Submission to the parliamentary committee Inquiry into language learning in Indigenous communities

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The Talking Namba project – Delivering Early Years Maths Concepts in First Language

Abstract: Building on the work of an Australian Research Council project, a professional learning methodology and resource for assisting Indigenous classroom paraprofessionals to become proficient at delivering foundational maths concepts in first language has been developed. While it has only recently become available to schools, this resource is currently already in use and trials are planned to assess the effectiveness of this approach on remote Indigenous student outcomes. Evidence gathered from the developmental work with the Indigenous paraprofessionals has been used to substantiate attainment of competencies for some of those enrolled in certificate courses.

Terms of reference addressed:

- The benefits of giving attention and recognition to Indigenous languages
- The contribution of Indigenous languages to closing the gap and strengthening Indigenous identity and culture
- The potential benefits of including indigenous languages in early education
- Measures to improve education outcomes in those Indigenous communities where English is a second language

Background: Building Community Capacity

The Talking Namba project is based largely on the findings of a study funded by the Australian Research Council, titled: **Building Community Capital to Support Sustainable Numeracy Education in Remote Locations (BCC).**[1] The study was conducted over a period of four years, from 2006 to 2009 at Shepherdson College, a remote Indigenous school located in the community of Galiwin'ku on Elcho Island in North East Arnhem land. The school had previously been involved in the Northern Territory's bilingual program. The community has a strong Indigenous culture and all members speak an Indigenous language (mostly Djamburrpuyŋu) as a first language.

The study focused on finding ways of helping the Indigenous Assistant Teachers (ATs) to develop a deeper understanding of the fundamental aspects of Western mathematics, so that they could more effectively assist teachers in the teaching and assessment of students. Two of the key findings of the project were:

- Exploring key ideas in Number and ways to introduce these ideas to children in Yolŋu Matha is an important step in developing Yolŋu adults' knowledge and confidence to support the teaching and learning of school mathematics.
- It is essential that Yolŋu adults use children's first language in introducing key ideas in school mathematics.[2]

In many ways, these findings mirrored the recommendations of pioneer researchers in the field of mathematics education in remote Indigenous communities. Pam Harris, for example, noted that *"(Instruction in English) can seriously jeopardise the younger child's chance at grasping the important*

basic concepts on which later learning of mathematics is built. The young child will be forced to learn foreign ideas in a foreign language which he has barely begun to speak…" [3]

The Talking Namba project

At the beginning of 2010, the Strong Literacy and Numeracy in Communities pilot commenced.[4] The Numeracy component of this pilot was based on the products and the key findings of the BCC project, and was focused on Early Years numeracy education (Transition to Year 3). While the project also encompassed urban schools, this aspect is outside of the terms of reference for this submission, consequently only the experience of the remote Indigenous schools will be considered. Two remote indigenous schools took part. Both schools were located in the North East Arnhem region. The name of the numeracy component, "Talking Namba", is a Kriol title suggested by the Assistant teachers who took part. The word "Talking" has much broader implications in Kriol than it does in English. In this title it implies discussion, exploration, negotiation, teaching and learning, all centred about this business of number.

The Schools

Gapuwiyak School services an inland community of around 1000 people. The community is located about 540 km east of Darwin on the shores of a saltwater lake. The dominant language is Djamburrpuyŋu, which is also the first language for a large majority of the children. Many children do not have any significant encounters with English until they begin to attend the local school. Despite the dominance of the Djambarrpuyŋu language, Gapuwiak School was never part of the bilingual program. Shepherdson College, the same school that was the site of the BCC project, has already been described. In short, Shepherdson College is located around 60 km north of Gapuwiyak, in the community of Galiwin'ku on Elcho Island. Both communities share a common dominant first language (Djamburrpuyŋu).

Defining the Project Aims

The aims of the pilot were twofold: Firstly to directly help ATs (and other Indigenous classroom paraprofessionals) to take a greater role in the delivery (and assessment) of key foundational mathematics concepts to Early Years students; and secondly, to produce a resource that could be used by teacher / AT partnerships to continue to facilitate the first aim beyond the life of the project.

For this project, the 'key foundational mathematical concepts' were taken to be those identified in the BCC project as the earliest underpinning or 'big' ideas of the 'Western' whole number system. These ideas are:

- Subitising (the instant recognition of the quantity of a collection of objects or representations)
- Trusting the Count (appreciation of the immutability of a count; includes an understanding that numbers name quantity, the importance of one to one correspondence and sequencing)
- Part-part-whole (understanding the components of specific totals, ways numbers can be broken up and reassembled)

- Base 10 and the Place Value system

In practice, these ideas are never taught as discrete entities. Part-part-whole is integral to Subitising and Base 10 / Place value for example, while 'Trusting the Count' is only consolidated through addressing its separate components.

Teaching and Learning with Classroom Paraprofessionals

The methodology of engaging in a discussion around a specific maths idea with Indigenous classroom paraprofessionals was developed during the BCC project and further refined through the Talking Namba project.

I (as numeracy consultant) would travel to the site accompanied by (Djambarrpuyŋu specialist) linguist Dr Melanie Wilkinson. We would present a 'hands-on' maths activity designed to illustrate a specific idea to the paraprofessionals. A lengthy discussion would generally follow, with the paraprofessionals spending much of the time exploring the idea in first language. This seemed critical to their assimilation of the idea. Generally the paraprofessionals would not attempt to 're-tell' the idea in English until they were confident they could describe it to one another (or to Dr Wilkinson) in first language.

Once the paraprofessionals were confident with the idea, and provided that there were sufficient numbers present, they would role play delivering the activity in first language. Finally, some children would be brought in and a volunteer would attempt to deliver the conceptual understanding to the students through an activity using first language. If this attempt proved unsuccessful, the attempt, and specifically the language of delivery, would be discussed, redesigned, and another attempt would be made.

Extensive use of audio visual recording was made throughout the process, and videos of successful lessons were preserved for inclusion in the legacy resource.

The strength of this approach seemed to lie in the communication it facilitated between the Indigenous knowledge of the language and capacity of their children and the deconstructed Western mathematical understanding. As Dr Wilkinson pointed out; "The *essential factors of this process are to work locally with a team that combines:*

- *knowledge of and about the Maths understandings*
- *knowledge of the languages involved in order to facilitate development of understandings and consideration of the best language to use*
- *the importance of ensuring effective communication between these fields of knowledge*
- *experience in the local context*" [5]

In other words, the negotiation of meaning between the Indigenous teachers and Western maths pedagogue, facilitated by the linguist as a three-way equal partnership allowed the development of a 'language of delivery' that would not have been possible through any isolated "field of knowledge".

Concepts don't always translate easily

A naïve understanding of translation often seems to underpin the interactions between non-Indigenous Teachers and Indigenous paraprofessionals in many remote classrooms, as typified by the request to "translate that" after the teacher has delivered a monologue on an aspect of their subject matter. While it is not hard to feel sympathetic to the request, especially if the teacher has given their best explanation only to be met with stares of incomprehension by the class, it is probably often not reasonable as a closer look at the process of "translating" a Western maths idea into Djamburrpuyŋu illustrates.

The idea of a one number being bigger or smaller than another is a basic one in western maths. Numbers are for quantifying, and quantifying is generally undertaken for the purpose of comparison. The problem with trying to teach this idea in Djambarrpuyŋu however is that this language does not contain words to describe comparison. There is no ready way to say "bigger" or "biggest" for example. In exploring this idea over a series of sessions (around an activity where students had to work out which number cards were bigger and which were smaller than a reference card placed in the middle) various paraprofessionals came up with a number of first language words to try to bridge the understanding, including:

- Garramat – High or Above
- Yarrgupthn – go down
- Bura – middle
- Gandarr – between
- Noyŋurr – below / Noylil – towards below
- Yindi – big (adult/Mother)
- Dhaŋaŋ – full
- Dhärrwa - many
- Rrambaŋi – same
- Nymukuŋn̲y – small
- L̲urrkuŋ̲– few (three)
- Bura - middle; in between; centre
- Wäŋa - place; country, home, camp

- Djul̲kmaram - to pass, overtake (transitive verb)

These words were used in explanations such as; **Dhiyaŋuny ŋayi ga maŋutji-l̲akaram buraŋurnydja wanha nhanŋu wäŋa lurrrkun'ku ga dhaŋaŋgu** (This focus, it -ing show, middle-at-focus, where its place few-for and lots-for)[6] forming part of the search for meaning engaged between students and their (paraprofessional) teacher. It can be imagined that such exchanges help strengthen a student's first language as well as helping to build a deeper understanding of Western maths. Moreover, observation of recorded teacher interactions revealed that once students showed signs of understanding, the teacher began to scaffold in the English words for the concept. It was not a matter of English or first language, but an approach that allowed mutual growth and reinforcement of both languages.

While a way of effectively explaining the idea in first language was developed and recorded, it was the result of a large amount of discussion, thought and input from a number of people, teachers and students, across both cultures. Observing processes such as these, it is not hard to see why Indigenous students find it difficult to grasp certain maths concepts when they are presented one way and in English only.

The Resource

The resource is web-based and organised around a conceptual 'progress map'[7]. As part of the BCC project, practical aspects and combinations of foundational ideas were defined and these were each further developed into a developmental continuum.

As part of the Talking Namba project, for the early years concepts (up to grade 3 on the map for whole number and addition /subtraction), each step on the continuum has been populated with ESL friendly hands-on activities. Additionally, for each of the five strands within number, a series of videos has been produced (these being the product of the training sessions) showing the development of a concept through a set of activities. These videos show good paraprofessional practice in the delivery of activities in a choice of English, Kriol and Djambarrpuyŋu.

The intention is that the paraprofessionals work with the teachers and together identify where groups of students might lie on the progress map. The resource then delivers a set of activities specifically targeted to those students. One or more of the activities may have an accompanying video for the paraprofessional to view, so they are hopefully able to learn about both the concept and how to deliver that activity. Obviously this will be of most benefit if the video is available in the paraprofessional's first language (For this reason, work has been contracted to add another five Indigenous language options to the current videos – see below).

Distribution of the Resource

The resource is currently available online[8]. It has also been distributed via DVD for schools with slow internet connections. A second, larger distribution of the DVD based version of the resource is planned for the near future. The resource was demonstrated to NT DET senior management. Several workshops demonstrating the resource and its intended use was also held for all regional Literacy /

Numeracy coaches – NT DET employees tasked with travelling around schools in order to assist teachers to achieve best practice.

Evidence

Much of the developmental work with the Indigenous paraprofessionals was recorded either using video or high quality audio. Training providers for a number of these paraprofessionals (typically the Bachelor Institute for Indigenous Tertiary Education) have requested and been provided with some of this material, specifically material which contains examples of the paraprofessionals explaining a concept in either English or first language, or where they have been recorded delivering an activity. These recordings have been considered excellent evidence of attainment of competencies required by certificate courses by the training providers. Although it is too early yet to look for evidence of improved student outcomes, trials involving baseline data are planned for next year.

The Immediate Future

OneTalk Technology[9] have already been contracted to provide oral interpretations of the video transcripts for five additional languages, including: Tiwi, Arrente, Warlpiri and Dhuwaya and Murinh Patha. This has been made possible by back-translating the first language material to provide a 'proven' front-end translation, as well as working with Kriol speakers to provide a suitable front-end translation of the original English material.

An Anindilyakwa (Groote Eylandt clans) component is planned, using the resource to mediate work with the paraprofessionals working at Angurugu School. As with the original material, the production of the resource will be contingent on the successful professional development of the staff, and local video material showing exemplary delivery of maths ideas in Anindilyakwa will be incorporated rather than a dubbed translation. Baseline student data will be then collected and a post-test delivered after the first year of the program.

There is strong interest from remote schools generally in the resource, with some schools beginning to include its deployment within their operational plan. Some schools have made greater commitments – the Numbulwar School community, for example, has decided to pursue a whole school professional development approach around the resource, and have organised whole staff training on a student-free day.

A proposal is currently being drafted for submission to the effect that the resource be supported on a region-wide basis, and where Indigenous classroom paraprofessionals who enhance their effectiveness as a result of undertaking professional development through the resource, have their skills financially recognised as well as being awarded recognition of prior learning towards appropriate certificate courses they choose to undertake.

Future possibilities

Due to time and funding constraints, only the whole number and addition / subtraction sections of the Progress Map have been populated with activities and videos. The next logical step in developing this resource would be to add activities and video resources to the progression around the 'big' idea of (equal) partitioning (early multiplication and division concepts). This would also compliment a series of early years fractions concept activities and videos.

Ultimately the ideal would be to populate all of the progressions to a year 6 level. While this would be of benefit to both mainstream and Indigenous maths programs however, it is the early years students, those with the least proficiency in English, where effective delivery of foundational concepts is imperative if they are to progress in mathematics at a rate commensurate with their mainstream contemporaries.

References

1. An Australian Research Council Linkage Project conducted by RMIT University in collaboration with the Northern Territory Department of Education & Training, Charles Darwin University and Bachelor Institute of Indigenous Tertiary Education, June 2006 to July 2009.

2. Major Findings (appended); Prepared by the BCC Research Team led by Prof Dianne Siemon – RMIT University, March 2010

3. Harris, P. *Measurement in Tribal Aboriginal Communities*, Second Edition, Northern Territory Department of Education, 1987 p 27.

4. The Strong Literacy Numeracy and in Communities pilot was funded by the Australian Government Department of Education, Employment and Workplace Relations as part of the Education Revolution - Improving our Schools - National Action Plan for Literacy and Numeracy (abridged project brief appended).

5. Wilson, M. Presentation to *Australian Federation of Modern Language Teachers Associations* conference, Darwin, 2011.

6. Literal translation provided by Dr Wilkinson.

7. Siemon, D. and Bradbury, J *Progress Map for fundamental numeracy concepts*, product of the BCC project, 2009 (appended).

8. *Talking Namba* online resource, http://ourcourses.ntschools.net/course/view.php?id=271

9. OneTalk Technology, a Northern Territory based business specialising in providing technical solutions around Australian Indigenous communications. Contact: info@onetalk.com.au

Major Findings

On reflection:

The use of the term 'Indigenous Assistant Teachers' to describe the work of Yolngu adults contributing to classroom practice does not reflect the work they do or its crucial importance in classroom learning.

From the Study Groups:

Exploring key ideas in Number and ways to introduce these ideas to children in Yolngu Matha is an important step in developing Yolngu adults knowledge and confidence to support the teaching and learning of school mathematics.

It is essential that Yolngu adults use children's first language in introducing key ideas in school mathematics.

School mathematics has little or no connection to the everyday experience of remote community members.

Relating to the ways numbers are used in the community and using these in the classroom is important for Yolngu adults and children's learning.

Yolngu adults need on-going professional development and support in school time to be *mathematics knowledge keepers*.

From the classroom:

A positive, purposeful and productive partnership between teaching teams is necessary for effective classroom practice.

Focussed professional development for both classroom teachers and Yolngu adults is essential to develop effective team teaching environments.

Yolngu ways of teaching are essential to children's learning and need to be recognised and supported.

From the community:

There is strong community support for Yolngu adults and a willingness to contribute and participate actively in community-based Teacher Education.

Parents and community members want their children to make progress in school mathematics.

There is a genuine interest in learning together to explore the ‘big picture’ of school mathematics in relation to Yolngu knowledge systems.