

Aboriginal Ways of Learning and Learning Styles

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1. INTRODUCTION

1.1 Purpose

The purpose of this paper is to further investigate the usefulness of the concept of Aboriginal ways of learning, and learning styles, as one approach to improving educational opportunities for Aboriginal Australian students. We define 'ways of learning' as the mental processes and instructional settings which a student uses while learning, and we define 'learning style' as a way of learning in which the student has a strength.

At conferences and seminars, Aboriginal people consistently raise their concerns that schooling outcomes for their children are woefully inadequate. Aboriginal cultural customs, values and codes of behaviour are an essential part of the lives of Aboriginal people. Yet they are obliged to send their children to mainstream schools where these customs, values and codes are usually ignored. Not only the teaching styles, but the very cultural basis and assumptions of the schooling is often inconsistent with their cultural background.

Most educators agree that a major role for education is the transmission of a society's culture from one generation to the next. Many Aboriginal people are upset that this process is usually denied to them.

Aboriginal students have a distinctive cultural heritage whether they come from urban, rural or traditional - oriented families. The National Aboriginal Education Committee (NAEC) emphasised that teachers and schools must: " ... develop an education theory and pedagogy that takes into account Aboriginal epistemology. Only when this occurs will education for our people be a process that builds on Aboriginal and Torres Strait Islander cultures and identity.... To be effective ... skills and learning must be acquired in harmony with our own cultural values, identity and choice of lifestyle, whether we reside in an urban, traditional community or homeland centre" (1985: 4).

Learning experiences of Aboriginal children, as with all students, are crucial to the educational and life opportunities of the children. Yet many teachers seem unable to use teaching processes which use the learning strengths of Aboriginal children. There is a need for research which explores cultural differences between Aboriginals and Non-Aboriginals, especially in the school setting to determine the extent to which an Aboriginal pedagogy is justified. And if an Aboriginal pedagogy is justified to some extent, such research could assist teachers to approach the schooling of Aboriginal students in a more sensitive and constructive way.

There is no doubt that many other factors affect school outcomes eg. health, housing, employment and other social factors, particularly racism. All of them demand their own consideration in schooling

programs. It is unfortunate, in our opinion, that there are some who continue to deny the need for an approach to schooling for Aboriginal students which is in any way different from that for other students. Outcomes, although improving, remain unacceptably low. In our opinion any professional consideration given to particular aspects that might lead to improving them needs to be explored. In line with this view we have concerned ourselves in this paper only with the micro processes of teaching and learning, not the content of school programs, or the social, economic and racial factors that also affect outcomes.

It is our aim to consolidate the information and research results available in one area only, that is, the pedagogy affecting Aboriginal ways of learning in a micro sense on the classroom floor and order this material in a manner that will assist all Australian teachers and communities, Aboriginal and Non-Aboriginal, to understand better this important issue. We contend that the distinctive needs of Aboriginal students demands a consideration of particular pedagogies.

1.2 Historical background

The need to examine the concept of an Aboriginal pedagogy was first put forward by Hughes as Chairman of the (NAEC) in the Presidential address to the Australian and New Zealand Association for the Advancement of Science Conference in 1985. Prior to that, the NAEC had developed national positions on the schooling of Aboriginal students. The NAEC was particularly concerned that the pedagogical approach taken by most

teachers was inappropriate, and that the appropriateness to Aboriginal students of current teaching practices needed to be thoroughly investigated.

The national Curriculum Development Centre established the Aboriginal and Torres Strait Islander Pedagogy Project in 1986 to take up this task. Extensive work was undertaken to establish a data base of materials on research and practice in Aboriginal and Torres Strait Islander education, the arrangement of evidence into categories for further study, and the analysis of findings. It was intended that a later stage would assess different approaches to teaching and identify pedagogical models which could provide insights for new strategies for teachers. Unfortunately the project closed along with the Curriculum Development Centre and as a result the opportunity to further research more appropriate pedagogical models was lost.

Hughes was an integral part of all of these projects. When he became Coordinator, Aboriginal Education, for the South Australian Education Department in 1986 he continued that involvement by introducing discussion on it amongst the Aboriginal Education Unit staff. He also initiated, along with More, who had a parallel interest in First Nations education in North America and a decade of experience with Aboriginal education, the Aboriginal Ways of Learning (AbWoL) Project. The AbWoL Project began to investigate theory and practice as used for South Australian Aboriginal students, especially those in minority situations in "mainstream" schools.

A small group of teachers who had a reputation as excellent teachers of Aboriginal students were selected from throughout South Australia. The teachers were exposed, in a professional development setting, to the model presented in this paper and to draft learning style and teaching style inventories described later. The teachers then developed adaptations of curriculum units which took much greater account of the recurrent Aboriginal learning styles according to the model that was being developed. Once the units were developed they were trialed with the teachers' own classes. The results of these trials are still being evaluated and will be reported on in due course.

2. BACKGROUND ON ABORIGINAL EDUCATION

2.1 Traditional Aboriginal perspectives

The ways of knowing (epistemology) of a cultural group are important to the education of its children. Aboriginal epistemology is conveyed in the particular world view held by Aboriginal society. According to Muir, the world for the traditional Aborigine is made up of entities which are related in an unscientific way (from a Non-Aboriginal perspective) but in a spiritual way which reflects the nature of a universe quite different from a white Australian" (1987: 12).

Muir summarised an account provided by Christie of the traditional Aboriginal world view.

The Aboriginal universe is basically one in which physical, scientific qualities are irrelevant and the world takes on meaning through the qualities, relationships and laws laid down in 'the dreaming'. There are a number of striking differences:

The Aboriginal world is not constrained by time or space - the land is still inhabited by the same beings which were involved in its creation - the spirits of dead people are constantly present - ceremonies not only re-enact the activities of ancient heroes but also recreate them.

English words are inadequate to describe this historic and contemporary world.

The value of things lies in their quality and relatedness. In a world made up of objects related through their spiritual essences, rather than their physical properties, counting is irrelevant. Aboriginal languages contain very few numbers and have few terms for the objective contrasting and comparison of physical objects.

Aboriginal society makes an individual's sense of worth depend upon where he or she can fit in it - cooperation rather than competition is valued and fostered (ibid.: 13,14).

We agree that traditional Aboriginal society is very different to western society. The 1985 report of the House of Representatives Select Committee on Aboriginal Education had this to say about traditional Aboriginal education from the evidence received during the inquiry:

Aboriginal society was a non-literate society and knowledge about the land and the means of survival, and about kinship and religion was not written down but was held and transmitted by the older men and women of the society.

Learning was then largely a matter of observation and imitation of the actions of older people and to a much lesser extent by verbal instruction from those who were older.

Much learning was unstructured and took place within concrete contexts.

The early education of Aboriginal children was undertaken by those with whom they were intimate and kin.

It was only later in life, particularly in the context of initiation or in the learning of religious knowledge and ritual, that verbal instruction was given in a more formal and structured way, and that information was imparted by people who were strangers or relative strangers (Blanchard, 1985).

Keeffe (1987) reports on interim findings from a study of the work of a group of Aboriginal teachers at Walungurra, in the north central desert region of the Northern Territory. He describes how the Pintupi teachers talk about their school and themselves using the word Yanangu, meaning people, body, or more explicitly, Aboriginal. This is a similar word to that used by Aboriginal people in Arnhem Land - Yolngu. The word Yanangu has a complex of meanings, which are summarised by Keeffe as Aboriginal, the person, the people, the body, or the real. Thus the Pintupi people see Yanangu as the essence of any education

process meaning achievement of the goal of educating the person as a whole.

The importance of an educational context that suggests and builds on the Yanangu is illustrated as follows:

According to the Yanangu teachers, the experience of attending schools where their own domain of the person is neglected or ignored is a difficult and traumatic experience. They say the students who try to be educated in a context that does not support Yanangu ideas, usually fail. The students become full of shame (kunta), as their own ideas about themselves do not correlate with those of the school. Likewise, they felt that people who try to down play, or ignore their own Yanangu aspects, have a great difficulty in replacing it with a walypala (Non-Aboriginal) person (ibid.: 10).

Aboriginal people generally hold the view that education for their children must acknowledge their culture, help Aboriginal children to learn and know their culture, and support their cultural identity.

This is seen as a joint task for Aboriginal teachers and teachers generally: "Aboriginal people everywhere would like to know about their own culture and history and about the Aboriginal way of life.

Parents and teachers should work together in growing up kids" (Theis, 1987: 41). "Devising an active and positive program of education for students, whose own society differs fundamentally from that of most of their teachers, requires input and cooperative planning from representatives of both societies; that is Aboriginal and the

mainstream " (ibid.: 45).

"Education should also prepare Aboriginal children to take their place, as Aborigines, in the wider society ... the need for children to acquire the same competencies as the children in the mainstream of Australian society" (ibid.: 43).

The method of traditional Aboriginal education was largely based on an informal learning approach. From an intensive study centred on Millingimbi in central Arnhem Land, Harris (1977) described five major 'informal learning' strategies and contrasted them with those used in Western - oriented approaches to education:

Most Yolngu learning is through observation and imitation ... rather than through verbal instruction, oral or written, as is the case in European schools and society.

The other most important learning strategy is learning through personal Trial & Feedback as opposed to verbal instruction accompanied by demonstration....

Most learning is achieved through real-life performance rather than through practice in contrived settings, as is often the case in schools.

The focus in Aboriginal learning is on mastering context-specific skills. Mastery of context-specific skills is in contrast to a school education system which seeks to teach abstract content-free principles which can be applied in new previously inexperienced situations.

Finally, Yolngu learners are more person-oriented than

information-oriented, and there is no institutionalised officer of 'teacher' in Yolngu society. This means that Aboriginal children and adults will assess, respect or ignore balanda (white) teachers more on the basis of how they relate as persons, than according to how they perform as teachers

(ibid.: 523).

2.2 Contemporary Aboriginal education

2.2.1 Purposes of education

In our view most contemporary Aboriginal statements about the purposes and nature of education have their roots in traditional Aboriginal societies. And they emphasise the importance of Aboriginal culture in determining the education provided to their children. For example, the current debate on 'two-way' versus 'both ways' education (Harris, 1995) has its roots in traditional communities. And both positions agree that education for Aboriginal children should, first, reinforce and build on their Aboriginality, and also prepare them for interaction with the wider Australian community.

The NAEC identified a number of aims of education, including processes that:

* build on Aboriginal cultural heritage and world view,

- * uses Aboriginal learning styles accompanied by an appropriate pedagogy,
- * leads to personal development and the acquisition of the skills and learning needed for Australia today, and
- * shares with Aboriginal people the responsibility for planning and implementation of policies on Aboriginal education (1985: 5).

They further expressed the view that

... in the education of Aboriginal children, the community should influence the process of schooling including the curriculum, rather than the school moulding the outcomes of schooling for the community.... Education must be a process which builds on what we are by recognising and developing our natural potential and cultural heritage [and] ... allows us to take our place as Aboriginal and Torres Strait Islander Australians with pride in our identity and with confidence that we can play our part in Australian society (ibid.: 2-5).

2.2.2 Two-Way education / Both-Ways education

One of the most important concepts in contemporary Aboriginal education is that of "two-way" education. Harris (1990) defined two-way Aboriginal schooling as:

a strategy to help make the matter of choice real in both worlds; to

provide opportunity for the primary Aboriginal identity to stay strong, though changing, and these continue to be the source of inner strength and security necessary for dealing with the Western world....

Aboriginal people today are increasingly interested both in being empowered in terms of the Western world and in retaining or rebuilding Aboriginal identity as a primary identity (1990: 48).

The debate has widened to embrace a "both - ways" concept. Whereas Harris promotes "cultural domain separation" to allow each domain (Aboriginal and Non-Aboriginal) to grow independently, the "both ways" position focuses on those aspects of each domain which are compatible. The "both ways" position accepts that it is necessary for some aspects of each domain to grow separately, but argues that in today's world there also needs to be a growing together of some aspects of each domain.

This paper contributes to the debate by investigating ways in which western and Aboriginal pedagogies may be integrated.

3. CULTURE , LEARNING AND LEARNING STYLES

3.1 Aboriginal cultures and learning

Groome (1995) contends that the historical anthropological models of

culture encompassed in terms like an 'Australian culture' or ' the
Aboriginal culture' are being increasingly challenged.

New models of culture are emerging which seek to better reflect the
realities of today's complex societies. Supporters of these models
claim that culture is not a fixed pattern of behaviours and values
shared by members of a group. They believe it is more realistic to view
it as something which is actively created by individuals in reaction to
the events of the world. There is not now and never has been, one
Aboriginal culture in Australia. Aboriginal people, especially young
Aboriginals, are living out an extremely wide range of cultural
patterns and styles, often having a repertoire of several models
available at any given time. Furthermore each individual will change
these cultural styles frequently as they seek to achieve cultural
authenticity (7).

We agree that Aboriginal societies in today's world are in transition.
On the one hand they wish to re-assert their traditions and on the
other they have to integrate the traditions into a western dominated
world.

Since 1992 all of us involved in the consultative and policy operations
of Aboriginal Education have had to move from corporate statements
about us and our society to more particulars for the actual
implementation of programs. We still lead off with 'Pan-Aboriginal'
statements for the purpose of political lobby at the ministerial,

system or committee level, but nowadays we have to follow up any macro statements with more specific detail that needs to be applied to actual pedagogy.

In getting down to the detail of programs or curricula at the school or local level you have to take into account local situations, practice and community acceptance. This can become extremely difficult. It emotionally tears you apart in trying to be both a politician and a practitioner (Hughes, 1997).

Many theories of education have placed value on 'cultural contexts' and the 'place of culture' in pedagogy. These, however, have often been directed at 'elitist' approaches to transmitting a particular cultural heritage, or to the value of 'communal influences' and social relationships on the individual child.

Debates about 'two-way schooling', 'both-ways schooling', 'Aboriginal perspectives across the curriculum' and greater involvement by Aboriginal people in decision making are contributing to a new understanding of the place of culture in education. In our opinion until recently the use of "culture" in educational statements was too loose referring to youth culture, gender aspects of culture, and the place of the arts in the classroom. However, the new perspectives on culture have helped to emphasise the effect of cultural influences, characteristic of particular social groups, on student behaviours and ways of learning, and hence on the pedagogical practices of teachers.

At the Commonwealth level, the 1985 NAEC report emphasised that education for Aborigines and Torres Strait Islanders should not only embody "a growing understanding by them of the many elements of their culture, (it should) also assist the development of their own personal identity ... and their feelings of self-esteem and cultural awareness" (1985: 12). At the State level, mission statements now reflect the same view. Indeed, many of the mission statements add that a school practice is questionable if it fails to acknowledge the contribution of all major social and cultural groups to the collective experience, identity and operation of the school.

Reynolds and Skilbeck (1976) discussed the manner in which people, including teachers, are shaped by culture, and how in turn people shape the culture. They emphasise that in planning a curriculum it is important to be aware of the ways in which culture impinges on the curriculum. They concluded:

There are social structures that function in school life which teachers cannot ignore, and there are hidden processes and connections in the imparting of cultural messages....

The most honest way of regarding the curriculum is to see it partly as the outcomes of the plans, aspirations , ideas and feelings of individual teaches and pupils, partly as the outcomes and social processes with hidden patterns about which we can learn much more .É (40).

The view of Reynolds and Skilbeck holds true in today's educational world. The cultural perspectives of Aboriginal people can contribute in a productive way to our understanding of the nature of schooling and learning experiences. These perspectives are at the heart of contemporary advocacy by Aboriginal people for changes in the education of their children.

3.2 The link between culture and learning styles

Investigations of relationships between learning and culture are not new (Cole & Means, 1981; Cole, Jay, Glick & Sharp, 1971). Results demonstrate a relationships between culture and how people think. The use of cognitive task analyses in these studies is very close to learning styles analyses.

One of the approaches to studying relationships between culture and learning styles is to analyse patterns of mental abilities in different cultures (Sternberg, 1988; Irvine & Berry, 1988; Jacob & Jordan, 1987). The "patterns of abilities hypothesis" postulates that "members of different cultural groups will typically develop different mental abilities or, more likely, that they will develop the same abilities but to different degrees" (Vernon, Jackson & Messick, 1988, p. 208). As indicated above there is no assumption here that the abilities are genetically-based, indeed they appear to be learned. It is the

relative strengths of the various abilities (which is closely related to our definition of learning styles) within a particular cultural category that is the focus of interpretation. Perhaps Sternberg's (1990) advice needs to be applied specifically to the cultural arena: "Styles of thinking and learning are every bit as important as levels of ability and we ignore students thinking style at our own peril - and theirs" (367).

There is certainly evidence of relationships between learning style and culture. However, definition and measurement of those relationship are problematic. Relationships between culture and cognitive style (which is closely related to learning style), as conceptualised by Witkin, have been studied extensively with Inuit, Native Canadian, Native American, Central African, Australian Aboriginal (desert and north-east coast), Papua New Guinean, and Scots (Berry, 1976). Some consistencies have emerged for various cultural groups including Mexican-Americans, Native-American, Blacks, and Jewish Americans (Vernon, et al., 1988). Other studies in China, India and Canada (Yu & Bain, 1985; Gardner, 1986; Vyas, 1988) also support a relationship between culture and learning style. But considerable within-group variation requires very cautious interpretation of the results.

Qualitative observations of learners in their own cultural setting suggest a strong link between culture and learning style (Swisher & Deyhle, 1989; Cooper, 1980). Banks focused on minority groups in the US., especially Black Americans. He reported that some researchers "

have found that ethnicity has a powerful effect on behaviour related to learning" (1988: 461). Anderson also focused on Black Americans. He concluded that cultural aspects of cognitive/learning style, as "cultural assets", were vital to more effective educational service delivery (1988: 8).

If an Aboriginal child comes from a cultural group in which children learn skills or concepts in a specific context (Harris, 1984) that child will likely be more effective with contextual learning. If a child comes from a cultural group which uses a great deal of non-contextualising learning (as in many Non-Aboriginal Australian cultures), then the child will likely be more effective with non-contextual learning. If an Aboriginal child comes from a background in which learning is usually demonstrated, or in which images are used regularly (eg.. images as part of the dreaming), then the child is more likely to develop a more imaginal learning style.

If a child comes from a cultural group in which the spoken or written work is used a great deal in learning (as in many Non-Aboriginal Australian cultures and many urban cultures), that child will be more likely to develop a verbal learning style.

Of course, the learning styles of an individual are not determined solely by cultural background. Individual life experiences and training also have a significant effect. The result is significant individual differences in children's learning styles within any

cultural group. Indeed, there is considerable overlap in learning styles of individuals from various cultural groups, especially when there is overlap in lifestyles and contact between two cultures.

One is left, then, with the task of describing a balance between learning styles that recur among members of a cultural group and individual variations between members of that cultural group.

We conclude that while there is not evidence for a single Aboriginal learning style, there are some recurrent learning styles which are more likely among Aboriginal students. Similarly there are also recurrent learning styles which appear to be more likely among Non-Aboriginal students. However there are wide variations amongst individuals in any cultural group and these must be taken into account. Further we submit that the recurrent styles among Aboriginal learners occur often enough to warrant careful attention by teachers provided teachers also attend to individual differences between students.

In summary, there is considerable support for the proposition that culture does affect the processes by which one learns and therefore the learning styles which one develops. "The research on field independence-dependence, on the relationships between learning at home and at school, on modality, on patterns of abilities and on various bipolar continua demonstrate that relationships exist" (More, 1990: 12).

At this point we temporarily leave this topic on culture and Aboriginal ways of learning, in order to propose a model of learning styles and ways of learning for use in this Project. Following the presentation and discussion of the model, we integrate it with the section, which we have just completed, on Aboriginal cultures and education.

4. TOWARDS A NEW MODEL OF LEARNING STYLES AND WAYS OF LEARNING

The concept of "learning styles" has held a prominent position in educational pedagogy for at least the past two decades (see Keefe's 1987 report for the National Association of Secondary School Principals). In an investigation of the application of the concept across cultures, More (1990) concluded that there is a link between culture and learning styles. He also proposed a model for using learning styles in multicultural settings and particularly with First Nations students in North America (1989, 1996).

We propose the following model for learning styles which is based on More's model. This model provides a consistent definition of learning styles and its companion concept, ways of learning; it focuses on a limited set of ways of learning in an structured way; and it allows for a balance between individual differences and cultural patterns.

Preliminary investigation of the efficacy of this model has begun in two settings in South Australia, with positive preliminary results.

4.1 Definitions

Definitions of terms related to learning styles have been developed to clarify concepts as they are used in this model.

4.1.1 Ways of learning

Ways of learning are the mental processes and instructional settings which an individual uses while learning.

Mental processes include organising, perceiving, coding, remembering and reasoning. Instructional settings include formal or informal, warm or impersonal, cooperative or competitive. For example, a student may carry out a learning task by organising holistically, coding verbally and in a formal, competitive setting.

4.1.2 Learning style

A learning style is a way of learning in which the student has a strength.

4.1.3. Discussion

These definitions are proposed because of two problems in the

literature. First is the absence of, and inconsistencies in,

definitions of learning style The second is confusion between "strength" and "preference" in the definitions. Most definitions of learning style are based on the preferred or usual way of learning of a student. And there is often a vague assumption that the preferred way of learning is also the strongest way of learning, with no research support for the assumption (More, 1989, 1990). Our preliminary findings suggest that students from a cultural minority (including Aboriginal students) usually use a way of learning which is not their strongest way of learning (learning style). This seems to occur especially when the teaching style of the school is different from their learning style. In addition many of the teachers we have worked with have pointed out that it is more useful to them to focus on the stronger ways of learning of their students rather than on the usual ways of learning. They see this focus as allowing them to build on the strengths of their students.

The definition of learning style is intended to reflect the fact that individuals have greater competence with some learning processes or learning settings, and lesser competence with others. The sources of these competencies and their relationship to the nature of the learning task are discussed in later sections.

4.2 Dimensions of ways of learning

We propose a perspective that looks at ways of learning and learning styles as a composite of many dimensions. We have listed below those dimensions which are appropriate to our definition and appear to be the most useful in understanding culturally related differences in ways of learning and learning styles (More, 1990).

a. Global _ Analytic

b. Verbal _ Imaginal

c. Concrete _ Abstract

d. Trial & Feedback _ Reflective

Each of these concepts is defined by a series of behavioural indicators developed in consultation with teachers in North America and Australia, described below.

The model treats each dimension as a continuum representing different combinations of the bipolar adjectives at each end of the continuum.

Other learning style models often categorise individuals strictly into one end or the other of the continuum as if they use only the one process rather than combinations of the two. They miss the possibility that learning processes are seldom purely one type or the other. For

example, in the model we propose, the learner may use both global and analytic processes but have a strength towards the global end of the continuum.

Two other dimensions of ways of learning which occur frequently with respect to indigenous learners are contextualised / decontextualised (Harris, 1980) and a positive quality relationship with the teacher (Groome, 1995: 89). However they are not a foci of this model for reasons of parsimony.

There are other ways of learning that depend on the instructional setting rather than on mental processes directly. They include cooperative/ competitive (Johnson & Johnson, 1992), individual oriented/ group oriented, high demand teacher versus low demand teacher and degree of teacher warmth (see Kleinfeld & Nelson, 1991), active/ receptive, and internal/ external locus of responsibility for learning.

4.2.1 Global --- Analytic

Global learning is a learning process which emphasises a Gestalt-like or holistic approach to integrating many components or stimuli of a learning task. Analytic learning is a learning process which emphasises learning the individual components or stimuli of a learning task. At the global (holistic) end of this spectrum, the student tends to understand best when the overall concept is presented first, when the

overview is emphasised or when a meaningful context is important. The more analytic student tends to learn best when learning is presented in small parts, gradually building up to the whole, or when context is less important, even confusing. The theoretical basis of this dimension was developed by Das (Naglieri, Das and Jarman, 1990, Das, 1995) from Vygotsky and Luria's works, and referred to as a "simultaneous/ successive' dimension.

4.2.2 Verbal --- Imaginal

Verbal learning is a learning process which emphasises the manipulation and coding of words in any form. Imaginal learning is a learning process which emphasises the manipulation and coding of images (concrete or abstract, and related to any of the senses, not just the visual).

The more verbal learner learns best from explanations which are based on words (as opposed to images or metaphors) or from dictionary-style definitions, relies more on words and labels, uses 'verbal regulation of behaviour' and codes concepts verbally rather than imaginally. The more imaginal learner learns from images (concrete or abstract), symbols and diagrams. The more imaginal learner is effective at making up his or her own images but may have difficulty in explaining them verbally. This continuum is based in part on theoretical work done by Paivio (More, 1990).

Imagery refers to more than visual imagery. The image may be related to any of the senses. For example, learners can process sound images or images involving any of the other senses. One student may have a sound-image of a major chord by remembering the individual notes which make up that major chord (an analytic image) or another by remembering the sound-image which those sounds make when they occur together (a global image).

Images may be considered as concrete (eg.. the memory of a heavy rock falling on one finger) or abstract (eg.. the images evoked by the word "love" or by the concept of Aboriginal dreaming).

4.2.3 Concrete --- Abstract

Concrete learning is a learning process which emphasises examples which can be directly perceived by one or more of the senses. Abstract learning is a learning process which emphasises concepts, principles or thoughts separate from their concrete instances.

A learner at the concrete end of this continuum learns better: when concrete examples are presented first followed by the more abstract principle or rule; when reference materials are directly related to the senses (eg. can be seen, touched or heard); or when "hands on" procedures are used. At the abstract end the learner does better when the concept or principle is presented first, followed by examples.

This type of learner is sometime confused by examples or has difficulty

extracting the principle or concept from the examples.

In circumstances in which the learner is unfamiliar with the cultural setting of the concept or principle being learned, it may be necessary to use a much more concrete approach to make the learning meaningful and relevant.

4.2.4 Trial & Feedback --- Reflective

Trial & Feedback learning is a learning process which emphasises an initial response (trial) followed by feedback which is used to refine the learning. This differs from impulsive responses which may not incorporate feedback, and which may not result in learning. Reflective learning is a learning process which emphasises thinking about (reflecting upon) the new learning before using it. This fourth dimension, comes primarily from More's (1989) work with Native Indian learners, particularly from his discussions with Native Indian elders as they compared traditional Native ways of learning to contemporary ways of learning. There is also a theoretical link to earlier work on "impulsive-reflective" learning styles (More: 199).

At one end of the continuum is the Reflective way of learning in which the learner completely thinks through (reflects upon) the new learning before using it, and in which the learner depends less on external

feedback. At the other end is Trial & Feedback, in which the learner responds more quickly (Trial), knowing the answer may not be completely correct, expecting to learn from the feedback to the response. This type of learner is much more dependent on external feedback from the teacher or from the environment. For example, one learns to ride a bicycle using the Trial & Feedback way of learning. The term trial and error is not used in order to emphasise the important role of feedback in this process.

4.2.5 Modality

Modality is a multiple dimension which reflects the fact that some student learn more effectively through seeing, others through hearing, other through touching, and so on. Some of the literature on learning styles two or more decades ago considered learning styles as referring only to modality.

4.3 Characteristics of learning styles in the proposed model

4.3.1 Best way of learning

In our proposed model the "best" way of learning for a particular learning task depends on (1) the learning styles of the learner and (2) the nature of the learning task. Generally the student should be encouraged to use his or her learning style. Sometimes, however, the

specific learning task requires a specific way of learning despite the learning styles of the learner. For example, when a student learns to do long division, that student is required by the nature of the task to use an analytic, sequential approach. When a student is asked to identify the theme of a short story, the nature of the task requires a more global approach. Thus the student needs to take both individual learning style and nature of the learning task into account when deciding which approach to use.

4.3.2 Teaching style

Our definitions of 'ways of teaching' and 'teaching style' are mirror images of our definitions of 'ways of learning' and 'learning style'.

Ways of teaching are the teaching processes and instructional settings which a teacher uses while teaching. A teaching style is a way of teaching in which the teacher has a strength, in which the teacher is more competent.

There is considerable evidence to suggest that one's teaching styles are based largely on one's learning styles. If an individual learns best using an analytic, imaginal, concrete approach, then he or she will be more likely to teach using that approach.

4.3.3 Learned or innate

The process of developing ways of learning and learning styles is primarily a social, learning process involving primary care givers as first suggested by Vygotsky (1978). There does not appear to be any evidence for an innate predisposition towards particular ways of learning. The evidence suggests (Swisher & Deyhle 1989; Kearins 1980) that learning styles are primarily learned. Most learning styles are learned as young children from mother, father, grandparents and close family friends with whom the child interacts regularly. From them the child learns content and skills. But the child also "learns how to learn" (learning styles). The learning styles of care givers have considerable influence on the child's learning styles. By the time a child gets to school, many of the learning styles have already been established.

4.4 Application to the Classroom

We propose a four-step process for using the concepts of ways of learning and learning styles in classrooms which include Aboriginal children, based on More (1996). The steps include finding a balance between the recurrent learning styles and individual differences in learning styles. They also take into account the need to assist students to strengthen their weaker learning styles since some learning tasks require a specific way of learning (whether or not it is a strength). Further exploration and development of these steps is a major part of the ongoing professional application component of the

AbWoL Project.

Briefly, the steps are as follows:

4.2.1. Identification of learning styles of learners using classroom

observations and inventories as well as research related to recurrent,

culturally based learning styles; identify teaching style of teachers

using inventories. A learning style inventory and a parallel teaching

style inventory are being developed as part of this step.

4.2.2. Matching teaching styles to learning styles for difficult

learning.

4.2.3. Strengthening weaker ways of learning; it is sometimes necessary

for the student to use these because of the nature of the learning task

or testing style.

4.2.4. Developing learning style selection strategies. This is a fairly

complex task because it must be done in a way that does not confuse the

learner who may already be having academic difficulties.
Discussions

with teachers suggest that in some cases it may best be left to the

unconscious since most learning style decisions are made unconsciously.

In other cases it may be beneficial for students to learn how to make

conscious decisions about appropriate ways of learning.

5. RECURRING LEARNING STYLES AND ABORIGINAL LEARNERS

We now return to the Aboriginal and Non-Aboriginal cultural settings.

The section which follows describes some of the recurrent learning styles of Aboriginal students which we predict from the research. One of the long range goals of the Aboriginal Ways of Learning (AbWoL) Project is to investigate these further, as discussed in the final section of this paper.

5.1 Recurrent Aboriginal learning styles

In this section we discuss cultural differences that may be related to learning styles, for Aboriginal Australians and Non-Aboriginal Australians. We do not want, however, to leave the reader with the notion that it is Aboriginal people who are different - rather both are different from each other. Neither group should be considered to be the norm or the standard.

The reader is reminded that the following discussion of Aboriginal learning styles is not meant to suggest that Aboriginal students be taught only in their stronger learning styles (see the section below on

Applications to the classroom). Aboriginal students must, as must all students, be helped also to strengthen their weaker learning styles in order to use the appropriate style when the task requires it.

The section which follows is based primarily on Aboriginal people in traditional communities. Limited research has been done with Aboriginal learners (other than Malin, 1990) in urban and contemporary communities. Such research is planned as part of the AbWoL Project

5.1.1 Primary cultural differences

a. Learning through observation and imitation rather than verbal instruction

One of the consistent findings is that much Aboriginal learning is by observation and imitation, rather than through verbal instruction (Harris, 1980; Hughes, 1992). This finding relates directly to the concrete - global - imaginal learning style dimensions. In terms of our model, observation by the learner provides a concrete, holistic image of the tasks to be performed. That image serves as an anchor or reference point for the learner.

b. Learning through Trial & Feedback

Observation and imitation appear to be towards the Reflective end of the Trial & Feedback Reflective dimension. Most ethnographic accounts

of observation and imitation learning in traditional settings suggest that the learner does not attempt to imitate until he or she is fairly certain that the imitation will be done correctly. This is consistent with teacher reports that Aboriginal students tend towards a reflective learning style.

c. The group is more important than the individual

Harris (1984) and Andrews and Hughes (1988) emphasise that the group is more important than the individual. This priority has an effect in two ways. First, the purpose of learning for many traditional Aboriginal people is primarily to benefit the group, not necessarily the individual. Second, learning as a group process seems to be more important than learning as an individual process.

This characteristic relates particularly to the cooperation-competition dimension and to the group-individual dimension. Watson (1991) found that urban Aboriginal students learn best in small groups based on gender or Aboriginality.

d. Holistic (global) learning

According to Hughes (1988), Aboriginal learning is often holistic, that is, the learner concentrates on understanding the overall concept or task before getting down to the details. By contrast, Harris (1984) reported that Non-Aboriginal learners emphasise sequential (or

analytic), learning as a result of their verbal learning style. Watson (1991) found that urban Aboriginal students need more discussion, talking and modelling at the beginning of the lesson.

The combination of global and imaginal learning styles on the part of many Aboriginal learners forms a very powerful contrast to the analytic, verbal learning styles of many Non-Aboriginal learners.

e. Visual-spatial skills

According to Hughes (1992) many Aboriginal learners build on visual-spatial styles. This is directly related to the visual modality and to imaginal processing. The difference between visual modality and imagery is that the modality relates to the method by which the information is received by the learner, whereas imagery relates to the way in which the information is coded by the learner.

f. Imagery

Concrete imagery has already been discussed above. But abstract imagery is also a learning style for many traditional Aboriginal people. For example, Bindarriy, Yangarriny, Mingalpa and Warlkuni (1991) describe how Aboriginal children had to rely on the images in the minds of the 'olmen' and 'olgamen' to reconstruct the location of the houses. In that example, the Aboriginal children used an abstract image to locate the houses. Learning the Aboriginal dreaming is another example of a common, highly-abstract learning process.

g. Contextual learning

Harris (especially 1984) emphasises the degree to which members of Aboriginal cultural groups learn within specific contexts. He also emphasises that learning in a Non-Aboriginal setting, particularly the school, is decontextualised, that is, the learning is not usually done in its 'real life' context.

h. Spontaneous learning

Spontaneous learning is another characteristic distinction between Aboriginal and Non-Aboriginal learning (Andrews & Hughes, 1988). By contrast, structured learning is more frequent in Non-Aboriginal cultures.

5.1.2 Secondary cultural differences

Secondary cultural differences are differences which arise from student's experiences with school, or with the majority society.

According to Ogbu,

Secondary cultural differences are those differences that arise after two populations have come in continuous contact or after members of a given population have begun to participate in an institution controlled

by another population, such as the schools. In other words, secondary cultural differences develop as a response to a contact situation, especially a contact situation involving the domination of one group by another [italics author's] (1987: 322).

a. Apparent passive participation

Apparent passive participation (Christie, 1982) has almost taken on the status of a learning style with respect to many Aboriginal students. However this is a misinterpretation of Aboriginal students behaviour in three ways. First, many Aboriginal students grow up learning at home to emphasise cooperative participation rather than initiation and manipulation (ibid., 1982). They may see initiation and manipulation as impolite and pushy. Second, many Aboriginal students and their parents feel they have no influence on the education of their children (Hughes, 1992; Bindarriy et al., 1991). Third, most Aboriginal students differ from their teachers in language usage, assumptions, information, and life experiences (Kearins, 1982). The resultant of these three factors is the apparently passive participant which is often in marked contrast to the apparently purposeful active participation of many Non-Aboriginal students.

b. Concrete learning style

Many teachers of Aboriginal students point to a concrete learning style of their students. They often express concern about the apparent

inability to learn abstract concepts and principles. This may be the result of the lack of relevance, to Aboriginal students, of how and what is taught. Seeing, touching, and hearing may be all that makes an irrelevant learning task meaningful to such students.

c. Reflective and random learning styles

As a result of the unfamiliar environment of the school and the feelings of ostracisation that many Aboriginal students experience (Malin, 1990), students may develop one of two learning styles. First, the student may develop a reflective style. That is, the student is slow to respond and thinks the answer through before responding, if at all. The motivation for the reflective way of learning may be to avoid embarrassment, shame and ridicule. Alternatively, an Aboriginal student may completely give up and simply make random, guessing attempts. This usually an ineffective use of Trial & Feedback in that meaningful feedback will only be a chance event.

In summary, using the terminology of the AbWoL model, the following are predicted as recurrent Aboriginal learning styles:

- a. global (from a primary cultural difference)

- b. imaginal (from a primary cultural difference)

c. concrete (from a secondary cultural difference)

d. a complex combination of Trial & Feedback and Reflective (from both
primary and secondary cultural differences)

e. contextualised (from a primary cultural difference)

As with other aspects of this paper these recurrent learning styles
require further investigation as part of the AbWoL Project.

5.2 Testing the predictions

The next step is to investigate the extent to which these predicted
learning styles actually occur. To this end a learning styles
inventory is being developed by the AbWoL Project. The inventory is
currently being pilot tested. Preliminary results suggest that they do
occur.

6. CONCLUSIONS AND IMPLICATIONS

6.1 Conclusions

6.1.1 Feasibility of using learning styles

We conclude that while there is not evidence for a single Aboriginal learning style, there are some recurrent learning styles which are more likely among Aboriginal students. Similarly there are also recurrent learning styles which appear to be more likely among Non-Aboriginal students. However there are wide variations amongst individuals in any cultural group and these must be taken into account. Further we submit that the recurrent styles among Aboriginal learners occur often enough to warrant careful attention by teachers provided teachers also attend to individual differences between students.

It is important to avoid the notion of Aboriginal learning styles as a new way of stereotyping Aboriginal students. Rather, the approach must be used as one way of building on the strengths of individual students.

We suggest that the most effective ways to incorporate learning styles and culture for Aboriginal students are:

- * to consider the recurrent learning styles that seem to be related to culture, especially with groups;
- * to determine individual learning styles as accurately as possible; and
- * to adapt teaching styles to student learning styles concurrent with strengthening weaker ways of learning.

6.1.2 Guiding principles

We propose the following principles for appropriate, effective use of recurrent Aboriginal learning styles based on ethical considerations, professional considerations and preliminary findings.

- a. Learning styles and ways of learning are best represented as bipolar continua since mental processing is almost always a combination of the processes which appear at the two ends of the continua. Learning styles are not one or another process, but are combinations of processes.
- b. Recurrent learning styles (for any cultural group) can be very helpful in planning for groups. But learning styles of individuals must take precedence.
- c. Cultures, including Aboriginal cultures, are dynamic. As a result one would not expect learning styles of a particular cultural group to remain static over a long period of time.
- d. Students must be assisted in strengthening their weaker ways of learning while fully appreciating and building on their learning styles.

6.1.3 Recurrent Aboriginal learning styles

In summary, using the terminology of the AbWoL model, we have identified the following recurrent Aboriginal learning styles:

- a. global (from a primary cultural difference),
- b. imaginal (from a primary cultural difference),
- c. concrete (from a secondary cultural difference),
- d. a complex combination of Trial & Feedback and Reflective (from both primary and secondary cultural differences),
- e. contextualised (from a primary cultural difference).

6.1.4 Model for using a learning styles approach

The proposed learning style model appears, from preliminary results, to be appropriate as the basis for further development. It was developed for use in cross-cultural settings and deals effectively with cultural differences reported in this investigation.

6.2 Implications for further research and development

The present paper reports on Part One of the AbWoL Project. Part Two involves further research and development and is based on the implications of in this section.

6.2.1 Further research and evaluation

There are a number of ways in which the model needs further investigation. First, most of the evidence for recurrent Aboriginal learning styles comes from two sources: research on Aboriginal cultures, little of which is classroom-related; and anecdotal teacher reports. As a result, more work needs to be done on the classroom validity of the model. Second, there is very little related to the model in the literature on cognitive psychology and cultural psychology. Stronger theoretical links of this sort need to be investigated. Third, there is limited research on the ways in which the use of learning styles and teaching styles affects achievement. This needs to be a priority for the next phase of the AbWoL Project. Fourth, there is a need to include much more investigation in urban settings.

In addition, various components of the model and its application need to be evaluated including the Learning Style Identification and Teaching Style Identification Inventories, teacher accuracy in judging learning styles, and the teacher development workshop.

Recommendations for further research:

1. investigation of the recurrent Aboriginal learning styles in actual classroom settings and in urban settings;
2. investigation of links between the model and current developments in

cognitive psychology and cultural psychology;

3. investigation of the effectiveness of various methods for using the model to improve learning with Aboriginal students; and
4. investigation of teaching styles of Aboriginal and Non-Aboriginal teachers, according to the components of the AbWoL model.

Recommendations for evaluation:

1. evaluation of the effect of a learning styles approach on Aboriginal student achievement;
2. evaluation of teachers' ability to teach to specific learning styles and ways of learning;
3. evaluation of the accuracy with which teachers interpret student behaviours and their own teaching behaviours according to the components of the AbWoL model;
4. evaluation of the professional development workshops and the teacher resource materials; and
5. evaluation of the AbWoL Learning Style Identification Inventory and the AbWoL Teaching Style Identification Inventory.

6.2.2. Further program development

a. Involvement of "expert" teachers

The early results of this investigation were sufficiently strong to support immediate development of classroom resource materials. A small

group of teachers who have a reputation as excellent teachers of Aboriginal students was selected from throughout South Australia.

The teachers were exposed, in a professional development setting, to the model presented in this paper and to the draft learning style and teaching style inventories. The teachers also had the opportunity to provide feedback for revisions and further development.

Then the teachers developed adaptations of curriculum units which built on the recurrent Aboriginal learning styles following the AbWoL model. Once the units were developed they were trialed with the teachers' own classes. The results of these trials are still being evaluated and will be reported in due course.

b. Teacher resources and professional development for teachers.

We recommend that further development include:

- * a learning style inventory that can be completed by the students themselves;
- * a practical classroom resource for teachers which builds on the results of this investigation;
- * a professional development workshop for teachers; and
- * adaptations of curriculum materials which emphasise the recurrent

Aboriginal learning styles, with a focus on appropriate pedagogy rather than appropriate content.

REFERENCES

Aboriginal Education Unit (1993) Teaching Aboriginal students; Teacher in service course, Aboriginal Education Unit, South Australia Department of Education, Adelaide.

Anderson, J. A. (1988) Cognitive styles and multicultural populations, *Journal of Teacher Education*, 39(1): 2-9.

Andrews, R. and Hughes, P. (1988) Toward a theoretical framework for the development of an Aboriginal pedagogy. Paper prepared for the National Aboriginal Pedagogy Project, Curriculum and Development Centre, Department of Employment, Education and Training, Canberra.

Banks, J. (1988) Ethnicity, class, cognitive and motivational styles: Research and teaching implications, *Journal of Negro Education*, 57(4): 452-66.

Berry, J. W. (1976) Human ecology and cognitive style: Comparative studies in psychological adaptation, Sage-Halstead, New York.

Bindarriy, Yangarriny, Mingalpa, Warlkuni (1991) Obstacles to Aboriginal Pedagogy. In Blekbala Wei, Deme Nayin, Yolngu Rom, Ngini Ngingingawula, Ngawurranungurumagi (Eds.), *Aboriginal Pedagogy: Aboriginal Teachers Speak Out*, Deakin University Press, Geelong.

Blanchard, A. (1985) *Aboriginal Education (Blanchard Report)*, House of Representatives Select Committee on Aboriginal Education, Parliament of the Commonwealth of Australia, Canberra.

Christie, M. (1982) *The ritual reader: Guiding principles for teaching meaningful reading to Aboriginal children*. Paper presented to the 8th Australian Reading Conference, Adelaide.

Cole, M. & Means, B. (1981) *Comparative studies of how people think*, Harvard University Press, Cambridge.

Cole, M., Gay, J., Glick, J. A. & Sharp, D. W. (1971) *The cultural context of learning and thinking*, Basic Books, New York.

Cooper, G. (1980) *Different ways of thinking*, *Minority Education*, 2(5): 1-4.

Das, J. (1995) *Some thoughts on two aspects of Vygotsky's work*, *Educational Psychologist*, 30: 93-7.

Gardner, J. (1986) *Construct validity of the K-ABC for Cantonese*,

English and Punjabi speaking Canadian children. Unpublished doctoral dissertation, University of British Columbia, Vancouver.

Groome, H. (1995) Working purposefully with Aboriginal students, Social Science Press, Wentworth Falls, NSW.

Harris, S. (1995) "Soft" and "hard" domain theory for bicultural education in indigenous groups, Peabody Journal of Education, 69: 140-153.

Harris, S. (1990) Two-way Aboriginal schooling: Education and cultural survival, Aboriginal Studies Press, Canberra.

Harris, S. (1984) Aboriginal learning styles and formal schooling. In M. Christie, S. Harris & D. McLay (Eds.) Teaching Aboriginal Children: Millingimbi and Beyond, Institute of Applied Aboriginal Studies, Mount Lawley, WA.

Harris, S. (1980) Culture and learning: Tradition and education in North-East Arnhem Land, Department of Education, Darwin, Northern Territory.

Harris, S. (1977) Millingimbi Aboriginal learning contexts. Unpublished doctoral dissertation, University of Mexico.

Hart, M. (1981) Traditional Aboriginal education. In Menary, B. (Ed)
Aborigines and schooling, College of the Arts and Education, Adelaide.

Hughes, P. (1997) Aboriginal cultures and learning. Unpublished
paper, Yunggoendi First Nations Centre for Higher Education and
Research, The Flinders University of South Australia, Adelaide.

Hughes, P. (1992) A compact for Aboriginal Education. Unpublished
paper, Aboriginal Education Unit, Department of Education, Adelaide.

Hughes, P. (1985) Towards a new pedagogy for Aboriginal education.
Presidential address for 54th ANZAAS Conference, Canberra.

Irvine, S. H. & Berry, J. W. (Eds.) (1988) Human abilities in cultural
context, Cambridge University Press, Cambridge.

Jacob, E., & Jordan, C. (Eds.) (1987) Theme issue: Explaining the
school performance of minority students, *Anthropology & Education
Quarterly*, 18(4).

Johnson, D. & Johnson, R. (1992) Implementing cooperative learning,
Contemporary Education, 63: 173-80.

Kearins, J. (1982) Cognitive strengths of Australian Aboriginal
children, *Wikaru*, December, 1982, 2-20.

Kearins, J. (c. 1980) Child rearing practices in Australia: Variations with life style. Unpublished paper, Department of Psychology, University of Western Australia.

Keefe, J. (1987) Learning style: Theory and practice, National Association of Secondary School Principals, Reston, VA.

Keeffe, K. (1987) Curriculum development in Aboriginal studies for schools: An interim report. Unpublished paper, Australian Institute of Aboriginal Studies, Canberra.

Kleinfeld, J. and Nelson, P. (1991) Adapting instruction to native American's learning styles, *Journal of cross cultural psychology*, 22 (2): 273-281.

Malin, M. (1990) Why is life so hard for Aboriginal students in urban classrooms? *Aboriginal Child at School*, 18 (1): 9-29.

More, A (1996) Adapting teaching to the learning styles of Native Indian students. Unpublished resource book for teachers, University of British Columbia, Vancouver.

More, A. (1990) Learning styles of Native Americans and Asians. Paper

presented to American Psychological Association Conference, Boston.

More, A. (1989) Native Indians and learning styles: A review for researchers and educators. *Journal of American Indian Education*, (Special Issue, August, 1989).

Muir, D. (1987) Interim paper for the Aboriginal and Torres Strait Islander Pedagogy Project. Unpublished paper.

Naglieri, J., Das, J., & Jarman, R. (1990) Planning, attention, simultaneous and successive processes as a model for assessment, *School Psychology Review*, 19 (4): 423-42.

National Aboriginal Education Committee (NAEC) (1985) Philosophy, aims and policy guidelines for Aboriginal and Torres Strait Islander Education, National Aboriginal Education Committee, Canberra.

National Aboriginal Education Committee (NAEC) (1984) Funding priorities in Aboriginal Education, Commonwealth Schools Commission, Canberra.

Ogbu, J. (1987) Variability in minority school performance: a problem in search of an explanation, *Anthropology & Education Quarterly*, 18: 312-34.

Reynolds, J. and Skilbeck, M (1976) Culture and the classroom, Open

Books, London.

Sternberg, R. J. (1990) Thinking Styles: Keys to understanding student performance, *Phi Delta Kappan*, 71: 366-371.

Sternberg, R. J. (1988) A triarchic view of intelligence in cross-cultural perspective. In S. H. Irvine, & J. W. Berry (Eds.) *Human abilities in cultural contact*, Cambridge University Press, Cambridge.

Swisher, K. & D. Deyhle (1989) The styles of learning are different, but the teaching is just the same: Suggestions for teachers of American Indian youth, *Journal of American Indian Education* (Special Issue, August, 1989).

Theis, K. (1987) *Aboriginal viewpoints on education: A survey in the East Kimberley region*, National Centre for research on Rural Education, Perth.

Vernon, P. A., Jackson, D. N., & Messick, S. (1988) Cultural influences on patterns of abilities in North America. In S. H. Irvine, & J. W. Berry, (Eds.) *Human abilities in cultural context*, Cambridge University Press, Cambridge, 208-231.

Vyas, H. (1988) Education and cognitive styles: A case study of Gujarati children in Britain, eastern United States and India. In C.

Bagley & G. Verma (Eds.) Multicultural childhood: Education ethnicity and cognitive styles, Gower Publishing, Hampshire, England.

Vygotsky, L. (1978) Mind in society: The development of higher psychological processes, Harvard University Press, Cambridge, MA.

Watson, S. (1991) Maths reporting with Aboriginal Children. In Aboriginal Education Resource Papers, Teaching and Learning Mathematics, South Australia, Department of Education, Adelaide.

Yu, A. & Bain, B. (1985) Language social class and cognitive style: A comparative study of unilingual & bilingual education in Hong Kong and Alberta, Hong Kong Teachers' Association, Hong Kong.