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Core conceptions of learning and ways of learning: Apparent dissonance for Indigenous Australian university students*

GILLIAN M. BOULTON-LEWIS¹, DAVID LEWIS² and LYNN WILSS¹

¹ *Centre for Cognitive Processes in Learning, School of Learning and Development, Queensland University Of Technology, Kelvin Grove, Brisbane, 4059, Australia, Phone: 61-7-3864-3118, Fax: 61-7-3864-3987, E-mail:;*

² *University of Queensland, Brisbane, Australia*

Abstract. This paper reports on a phenomenographic investigation into conceptions of learning for 15 Indigenous Australian university students over the three years of their degree courses. The ways in which they went about learning were also investigated along with the relationship between individual students' 'core' conceptions of learning and the ways in which they learnt. Results indicated that their conceptions and ways of learning were similar in some respects to those found for other university students. However some students went about learning in ways that were incongruent with the core conception of learning they held. This can be regarded as dissonance between strategies and conceptions of learning. The implications of this for Indigenous Australian university students are discussed.

Keywords: approaches to learning, conceptions of learning, core conceptions, dissonance, Indigenous Australian university students, longitudinal, phenomenographic investigation, study orchestration

Conceptions of learning

Many studies in recent years have examined conceptions of learning from a phenomenographic perspective. The focus of phenomenographic inquiry is to investigate the qualitatively different ways that people experience phenomena (Marton, 1988) and to delineate those ways of experiencing, or conceptions, as categories of description. A conception is dependent upon both human activity and the world that is external to an individual and, as Svensson (1997) states, it encompasses the "meanings and understandings of phenomena" (p. 163). In the case of learning, conceptions develop as a result of a student's engagement in learning contexts. This is reiterated by Morgan and Beaty (1997) when they describe a conception as a focus of awareness that constitutes part of a student's experience of learning. They explain that an experience has a

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structural and a referential aspect. The structural aspect concerns the constituent parts of the experience and their relationship to each other as well as contextual factors. Intertwined with the structural is the referential, or in other words the meaning aspect of the experience.

Results of studies of conceptions of learning indicate that there are common elements to these across cultures and that these are closely aligned to Marton et al.'s (1993) six conceptions of learning. The six conceptions, which build on Säljö's (1979) conceptions of learning, resulted from a longitudinal investigation involving British Open University students and are as follows: A. increasing one's knowledge, B. memorising, C. applying, D. understanding, E. seeing something in a different way, and F. changing as a person. According to Marton, et al. these conceptions form a hierarchy with the first three focusing on quantitative dimensions of learning while the latter three are characteristically qualitative. The conception 'understanding' is the demarcation point as it relates to gaining *meaning* (Marton et al., 1993, p. 288). The first three conceptions concern taking in information as though it was "something ready-made" (Marton et al., 1993, p. 288) and devoid of meaning.

Learning approaches

Approaches to learning have been investigated from various perspectives including study behaviour, strategies, and context. The contention is that there is a relationship between students' perceptions of the learning environment, their approach to learning and the outcome of learning (Trigwell and Prosser, 1991; Van Rossum and Schenk, 1984). Marton and Säljö (1997) explain an approach to learning as involving either 'deep' or 'surface' processes. This takes into account "referential aspects of students' experiences" (p. 47) or in other words whether or not they are seeking meaning in what they are learning. A surface approach entails the use of low level cognitive activities with the intention to "get the task out of the way with the minimum trouble, while appearing to meet requirements" (Biggs, 1999, p. 14). Strategies that evidence a surface approach include: focusing on words and isolated facts, learning enough just to pass, routine memorising, and being bound by the syllabus. On the other hand

a deep approach is evidenced by strategies such as: reflecting on what is being learnt, relating ideas, seeking meaning and understanding, and questioning. Some studies have shown that deeper and more meaningful study strategies are associated with better conceptual knowledge and an outcome of learning that evidences understanding (Marton and Säljö, 1997) while surface or rote strategies have been associated with poor performance on final examination questions (Hegarty-Hazel and Prosser, 1991).

Learning strategies, according to Vermunt and Verloop (2000) constitute combinations of learning activities. Weinstein and MacDonald (1986) explain strategies as comprising any cognitive, affective, or behavioural activities that are used in the processes of encoding, storing, retrieving, or using knowledge. Similarly, Vermunt and Verloop (1999) described learning activities according to three categories, cognitive, affective, and metacognitive. Cognitive activities included relating and structuring, analysing, memorising and processing critically. Affective activities included concentrating and exerting effort, appraising, and dealing with emotions while metacognitive activities incorporated both cognitive and affective components. Students practising metacognitive processes exert control over how they process information, orient or prepare a learning process by examining content, adjust the original learning plan through continual monitoring, and evaluate and reflect by trying to explain course work in one's own words.

Study orchestrations

Students generally undertake learning by employing a variety of strategies within contexts that are influenced by many factors. For example Prosser et al. (2000) report that a student's prior knowledge and perceptions of the learning context are relational to how they approach learning. They believe that a learning environment that is perceived to comprise good teaching and clear goals and that fosters independent learning behaviour is correlated positively with a deep approach to learning and high learning outcomes. Such an environment and outcomes are dependent upon coherent linkages between learning context and learning

behaviour. Meyer (2000) explains that learning behaviour at an individual or group level constitutes a study orchestration. This takes into account the “consonant relationships between students’ perceptions of the learning environment, their approaches to studying, and variation in their conceptions of what ‘learning’ is” (Meyer, 2000, p. 3).

The demands of the learning environment, including instructional strategies, may support how some students go about their learning; for others this is not the case. According to Lindblom-Ylänne and Lonka (2000) the learning environment influences a student’s study orchestration. They exemplified this by studying medical and psychology students and found that the learning environment for medical students reflected a conflict with individual students’ study practices. They attributed this to a traditional curriculum that medical students found dissatisfying as it led to a reproducing study orchestration which was often in conflict with the way they preferred to learn. This was contrasted with the ‘activating’ curriculum for psychology students that fostered sophisticated conceptions of learning and knowledge. While psychology students exhibited both meaning and reproducing orchestrations to studying, the medical students’ grades were significantly lower than those of the psychology students. Lindblom-Ylänne and Lonka concluded that the functionality of the learning environment impacts on the development of students’ study orchestrations.

Dissonant study orchestrations

When students possess a coherent approach and conception of learning it should follow that their learning experience will result in productive engagement with both content and context. However learning often involves some form of instruction and this can also influence students’ engagement in learning situations. Vermunt (1996) contends that instruction plays a crucial role in the experience of learning but warns “instruction does not lead to learning automatically” (p. 25). Sometimes students experience instruction that fails to match their style of learning, and they may approach learning in ways that are counter-productive or incongruent with their conception of learning (Wilss, et al., 2000), or they may lack

motivation. Some studies have examined contextualised learning behaviours of students in higher education to determine reasons for such manifestations (Meyer, 1991, 2000; Prosser, Trigwell, Hazel, and Waterhouse, 2000). Meyer explains the breakdown or lack of coherent linkages between some or all of the common sources of explanatory variation in contextualised learning behaviour as ‘dissonance’. This is characterised by variation in contrasting forms of generic cognitive processes, motives, regulatory mechanisms, contextual perceptions and conceptions of learning. Students who cannot reconcile dissonance are academically at risk.

As stated already, dissonant study orchestrations of psychology students were investigated by Lindblom-Ylänne and Lonka (2000) who believed that student learning reflects the interaction between the learner and the learning environment. They found two main learning orchestrations: a *meaning orchestration* and a *reproducing orchestration*. Students with a coherent meaning orchestration were motivated and satisfied with their studies and they emphasized theoretical thinking and understanding. Students with a coherent reproducing orchestration expected basic instruction and their motivation and satisfaction were neutral. By contrast dissonant students were least satisfied and found aspects to criticize in instruction and curriculum. Entwistle, Tait, and McCune (2000) administered the Approaches and Study Skills Inventory (ASSIST, Tait, Entwistle, and McCune, 1998) to higher education students in Britain, Scotland, and South Africa. A sample of the South African students showed low attainment and dissonant patterns of response. They were disorganised in their studying, highly anxious, and exhibited confusion between their intention to seek meaning and their syllabus boundness and weak levels in the ideas in the course. In other words these students implied that they were seeking a deep approach but they did not know how to achieve it.

When Cliff (2000) conducted a qualitative investigation into the study approach of first-year engineering students enrolled in an Academic Support Programme in Cape Town he found that those with a dissonant orchestration appeared to:

- equate understanding with mechanistic study approaches and applied quantitative procedures to problem solving;
- equate understanding with memorising;
- possess inappropriate forms of motivation;
- be unable to explain study difficulties, academic failures or underperformance;
- have approaches that were dissonant with their perceptions; and
- lack metacognitive awareness.

He concluded that dissonance resulted from students' inability to adjust their study behaviour to meet the demands of the academic context. Others (Entwistle and Ramsden, 1983; Prosser et al., 2000) have found evidence of dissonance that is based on students' lack of prior knowledge for studies they are currently undertaking. Prosser et al. conducted a phenomenographic analysis of physics students' understanding over a semester and found a disintegrated cluster who possessed poor conceptual knowledge, perceived the context as affording both surface and deep approaches and used both approaches. These were the lowest achieving students. They also found that students with well-developed prior knowledge were likely to adopt a deep approach and had well-developed knowledge at the end of their studies. Several studies that used the Inventory of Learning Styles (ILS) were examined by Vermunt and Verloop (2000) for evidence of dissonance. Five phenomena of dissonance were found that included:

- lack of *differentiation* within learning strategies, mental models of learning and learning orientations;
- lack of *integration* between learning strategies, mental models of learning and learning orientations;.

- *incompatibility* of learning strategies, mental models of learning and learning orientations; and
- *missing learning style elements* – some students learn according to the bare elements of a style – for example pure memorisation with no analytic elements. They may omit essential elements and this may result in low achievement.

Rationale for this study

Most studies into dissonant study orchestrations have ~~taken a quantitative viewpoint~~ been quantitative. The study described in this paper is longitudinal, ~~case-based~~ (IT IS NOT CASE BASED IN THE WAY THAT JARGON IS USED) and phenomenographic. Relationships between conceptions of learning, ways of going about learning and other aspects associated with learning for Aboriginal and Torres Strait Islander university students over a three year period were examined. ?Phenomenographic methodology facilitates full descriptions of events that allows meaning to evolve from research findings.? WHAT DO WE REALLY MEAN BY THIS? As Indigenous university students have the highest attrition rate of all university students in Australia it is important to know not only if they experience dissonant study orchestrations but if they do, why this is the case; employing phenomenographic methodology was one means by which this could be achieved. ~~This information can be then used as a basis from which teaching and learning strategies can be developed to help overcome dissonance.~~

Specifically this study: a) describes conceptions of learning including core conceptions for individual students over a three year period, b) describes the ways in which they learn, and c) provides a comparative analysis of these aspects of learning to discern any evidence of dissonance.

Methodology

Sample

The sample, after three years, comprised 15 Aboriginal and Torres Strait Islander students. Eleven were studying a specialised bachelor degree program, in Indigenous Primary Health Care, that was specifically planned for their learning needs. The other students were studying bachelor degree courses in built environment and engineering, humanities, commerce, and business; 10 were male and 5 were female. Ages ranged from 18 to 48 years; the mean age was approximately 25 years. Two students came from remote areas such as Thursday Island, 9 from regional country towns and 4 from capital cities. Twelve students had completed Year 12; the others had completed Year 10 but subsequently did either a bridging course or a diploma at a technical and further education college before gaining entry to university. Some had varied work experience, and some had studied in other courses. The students came from diverse backgrounds, living conditions, and cultural experiences.

Interviews

Individual, semi-structured, audiotaped interviews each lasting about an hour, were conducted by two Aboriginal research assistants in conjunction with two of the researchers.¹ Predetermined questions, used to stimulate dialogue, covered the following topics: reasons for studying at university; methods of studying; the meaning of learning, understanding, and knowledge; learning outside university; and memorisation and learning. Following phenomenographic methodology (Svensson, 1997) the interviews were framed so that the questions related to each other and were contextualised. For example students were asked to *give an example of something they had learned recently*, followed by *what does learning mean to you*, *tell me about something you have learned outside of university* and *are learning at university and other places the same or different?* The interviewer explored interesting points that were relevant to learning as they arose.

Analysis

Interviews were transcribed from the audiotapes and analysed jointly by the researchers using a phenomenographic approach to determine students' conceptions of learning. This approach was adopted as it seeks to identify the different ways in which people conceive of and understand phenomena as they endeavour to make sense of their experiences. Conceptions are explained as being relational because intentions and the context in which phenomena occur (Johansson, Marton, and Svensson, 1985) influence people's experiences. In a departure from previous phenomenographic studies, interview transcripts were initially summarised as a series of brief case studies that focused on reasons for studying, formal learning, informal learning, understanding, strategies, and knowledge. The data were pooled and the researchers adopted an iterative approach to ascertain relations, similarities and differences in the students' responses. This was conducted by moving between the full transcripts and the summaries.

Categories of description that constituted the students' conceptions of formal learning were derived. In earlier phenomenographic research (Marton, Dall'Alba, and Beaty, 1993; Marton, 1994; Prosser, Trigwell, and Taylor, 1994), subsequent to deriving conceptions of learning from pooled data, ~~students~~ INTERVIEWEES (PTT DID NOT TALK TO STUDENTS) have been described in terms of their highest conception of learning. We believe that there are problems with this procedure unless the highest conception constitutes their 'core' conception of learning. By core conception we mean the conception that we can derive from each interview that subsumes lower conceptions and is supported by what they say overall about learning. That is what they say about learning as well as related aspects such as understanding, knowledge, how they go about learning, memorisation, and the relationship between learning and understanding. Students may also voice conceptions that suggest higher categories of the experience of learning but that do not fit with other statements they make about learning, consequently we would not categorise them generally at that level. Categories of ways students learned were also ascertained.

The process described above was carried out with data for each year analysed independently of the other years. Conceptions for the three years were then compared. Initial analysis of data for the first two years of this research is reported in a book chapter (Boulton-Lewis, Marton, and Wilss, 2001). Since writing the chapter the data were reanalysed subsequent to further discussions by the research team. Based on these discussions some modifications took place to the conceptions that were derived previously and reported in the book chapter. While the first year conceptions remain the same, the second year conceptions now include a fourth conception of 'seeing something differently' and the conception of 'change as a person' is now the fifth conception 'change in thinking and understanding'. These two additional conceptions are based on a sample size of one. Findings from the study are also published in Boulton-Lewis, et al. (2000a, 2000b) and Wilss, et al. (2000).

Following are descriptions of the students' conceptions of learning, the ways in which they learned, and an analysis of the relationship between students core conceptions and predominant way in which they approached learning.

Results

Conceptions of learning

During the first year (Boulton-Lewis, Marton, Lewis, and Wilss, 2000a, 2000b) conceptions were classified into three main categories of description. These were: 1. *acquisition of knowledge*, 2. *understanding*, and 3. *personal growth*. Acquisition also had the sub-category of 1(a) *acquisition and use* and understanding had three sub-categories: 2(a) *understand and remember*, 2(b) *understand and apply*, and 2(c) *understand and relate*. While the conception, *acquisition* was apparent in the second year but not the third year, *acquisition and use* and the three categories of *understanding* were apparent in both the second and third years. The conception *personal growth* was not evident during the second and third years. However *seeing something differently* and *change in thinking and understanding* emerged as

conceptions in second year and were also apparent in third year. Students were assigned to a core conception according to what they said about learning, as well as other related areas as described above. Table 1 summarises students' core conceptions for the three years.

Table 1. Core conceptions of learning by student for the three years of the study

Conception of Learning		Students		
		1997	1998	1999
1	Acquisition	4	4	-
(a)	and use	6	6	4, 6, 22
2	Understanding			
(a)	Remember	1, 2, 8, 11, 13, 14, 22	8, 11, 13, 14, 22	8, 11, 13, 14
(b)	Apply	5, 7, 16	1, 2, 7, 16	1, 2, 7, 16
(c)	Relate	15	9, 15	9, 15
3	Personal Growth	9, 10	-	-
4	See Something Differently	-	10	10
5	Change In Thinking and Understanding	-	5	5

Ways of learning

While students reported using a variety of ways to learn, a detailed analysis revealed six main categories: practical application, visual imagery, read, write, discuss, and think/relate. Within each category are strategies that indicate increasing cognitive engagement with material being learnt. We have classified these strategies according to three levels: (a) *focusing and rehearsal* strategies, (b) *organisation and memorisation* strategies and (c) *elaboration and monitoring* strategies. While most students used a variety of strategies that encompassed each category and each level, we assigned each student to a level of strategy according to those they stated using most frequently. Some of the categories of strategies and levels are summarised in Table 2 and Table 3 shows the students according to the level of strategy they used most frequently each year.

Table 2. Some categories and levels of strategies used by students

Read	Write	Discuss	Think/Relate
<i>Focusing/Rehearsal Strategies</i> →			
<ul style="list-style-type: none"> • skim • highlight key words • colour certain areas • repeat over and over • look for what I think will be on the exam 	<ul style="list-style-type: none"> • take notes • rewrite it six times • key points 		
<i>Organisation/Memorisation Strategies</i> →			
<ul style="list-style-type: none"> • revise • summarise • look in another text • reorganise and remember 	<ul style="list-style-type: none"> • write out, go over • write assignments out several times • summarise main points 	<ul style="list-style-type: none"> • ask questions in tutes • question somebody • somebody question me • ask visiting specialist 	
<i>Elaboration/Monitoring Strategies</i> →			
<ul style="list-style-type: none"> • put in words I understand • break it down to make sense • read again to check understanding • analyse what they are saying • absorb/understand 	<ul style="list-style-type: none"> • mnemonics • write down what you understand • has structure in head prior to writing • write/synthesise in my own words • argue it • write it a few times, try and connect it, make sense of it 	<ul style="list-style-type: none"> • question myself • talk to myself to understand • ask questions to go deeper • talk to others of the same race, joke and laugh • discuss readings with friends, wife, class 	<ul style="list-style-type: none"> • engage, reflect <p><i>Personal Connection</i></p> <ul style="list-style-type: none"> • combine personal and formal • relate informal/formal knowledge • combine personal, library, internet <p><i>Life Connection</i></p> <ul style="list-style-type: none"> • think through others' experiences • think how it relates to life

Table 3. Most frequently used level of strategy by student for the three years of the study

Level of Strategy	Students		
	1997	1998	1999
Focusing/Rehearsal	1, 2, 4, 13,	4, 16	4, 6, 11, 22
Organisation/Memorisation	5, 10, 11, 14, 16, 22	5, 6, 7, 11, 13, 14	1, 2, 7, 13, 15, 16
Elaboration/Monitoring	6, 7, 8, 9, 15	1, 2, 8, 9, 10, 15, 22	5, 8, 9, 10, 14

The relationship between core conceptions and ways of learning

Research suggests that conceptions of learning influence the way in which a student learns (Marton, et al., 1993; Watkins, 1996). In this section we analyse the core conception of learning held by each student and the predominant way in which they learned. It is reasonable to assume that core conceptions and ways of learning should be compatible. However in our study this is not necessarily the case. While core conceptions take into account the way a student learns, they also include other aspects of learning. For example students were asked what learning meant to them, about understanding, knowledge, how they went about learning, the relationship between understanding and learning, as well as other areas related to learning. Additionally, as already stated, students learned in a variety of ways that encompassed many strategies. Thus it is possible for inconsistencies to occur between core conceptions and some of the ways in which students went about learning.

We believe that the core conceptions of formal learning, *acquiring* and *acquiring and using knowledge*, will entail using mostly focusing and rehearsal strategies. Similarly the core conceptions from *acquiring knowledge to understand and apply* will entail employing mostly organisation and memorisation strategies. Finally the conceptions *understand and relate information, personal growth* and *change in thinking and understanding* would assume that students utilise mostly elaboration and monitoring strategies. Taking the associated strategies and conceptions into consideration it is evident that in most cases, each year, students held core conceptions and went about learning in ways that were compatible. However there were students who exhibited dissonance between their core conception and some of the ways in which they learnt. ~~Dissonance is described by Cliff (2000) as centring “around a failure to adjust individual study behaviour to meet the demands of different academic contexts” (p. 57). Similarly Meyer and Vermunt (2000) explain dissonance as disintegrated study patterns or study orchestrations that take into account factors such as students’ perceptions of learning~~

~~environments, their approaches to studying and variations in their conceptions of learning.~~

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Dissonance occurred, for example, in first year for student 10 who held a core conception of learning as *personal growth*, yet used predominantly organisation and memorisation strategies. While he did use elaboration and monitoring strategies such as synthesising information into his own words and breaking material down he learnt mainly by reading over and over information and writing it out, asking lecturers questions, and memorising. Of particular interest is student 6 who in first year held a core conception of learning as *acquiring and using knowledge* yet used many elaboration and monitoring strategies. These were evident when he said that he learned by relating information to questions, looking for relevance, analysing what lecturers said, writing what he thought about material, and thinking about information. During the first year of the study dissonance was evident for 7 students, in the second year for 5 students, and in the third year 4 students exhibited dissonance.

Of the 7 students who exhibited dissonance in their first year of study only one (student 8) remained dissonant in each subsequent year. This student held the core conception *understand and remember* but used many elaboration and monitoring strategies. It is interesting to note that this student experienced difficulties during the course that resulted in her repeating two subjects. It is also interesting that student 22 displayed dissonance only during his second year of study (his core conception was *understand and remember* but he used many elaboration and monitoring strategies). Students 11 (*understand and remember/elaboration and monitoring*), 14 (*understand and remember/elaboration and monitoring*) and 15 (*understand and relate/organisation and memorisation*) displayed dissonance only during their third year. Also of note is the fact that some students exhibited dissonance in their first year yet by second or third year they held compatible core conceptions and ways of going about their learning. This was the case for students 1

(*understand and remember*/focus and rehearsal), 2 (*understand and remember*/focus and rehearsal), 6 (*acquire and use*/elaboration and monitoring), 7 (*understand and apply*/elaboration and monitoring), and 10 (*personal growth*/organisation and memorisation).

Discussion

This longitudinal study investigated conceptions of learning and ways of learning for Aboriginal and Torres Strait Islander university students during the three years of their degree courses. Findings indicated that, for the most part, these students held conceptions of learning and went about learning in ways that are similar to other university students. However These students came from varied backgrounds and diverse prior educational experiences, which, in some cases, were limited as preparation for the demands of higher education. We believe that this had implications for some students in terms of the conceptions they held and the ways in which they learned.

The Indigenous students in this study held conceptions of learning that were similar to some of those found by Marton et al. (1993) for British Open University students. Both groups of students expressed conceptions that were hierarchical (Marton, 1994) and moved VARIED from quantitative to qualitative dimensions of learning. Both groups also stated that learning meant to *acquire* or *increase* knowledge, that it involved *applying* what was learnt as well as *understanding* and *seeing something in a different way*. However the Indigenous students also expressed conceptions of learning that differed from those reported by Marton et al.

While many of the Indigenous students stated that learning meant understanding this was expressed for the most part in quantitative terms. The focus was on acquiring and using specific information that was understood at a superficial level and on making sense of words and concepts. This is different from understanding as explained by Marton et al. (1993) who stated that it related to “gaining meaning” (p. 288) in an overall sense and as such is

qualitative. The Indigenous students also spoke about understanding in three ways which bears similarities to the findings of Burns, Clift, and Duncan (1991) and Mugler and Landbeck (2000) who found different interpretations of understanding. The conception 'change', that was explained by 1 Indigenous student, related to a *change in thinking and understanding* as a result of new information conflicting with previously held beliefs. By contrast Marton et al. explain change as *changing as a person*. Others (Bruce and Gerber, 1995; Dahlin and Regmi, 1997) have also reported *change* as a conception of learning that is different from changing as a person. Dahlin and Regmi found three categories of change with Nepali students including a *change of consciousness or understanding* that is similar to a *change in thinking and understanding* as explained by the Indigenous students. Essentially most of the Indigenous students held quantitative conceptions of learning that included *acquiring* and *acquiring and using information* as well as *understanding, remember and apply*; while the remaining conceptions were qualitative, they were expressed by ~~fewer~~ ONLY FOUR students.

~~The longitudinal nature of this research enabled developmental trends in students' conceptions of learning to be investigated. What emerged from the data over the three years was that many of the Indigenous students began and completed their course with the same core conception. Similarly, Cliff (1998) found that conceptions did not change for students at the University of Cape Town. The students in Cliff's study and this study share similar backgrounds in that, for many, their prior educational experiences failed to prepare them for higher education. Entwistle (1997) proposed that throughout their studies students will develop changed and advanced conceptions of learning. However while most of the Indigenous students in this study held the same conception over the years, a developmental awareness of learning was evident; it encompassed two aspects. Firstly, some higher level conceptions were evident by the second year of the study and secondly some individual~~

~~students moved to a higher level conception by the second or third year of their course. It could be argued that studying at university allowed these students to develop a changed awareness of themselves as learners.~~

The strategies that the students used to learn were varied and included many that Vermunt and Verloop (1999) classify as cognitive, affective or metacognitive. Some strategies were indicative of those that exemplify a deep approach to learning (Marton and Saljo, 1997). For example some students related what they were learning to their existing knowledge and others spoke of questioning lecturers or themselves to clarify meaning. On the other hand many students used focusing and rehearsal strategies which evidence a surface approach. Most students used a range of strategies that included both surface and deep approaches. A relational analysis between strategies and conceptions for each student revealed that some were using many strategies that were incongruent with their conception of learning. This could be regarded as dissonance (Meyer, 2000) between strategies and conceptions of learning.

One explanation for the apparent dissonance could be a lack of coherence between the learning context and how these students learn and this may be due to cultural influences on learning that are specific to Indigenous students. This is an area that requires further research. It is also likely that some students lacked the prior knowledge required for the courses they were undertaking. Prosser et al. (2000) explained that a student's prior knowledge and their perceptions of the learning context are relational to how they approach learning. Therefore lacking prior knowledge and perceiving the learning environment as culturally different may have resulted in an incoherent study orchestration (Meyer, 2000). ~~A consequence of this for some was dissonance between their conception of learning and strategies they used to learn.~~
WE CAN'T BE SURE ABOUT THIS.

The dissonance that was evident in some cases was similar to that described by Cliff (2000) ~~ABOVE for engineering students enrolled in an Academic Support Programme in Cape Town.~~ Specifically some of the Indigenous students, ~~AS DID THE SOUTH AFRICAN STUDENTS~~ equated understanding with memorising and some equated understanding with mechanistic study approaches. Vermunt and Verloop (2000) have described a similar phenomenon as students learning by using the bare elements of a style or “missing essential elements of learning style” (p. 83). Students in this study who used mostly focusing and rehearsal strategies could be regarded as learning in this way. In particular this resulted in dissonance for one student in first year who used mostly focusing and rehearsal strategies yet held a conception that related to understanding. Tait, Entwistle, and McCune (1998) also noted dissonance for South African students in their approaches to study. It is interesting that some South African students as well as some Indigenous students in this study evidenced similar dissonant study orchestrations. This ~~reinforces~~ **SUPPORTS** the notion that there are cultural aspects to study orchestrations for Indigenous university students. ~~It also reinforces the contention that this is an area that would benefit from further investigation.~~

Conclusion

The results of this study revealed several interesting aspects of learning for a group of Australian Aboriginal and Torres Strait Islander university students. However, while these add to what is known about learning for these students, our sample is small and it is not possible to generalise the findings. The findings are delineated and discussed below in terms of the implications they might hold for higher education and Indigenous students.

Conceptions for this group were mostly quantitative and for many students they did not change over the three years. This may be a result of the students’ prior educational experiences, which for some were limited in regard to the requirements for university learning, or it may be due to cultural aspects of their experience of learning. Results also

showed that these students explained understanding as a conception of learning that constituted three sub-categories which indicates that understanding is a multi-faceted construct. This has implications for teaching and learning in that students may focus on information in different ways that are dependent upon the type of understanding they INTEND to achieve. This is an area that would benefit from further research. Findings also point to the contention that the conception *change* may be specific to student's thinking and understanding rather than change in terms of a person changing. As others (Bruce and Gerber, 1995; Dahlin and Regmi, 1997) have found 'change' to be a conception related specifically to learning, this also requires further investigation to delimit its boundaries.

Dissonance between conceptions of learning and strategies used to learn were apparent in each year of the study. However there were fewer students who held dissonant core conceptions and ways of learning in the third year than in the first or second years of the study. We contend that this is most likely a result of students developing a greater awareness about themselves as learners and consequently developing ways to learn that were in keeping with their conception of learning. This may have involved, in part, developing a greater awareness of the requirements of learning ~~the theoretical content of~~ IN university courses.

We suggest that Indigenous Australian university students be HELPED to develop a greater awareness of the requirements of learning at university early in their courses in order to ACQUIRE strategies that promote deeper engagement with information and more meaningful and congruent conceptions of learning. Additionally, teaching in university courses could be adapted, where appropriate, to cater for differences in learning, including considerations SPECIFIC to Indigenous Australian students. This may involve, for example, including specific Indigenous examples to elaborate certain points or allowing Indigenous students to consider content from their cultural perspective. SUCH PROCEDURES might help address potential dissonance between conceptions of learning and strategies used to

~~learn~~ for these students. ~~Such practices may help these students to overcome any inadequacies in their prior educational experiences and encourage them to become more effective learners who hold meaningful conceptions of learning.~~

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