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ACROSS AUSTRALIA.....

FROM TEACHER TO TEACHER



INTERPRETING THE MATHS SYLLABUS FOR ABORIGINAL SCHOOLS

*K. Gale

The *Western Australian Maths Syllabus with Notes* is the recommended Maths curriculum for all Northern Territory schools. However, for teachers in tribal Aboriginal communities it is obvious that the gulf between this syllabus and the education setting is enormous. It is therefore essential that teachers try to bridge this gulf. The answer does not lie in the syllabus itself, but in the insights a teacher has about the culture and systems of knowledge of his/her Aboriginal students. I would like to talk about these insights in the form of a letter to a first-year non-Aboriginal teacher in an Early Childhood class in an Aboriginal bilingual school in the Northern Territory. I hope it makes her/him a little more insightful, because it has made me so.

Dear H.....

By now you will have had time to look at the *Western Australian Maths Syllabus with Notes* which is the recommended Maths curriculum for N.T. schools. If you are like me, you will initially have been overwhelmed at the thought of having to interpret it for planning a Maths program in your Aboriginal classroom. But take heart, because I would like to try to help you think about how to do this, and I'll refer you to support materials and readings that have some answers. Then, hopefully, you can feel confident about planning a Maths program to guide your students towards meaningful experiences.

I believe that, as teachers in Aboriginal schools, it is essential that we try to make education (and Maths in particular) meaningful for our students. Without meaning and purpose in education, we are perpetuating the unequal opportunity that has been offered to Aboriginal students in the past.

Ms Kathryn Gale, formerly teacher linguist, Bamuyili, N.T.

My first piece of advice is, learn to be a learner. If you do this you will not only reap the benefits for your classroom, but you will also become a respected member of your Aboriginal community. Begin by assessing the resources available to you in your community. By resources, I don't mean Maths equipment and aids. I mean people and information. Your best resources are your students, their families and your Aboriginal teacher. Employ some informal learning strategies and spend time observing and participating in shared experiences with local community members.

Before long you will find (or you may have already experienced) that Maths as we understand it is a reflection of our view of the world, and that Aborigines have a very different view of their world. Let me tell you a story about how I began to appreciate this and so learn from personal experiences more about these differences.

One day I went fishing with a carload of friends and after we'd unsuccessfully caught many fish, we began telling 'fish' stories. One young Aboriginal woman enthusiastically related a story about the huge fish that had slipped from her hook. I asked "How big was it?" She replied, "This big," (holding her fingers about 6" apart.) I replied, "Oh yeh? Well, mine was *this* big", (holding my fingers about 12" apart.) My friend's eyes were aghast.

Further conversation revealed, however, that we both had different understandings of the word 'big'. Her 6" 'big' fish was, in my terms 6" wide, and my 12" 'big' fish was 12" long. In fact, then, her fish had been much bigger than mine.

From our Western viewpoint a 'big' fish is regarded as one that is very long. But from the Aboriginal viewpoint, a 'big' fish is regarded as one that has a lot of meat on it, and is a good source of food.

This experience opened my eyes to the differences in mathematical concepts that exist between the two cultures. And it also taught me that Maths concepts are influenced by the world view held by those cultures. So you see, your own personal experiences and observations are so important in helping you see these differences for yourself.

Recognising, then, the differing concepts and world view inherent in the Aboriginal system of knowledge, how does this affect your classroom Maths program? Well, as a teacher in Early Childhood Education, your basic concern is the building of foundations for further academic growth for your students. And to build these foundations we must, as Beth Graham advocates,

Begin with the concepts inherent in the system of knowledge to which the Aboriginal language relates.

(Graham, 1983)

(By the way, you should read all Beth Graham's articles on Maths.) In Bilingual Education this is possible, as it allows us to go much further, of course, than merely recognising the children's language and using it to teach foreign concepts. It means recognising and using the Aboriginal system of knowledge to which that language relates.

Richard Guy, in his book *The Teaching of Mathematics*, reminds teachers that -

Children become confused quickly unless teachers are aware of how the meanings of concepts are different between the two cultures...teachers must keep the different ideas separate in their own minds in order to be effective in the classroom. (Guy, 1982)

Unfortunately, there is no set of general rules that can help teachers understand the complex system of knowledge and skills in Aboriginal society. But you can be helped to understand more by reading some of the work of Pam Harris, for example. She has written about Aboriginal concepts of space, time, money and measurement, from information she has gathered from many communities.

With regard to Aboriginal world view, let me recommend a couple of good articles in relation to Maths. Michael Christie has written an article, entitled "The Aboriginal World View: a White Person's Ideas", which is most interesting. He defines 'world view' as the "ideas and beliefs which a people holds about its world and the people and things in it" (p.3). Mathematics as we know it, reflects the world view of the Western culture. In our world of modern technology we quantify, classify and organise in a way that makes us dependent upon figures and calculations. Michael Christie makes the point that, from the Aboriginal perspective of the world, things cannot be quantified -

In a world made up of objects related through their spiritual essences, rather than their physical properties, counting is irrelevant. Value lies in quality and relatedness rather than in quantities.

(Christie, 1984, p.4)

Barbara Sayers, in an article entitled "Aboriginal Mathematical Concepts: A Cultural and Linguistic Explanation for Some of the Problems", reminds us again of the different world view held by Aborigines, and how this is reflected in their languages in particular.

Traditional Aboriginal culture did not need to count, weigh or measure, and as a result did not develop the appropriate concepts or language.

(Sayers, 1983)

So you see, when we introduce Western Maths to Aboriginal students, we are not only introducing new language and new concepts but a new way of viewing the world. Realising that, it is very easy to begin thinking - why teach our Maths to Aboriginal children? and - Mathematics for what? This is, in fact, a question that we need to ask continually if we are going to make Maths meaningful for Aboriginal students.

Pam Harris addresses this very issue in her article "What Is Primary School Mathematics?" She ascertains that Maths is both relevant and achievable in Aboriginal schools and as teachers we must have high expectations for our Aboriginal students. We are obliged to teach Western maths because, in traditional-oriented Aboriginal communities, Maths has become necessary in everyday life in employment, community affairs and for people to manage their own affairs. Also, to operate with efficiency in the wider white man's world, Maths is a major clue for Aborigines' understanding of how white men think. Aborigines have themselves recognised the need for knowledge of Western Maths and request that it is taught in schools.

From that, we can appreciate that Aborigines have very clear goals concerning Maths in school. They do indeed want their children to learn about Western Maths, which gives us an idea of where we are heading, and what we should aim for.

The *Western Australian Maths Syllabus* is therefore very relevant when viewing Maths with such long-term goals in mind. The syllabus is an expression of the world view that Aborigines want to learn about.

How we reach those goals, however, must be influenced by our understandings about the differences in world view, concepts and language of Aboriginal students. That means some adaptation of the syllabus, or the way it is used, needs to take place. Pam Harris stresses, however, that -

This does not imply that the aims for the endpoints to be reached by the end of primary school should be changed, but that in Aboriginal schools, these endpoints may be more effectively reached through a primary Maths program that has different emphases, different sequencing and different teaching methods from those recommended for Anglo-Australian children.

(Harris, P., 1980, p.31)

Let's return to your situation in an Early Childhood class in a Bilingual school and refer to the Pre-Primary and Stage One stages in the *W.A. Maths Syllabus*.

You will notice, when looking at the Pre-Primary Stage, that the focus is on experiential learning, and "promoting social, linguistic and cognitive development" (p.18). Manipulation of materials and verbal communication are considered extremely important and teachers are encouraged to interact verbally with the children, employing questioning techniques to develop mathematical thought, ideas and language. The starting points and activities, however, are from the Western world view and related to the English language and Western logic. Hence, they are very inappropriate for Pre-Primary Aboriginal children in bilingual schools. However, as Beth Graham advocates, it is possible to design appropriate experiences for these children

to enable them to formally organise and classify local mathematical knowledge in the language they speak. The language they use to describe the experiences can then arise directly from the experience and not from a translation of English terminology.

(Graham, 1983)

It is fortunate for us that, along with Beth Graham, some other experienced teachers in Aboriginal Education have successfully begun to develop Maths curriculum support materials, showing teachers how best to use local mathematical knowledge. These materials also suggest different emphases and different sequencing as opposed to what is suggested in the *W.A. Maths Syllabus*.

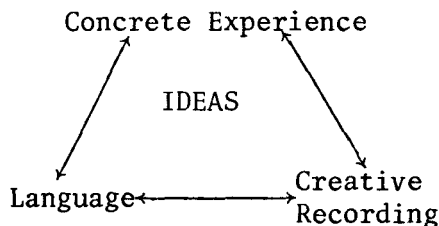
For example, in *Mathematics in Aboriginal Schools*, T-3, Pt.1, Transition, classification is the main emphasis of the program. Children are encouraged to classify things according to local Aboriginal knowledge and much of this is related to areas we call 'space' and 'measurement'. Using classification as the starting point, children label, organize and compare information and

further mathematical ideas emerge, e.g. one-to-one correspondence, more, the same, etc. In addition, the children develop language and recording skills that increase their understanding of these ideas. In time, as well as being able to continue to study mathematical ideas inherent in their own language, children will be able to transfer these skills and understandings to the maths concepts that are inherent in English. (*Mathematics in Aboriginal Schools*, T-3, Part 1: Transition, 1982)

(You must read and refer to this *Transition Maths* booklet and use it as a guide to meaningful Maths activities.)

Helen Western, in her book *Mathematics for Young Children*, also outlines lessons and activities similar to those in the *Transition Maths* booklet.

In acquiring Maths concepts, children need a constant interaction of experiences, language and recording. The *Transition Maths* booklet uses the following diagram to illustrate this.



When planning activities this interaction must be kept in mind in order to help children develop mathematical ideas. But it must be remembered that because

Aboriginal society is more concerned with organising relationships between people than with organising relationships between things which involves a study of quantity, size, etc., it will take Aboriginal children much longer to achieve competence, as opposed to performance, in their acquisition of Western mathematical ideas, as these are not being reinforced by the society in which the children live. (*Mathematics in Aboriginal Schools*, T-3, Part 1, Transition, 1982)

Time, then, is a crucial factor here. You should not feel impatient and nervous if you observe that the children are 'behind' what may be expected of children in the *W.A. Maths Syllabus*. You

must allow the children sufficient time to develop concepts and ideas, and build firm foundations before moving on to new concepts and the world of abstract thought.

For example, in the Stage 1 Number Strand in the W.A. Maths, you would need to allow Aboriginal children to spend sufficient time on Part 1 - 'Early Experiences Leading to Number,' before moving on to Part 2 - 'Counting Activities.' On the other hand, looking at the Stage 1 Space Strand, you would probably find that the children succeed with Part 2 - 'Investigation of Space and Shape in the Environment,' well before attempting Part 1 - 'Early Experiences with Three Dimensional Objects', because of their highly developed directional and spacial skills related to their environment.

Let's talk about Language again. Language really is the bridge between the world of concrete experiences and the world of abstract thought. In the bilingual E.C. classroom most Maths activities use the vernacular language, except in 'Beginning to Learn Maths in English' lessons. (In these lessons, children begin to learn Maths ideas that reflect Western reality. These ideas are not translatable - or not easily translated - and are therefore best introduced in English. However, when these new ideas and terms are introduced in English, children need

many experiences to allow labelling in English (input) before they are asked to demonstrate understandings of these concepts for themselves (output).)

(Graham, 1983)

Getting back to vernacular language, early Maths experiences as I've said before, must involve a great deal of language development and enrichment. You will be working very closely with your Aboriginal teacher, helping plan vernacular Maths activities, but it will be very hard for you to actually monitor whether language development is taking place. Although you can't determine exactly what is happening, you can discuss with your Aboriginal teacher what *should* take place before activities begin, and then the outcome, after the events. This will help you both plan and evaluate more effectively together. Read p.4 "Working with Aboriginal Teachers" in the Transition Maths booklet.

Let me leave you with some final suggestions about how to work towards purposeful Maths activities.

Michael Christie (1982) has outlined some suggestions about how we can help Aboriginal students become purposeful learners. His guiding principles for teaching meaningful reading can also be

applied to Mathematics, and can help children move away from the idea that Maths has meaning only in school and doesn't have meaning outside the school.

Here are some guiding principles:

1. Maths lessons/activities should be a means to an end, not ends in themselves, and teachers should always talk with the children about the *purpose behind the lessons/activities*.
2. The goal of the activities should be for the *children's benefit* and not for teacher approval, and the children should realise this.
3. The children should feel a *sense of control* in Maths activities and they should be given opportunity to explore and develop personal mathematical thought.
4. The children should be *encouraged to predict* meaning/outcomes and reflect meaning/outcomes in all activities.

Well, I do hope that my long discussion has given you some food for thought. More importantly, I hope that it has given you the insight to use the *Western Australian Maths Syllabus* with more confidence. It should be used as a guide, along with all the other materials that I have referred you to. Good luck.

Kind regards,

Kathryn Gale

REFERENCES

- Christie, M., 1982: The Ritual Reader: Guiding Principles for Teaching Meaningful Reading to Aboriginal Children. Paper presented 6th ARA Conference, Adelaide.
- Christie, M., 1984: The Aboriginal world view: a white person's ideas. *The Aboriginal Child at School*, 12:1.
- Clements, K., 1982: Language factors in school Mathematics. *Australian Review of Applied Linguistics*, 5:1

- Graham, B., 1982: Can we count on Maths? *The Aboriginal Child at School*, 10:2.
- Graham, B., 1983: Language factors in school Mathematics. *Australian Review of Applied Linguistics*. 5:1.
- Guy, R., 1982: *The Teaching of Mathematics*. N.T. Dept of Education. Macarthur Press, N.S.W.
- Harris, P., 1980: *Measurement in Tribal Aboriginal Communities*. N.T. Dept of Education, Darwin.
- Harris, P., 1983: What is Primary School Maths? (unpublished paper).
- Harris, S., 1980: *Culture and Learning : Tradition and Education in N.E. Arnhem Land*. Professional Services, N.T. Dept of Education, Darwin.
- Hunting, R. & Whitely, H., 1983: Mathematics, prior knowledge and the Australian Aborigine. *MERGA*. Research in Maths Education in Australia. Dec.
- Mathematics in Aboriginal Schools. T-3 Part 1: Transition*. Maths Unit, Professional Services, N.T. Dept of Education, Darwin.
- Sayers, B., 1983: Aboriginal mathematical concepts: a cultural and linguistic explanation for some of the problems. *The Aboriginal Child at School*, 11:1.
- Western Australian Maths Syllabus with Notes. Pre-Primary - Yr 7*. Curriculum Branch, Western Australian Department of Education, Perth.
- Western, H., 1979: *Mathematics for Young Children: A Handbook of Activities for Australian Teachers*. Forrest Press, Victoria.

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