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Listening to What People Have to Say About Mathematics: Primary Mathematics and the Thoughts of One Murri Student

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Abstract

The purpose of this paper is to report on the progress of a study undertaken in North West New South Wales which investigated the views held by parents, students and teachers towards the learning of mathematics in Years 5 and 6. The study involved Aboriginal and non-Aboriginal people being interviewed within their community. This paper presents a background to the study, some comment on how the study was implemented and an initial analysis of the views held by one Murri student.

Introduction

In New South Wales primary schools it is the *Mathematics K-6 Syllabus* (NSW Department of Education, 1989) that is the main source of curriculum content for the teaching and learning activities in mathematics. One could say that this is the **intent** of what is to be achieved as stated by the department, the **reality** is what actually

happens in the classroom which is controlled in large part by the teacher and then you have the **attained**, that which is learnt and controlled by the student. Often the classroom focus is on the students attaining the content as prescribed in curricula and people would agree that this is a major purpose of school.

The last few years have seen the growth in discussion and listing of the desired outcomes for students as they progress through school (Curriculum Corporation, 1993). The focus for these discussions, and rightfully so, has been on the actual skills, knowledge and processes, the cognitive domain, that students should attain by the end of school. This can be viewed as an attempt to look for equity in 'equal outcomes amongst groups' (Boston, 1994). Such a view towards outcomes crosses all subject areas including mathematics.

The same degree of attention has not been given to the attitudes that students develop at school and to the feelings that they have towards the learning of mathematics. Personal feelings and emotions are linked to the learning of mathematics. On some occasions it is one of those subjects hated (Howard, 1989; Carroll, 1994). As to what else is linked to the liking or disliking of mathematics by Aboriginal students, at all year levels, little is known. Issues related to the content-driven curriculum, lack of clear explanations, the

language used in the learning of mathematics, the lack of content relevance for students, inconsistent use of concrete materials and the need for teacher sensitivity have been put forward in recent discussions (French *et al.* 1994).

Aboriginal children usually learn mathematics in a cross cultural context and thus it was important in investigating this area to speak with both the Aboriginal and non-Aboriginal people involved in the school. In the school situation students, parents and educators need to be interviewed in order to gain a full picture of what people consider important in the learning of mathematics. As one Gamilaroi mother said:

That's good for they're all kids and we're sick and tired of being looked at on our own. We live together.

Much of the work in the area of Aboriginal people and the learning of mathematics has focussed on geographically remote communities (Harris, 1991; Harris, 1990; Currie *et al.*, 1989). Little collaborative work has yet been carried out in rural and urban locations though some studies carried out by Aboriginal researchers are beginning to be published. One such publication, Harris and Marlin (1994), reported research findings related to literacy issues. The area of numeracy has been identified as a focus for investigation by the New South Wales Aboriginal Education Consultative Group Incorporated for the triennium 1993-95.

The Study

To investigate issues related to Aboriginal students' views towards mathematics a study was undertaken in 1994. The purpose of the study was to investigate the held views of students, parents

and teachers towards the learning of mathematics in the latter years of primary school.

Throughout the study there has been a continuing link of negotiation and consultation with the various Aboriginal and non-Aboriginal school and community groups who were participants. These included state and regional Aboriginal Education Consultative Groups, Aboriginal Education Assistants, Aboriginal Student Support and Parent Awareness (ASSPA) Committees, Parent and Citizen Associations, school staffs, NSW Department of School Education (North West Region) and individual teachers, parents and students. At this point the willingness, co-operation and trust of all groups involved with the study are acknowledged.

Interviews were held because it was considered to be the best method for people to give their views in a way that surveys often do not allow. It was also considered that people would value the opportunity to have their say. During the study, which focussed on one school community, a hundred and ten interviews were held with Aboriginal and non-Aboriginal students, parents and educators. Each interview ranged in time from fifteen minutes to an hour. They took place within schools and homes at the convenience of those involved. Interviews with children only took place after written permission had been given by the parents and the children had agreed. When approval was given they were audiotaped, at other times notes were kept as a summary of the discussions. Students, parents and teachers were informed that their ideas would be shared with others but that pseudonyms would be used to maintain confidentiality.

The Views of One Murri Student

The interview reported here comprised many views about mathematics, and the learning of mathematics, held by a Year 6 Murri student, Natalie (pseudonym). Her views have been categorised into topics and presented with significant comments included. The school which she attended graded for mathematics across Years 5 and 6 and Natalie was in the second top mathematics class. Though a little nervous at the start of the interview as it progressed her manner became more relaxed, confident and self-assured. During the interview Natalie was keen to comment and gave thoughtful expressions of her views.

Natalie's Views...

• about mathematics

For Natalie, the best things about mathematics were 'doing stencils and learning new things'. She liked stencils because it was doing '...something different than writing in your book every day because we usually do mental in our book every day.' She liked learning new things '...because you may need to know those later in life and you need to know them like if you want to work in a bank or something you may need to know a lot about maths.' Natalie liked going to mathematics and never found it boring saying that '...it's just good to go to.' Though Natalie thought maths was '...fun...and you learn a lot about it cause it's important of life...' she was unable to identify her reasons for thinking it fun.

However, she was able to identify what made maths hard for her citing mental, decimal notation and problem solving:

...some of the questions in our mental the teacher hasn't taught us yet and we don't

really know what they are but she tells us about it after we do our mental, our twenty mental and we and then we find out and sometimes it's hard to understand what it is. Like...um we're doing decimal notation all week...and it's a bit hard to do them because you forget where to put the decimal and forget where the numbers go in places.

Natalie felt that problems were good 'when they're easy and a bit hard but not when they're really hard'. They were hard when she did not know what to do and she became confused because

the words that she used on there that I can't understand that I don't know what they mean or something. They may be a word that I haven't looked it up in the dictionary and don't know the meaning.

Her strategy for overcoming such difficulties was to '...ask the friend next to me.'

When Natalie found mathematics hard she said that '...I feel bad because I like haven't listened to the teacher or something about what you had to do to solve it.' Her strategy for overcoming these difficult times was to '...ask the friend next to me. She still tells me a bit.' Natalie liked doing mathematics 'on my own most of the time but if a question gets a bit hard I ask my friend sitting next to me and she just tells me what you're meant to do.' When she didn't understand, Natalie seemed to blame herself, suggesting that '...I mustn't have been listening or something.'

Natalie believed that 'mathematics is....um..... [pause] a great deal to learn and to um.....to learn about' and that there was a lot more to learn and that it would get harder 'especially in high school.' When asked to identify any times on the weekends when she used mathematics Natalie said that she didn't. All she did was 'play netball and go uptown.'

- **about learning mathematics**

To learn mathematics, what she had to do was

...just mainly listen and keep my ears open so I can learn more than what I've already learnt cause I may think that I haven't learnt enough so I need to learn more so just listening to the teacher and stuff.

She believed that eventually you cottoned on saying that it will take '...maybe a few more days or something.'

- **about her class**

Natalie's mathematics lesson usually comprised mental calculations and stencils, though sometimes they did different things, 'like this morning [the day of the interview] we went out and ran a kilometre cause we're doing things on kilometres.' The children had timed themselves and it had taken Natalie 'five minutes to run a kilometre.' She had run another distance though she could not remember that it had been a hundred metres, 'it took me thirty seconds to do um ...um...um...I forget.'



Nothing in maths class annoyed Natalie, having stated that 'everything's just fine in our class during maths.' She felt confident in asking her teacher questions when she did not understand, saying '...I just ask her straight out,' though she did have friends who got worried when they had to ask. In her mathematics class Natalie believed

I learn a lot off my teacher because she is really understanding and she knows what you're talking about and she helps you out a lot.

She was understanding because 'um...well she sits and listens'. Natalie believed that her:

...last year's teacher was good as well and he listened but I just think this year's teacher is more understanding and I think Mrs Andrews probably has more um...been probably teaching maths longer than the other teacher and she knows more about it...

She also 'handles the kids very nicely'.

- **about her ability doing mathematics**

When asked whether she was good at maths, Natalie stated 'well um I think I am. I've got confidence in myself.' Her belief of being good was based on test results, with her saying that 'most times I get good results when I do tests and that's about all.' The values of confidence and belief in self were strongly held by Natalie who believed that:

I just did what I had to do and um...I believed in myself. I knew that I could do it and I'd make it all the way and I have sort of, I've moved up a maths class from last year.

- **about mathematics homework**

Natalie thought that mathematics homework was good, for it gave 'you something to do every afternoon.' Her mum helped her when she could but when mum didn't understand she just told Natalie 'what [I'm] meant to do like if I don't understand what she's telling us on the sheet so mum just tells me what to do and I figure it out' though this didn't happen very often.

- **about calculators**

Natalie commented that her class used calculators:

to mark our mentals or our sheet so the teacher doesn't have to mark it so we just get a calculator and work out the answer ourself.

She didn't have her own calculator but thought that they were a good idea because 'you could know the answer what it might be what the right answer is and if it isn't you can find out what it is.'

- **about mathematics tests**

Mathematics tests was a topic where Natalie brought together her views concerning one's confidence and belief in self, as well as listening, to discuss children who do not do well in tests:

...there might be someone who's not as good sitting next to you and they copy or something and if you're better than them or better at maths than them they could cheat and which they should listen and um have confidence in theirself so that they can get further up than what I am.

- **about maths organisation**

Children at the school were graded for mathematics in Years 3 to 6 and Natalie thought that this was a good idea because:

you just get tired of staying in the same classroom all day and you like to see your other friends in your maths class and stuff even though you can see them out in the playground you get to sit and have a real good talk with them or something.

She thought it was good for the other children too.

Using her friend Frances as an example, Natalie commented that:

she's really good at maths and she's in enrichment and it does make you feel um...good for them that they're getting somewhere in life.

In comparing herself to her friend, Natalie felt that:

like she's in the top maths class and I'm in the second and I just feel the same but they may have a bit harder work than us in our class but I still...I don't feel left out or anything I just feel the same.

She knew that 'their teacher gives them harder work' in the top mathematics class.

Discussion

The analysis of Natalie's comments has identified some emerging issues from the study. Natalie believed that she learnt mathematics by listening to the teacher, who was the main source of knowledge. She believed that one's learning of mathematics was directly related to your level and intensity of listening. This suggested that she thought that mathematics was transmitted to students through the teacher and that the more you listened, the more you learnt.

Natalie viewed mathematics as easy, not so easy, and hard. When she found mathematics hard she viewed herself often at fault by not listening or perhaps not understanding some of the words that were used. Perceived difficulties, in mathematics, were seen to be her fault. Difficulties in not knowing and comprehending words and thus understanding the given verbal or written text

emerged as a major source of Natalie's confusion when doing mathematics.

Mathematics was fun and Natalie enjoyed going because it was a boost to her self-esteem to have moved up a class; she liked the relationship she had with the teacher, she enjoyed learning new things, and it was a social activity where she got to meet and talk with her friends. When asked why maths was fun, she was unable to articulate these reasons. Perhaps this was the first time she had been asked. One wonders if any of these were focused onto the learning of mathematics itself or rather the social and affective issues emanating from the people within the class.

The positive relationship between Natalie and her mathematics teacher was considered crucial to her enjoying mathematics. The teacher's willingness to sit and listen, and the nice way she handled the children were teacher attributes that Natalie considered important.

A significant view that emerged from this interview was the importance that Natalie placed on confidence and belief in self. She considered that both were important in one's successful learning of mathematics.

She did not identify any mathematics used outside of school, yet there were mathematical skills, knowledge and understandings used in the sport Natalie played and the shopping that she did 'uptown'. It may well be that she did not think of it as mathematics or she did not consider it as mathematics in the context of this interview held at school and perhaps perceived by the student as related to the mathematics learnt at school.

Calculators were used to mark student work in class and Natalie believed they were good for getting the right answer. Such a view may have

indicated that she was transferring authority for the correct answer from being within the teacher to within the calculator and at no time within herself.

Test results were the main indicator for Natalie as to whether or not she was good at mathematics. This was an external source of attribution which suggested that 'test marks tell me if I'm good at mathematics'. At no time did she suggest an internal attribution which could have indicated 'I am good at mathematics because I know I am.' The source of mathematics knowledge and your degree of 'goodness at mathematics' were seen to be external to the student and vested in other sources than yourself, in Natalie's case the teacher and tests.

Included in Natalie's expressed views towards mathematics and her learning of mathematics were:

- the main way to learn mathematics was by listening;
- the teacher was the main source of mathematics knowledge;
- the learner was at fault if she did not understand;
- a teacher's willingness to sit and listen in mathematics and ability to handle children nicely were important;
- a lack of understanding of some words made mathematics confusing;
- the correct answer was within teachers or calculators and not within yourself;
- marks, as test results, told you if you were good at doing mathematics;
- mathematics was a social activity in that you met and worked with your friends;
- identifying reasons why you liked mathematics lessons was difficult;

- confidence and belief in self were important personal values in the learning of mathematics.

Classroom Implications

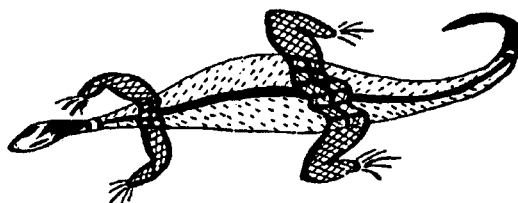
The implications for teaching and learning based on this one interview are far-ranging, in that many of the classroom practices experienced by the student were based on learning by absorption or transmission approaches. In suggesting the following classroom implications it is realised that teachers may need to critically assess their teaching styles.

Natalie believed that she had little control or ownership of the mathematics that she learnt. How do teachers plan towards modifying this belief?

Suggested classroom implications focus on:

- using some of the mathematics that students encounter outside of the school, through sport and other activities with which they are involved;
- displaying student's mathematics about the classroom;
- providing students with the opportunity to express their set of beliefs about the learning and teaching of mathematics;
- establishing a problem-solving context in mathematics lessons;
- having students edit and conference their mathematics work with other children;
- giving students the opportunity to talk about and share their mathematics in groups;
- allowing students to generate their own mathematical questions;
- listing the mathematical terms that students are learning;
- having students identify instances when mathematics is useful to them, perhaps in the form of a journal or photos;
- establishing a learning environment in which students are reinforced with the mathematics that they know, are given the opportunity to state the mathematics that they are unsure of, and to be assured that student error is not the teacher focus of assessment in mathematics;
- having students identify the mathematical skills and processes that they use;
- recognising that Aboriginal students do face conflict situations in the school and classroom related to language use, learning styles, teacher approaches and questioning styles;
- planning for the development of student's self-esteem and belief in self during mathematics lessons.

These implications are suggestions for all educators to consider as they go about planning the teaching and learning strategies to be introduced into the mathematics classroom. To these may be added more as teachers begin to address the issues raised by their student's set of beliefs about aspects of mathematics.



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