DEVELOPING 'QUALITY' TEACHERS IN REMOTE INDIGENOUS CONTEXTS: NUMERACY LEADERS

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Remote Indigenous education is challenged by many factors one of which is the attraction and retention of quality teachers to work in hard-to-staff schools. In this paper, I explore how successful remote schools have worked with the significant challenge – ensuring quality and rich mathematics learning for Indigenous students Building the skills of beginning teachers to work in these schools is the focus of this paper. Building a culture across the school in which early career teachers negotiate their new context and develop a sense of identity as beginning teachers has been achieved at many schools through the deployment of a numeracy leader.

THE CHALLENGES OF REMOTE INDIGENOUS EDUCATION

Remote education is fraught with many challenges, most of which are documented across many years of research. For the purposes of this paper, I will provide a brief summary of the diversity of research with the intent to provide a context. In this background, I focus on those issues associated with teacher quality in this context. The development of teacher quality within the context of remote Indigenous schools is the focus of the paper. I draw on data from a national study across nearly forty schools where many of the schools have developed a middle leader role whose primary task is the development of quality practices and quality teachers in those schools. While the term "quality" is a contested one, it is used here to highlight the characteristics of good educators who work in challenging contexts.

I am creating a term – pedagogical capital – as a reference to Bourdieu's framing of the forms of knowledge and dispositions which he refers to as capital (Bourdieu, 1983). These knowledges and dispositions have particular exchange value within a particular field. In the context of this paper, pedagogical capital refers to the knowledges and skills that teachers need to be successful in remote Indigenous education. These skills and dispositions may resemble some of those that are found in urban settings, but there are peculiar demands in remote settings that require different practices if there is to be success in learning mathematics.

Teacher Quality: Transient, Tourist Teachers

Many of the teachers who come to teach in remote areas are early in their career so they lack the experience of both teaching (mathematics) and are often in their first position in a remote/Indigenous context. Most employers recognise the importance of mentoring for early career teachers with most statutory-employing groups offering some form of mentor to beginning teachers. This is not so easy in the remote context where often all teachers are at the early start of their careers, and in some cases the principal is equally early in her/his career. This begs askance as to how, at a very

practical level, can beginning teachers develop the repertoire of skills, knowledge, dispositions and resilience need to survive and thrive in remote contexts. For early career teachers to lead others can be problematic when they do not have a extensive toolkit for professional learning of others (Borko, Koellner, & Jacobs, 2014). Teaching in remote schools places considerable pressure on teachers and school leaders as they negotiate the environmental and emotion challenges of living in remote isolated areas (Jarzabkowski, 2003). There are some authors who question whether too much is asked of early career teachers in remote contexts and that, in fact, employers may be putting too much reliance on the personal resilience of teachers as they enter these 'hard-to-teach' schools (Sullivan & Johnson, 2012) rather than building the skill set of teachers to be able to work effectively and productively in these contexts.

The pressure on teachers in remote (and rural)[1] settings often results in a high turnover of teachers. In some states, the contract for teachers may between 1 and 3 years. This high mobility or transience results in perceptions held by community members of the teaching staff (Mills & Gale, 2003), often where there is a high degree of scepticism as to the teachers' commitment to the school and community.

There are many motivations as to why teacher seek to work in remote areas. In a study of teachers working in a remote region of northern Australia (R. Jorgensen, Grootenboer, & Niesche, 2013) it was found that the motivations varied from adventure, travel and missionary with only one teacher (out of 32) identifying a socially-just motivation to working in the context. Similarly others (Schulz, 2015) have found the unwitting complicity to the three Ms[2] and tourist discourses for motivating white teachers to work in remote desert contexts. As some (Hickling-Hudson & Ahlquist, 2004) have argued, the inexperience of neophyte teachers places them at greater risk of implementing reproductive pedagogies, vis a vis neo-colonial approaches and thus expose students to a Eurocentric curriculum which may contribute to the alienation and marginalisation of Indigenous learners.

Culturally Inclusive Practices

As the contexts within which the study is being conducted are very remote, the culture/s and language/s often are still very traditional. For many students, coming to school represents a strong cultural dissonance between the home and school. There are numerous studies and philosophical writings of the value of including approaches that advocate a culturally inclusive approach. Such approaches are quite diverse

1 In the Australian context, remote settings are those which are geographically isolated, while rural settings are those often found in farming areas where there is often some sense of isolation, but without the considerable geographical isolation of remote settings.

2 The three Ms are a reference to "missionaries, mercenaries and misfit" as the people who opt out to live in remote, harsh contexts.

ranging from those that are ethnographic in standpoint and seek to build the cultural knowledges and practices into the existing mathematics curriculum, or in some cases to become the mathematics curriculum. Examples of this type of work are evident in the ethnomathematics tradition where there is a celebration of the mathematics embedded in cultural practices of non-dominant cultures (Rosa & Orey, 2015). There have been explicit attempts to seek the mathematics undertaken by Indigenous Australian communities and then incorporate this into a revised mathematics curriculum (Watson & Chambers, 1989). Other approaches have sought to identify more subtle aspects of culture and recognise how these impact on learners as they negotiate the taken-for-granted social and cultural norms of classrooms (Malin, 1990). These approaches adopt a strong care factor and seek to build into the programs elements of culture/s that will enable students to feel validated and included in the classroom practices (Savage et al., 2011) and, in so doing, sustain cultural pluralism (Paris, 2012). The culturally inclusive/responsive approaches often lack strong, effective and practical examples for educators and often at risk of not having the potential impact that the theory suggests (Griner, 2012). There is risk within these approaches as cautioned by Nakata (2003) that can engender the educational context being subverted for the cultural or anthropological discourses and thus serving as a convenient rationale for the failure of those intended to be beneficiaries of the approach. The vast literature on mathematical content knowledge and pedagogical content knowledge has shown that teachers who have strong knowledge in one or both of these areas is more likely to produce better learning for the students (Baumert et al., 2010; Campbell & Malkus, 2014).

One of the major issues in remote education is the tyranny of distance and how this impacts on the possibilities for teachers' learning (Parding, 2013). It has been found that teacher support is critical for beginning teachers and the resultant quality of their teaching (Blömeke & Klein, 2013). Most communities do not have access to relief teachers who could come into the school and relieve a teacher to undertake external professional development. The distance itself also represents a significant issue. At best, there is a day travel each way to attend a professional development outside the school. Alternatively to bring in external people to conduct professional learning, requires additional travel costs for the consultant – both temporal and fiscal. As most remote schools are isolated, it is just as problematic to link schools to provide professional learning opportunities. Finally, accessing on-line resources may seem to be a good option but most schools have unreliable satellite internet which will fall over on cloudy/rainy days to the point of not even working, the cost is extremely high for downloading, and the band width is limited so that high resolution video is almost an impossibility to download. Collectively, these issues provide challenges for schools in terms of professional learning, particularly for new graduates, and/or teachers new to remote education.

Numeracy: Key Learning Area

For most remote and very remote schools, literacy and numeracy are key learning areas that take a priority in curriculum offerings. Most schools in the Remote Numeracy Project (which is the basis of this paper) structure their day around three sessions. The order may vary, but it is predominantly the first session of the day is literacy, the second is numeracy and the third is all other curriculum areas. This process not only gives a high priority to literacy and numeracy but in most cases the lessons are in the first part of the day so that quality learning time is allocated to the two key areas.

THE OUTCOMES OF REMOTE INDIGENOUS EDUCATION

There is widespread recognition of the educational chasm in achievement for Indigenous and non-Indigenous students. It is not possible to make sweeping comments since other factors impact on success including geographical location, social status, gender, language etc. What is very apparent is for Indigenous students living in remote and very remote locations, there is a marked gap in achievement. To this end, successive Federal governments from 2007 have implemented the "Closing the Gap" initiative which seeks to lessen the gap in health, education and housing for Indigenous people in comparison to non-Indigenous people (Australian Government: Prime Minister and Cabinet, 2016). Despite considerable funding being allocated to education through the funding associated with Closing the Gap, it appears that there has been little change in educational achievement (Taylor, 2016). While educational outcomes are important, other authors (Yeung, Craven, & Ali, 2013) have explored the nexus between academic scores in literacy and numeracy with self-concepts, self-ratings of schoolwork and learning-related factors for Indigenous and non-Indigenous students. They reported that Indigenous students reported much lower scores than for non-Indigenous learners thus suggesting that schools need to focus on academic as well as factors associated with enjoyment of school life.

MOVING FORWARD: BUILDING PEDAGOGICAL CAPITAL

Building scholastic capital, that is the capital that has value with in the field of education (R. Jorgensen & Sullivan, 2010), through education underpins the purpose of schooling. Investing in education allows students to build better lives in the future. Whether this is seen as an overt principle or a tacit assumption, it is without doubt the key purpose of schooling. Yet, what is known is that the gap between Indigenous students and non-Indigenous students, most notably those living in remote and very remote settings is alarmingly worrying. Many strategies have been developed, some of which were discussed earlier but mostly emphasise the importance of quality teachers (Pearson, 2009; Penfold, 2014). Winheller, Hattie and Brown (2013) have concluded that "the perceived quality of learning is connected with 'confidence in' and 'liking mathematics', which in turn predict students' mathematics achievement" (p. 49). Their work across a number of publications emphasises that the teacher is the most important variable in students' success despite some criticism around methods as to how the Hattie and co-researchers were able to make such claims (Ingvarson & Rowe, 2008). It is generally accepted by employers that investing in teachers is a positive step in building capacity of both teachers and students. To this end, it is invaluable for teachers to have access to practices that will allow them to build their pedagogical knowledge unique to remote Indigenous contexts, that is, build their pedagogical capital.

THE REMOTE NUMERACY PROJECT

The project has been described elsewhere (Robyn. Jorgensen, 2015) but, in brief, it (to date) has consisted of nearly 40 case studies of remote and very remote schools that have a population with more than 80% indigenous students attending. The schools have been successful in the teaching of numeracy. The study has been conducted across 5 states/territories and includes all sectors and systems of schooling. The study is ethnographic in design and seeks to develop case studies of each school (Jorgensen (Zevenbergen), 2016) that describe the practices adopted by the schools. Data consist of interviews with leaders, teachers and other staff at the school, classroom observations and document analysis. All interviews are recorded, transcribed and coded using NVivo (QSR, 2010). The data presented here draws on the node relating to middle leadership.

BUILDING PEDAGOGICAL CAPITAL THROUGH MIDDLE LEADERSHIP

Many schools across the study have adopted a role within the school whose task is to build the expertise or capital of the teachers in mathematics; to foster the development of a whole school approach; to provide support for the teachers in many areas including feedback on lessons, advice on assessment, interpretation of data; build a whole school plan for mathematics; and to liaise between the leadership team and the classroom teachers. Across the schools, the title of this position varied, but for the purposes of this paper, I have opted to adopt the term 'numeracy leader' for this role. In the following sections, I draw on teachers' voices to highlight the role and value within this context of education, which in turn, helps to identify the characteristics of pedagogical capital – the skills and dispositions that are needed and valued in remote Indigenous settings.

ROLE OF THE NUMERACY LEADER: IN-CLASS SUPPORT

Across the schools that had adopted the numeracy leader, there was a general consensus that the in-class support was a valuable role in building the culture of the school and the expertise or pedagogical capital of the teachers. The types of support that could be offered in the classroom varied across the study, and included feedback on lessons, co-planning with the teacher, developing tests/assessments and then interpreting the data to inform subsequent teaching, and modelling teaching, along with tasks that the teacher and/or school saw as valuable. While various terms are used in different schools –such as numeracy specialist, support teacher, numeracy coordinator, mathematics specialist etc – the terms are used to describe a role where there is a dedicated teacher who is tasked with supporting teachers to develop their numeracy practices within the contexts of their classrooms.

Numeracy leader: They [teachers] had a support teacher every day for maths. We also had a numeracy specialist that would be coming in and that was part of my role as a year 1 support. I would take out a group of the lowest children and I'd be responsible for doing their numeracy learning for the year.

Teacher: [name] used to be our maths specialist but now we don't have that any more. That was good having her because she was timetabled in to help you as well during maths. During the term she'd be like, 'alright for the next two weeks I'm going to support you and help you with your programs' and she'd move around the school … She'd sit down with me and we'd write our whole term program together and pick out what we needed to do. We'd look at the kid's data that we'd take from diagnostic tests and stuff and decide what we needed to target and look through the curriculum and come up with our plans. She used to do that with everyone.

Numeracy leader: I was going out to [name of community], they've got an early year's centre out there as well so worked with those kids as well. So helping the teachers plan and assess lessons and then I'd also go in and support them. Collating the data and analysing data to keep passing on to the teachers the following year.

Co-Planning and Co-Teaching

The numeracy leaders often worked very closely with the teachers to build their planning documents and assessments. The numeracy leader often would team teach with the teacher. In some cases, this was as a support person in the classroom to help with the diversity within a classroom, in other cases to model teaching for the teacher.

> Teacher: So we'll sit down and we'll do it together. Like, so she knows that, you know, we'll work off my term planner that we've got, and I know that on those 2 days I wanted to do time and yeah, so that's what, so I use that. And so we'll sit down and we'll just go through the First Steps books and we'll find some activities that will help the kids reach it. .. Well, we're meant to do it weekly, and then it used to be, and it's meant to be, but it hasn't happened lately, on Mondays and Tuesdays is when I generally do number. Only because there's so many kids in the class and they're quite needy, [name] usually comes in and we team teach.

Building Deep Mathematics

As is well known from the research literature, many primary school teachers have low Mathematics Content Knowledge (MCK) and often are fearful of teaching mathematics. Building MCK in both teachers and students is empowering and has been a part of many schools' professional learning. Many workshops have been held that focus on the learning of mathematics, and this in turn has helped teachers build the mathematics learning for their students.

> Teacher: …we've got our numeracy coordinator, … but she works very closely with teachers to ensure that mathematical understanding has been developed in the kids not just, like I was saying about the fractions, not hollow, there's a depth to it.

Professional Learning

The numeracy leader has a role in the professional learning of the teachers. This was undertaken in many different ways across the schools – after school sessions, in-class in real time, professional reading, mathematics activities, and so on and largely based on the needs of the teachers and the vision of the school.

> Teacher: We've had a lot of PD and how to develop appropriate, well not appropriate, it's sort of like a bit of a developmentally-appropriate maths lesson to really get these kids moving from what they were doing before [the numeracy leadership team] got here to now and it really has deepened the whole understanding.

Depending on the school, the Numeracy Leader often worked with the Aboriginal Education workers[3] as well to build their knowledge – both mathematics and pedagogy so that they would be able to be a valuable resource in the classroom.

Building a Whole School Approach

There is strong sense across the participating schools of the need for a whole school approach to teaching numeracy/mathematics. The middle leader has an important role in building that culture and the knowledge within the teachers on how to teach mathematics at this school.

> Principal: I think because [name] is spread across 2 coordinator roles, literacy and the numeracy roles. So she might be being stretched a bit thin in that way. I think the whole school has to work on being on the same, have the same vision and we got new staff so perhaps that will take time.

> Principal: Teachers are aware when appointed [to the school] what program we use. They get lots of info about the program, and support. Numeracy coordinator gives less time to experienced teachers, and more time to new teachers, initially.

SUMMARY AND CONCLUSION

In summary, the role of the numeracy leader is quite diverse. Having a person based within the school ameliorates many of the issues identified in the literature in terms of supporting teachers in remote contexts.   The role is diverse as shown in the previous sections and summarised below.

> Numeracy leader: [it's a] Mentoring role. I'm not expert in anything. Try help them develop further understanding in all areas of maths; providing them with good assessment items; showing them how to use it to inform teaching; keep them enthusiastic; be ready to go in and model (not just talk the talk); trying to show staff the way you can show kids how to pick up patterns (because maths is all about patterns).

While the role is overall seen as a very positive one for so many reasons, the characteristics of the person in the role is very important. While in most cases, the teachers and leaders were very positive about the role and the appointees, there was a case where the teachers were somewhat circumspect about the person. This was largely due to the person also being early career (3 years since graduation) and did not have the repertoire of skills, knowledge and classroom experience to be able to support the teachers in a genuine and deep way. Overall, however, the numeracy leader role has been instrumental at some schools to build a whole school approach but also to build a positive learning culture among the staff.

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3 Aboriginal Education Workers is a term used across the project to refer to local First People who live in community and take various roles to support teachers in the classroom.

Principal: So you're seeing similar practice being used across the board. And a lot of it is good discussions too. You know, we'll often have that chance, let's just have a brainstorm on sharing some good practice together. Or after our staff meetings, we're all held in our meeting room, and after we developed the, um, data wall in March this year, we found that that's really added to some wonderful discussions and people hanging around after staff meetings to talk.

Having the right person in the role as a numeracy leader has enabled schools to address many of the issues that are commonplace across remote schools. The schools in this project have taken a proactive stance, often being quite creative in how they manage to fund the role, to ensure that teachers are able to access the support they need to build a comprehensive and cohesive approach to teaching mathematics. The processes described by the participants in the project elucidate the ways in which the pedagogical capital of the teachers and Aboriginal Education Workers can be built up (and sustained). Having particular skills and dispositions, that is, pedagogical capital, is paramount to building the success in numeracy learning for Indigenous students. This paper has explored some of the features of that capital that have enabled success in the contexts of this study.

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