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CURRICULUM DEVELOPMENT IMPLICATIONS for ABORIGINAL CHILDREN

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Factors influencing development of curicula for Aboriginal children must not overlook the importance of a strong verbal language component.

It is evident from research projects, and observation that persons of average or above average verbal abilities are found in most Upper Secondary Classes, Colleges and Universities. As a large proportion of graduates have proficient verbal abilities, this must be an area in our schools on which we must place importance. It is also a fact that just about any desirable avenue in life depends on some type of admission or selection procedure; whether it be tests written or telephone applications or interviews. The weighting of most selection criteria tends to give greater weight to verbal abilities than to any other personal individual characteristic.

Verbal communication, verbal knowledge, reading ability, and other language-based skills are all required to attain some degree of success in our society, whether the verbal ability is of importance to the position sought or not, e.g. the Arts, Tecnics etc. The development of skills in a knowledge of vocabulary, facility with words and quantative concepts, and abilities to reason in verbal terms must be pursued.

We are living in an age of crucial transition and the technological and communication revolution has only just commenced. Even today we are seeing the trend to the written language becoming more and more speech orientated and the return of human language to one of its basic forms of communication, that of the spoken word. This trend really is not a matter of displacement of written words but one of accommodation. Video, C.D's and tapes are more and more being loaded with the Classics and modern literature including all the translations of the Bible. Literacy is coming to the stage of having to learn to live in a close harmonious co-existence with the audio-visual medium.

It is estimated that by the 1990's 80% of all the workforce will be in computer and technological related fields. It is in this setting that individual cognitive activity will revolve more increasingly around the procession and transmitting of information and communications.

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It is imperative to direct the teaching of effective information processing and communication skills. As this area increases those who are to survive and succeed in tomorrow's society are going to be the technologically educated "elite". There is an increasing need to develop these information processing skills because with modern machines being able to be programmed to behave with "relative intelligence" the need for average and below average intellectual ability employees is rapidly decreasing.

The aim of our curricula must be "learning to learn" and we must allow in all our areas of curriculum development ample opportunity to ensure effective learning by giving opportunities for each individual to go through the learning process of individual and group Problem Solving using problems embedded with situations which make sense both culturally and with a social reality and utility to the child. Problems must focus on ONE thing only in the initial stages, account for the child's working memory, and have ample opportunities for interaction with each other, allowing time for both sufficient extension and consolidation of the information.

Aboriginal children who aspire to become leaders really have no choice in the language medium in which they learn, as the majority of all people communicate in Standard English and if they are to acquire relevant skills they will need to be proficient in this medium.

The cramming of the syllabus with information and fact, is a recipe for failure as most Aboriginal children are deficient in the skills necessary to process that information and thus they are faced with failure or at least reach a point of frustration .

In the West Australian, Oct. 17th.1983 Kim Beasley stated

"Teachers could not concentrate on these important skills because other material was being increasingly stuffed into the curriculum.
Schools had at certain times been too casual about literacy and number skills."

We must get back to basics and develop a solid foundation upon which to start with an emphasis on a language based course involving all aspects of developing facility in Standard English, a working vocabulary, problem-solving ability and communication skills, are imperative and should be stressed from the Pre-school through to Senior College level.

The low achievement and poor test results of Aboriginal children will be eliminated once their verbal confidence and information processing skills are increase. It is in this atmosphere that new information and facts will be interesting and relevant to the child as the skills required to handle them will be inherent in the child.

Research has shown that levels of cognitive performance is a function of increasing the capacity to process information in interaction with environmental stimuli (Fischer, 1980; Halford 1982). Tests have also shown that high contact Aboriginal children possess the capacity to process information the same as European children of the same age. Boulton et al 1986 suggest that the differences in Aboriginal cognitive strategies that have been identified in other research could be learned differences dependent on different learning contexts rather than on inherent cognitive differences. If this is correct then the success of our teaching of Scientific and Technological concepts to Aboriginal children lies in teaching both appropriate content and strategies.

At this stage it could be appropriate to look at the question of language in relation to Mathematics Curriculum planning as there are many different views on the extent to which language and the development of thought are inter-related. Piaget, in the 1970s wrote that forty years previously he had "believed in the close relation between language and thought" but that this view has now been amended - "there exists a logic of co-ordinations of actions far deeper than the logic related language and much prior to that of propositions in the strict sense" (Piaget, 1974; p.109).

Bruner maintains that "the development of adequate terminology is essential to cognitive growth" (Aiken, 1972; p. 27) and he supports the idea that sentences have a compelling power to control both thought and action" (Bruner, 55). Vygotsky put a lot of effort into a study of the beginnings of speech in young children and closes his book on "Thought and Language" with the statements "words play a central part not only in the development of thought but in the historical growth of consciousness as a whole. A word is a microcosm of human consciousness" (Vygotsky, 1983; p.153).

So, if we are to train Aboriginal children to be leaders in the future, they will need to develop a scientific and mathematical language, thinking, concepts and skills. This is a challenge as in Traditional Aboriginal culture they are not orientated to our concepts of technological computations, especially in the area of Time, Length, Width, Area, Volume, Money, Number and Causal relationships.

But, as we have explored and if we are to believe that the capacity for Aboriginal children to develop cognitively is the same as for any other similar children of European culture and age, we should bear in mind when developing curricula the following two premises:-

(A) Traditionally -orientated Aboriginal children are at a cultural disadvantage;

(B) That the children are not significantly different from other groups in their inherent ability to master mathematical and scientific concepts;

Let us first look at some research findings supporting the first assumption.

Marion deLemos (1986) studied the development of conservation in Australian Aboriginal children and found that:

1. The concept of conservation was found to develop later in Aboriginal children than in European children.

2. The same stages of development were found in Aboriginal children as in the European children, with non-conservation being found in the younger children and conservation in the older children."

Dalsen (1970) also observed :

> "The development of concrete operations is seen as pre-requisite for the adequate understanding and handling of number, measurement, time, space, speed, causality, and other "scientific" concepts .
> Furthermore, it is theoretically only after concrete operations have been fully co-ordinated into a common equilibrated structure, that the possibility of further development, namely into formal thinking exists. Put into broad and simplified educational terms, Concrete Operations can be seen as indispensable for Primary Education and Formal Operations for Tertiary Education."

Dasen in a paper entitled "Piagetian Research in Central Australia" states;

> "The knowledge of the level of cognitive development which a child has reached should enable the teacher to choose methods and curricula which are adapted to the child's stage instead of his age."

Research and observation in the mathematics education of many Secondary School Children, show a need to work with concrete representations of concepts and principals before they can put meaning and comprehension into the abstract and symbolic forms of these objects.

The work of Piaget, Bruner, Dienes, Bell and others support the proposition that manipulating concrete objects is an important activity in the learning of mathematical and scientific concepts.

Bell, in his writings of Piaget states:

> "Sixth, seventh and eighth grade teachers can expect to find many concrete operational students in their classes. At every, Secondary school grade there are students who have not completely entered the formal operational stage. Junior High School students enjoy working with diagrams, models

> and other physical devices; they need to relate new abstract concepts to physical reality and their own experiences. New topics in mathematics should be introduced through concrete examples, and intuition and experimentation should play a large part in teaching strategies for new principles and concepts" (Bell, F., 1978, 102).

From these studies we can draw some important implications in developing curricula for Aboriginal children.

1. Pre-school programs fostering cognitive and linguistic development are imperative.

2. Activities should involve active thinking, and questioning *technique* is important to allow the *Hows* and the *Whys* of the lesson to be understood.

3. If children have not gained an understanding of conservation they must engage in activities using a wide variety of concrete materials and must attain conservation skills before they can proceed to understand the advanced concepts taught in school. If children are introduced to advanced concepts before having the prerequisite basic understandings, it can lead to frustration and negative motivation.

4. A strong language and concrete activity base is essential from the earliest years, and leads to reinforcement of basic skills before proceeding to new objectives in their learning.

To understand the low achievement in Aboriginal children in secondary schools Dasen states:

> "The present study shows that, in today's situation, a large proportion of Aboriginal children do not reach the concrete operational stage. This implies that they will not be able to handle efficiently the major part of the Primary school curriculum. Furthermore, it means that these children will not be able to reach the stage of formal operations which is thought to be indispensable for Secondary Education."

Just recently some very impressive successes in the area of educational intervention have been reported. These have focused on carefully diagnosed deficits. Other research in the training of componential skills of generalizable problem-solving abilities although still in the experimental stages, are showing promise (Detterman & Sternberg, 1982).

The implications of all this for the Aboriginal child are, that with high contact and a strong language base upon which to work, they have the same capacity to learn tasks equivalent to any other child at the same level.

These children however, probably need to learn these technological skills initially in a situation that causes the discipline to seem useful in everyday life. There is a need for them to select, verbalise, process, recall and symbolise class, pattern and structural concepts relevant to the subject from their everyday experiences.

This will require them to be systematically taught concepts and strategies necessary in an educational environment that enhances their usefulness and meaning. The curricula must be designed and sequenced to accommodate the demands of learning tasks and teacher strategies thus complementing the ever increasing information-processing.

This should be obtainable through an apperceptive progression moving:

(a) from the known to the unknown;

(b) from the informal to the formal;

(c) from the concrete to the abstract:

Working at a high level of interest, using the child's own cultural understandings and needs as a point from which to start. Whilst Bruner recognises that older students may be able to grasp a mathematical idea by analysing a representation presented by the teacher; he believes that most students, especially younger ones, should construct their own representations of ideas. He also thinks that it is better for students to begin with concrete representations which they have a hand in formulating in the early stages of concept learning, understanding appears to depend upon the concrete activities which students carry out as they construct representations of each concept (Bell, F, . 1978, 143).

Hilary Shuard, a well known educationalist from the U.K. , says about Secondary Students.

> "For most students in secondary schools logical reasoning concerned with the world of number, space, quantity and time, and for such thinking they will need the sure foundation of active manipulation and concrete operations." (Shuard, H., 1982,)

The step of moving from the concrete representation to the abstract is a most challenging step both for the teacher and the student.

Dale in his discussion on Piagetian approaches to learning, makes the claim that "A major source of learning is the activity of the child", but also points out that "By the formal stage this kind of activity can be considerably reduced but is still an essential foundation for thinking." (Dale, L.,1975, 135-6)

> "A good school should encourage the child's activity, and his manipulation and exploration of objects. When the teacher tries to by-pass this process by imparting knowledge in a verbal manner, the result is often superficial learning the teacher's major task is to provide for the child a wide variety of potentially interesting materials on which he may act. Manipulation of things is a prerequisite for higher, verbal understanding. The child cannot jump to the higher levels before establishing a basis in concrete manipulation." (Ginsburg, H. and Opper, S. 1969.)

Using as a foundation the philosophies and research outlined above at our school we have embarked on an exciting school structure which we hope will see positive results in the skills development of our children.

In the Secondary school we are developing a modified Unit Curriculum approach with specially designed units for different stages within the school. The adoption of a streamed approach is an attempt to try to cater for the vastly differing levels of the students in our school.

Up to the middle of 1987 we used a traditional approach and sought to teach students at a number of differing levels in "year" classes. Many students showed signs of lack of motivation including frustration, misbehaviour, low self worth, lack of interest and failure to work to capacity. With the introduction of the Modified Curriculum approach the tone of the school has improved dramatically. The modified approach replaces the three classes years 8,9,10 with the four Groups indicated by Streams C, A ,P and S.

The table below sets out the main features of the Modified Structure.

Stream	Levels	Subjects	Students
C Professional Academic	4, 5, 6	Compulsory: Eng; Math; Science: Soc. St; Bible. Choice: 2 From Bus. St; Electronics; Photog.	All year 9 & 10 with Tertiary Prospects.
A Intermediate Academic	1,2,3, 4.	Compulsory: Eng; Math; Science; Soc. St; Bible. Choice: Media Studies; Computer St.; Manual.	Year 8 plus 9 and 10 not at C stream Level.
P Remediation	0,1	Compulsory: Eng; Math; Science: Soc. St; Bible Choice: Media Studies; Computers; Motors; Hort.	Students not at normal, Secondary Level.
S Special Transition	0,1	Normal Skills Studies Motors; Handyman Hortic. Home Science.	Students from Desert Commun. with few basic skills.

This approach has proved to be an innovative and workable approach and it is attempting to make provision for the vast range of individual differences in the school. Although the approach attempts to address these differences by streaming and with a limited choice of Electives, it is flexible enough to allow students who succeed in one level to progress and, possibly move towards tertiary training, as well as providing a number of alternative exit points.

As there may be some sequencing difficulties in some areas of Mathematics and science Unit where pre-requisites may be required, this is ameliorated by the planning of single independent (as much as will allow) discreet Units with Diagnostic, Remedial and language components built in. These Units will commence with the practical, concrete building of the basic skills and drills required for the Unit and then will progress to building up to the understandings of the stated objectives of the Unit.

Students from the four stages are tested and counselled regularly to ensure that they are placed as close as possible to their correct stage. This model allows for the varied levels of students at the school as well as allowing intrinsic motivation and upward mobility from all groups. This is not a "normal approach", but in our case we are not looking for a "normal result.

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We would appreciate photographs or drawings that could be used for the cover of the journal. **Photographs or drawings of children in learnng settings or to illustrate particular articles are especially needed.** We can use any black and white or colour photo that has good resolution. All work will be suitably acknowledged and returned as soon as possible.

Hon. Editor.