



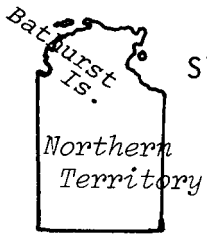
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THE SECONDARY MATHEMATICS PROGRAM AT ST THERESE'S SCHOOL, BATHURST ISLAND, N.T.

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At St Therese's Girls' School we have initiated a transition from a post-primary program to a secondary program. Part of this change has been a re-thinking and reorganization of the mathematics program.

There are 40 students in the secondary section. In the past they were taught in three different classes - Grades 8, 9 and 10. One teacher taught each class and the secondary section was organized like a primary school. Now the secondary section is organized along different lines, but it is not the purpose of this paper to explain the organization of the secondary section. The purpose of this paper is to explain the philosophy, approach, and some of the content of the secondary mathematics program.

It would seem that in the past the philosophy behind most post-primary programs prompted teachers to engage their classes in one of two activities. Either the class would spend the bulk of its day engaged in some sort of manual study, or else the teacher would engage the class in studies that were aimed at catching up with the Aboriginal students' non-Aboriginal counterparts. The philosophy behind both approaches saw the Aboriginal students as inferior.

The philosophy behind both the mathematics program at St Therese's, and the secondary program in general, is based on what I believe to be a far more truthful reality. I believe that it is not acceptable to infer that Aboriginal students are inferior and to organize their schooling around either manual studies or alternatively academic studies aimed at catching up to their European-Australian counterparts.

The mathematics program and the whole secondary program are based on the fact that there are some facets of both the Tiwi culture and the dominant culture that Tiwi secondary students need to master

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before they can be contributing members of their community. The program realistically looks at the skills which are essential and sets out to teach these in a meaningful and relevant context.

The basic philosophy underlying the mathematics program requires a realistic and honest diagnosis of the skill deficiencies of each student. The skills treated are those that are considered essential for the student to learn.

The diagnosis of these skill areas is recorded in an Evaluation Checklist which was compiled by myself in 1980.* (This checklist draws much from the W.A. Mathematics Curriculum).

One of the basic principles underlying the checklist is that the teacher is required not to attempt to reach mathematical concepts that are beyond the learning threshold of the pupil. Also, the teacher is required to give most emphasis to areas of application to real life and language use, rather than teaching the mathematical processes of operations *per se*.

The Evaluation Checklist provides a list of the areas felt to be crucial in assisting students to become contributing members of the Tiwi community. I shall briefly outline the sections of the checklist here. It is important to note that this list would vary according to the nature of the community and its situation in relation to the European-Australian culture.

The Evaluation Checklist has nine general sections and they comprise the following areas:

- Section 1 : Measurement - Time
- Section 2 : Number - Money
- Section 3 : Number - Tiwi language for mathematical concepts*
- Section 4 : Number - Basic operations and fractions
- Section 5 : Measurement - Metric measure
- Section 6 : Applications to real life
- Section 7 : The Calculator*
- Section 8 : Number concept
- Section 9 : Space - Grids, graphs, networks and maps

These sections are not presented in any order of priority. The checklist itself is in its draft form and up to now we have found

* See Appendix, pp.31-33.

more checkpoints we would like to add. As yet, however, we have not needed to make radical changes, so the checklist stands very much in its present form.

What must be emphasized is that the teacher is required to teach the simple, basic, underlying skills before embarking on more complex ones. The Evaluation Checklist helps guarantee that this will be the case. What is also most important is that each unknown skill be taught in a meaningful and relevant context. It is crucial to teach the skill deficient areas at the interest age of the students.

The whole focus of the Evaluation Checklist is to provide guidelines for areas that are relevant and meaningful for the adolescent and young Aboriginal student. These areas are ones that the young adolescent person will need to have learnt in order to function as a member of her Tiwi community.

There is no attempt to teach mathematical concepts that may be required by an aspiring university student. At present we have no such student in our school and evaluation has shown that the need areas are at the very simple level of mathematical skills.

The basic approach is to present these deficit skills in the context of the secondary student's life - both as she is an adolescent and also as a person who in a short time will be leaving school and sharing in the adult life of her community.

To this end, I have discovered that much of the basic skills and number concepts can be readily understood by the students when examples of money are used. The students much more readily appreciate the operations of multiplication, subtraction and division when they perform these operations with money. Also, they very quickly learn the value of numbers when they use numbers in counting money.

I have also found the calculator to be a wonderful tool for providing students with a better understanding of the purpose of calculations as well as for teaching number concepts.

What is anathema to this type of mathematical approach is requiring students to sit down right through the maths period and perform a page full of calculations on paper. In no sense will students gain an understanding of the world in such an approach.

What is important is that the student does her work in a practical context and with tools that have meaning to her. What is important, also, is that she is acquiring skills in an atmosphere of

mutual help from her peers as well as from her teacher. She learns by doing and by example. She is not afraid of failing because there is, in no sense, punishment for failure. She is learning skills that she knows she will need when she leaves school.

APPENDIX : Extracts from Mathematics Evaluation Checklist

Tiwi Language for Mathematical Concepts

1. Knows Tiwi form of words for addition -
x amintiya a y wuta z
2. Can apply Tiwi form of words for addition to simple practical problems.
3. Knows Tiwi form of words for subtraction -
x tanga y wuta z
4. Can apply Tiwi form of words for subtraction to simple practical problems.
5. Knows Tiwi form of words for multiplication -
Wutiyati x, y - ajirri ngampajuwulima wuta z
6. Can apply Tiwi form of words for multiplication to simple practical problems.
7. Knows Tiwi form of words for division -
x Ngawunipuluwamigi y ajirri wuta z
8. Can apply Tiwi form of words for division to simple practical problems
9. Knows Tiwi numbers from 1 to 10 -
 1. Yati
 2. Yuwurrara
 3. Yuwurrajirrima
 4. Yukurri
 5. Pinginingita
 6. Kiringarra
 7. Walimani
 8. Punyipunyinga
 9. Punyipunyinga Yati
 10. Wamutirrara

10. Knows Tiwi numbers from 0 to 20 -
0 = Karrikamini
13 = Wamutirrara Yuwurrajirrima etc.
11. Knows Tiwi forms of words for numbers above 20 -
e.g. 35 = 10 10 10 5
12. Knows Tiwi sign language for numbers.
13. Knows Tiwi sing language for clock time.

The Calculator

1. Knows how to feed a number into a calculator.
2. Knows how to put a money number into calculator.
3. Is able to perform the addition allorgism with any set of numbers (not involving money or other measurement numbers).
4. Able to perform addition where applications to real life, and use of Tiwi and English language is emphasized.
5. Able to perform subtraction on any set of numbers.
6. Able to perform subtraction where applications to real life and the use of language is emphasized.
7. Able to perform multiplication on any set of numbers.
8. Able to perform multiplication where applications to real life and the use of language is emphasized.
9. Able to perform division on any set of numbers.
10. Able to perform division where applications to real life and the use of language is emphasized.
11. Able to construct a table of multiplication number facts - (0 - 10).
12. Able to construct a table of division number facts (0 - 100).

13. Able to construct a table of squares using the calculator - (0 - 625).
14. Able to construct a table of square roots using the calculator - (0 - 25).
15. Able to construct a table of equivalent fractions for decimals.
16. Able to construct a table of equivalent fractions for $\frac{1}{2}$, $\frac{1}{4}$, where 10 equivalent fractions are included in each table.
17. Able to construct a table of percentages for common fractions.
18. Able to use the calculator in working out -
 - a) bills in a shop
 - b) change to be given
 - c) withdrawal and deposit transactions
 - d) cheque transactions
 - e) bank statements
 - f) difference between times in a timetable
 - g) percentages
 - h) ratios
 - i) tax forms
 - j) total price in a catalogue
 - k) budgeting
 - l) simple statistics
 - m) addition and subtraction of weights, lengths or volumes where more than one unit of measure is used.

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