (Baturo & Cooper, 2005). Attendance was 90% for the PD when special personal and contextual circumstances were taken into account, a rate which experienced members of the community said was very high. For us, it was gratifying considering that attendance was not compulsory and PD took most of the school day (and some ITAs were under pressure from teachers to spend time in classrooms). One implication of such high attendance was that the PD "hit the spot" for ITAs in its focus (early mathematics), its pace and its stance that we were equal collaborators (2-way strong). As their confidence increased across the four weeks, so too did their sense of job authority (as evidenced in their interactions with the students).

Knowledge, affects and empowerment. From researcher, teacher and student observations, the project was highly successful (Baturo & Cooper, 2006). All researchers and observers commented on how dramatically the ITAs had changed across the four weeks of the course as initial shyness had been replaced by, as one researcher called it, *a thirst for knowledge*. The ITAs wanted all that we could give them on the structure of the number system and techniques for teaching it. The feedback from the ITAs to the PD and tutoring was infectious; again all researchers and observers felt it.

The ITAs were excited about what they were learning and very proud of how they tutored the students; we were so nervous at the tutoring trials and the ITAs were so calm; the teachers and students were delighted by the tasks and their "new" tutors. We were also impressed with the ITAs' confidence, their use of materials and their questioning. One observer remarked that it was *like a dam had burst and there was a pouring out of interest*; another said it was *like rain falling on land after a drought*. One principal stated, *the ITAs have been more successful in their work with students and far more confident in the way they deal with students generally in the classroom, the kids have also responded positively*.

The teachers were amazed at what the ITAs could do in the trials and wanted them to return immediately to the classroom and repeat it with their students. One teacher commented, *kids were well behaved because they knew and liked what they were doing ... for kids who generally didn't succeed at school work, they liked the fact that they were able to succeed*, and another supported, *kids also seemed to enjoy every part of it particularly the one-on-one teaching they received*. The teachers also commented on how the ITAs had changed across the four weeks, saying that now they moved around the classroom helping students in all subjects, not sitting back and watching as they had done before. The most powerful evidence was from the primary school principal who later gave credit to her ITAs' tutoring skills for six students meeting the Year 2 minimum standards in mathematics, something which no student had achieved previously in the school.

However, it was the community's response to the PD that was most unexpected. The graduation ceremony we gave the ITAs became a major event in the town; many elders and community members attended as did external dignitaries in Indigenous Affairs. All applauded the success of the ITAs. One Elder commented that her generation was not educated past Year 4 and that she *never thought she'd see the day when people of her community would have the opportunity to undertake a university program*. Another commented that there was *no shame*. These and others indicated their pride in the ITAs' achievement.

Improvement in performance ratings was also significant (see Table 2), but this was almost a self- fulfilling prophecy considering the ITA's lack of prior PD and limited previous education, and reactions to this PD opportunity. The initial ratings indicate the novelty of the PD (and nervousness of the ITAs) whilst the final ratings indicated that the ITAs had engaged, learnt and grown confident.

Table 2: *IEWs' pre-post ratings for mathematics and mathematics tutoring affects, knowledge and tutoring skill*

Affect, knowledge and tutoring-skill characteristics		Mathematics		Mathematics Tutoring	
		Pre Mean	Post Mean	Pre Mean	Post Mean
Affects	Motivation	1.6	4.5	1.7	4.5
	Confidence	1.6	4.4	1.5	4.4
Knowledge	2-digit numbers	2.5	4.5	1.1	3.8
	3-digit numbers	2.0	4.1	1.0	3.7
Tutoring	2-digit numbers	N/A	N/A	1.9	4.3
	3-digit numbers	N/A	N/A	1.7	4.1

<u>Note</u>. N/A means "Not Applicable".

DISCUSSION AND IMPLICATIONS

From the point of view of everyone involved, the PD program was successful − it improved ITAs' mathematics knowledge and pedagogy and tutoring skills and built their confidence and gave them esteem within the community. It appeared to affect positively all who came in contact with it; for example, the government representative at graduation supported further grant applications and the primary principal's open support in a meeting of State principals secured us the school support we needed for follow up research. It was evident that the ITAs were amenable to, needed, and benefited from the PD and that the project's PD program was effective and efficient (Baturo & Cooper, 2006). However, the interest in this paper is to understand how and why things appeared to work so well. For this, we will initially look at the effect of some of the program's underlying principles, then at authority, and finally at a serendipitous confluence of interventions. Finally we will draw implications for future PD and research.

Principles. The basis of the project's success appeared to be how the principles interacted. First, our choice of using council buildings rather than the school as the learning space appeared to be influential. It made the program overt, public and visible to the community who gathered each day at the shops and council offices. It also gave the ITAs and the project the appearance of council approval and boosted the ITA's esteem in the community. Second, our decision to teach mathematics for structural learning was also influential. The ITAs recognised that they were successfully learning and tutoring important basic concepts and processes (what they called, *the big maths*) not just simple facts and skills, and that the researchers had high expectations of them (an important component of improving performance and building pride according to Sarra, 2003). Third, our decision to have student trials and to design instruction to maximise ITA tutoring success worked, and boosted the ITAs' confidence, motivation, pride and commitment and made them willing to try other new things (a PD cycle described in Clarke & Hollingsworth, 2002).

Authority. The project's success can also be seen in terms of power and authority (see Table 3). The project provided the ITAs with knowledge and skills to operate

successfully in classrooms in ways they had not known before, thus boosting ITA power and authority <u>within the schools</u> (Foucalt, 1991; Smith, 2002). Similarly, in Weber's terms (Haralambos et al., 2004), the public nature of the project and the visible support of the council boosted the ITAs' *charismatic* and *bureaucratic* authority <u>in the community</u>, particularly as regards job authority (Ardler, 1993). Consequently, the balance of teacher-ITA authority changed positively for the ITAs as per Table 3.

Serendipity. At the same time as our project was running, the primary-school principal was putting in place a school renewal based on Sarra (2003), one of whose tenets is to increase Indigenous leadership in schools. As a consequence, the ITAs role in the primary school was given *bureaucratic authority*, thus further changing authority relationships (see Table 3). Thus, teacher-ITA partnerships were more equitable in primary than secondary school (which explains the greater success of the primary ITAs).

Table 3: *Authority types, Teachers and ITAs in school and community after PD*

Authority type	School		Community	
	T	**ITA**	**T**	**ITA**
Traditional	✓ present	✗ not present	✗ not present	? depends
Charismatic	? depends	✓ present	? depends	✓ present
Bureacratic	✓ present	✗ not present ✓ present *	✗ not present	✓ present

<u>Note</u>. * represents the change in the primary school <u>after the principal's school renewal</u>.

Implications. Two main implications emerged from the projects' results. First, successful ITA PD requires structural mathematics, train-trial cycles, careful selection of learning space and a focus on success. These principles interact to build affect and esteem, and the ITAs become effective tutors and improve students' mathematics outcomes (Baturo & Cooper, 2006). Second, any PD program to educate ITAs will have effects on authority within school and community which in this project led to more balanced power relationships, better teacher-ITA partnerships, greater school Indigenous influence and leadership, more contextualisation, pride and belief in ability, and improved mathematics outcomes (Foucalt, 1991; Matthews et al., 2005; Sarra, 2003; Smith, 2002; Warren Baturo, etal., in press). These authority changes must be catered for or they may have unwitting negative effects as well as serendipitous positive effects.

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