

## **GOR02645 "Changes in approaches to learning: A qualitative investigation of international students at an Australian university"**

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### **Abstract**

This paper reports on a study into the approaches to learning and changes in approaches to learning of a group of 30 international students studying at an Australian university. The study continued for a three year period commencing with the students enrolment in a one year pre tertiary program until the students completed their second year of undergraduate study.

The students were asked to respond to three categories of questions; the first category relating to the general meaning of terms and conceptions of understanding; the second to broad approaches to learning within the student's particular learning situation and the final category of questions related to individual approaches to studying for major examinations and approaches to completing major assignments.

It was found that students did not necessarily construct knowledge in the same way. This may have a cultural basis. That the construction of knowledge may not necessarily be universal is consistent with other research evidence (Kember et al., 1997). Transcripts of student interviews also suggests that a number of broad orientations to learning can be identified. These approaches could be characterised as holistic/deep; serialist/deep; holistic/surface and serialist/surface.

In general, while most students expressed willingness to adjust their particular approaches to specific tasks, their beliefs about knowledge and learning were found to be relatively stable over time. The conclusion from this is that while students are willing to adjust their learning to particular task, this is within the framework of the broad approaches to learning available to them. The evidence from this research suggests that there are differential rates of change occurring in student learning; changes in approaches to specific tasks would appear to occur more readily than overall orientations to learning. It would also appear that some students, in particular those who identified as holistic/deep learners, are more willing to consider adjusting their learning strategies than other types of learners.

While the categories identified in this study use different terminology, it is possible to equate them with Kember's (2001) recent research findings on student orientations to learning. These finding also support Kember's conclusions that a student's epistemological beliefs coupled with learning approaches should be considered when assisting students to make the transition to tertiary study.

### **Introduction**

In the past ten years Australian universities have experienced a considerable increase in international student numbers following government deregulations. The gains to those universities are considerable, not only financial but also the contribution these students have

made to the social and cultural life of university campuses. While the changes to the universities are obvious, less noticeable but equally important are the adjustments that the individual students have made to their learning. Given that most of the students are from non Western cultural backgrounds, are models which have often been developed within western contextual frameworks appropriate for investigating the learning of international students in Australian universities? Certainly early research on international students which focussed on the perceived difficulties of international students and which has been described by Volet and Renshaw (1993, p.4) as a deficit model providing a "negative, stereotyped and static view of Asian students' learning" is not a suitable model to examine international student learning in the Australian context.

The "deficit" model in identifying problems associated with international student learning in Australia suggests a poor adjustment or a lack of adjustment on the part of international students to the new learning environment. This contradicts another stereotype of international students in Australia: the high achieving, successful Asian student (Biggs, 1994), developed no doubt from a growing body of evidence (Dobson & Sharma, 1993) that students from Confucian heritage cultures at home were outperforming Western students (Biggs 1994). Biggs refers to the nexus of these two stereotypes-the perception that Asian students rote learn and adopt a surface approach as their prime learning process and yet are also considered to be achieving outstanding academic results-as "the paradox of the Asian learner".

Reconciling this paradox has resulted in research (Chalmers & Volet, 1997; Volet, Renshaw & Tietzel, 1994) in recent years which has sought to investigate how the student actually learns. Few studies, however, have undertaken long term investigations of international student learning and changes in student learning in order to assess how international students learn and what adjusts may take place over a long period of time. In order to examine the changes that may take place in the student learning process, it is important to identify an appropriate instrument which can be used to assess learning from a cross cultural perspective.

### **The Approaches to Learning Construct: a cross cultural learning model?**

Biggs (1987b) describes approaches to learning as an integrated system which includes a combination of motive and strategy, where personological characteristics of the students are combined with operational factors relating to process. Approaches to learning then describes the events and their relationships that characterise institutional learning and have been described by Biggs (1985) as the Presage, Process and Product model. In recent years there has been more explicit emphasis (Kember, 2001; Lonka & Lindblom-Ylänne, 1996; Schommer, 1998; Vermunt, 1996) placed on student conceptions of learning as an important factor influencing the learning outcome. It is suggested that the model identified in Figure 1.1 could appropriately be used to examine student approaches to learning and the quality of the learning outcome.

### **Figure 1.1 The Relationship between Presage, Process and Product in Student Learning**

**(Adapted from Biggs, 1987b)**

Biggs' (1987b) operationalised the approaches to learning construct through the Study Process Questionnaire (Biggs, 1987a) and identified three student approaches to learning: deep, surface and achieving. Within the Western educational framework a deep approach to learning is associated with "good academic performance" (Biggs, 1985, p.191) resulting from interest in the subject and a desire to understand the material while a surface approach to learning has been associated with poor academic performance based on extrinsic motivation and a desire to minimise effort. The Study Process Questionnaire has also been used (Regan & Regan, 1995; Volet *et al.*, 1994) to investigate change over time in student approaches to learning. This tool has been extensively investigated (Biggs, 1987b; Biggs, 1992; Kember & Leung, 1998) Volet *et al.*, 1994) and found to be an appropriate tool to investigate approaches to learning within a cross cultural framework (Table 1.1).

**Table 1.1 Comparison of the Internal Consistency of the Study Process Questionnaire Scales and Subscales**

No.	SA	DA	AA	SM	SS	DM	DS	AM	AS
Biggs (1987b)	823	.61	.66	.65	.76	.72	.77		
Aust. Uni.									
Biggs (1992 )	2338	.53	.65	.60	.75	.74	.69		
H.K. Uni.									
Kember &	4843	.60	.57	.63	.71	.71	.74		
Leung (1998)									
H.K. Uni.									
Volet <i>et al.</i> (1994)									
Australian									
Internat. Time1	120	.60	.78	.81	.50	.61	.70	.72	.76
Time2	91	.61	.80	.75	.57	.46	.76	.64	.65
Australian									
Local Time1	434	.69	.73	.76	.63	.57	.71	.61	.75
Time2	268	.70	.71	.77	.65	.61	.69	.55	.76

SA Surface Approach SM Surface Motive SS Surface Strategy

DA Deep Approach DM Deep Motive DS Deep Strategy

AA Achieving Approach AM Achieving Motive AS Achieving Strategy

While the Study Process Questionnaire can provide quantitative evidence of changes in student learning over time, the instrument cannot provide a qualitative description of the student learning outcome. Using the approaches to learning construct with its deep-surface distinction, Entwistle and Marton (1994) investigated the academic experience of students studying for major examinations. Preparing for a major examination should provide important insights into the relationship between student conceptions of learning, motivation and study strategies. Entwistle and Marton suggested five categories of understanding based on the surface-deep distinction of the approaches to learning construct. They suggested that these "forms of understanding are used by students during the revision process as they prepare for major examinations. Forms of understanding (Table 1.2) are considered to be both "the students intentions and... the ways of developing understanding during revision (Entwistle and Marton, 1994; p.163).

**Table 1.2 Forms of Understanding and the Knowledge Object  
(From Entwistle and Marton, 1994)**

Forms of Understanding (Process)	The Knowledge Object (Learning Outcome)
<ul style="list-style-type: none"> <li>• Absorbing facts, details, and procedures related to exams without consideration of structure.</li> <li>• Accepting and using only the knowledge and logical structures provided in the lecture notes.</li> <li>• Relying mainly on notes to develop summary structures solely to control exam answers.</li> </ul>	<ul style="list-style-type: none"> <li>• Understandings reflecting the contents of specific books and lectures. Characterised by:  a lack of individual reflection on the matter being studied.  summary notes effectively are mini lecture notes.</li> <li>• Understandings reflecting the logical structuring of a field of knowledge. Characterised by:  attention to a logical structure of revision notes.  an attempt to understand a field</li> </ul>

<ul style="list-style-type: none"> <li>• Developing structures from strategic reading to represent personal understanding, but also to control exam answers.</li>   <li>• Developing structures from wide reading which relate personal understanding to the nature of the discipline.</li> </ul>	<p>of knowledge.</p> <ul style="list-style-type: none"> <li>• Understandings reflecting a personal restructuring of a field of knowledge. Characterised by:</li> </ul> <p>the structuring of the knowledge object through drawing on theory and personal reflections.</p> <ul style="list-style-type: none"> <li>• Understandings reflecting the phenomena through knowledge restructuring. Characterised by:</li> </ul> <p>the development of own structures by utilising logical relations and general theoretical frameworks.</p> <p>an understanding of the actual phenomena of the academic work.</p>
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It is argued that the approaches to learning construct both through its quantitative investigative tool (the Study Process Questionnaire ) and through its qualitative expression (Forms of Understanding) should provide a relevant cross-cultural framework to investigate how international students learn and also what changes in the learning process they make while studying within an Australian higher education context. The focus of this paper is to investigate the extent to which the approaches to learning construct operationalised through both the Study Process Questionnaire and Forms of Understanding can be used to investigate the approaches to learning and changes in the approaches to learning of a group of international students studying in an Australian university.

## Method

### *Participants*

An initial group of 78 international students agreed to be part of a three year study investigating student approaches to learning and changes in those approaches to learning. From this group, a sub group of 30 students were selected for interview on a semi-random (random within each of the three groups) basis from the original 78 students who agreed to take part in the study. The 30 students were divided into three groups based on scores achieved in mental reasoning. Biggs (1992) identified that ability could be an instrumental factor in student use of particular Approaches to Learning (although subsequent analysis of survey data did not establish this link for this group of students). Ten students were

randomly chosen from the top third of students, ten from the middle group of students and ten from the bottom third of the students.

### ***Attrition Rate***

Of the 78 students, 50 continued for the three years of the quantitative investigation. The attrition rate of students selected for interview over the three years of the study was 50%, with 10 actually leaving the university. One student of this 10 left the university (and enrolled at the local institute) just before final examinations at the end of the third year of the study having completed all interviews and surveys before leaving the university. Of the potential 21 students who remained at the university or the local institute and could have remained in the study, 15 students remained involved for the entire interview process. In effect six students remained at the university but did not continue with the interview process for the full three years. The highest attrition rate occurred after the first year of preparatory study and before the first interview period in their undergraduate study.

### ***The Quantitative Investigation***

Students completed the Study process Questionnaire on four occasions, on arrival, at the end of the first year and in the second semester of the second and third year of study.

### ***Validity and Reliability of the Study Process Questionnaire***

In order to assess the theoretical propositions of the Study Process Questionnaire in terms of the study identified here, the inventory was examined for both conceptual validity and reliability using data gathered at the second collection. The reliability of the Study Process Questionnaire was estimated using Cronbach's alpha coefficient. An important advantage in using Cronbach's alpha coefficient to calculate the reliability of the results is that it has been frequently used by other studies (Biggs, 1992; Volet *et al.*, 1994) where the Study Process Questionnaire has been used to assess changes in student learning over time. A congruence between a corresponding motive and strategy is highly desirable. In order to test this congruence, the scores of the six subscales obtained by the students on each of the four occasions were intercorrelated. All six measures from the Study Process Questionnaire were correlated using Pearson's product-moment correlations with significance determined at the  $p < .05$  level.

### ***The Qualitative Investigation***

#### ***The Interview Process***

Interviews were carried out during periods of time mutually convenient to both parties. Selected participants were interviewed in the initial phase, within two months of commencing the preparatory program and before the commencement of the Semester 1 examinations. Interviews generally lasted for about 45 minutes to one hour and all took a semi-structured format. Students were briefed that the purpose of the interview was as an investigation into individual approaches to learning and specifically their method of studying for examinations and preparing for major assignments. All students agreed to the interviews being taped. Each subsequent interview took place at nine to twelve month intervals. During each interview students were encouraged to describe their learning experience and how they saw their learning as progressing. While some students did identify cross-cultural issues in their learning, the interview questions (Appendix 1) were not specifically oriented towards encouraging the student to identify cultural differences given that students may have had varying capacities to recognise cultural differences in both their own and other students' approaches to learning.

### *Methods of Data Analysis of Verbal Reporting*

Transcripts of student interview data were produced and subjected to the process of iterative analysis to identify themes and within these themes categories which summarised and conceptually clarified the comments made by the students. Forms of understanding (process factors) and the quality of learning outcomes (product factors) were classified according to the categories identified in Table 1.2. Student responses were considered in three areas: their understanding of concepts, such as learning and knowledge; their identification of learning processes, and their perception of the quality of their learning outcome. Each response was then categorised as the result of a rigorous "iterative reading and re-reading of transcripts to establish similarities and differences in the responses made" (Entwistle & Marton, 1994, p.166) and was carried out by two researchers. Where discrepancies arose, the transcript was re-read and compared with the responses of the interviewee, finally categorised according to similarities and differences and placed within one of the established categories. The purpose of the categorisation was to place each student's explanation of their conceptions of learning, range of strategies and the quality of their learning outcomes into an appropriate grouping. For the purpose of this investigation, the highest category of process or quality of learning outcome identified by a student in a single interview was the basis of classification. Students had only to demonstrate that they were aware of and sought to identify a particular process or outcome in that interview period to be thus classified.

### *An Alternative Classification Framework*

Entwistle and Marton (1994, p.167) considered that the British higher education students first sought "a general understanding of the topic" and "after a general understanding of the topic had been achieved, students then concentrated on learning the details they thought they would have to use in the examinations to bolster their explanations and justify their conclusions" and from this basis they identified five forms of understanding. It became apparent that student interview responses would also need to be re-examined according to how students perceived knowledge should be constructed-serially or holistically based on earlier work (Kember & Gow, 1990). This provided an additional dimension to analysing verbal reports.

## **Results**

### **The Cross-Cultural Applicability of Approaches to Learning**

The principal components factor analysis with varimax rotation for the deep and surface motive (Table 1.6) and strategy subscales (Tables 1.7) is provided. Both tables show clear support for the two factor surface-deep distinction identified in the approaches to learning construct. As a result of the restricted sample size, a slightly more conservative .40 coefficient was used as the measure to indicate loading.

### *Deep and Surface Motive and Strategy Subscales*

Factor 1 (Table 1.3) is identified as the surface motive subscale. In terms of the surface motive subscale only surface motive Item 25 ("Lecturers shouldn't expect students to spend significant amounts of time studying material everyone knows won't be examined") failed to load positively onto the surface motive subscale. Factor 2 could be identified as the deep motive subscale. Factor 1 (Table 1.4) is identified as the deep strategy subscale (Table 5.8). Factor 2 is identified as the surface strategy subscale. The strategy subscale Item 34 ("I find it best to accept the statements and ideas of my lecturers and question them only under

special circumstances") did not significantly load onto the appropriate surface strategy subscale. One item, Item 16 ("I tend to choose subjects with a lot of factual content rather than theoretical kinds of subjects") loaded anomalously as a deep strategy subscale strategy rather than a surface strategy subscale.

**Table 1.3 Principal Components Analysis: Motive Subscale**

Item	Factor 1	Factor 2
	(Surface Motive)	(Deep Motive)
Surface Motive 1	.71 *	.06
Deep Motive 2	.01	.65 *
Surface Motive 7	.48 *	-.35
Deep Motive 8	.33	.49 *
Surface Motive 13	.78 *	.31
Deep Motive 14	.11	.58 *
Surface Motive 19	.67 *	-.26
Deep Motive 20	-.24	.46 *
Surface Motive 25	.03	-.31
Deep Motive 26	.22	.62 *
Surface Motive 31	.49 *	-.13
Deep Motive 32	.30	.51 *
Surface Motive 37	.82 *	.12
Deep Motive 38	-.01	.43*
Explained Variance	3.03	2.50
Proportion of Total	.22	.18

**Table 1.4 Principal Components Analysis: Strategy Subscale**

Item	Factor 1	Factor 2
	(Deep Strategy)	(Surface Strategy)
Surface Strategy 4	-.19	.63 *

Deep Strategy 5	.61 *	-.17
Surface Strategy 10	.12	.74 *
Deep Strategy 11	.61 *	.15
Surface Strategy 16	.49 *	.35
Deep Strategy 17	.66 *	.19
Surface Strategy 22	-.34	.59
Deep Strategy 23	.66 *	-.21
Surface Strategy 28	.24	.51 *
Deep Strategy 29	.51 *	-.14
Surface Strategy 34	.23	.37
Deep Strategy 35	.41*	-.35
Surface Strategy 40	.02	.51 *
Deep Strategy 41	.70 *	-.02
Explained Variance	3.06	2.41
Prp. Total	.22	.17

*Internal Consistency of the Study Process Questionnaire Scales and Subscales*

The internal consistency indicators (Cronbach's alpha coefficient) of the Study Process Questionnaire at the second data collection period (Table 1.5) were acceptable.

**Table 1.5 Internal Consistency of the SPQ Scales and Subscales (Cronbach's Alpha Co-efficient)**

No. SA DA AA SM SS DM DS AM AS

Time 2 77 .78 .80 .79 .71 .63 .63 .73 .70 .79

SA Surface Approach SM Surface Motive SS Surface Strategy

DA Deep Approach DM Deep Motive DS Deep Strategy

AA Achieving Approach AM Achieving Motive AS Achieving Strategy

## Changes in Approaches to Learning Over Time

### *Repeated Measures for Whole Group Over Time*

Table 1.7 identifies within-group changes over time for whole-group data. What is apparent for whole-group data is that there is a significant change in approaches to learning occurring over time.

**Table 1.7 Mean Scores in Approaches to Learning for Whole Group over Time**

SM SS DM DS AM AS

March 1996 Survey Data

Mean 25.39 23.05 23.93 22.98 24.65 23.67

SD 5.15 3.63 4.30 4.51 4.62 4.97

N 78 78 78 78 78 78

November 1996 Survey Data

Mean 25.10 22.51 23.89 23.44 24.38 22.14

SD 5.13 4.24 4.34 4.30 5.08 5.49

N 77 77 77 77 77 77

July 1997 Survey Data

Mean 23.85 21.83 24.28 23.52 24.39 22.03

SD 5.63 5.19 4.85 4.50 5.35 4.99

N 55 55 55 55 55 55

July 1998 Survey Data

Mean 23.38 21.38 24.60 24.03 22.84 21.11

SD 5.38 4.68 4.73 4.55 4.99 5.11

N 55 55 55 55 55 55

SA Surface Approach SM Surface Motive SS Surface Strategy

DA Deep Approach DM Deep Motive DS Deep Strategy

AA Achieving Approach AM Achieving Motive AS Achieving Strategy

**Table 1.8 Changes in Approaches to Learning over Time**

df Effect MS Effect df Error MS Error F p level

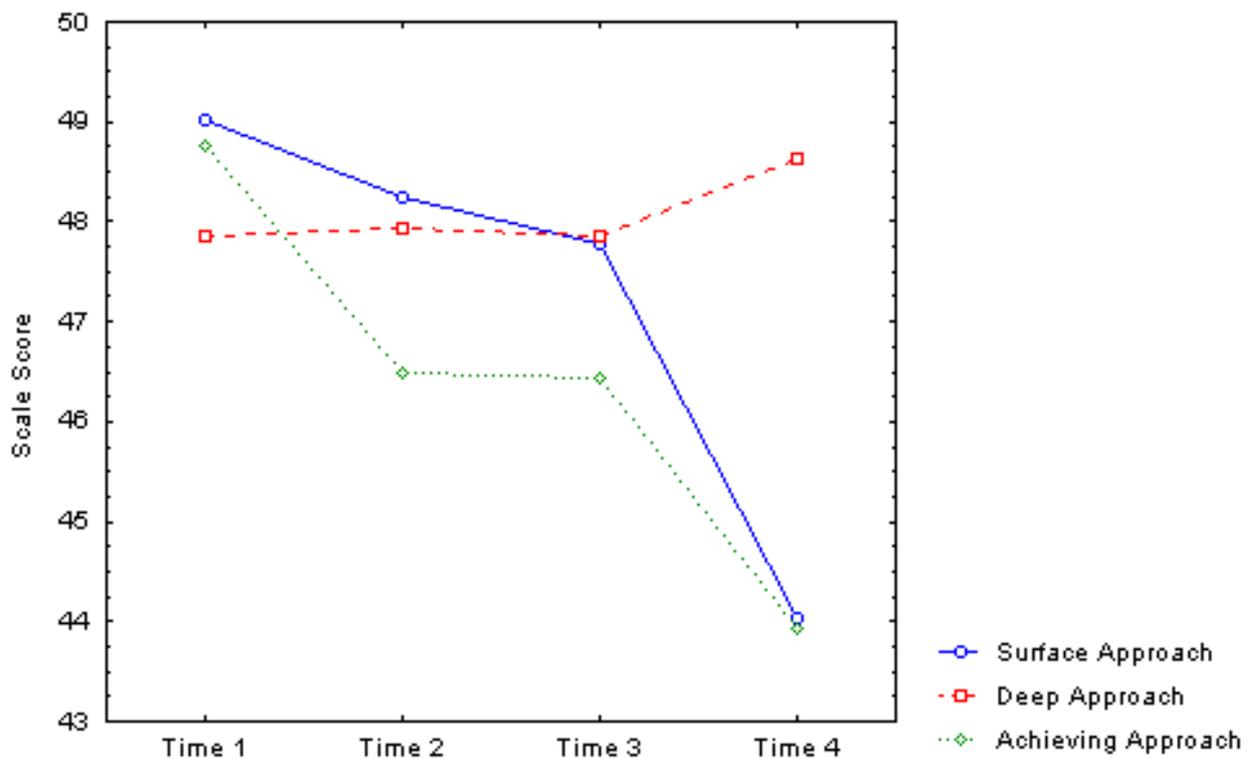
Times 3 237.67 147 75.88 3.13 .03

Scales 2 139.80 98 103.22 1.35 .26

Times\*Scale 6 104.87 294 23.11 4.54 .0002

Figure 1.2 illustrates these changes indicating that while a deep approach is gradually increasing (though not significantly) for the whole group over time, both the surface and achieving approaches are decreasing significantly over time. Each approach was examined in more detail to identify significance in these changes over time.

**Figure 1.2 Changes in Approaches to Learning over Time**



Significant changes had occurred over time in student approaches to learning. However, it was also noted that this change was slow to occur and it was not until the final year (the third year of the study) that clearly identifiable changes in approaches to learning emerged. Given that the evidence of the significant change in approaches to learning occurred between the first and final data collection periods only, this also tends to support Biggs' (1992) view that approaches to learning are relatively stable and slow to change, although some changes should certainly be expected.

In an attempt to identify from where this change was originating it was considered that analysis of interview data may lead to more insight into the nature of the change over time.

### **The Qualitative Investigation**

All student responses were ultimately placed into a two by two matrix; the first category was developed according to student identification of their forms of understanding, and the second category according to their conception of how knowledge was constructed. It is suggested that this categorisation more accurately reflects student descriptions of their own learning. This is because some students who had the intention to understand the material nevertheless adopted a process which has been termed a "lock step" approach (Kember & Gow, 1990). Student identification of the processes they used to achieve particular learning outcomes over the three years of the interviews provided a particular insight into how that student was adjusting to the learning process and provided an opportunity to consider student conceptions of learning, approaches to learning and particular strategies with respect to their identified quality of learning outcome as well as actual academic performance.

From this four models were developed to describe those aspects of the learning process. These models are: holistic/deep; serialist/deep; holistic/surface; serialist/surface. It is suggested that these models can be used to aid in the understanding of the "paradox of the Asian learner" identified; that is students who appear to be adopting a surface-like approach to learning but are in fact adopting a deep approach from the basis of a serialist conception of how knowledge is acquired.

The *holistic/deep model* identifies an approach to learning where the student conceives an overall conception of the learning process and employs deep strategies to achieve a high quality of learning outcome and academic performance. This type of approach seeks broad general understanding which is built in at the start of the learning process.

The *serialist/deep* model identifies an approach to learning where the student conceives an incremental conception of the learning process and employs deep strategies, to achieve a high quality of learning outcome. The student using this approach seeks to build understanding from the components, detail and logical order of the material under study but searches for meaning within each part with the aim of eventually understanding the whole.

The *holistic/surface* model identifies an approach to learning where the student seeks to understand the whole but without sufficient attention to detail to have an understanding of the material under investigation. This type of student can be equated to the student learning approach referred to by Pask (1976) as "globetrotting". The *serialist/surface* model identifies an approach to learning which could be classed as the most improvident of the four models identified. It is characterized by the students building understandings based on fragments and partial detail and rarely conceptualising the whole. Memorisation and rote learning both have important roles in this model cannot necessarily be compared to the use of memorisation and rote learning associated with the other models. It is suggested that the serialist/holistic construct links the method of how knowledge is *constructed* to the intentions of how the knowledge is acquired while the surface-deep construct refers to the method of how knowledge is *acquired* and the intention of the learner.

#### **Model 1: The Holistic/Deep Learner**

Model 1 identifies an approach to learning where the student conceives an holistic conception of the learning process and employs deep strategies to achieve a high quality of learning outcome and academic performance. This type of approach seeks broad overall understanding which is built in at the start of the learning process.

### Figure 1.3 Holistic / Deep Approach

*I try and have that overview. I try and look at that question. I will try and locate where is this question in my big picture. I then can go into more details later. If it still didn't fit, I would ask myself, maybe there is something wrong with my big picture and I will try and redraw it. I think it is great if I have to redraw it because I think it is new and I have got something new because at other times, I just have to add it and it doesn't change my big picture. (Student 3, final interview)*

The above comments suggest that Student 3 is flexible, metacognitive and adopts a deep approach to learning. When Student 3 is faced with the need to change her current processes she describes this as "great". This is more than accepting that she may need to change; she is actively quite excited by the prospect. Student 3's conception of learning was broad enough to include the need to understand and apply the knowledge obtained and consider different ways of thinking, but, in her personal philosophy on life, she displayed little tolerance for ambiguity. Student 3 went on to qualify her statement regarding what she considered learning meant.

*I think learning is to get some new information, to understand some new information and then try to use some new information....I just prefer right or wrong. I don't like ambiguous things. I just want it to be clear. I think learning is knowing that there **IS** (student's emphasis) right or wrong.(Student 3, Final Interview).*

As the example of Student 3 illustrates, it is clearly difficult to identify a simple linear relationship from conceptions of learning to learning orientations and to the strategies a student will adopt in their learning. Students, particularly the more able, appear quite

capable of holding one particular epistemology about learning which may be considered quite narrow and limiting while at the same time holding others that are remarkably broad.

While superficially it appears that Student 3's willingness to change may seem to be a contradiction to her previously mentioned intolerance of ambiguity when seeking solutions, this should not necessarily be considered the case. This example illustrates an important point, Student 3 has a strong orientation to learning which is broad and deep and yet she is also capable of holding a particular epistemology about truth that seems inconsistent with her other explanations of learning. A *preference* for a particular conception of learning and at the same time a rather narrow conception of the meaning of truth does not preclude this student from searching to deeply understand the material she is investigating and using a wide range of strategies to find the right answers. Her preferences or orientations have not circumvented her metacognitive processes to deeply investigate and search for meaning. This seeming contradiction succinctly highlights Schommer's (1998) conception of multiple epistemologies of learning.

### **Model 2: The Serialist/Deep Learner**

Model 2 identifies an approach to learning where the student conceives a serialist conception of the learning process and employs deep strategies to achieve a high quality of learning outcome. The student using this approach seeks to build understanding from the components, and detail and logical order from the material under study. Understanding is progressively built up over a period of time. Seeing learning as a quantitative increase in knowledge did not mean that understanding did not take place and also did not mean that a search for meaning was avoided.

#### *A Progressive Increase in Understanding: Student 17*

*(What is learning?) Through the participation some activity and then you can understand some theory by the activity. Just like a chemistry practical. By the chemistry practical you know the activity of some metals and this is learning I think. (Student 17, Interview 1)*

*I think it can be, because (to) understand is quite usually you remember it but maybe you can't understand it, you don't know at that time but you do something and then you understand; before if I don't understand a mathematical question now, maybe if I do much more exercise I will later, with understanding memory. (Student 17, Interview 2)*

Student 17 is effectively explaining a process whereby sometimes understanding follows the memorisation. He called this learning with "understanding memory". He didn't understand it at first but in the process of "understanding memory" (or perhaps this could also be termed memorisation for understanding) he actually understands.

### **Figure 1.4 Serialist / Deep Approach**

To Student 17, from Hong Kong, learning was objectivist but not necessarily only obtained by the teacher or limited to repeating what the teacher had given. Learning was also procedural. This student has adopted what appears as the classic lock step approach to learning identified in the literature (e.g. Kember and Gow, 1990) as applying particularly to students from Confucian heritage cultures. His conception of what learning means and how it is obtained may superficially suggest that he was a surface learner. Student 17 in the second interview explained that he was not a risk taker but might become one, a further important finding in this study of those students who appeared to perform academically. This recognition of the need to change is considered as one of the most important factors resulting in changes in conceptions of learning and reflected a profound change being experienced by this student.

*I tend to do the standard pass. I am not a risk taker, it is too dangerous for me if I do a strange thing I don't know. I think I could be a risk taker later because architecture should be risky. (Student 17, Interview 2)*

Certainly Student 17 did seek a high level of understanding. His search for understanding was deep and the quality of his learning outcome profound

*At this moment I always connect in my mind the word understanding with the word inspiration. If you understand it you must have inspiration from the process or otherwise it is not understanding. Understanding for me is the first stage of the process...if you understand you need another thing to come out. When I am studying the work of I.M. Pey I surely appreciate his feeling but I also appreciate how he thinks, how he decides to do with the question; what he thinks of the problem and how he responds to the problem... I learned how to appreciate his buildings and how to appreciate him. This is a two way thing...I appreciate his buildings less than I appreciate him. What I appreciate is the way he deals with the problem. (Student 17, Final Interview)*

To this student, the process of learning is cognitive, metacognitive, and affective, and his final comments also suggest he was considering how knowledge itself could be restructured. The quality of his learning outcome provides for a variety of positions and solutions to specific problems. Knowledge was not objectivist and not right or wrong but he needed to approach it serially in order to deeply understand aspects of the learning. He accepted that his view of the world is filtered through his own perception and the struggle for this student is to try to "learn from their (other architect's) eyes" (from their perspective) in order to understand how reality can be mediated.

### **Model 3: The Holistic/Surface Learner**

Model 3 identifies an approach to learning where the student seeks to understand the whole but without sufficient attention to detail to have a developed and detailed understanding of the material under investigation. This type of student is referred to by Pask (1976) as a globetrotter.

#### *Student 14*

Student 14 was associated with the holistic/surface approach because this categorisation was based on the processes and strategies which could most *consistently* be associated with that student.

## Figure 1.5 Holistic / Surface Approach

For Student 14, the accommodation to a completely different and challenging undergraduate course proved overly demanding and consequently generated a range of improvident solutions. For students such as this, memorisation provided a solution, however imperfect, to achieve metacognitive resolution to a perceived problem.

*You can rote learn without understanding. I think I did quite a lot of that last year. (Why did you do that?) I didn't understand the things and so I thought rote learning was a better way of learning, a better strategy for me by rote learning. Most things I understand I didn't need to rote learn because I knew what they were all about but for certain topics that I didn't understand I thought that rote learning was the right move. (How are you going to tackle that now?) This year I think I just need it for one of my subjects- psychology. For psychology and more theoretical subjects, I use rote learning to replace understanding. (Won't this become a problem?) Psychology at this stage is just the basics. I understand most of it and it is just the points I am memorising. (Student 14, Final Interview)*

Student 14's response provides an important insight into the complicated relationship of the components of learning. Student 14 seeks overall understanding but when she cannot achieve it she uses what can be considered the "classic" surface approach to try and memorise the material. After producing poor results the previous year, the very strategy which failed to produce results in the previous year was considered the solution to the current failure to understand. For Student 14, rote learning and memorisation occurs not because of motivational intentions but because the student does not appear to have other operational strategies to engage the material under study. Student 14 considered that her lack of progress was not related to the processes she was using.

*Yes, I think my mistake for Anatomy was I put everything into one whole sheet. I should have split the things into smaller components. Smaller cue cards instead of just one page. Yes I have learned that. This year it is better for me. (Are you trying to understand a whole topic or are you trying to*

understand it in parts?) *I am still doing it in parts, that for me is the better way.* (Student 14, Final Interview)

#### **Model 4: The Serialist/Surface Learner**

Model 4 identifies an approach to learning which could be classed as the most improvident of the four models identified. The student sought to build understandings based on fragments and partial detail and rarely saw the whole. Memorisation and rote learning were almost the only strategies available to this learner because the student could conceive of no other way to achieve knowledge of the material learned.

##### *Flawed Metacognition and Improvidence: Student 19*

Student 19 was associated strongly with what can be identified as a serialist surface approach. The problems for a serialist/surface learner may simply be that they are true "novices" and have few conceptions of how to approach the task. Socially mediated learning also is an issue here since the student had come from a cultural background where rote learning had extreme importance.

#### **Figure 1.6 Serialist / Surface Approach**

Student 19 identifies his solutions to his particular set of academic difficulties;

*Mostly I just learn the topic even if I don't understand it...* (Student 19, Interview 1)

*Mostly the same- you learn it by heart and then trial it over and over again until you understand and learn. You do it over and over again until you do it and mostly it works..* (Student 19, Final Interview)

While it is possible to analyse the role of rote learning and memorisation to avoid understanding from the traditional perspective of intentionality and for some students there was a certain intention to memorise to avoid searching for meaning, it will not explain the complex situation being experienced by Student 19 who was not seeking to avoid meaning or minimise effort. It may be more meaningful to analyse these processes from the

perspective of metacognition. If learning is viewed from a *novice-expert* (Veenman, Elshout & Meijer, 1997) paradigm, then the processes adopted by the learner in order to undertake a specific task may be the result of an inadequate conception of learning and having few strategies to allowing deeper learning to proceed. His metacognition did not accommodate the possibility of a *need* to change his approach. Traditional motivational models of student learning would not accommodate the complex socio-cultural, cognitive and metacognitive experiences of this student.

(When you were studying for examinations, how did you decide what was important?) *One month before exams, I would follow the exercises and stuff, this was normal until you have learned it. I didn't summarise anything, just read the notes. I learned it over and over again, the whole thing. I didn't choose the important things, I did everything. If you do forget some of the words, then you can make up your own, a few words. I tried to learn every piece of information. I checked that I knew it by speaking out loud, saying it over again and seeing what I have forgot and learn that one... (Had you given the time would it have been a good way to study?) Yes it was not the way of learning but the time. (Student 19, Final Interview)*

The student believed that it was essential to learn everything by heart. He was drawing heavily on working memory and consequently experiencing cognitive overload. His perception of the problem was that he had not devoted sufficient time to study. This is certainly true if he continued in his stated aim of learning all the information off by heart. This is a persistent view that the student has held over the three years, despite of a lack of academic progress. The evidence presented by Janssen (1996) and Lonka and Lindblom-Ylänne (1996) that metacognition is quintessentially linked with epistemological beliefs is supported by Student 19's conceptualisation on the meaning of learning;

*Learning is to like get information and the knowledge to know whatever the technology is and how good it works and all that other stuff. Learning to gain information and knowledge and apply it and do the work. (Student 19, Final Interview)*

Knowledge means knowing every piece of information as it appears by heart and using this information so that it works. His did not perceive the need for a different study strategy and did not consider his existing strategy was the problem. Such poorly developed skills and competencies or flawed metacognition not only restrict the strategies students employ but, are closely related to the conceptions of what learning means. His conception of learning, his approach to learning and the quality of his learning outcomes were not so much related to his motivation which remained high but to his flawed metacognitive processes. The student remained motivated and considered himself a "good" student. Student 19's final words were:

*I am hard working, ambitious and that's it. (Give me an example of how you are hardworking?) Whatever you have given me to learn, I will do it. I will not just wait or leave it for a long time. Maybe I will finish it earlier even. (Student 19, Final Interview)*

This student sincerely wanted to succeed but was unable to execute sufficient metacognitive change for this to occur. This student (like the majority of this group) was prepared to expend great effort in order to secure better results but in his case his metacognitive strategies did not include a shift away from current strategy use and he failed to see a different way.

## Conclusion

### *The Quantitative Investigation*

The results of this study suggest that the approaches to learning construct as expressed through the Study Process Questionnaire (Biggs, 1987a) can be used to investigate the learning processes of a culturally diverse group of students. Secondly, the approaches to learning construct, as operationalised through the Study Process Questionnaire could also be used to identify change over time in the *overall* learning processes of the students. The evidence does suggest that the process of change is slow and may take a considerable period of time to emerge.

### *The cross cultural applicability of the Study Process Questionnaire*

Overall the Study Process Questionnaire provided findings in terms of its reliability (over .75) which were at least as consistent as those identified in other studies when the Study Process Questionnaire has been applied to students from Western cultural backgrounds (e.g. Burnett and Dart, 2000). Some aspects of student learning would appear to be universals. They are truly *etic* in that it is possible to use the constructs developed in one culture and apply them equally across a number of cultures to produce similar findings. Some items in the Study Process Questionnaire instrument do, however, need particular care in their interpretation and potentially in their future use. The particular cases in point could be identified as the role of extrinsic and intrinsic motivation, the identification of a personal philosophy and some aspects of surface strategy which relate to the role of the lecturer and particular interpretations on the use of rote learning as a surface strategy.

Kember, Wong & Leung (1999) suggest that intrinsic and extrinsic motivations are not incompatible. While career motivation may initially appear to be surface or extrinsic motivation. some students in this study who were motivated by career prospects did not necessarily take a minimising approach. This conclusion may help to explain the finding that a surface-like approach to learning was not necessarily associated with poor academic performance. Perhaps those aspects of the Study Process Questionnaire identifying career motivation as a surface-like approach may no longer be applicable to tertiary students generally and not just students from Confucian heritage cultures.

### *Changes Over Time in Approaches to Learning*

It was found that the student approaches to learning construct was able to identify significant change over time in student approaches to learning with students adopting a relatively deeper approach over the three years, while conversely adopting significantly less surface and achieving approaches over time. The qualitative responses suggested that students were generally prepared to change their approaches if they had sufficient metacognitive skills to effect this change. It would seem that a pattern of "risk taking" being associated with intellectual ability could be identified for this group as a whole. This also supports the findings of Veenman *et al.* (1997) who suggest that there appears to be an important role for cognitive ability in recognising the need to effect metacognitive change. It is also suggested that it may not be the risk taking in itself that results in good academic progress but that the risk taker has a greater repertoire of metacognitive strategies available to them. This would tend to support Veenman *et al.*'s (1997) conclusions that students possess an assembly of skills and can draw on these as required. In effect, the change in learning approaches adopted by the students may be stemming from the greater range of skills available to these students and a wider cognition of how these may be applied rather than overall changes in orientations.

### ***The Qualitative Investigation***

Analysis of interview data would suggest that a qualitative view of learning is connected to metacognitive awareness of the need to change. Motivation to succeed and a desire to pursue deep strategies would appear to be insufficient in themselves to ensure effective learning takes place. The results of this study suggest that the student also needs to be able to activate effective alternative strategies, that is, to be flexible. Some students even when faced by failure and a lack of reward for the effort expended continued to believe that they needed to do more of the same thing rather than risk the possibility of change. This is perhaps surprising when it is considered that by already failing there would seem little to risk! The changes in student conceptions of learning were considered to be associated with higher levels of metacognitive processing. It is conceivable that adapting strategies to a particular task may not require the same levels of metacognitive realignment as required by a shift from a surface like to a deep level of processing.

Vermunt's (1998) conclusion that conceptions of learning and learning orientations are relatively stable over time is consistent with the general approach to learning construct identified by Biggs (1987b) and is supported by the current study. While students are generally slow to change their *usual* way of approaching the learning process over a period of time some evidence of change can be identified. This supports Biggs' (1987b) conceptualisation that approaches to learning are relatively stable predispositions. The qualitative data also suggests that task strategies may be more likely to change than overall orientations, although there would appear to be a link between task approaches and overall strategies as suggested by Veenman *et al.* (1997).

The importance of versatility (possibly stemming from mental reasoning ability) in approaching the learning process was also evident in student responses. While certain approaches were certainly preferable in seeking to maximise academic achievement, it was evident from student responses that a range of approaches were also important and that the range reflected student recognition of different situational contexts. Finally, the findings from this study would lend support to recent research (e.g. Dowson & McInerney, 1998; Vermunt, 1998) which highlights that student academic achievement is best explained by a range of factors.

Another presage factor identified in this study as important to the student learning process is the role of conceptions of learning (Schommer, 1998). Vermunt (1998) indicates that mental models of learning where the learner constructs their own knowledge are far more influential over the learning process than learning orientations. It is suggested that the approaches to learning construct when added to a construct identifying student conceptions of learning would provide more explanation of student academic performance. Kember (2001) found that students were influenced by a set of beliefs about knowledge which could be identified. He referred to these as didactic/reproductive or facilitative/transformative. While Kember's terms could not be directly equated to the models identified in this study it is suggested that this is because the focus of emphasis is different in the models, although their overall conceptualisation of student learning along a step by step reproducing conceptualisation or along a transformative conceptualisation would support the serialist/holistic surface conceptualisations or the serialist/holistic deep conceptualisations of learning identified in this study. It is suggested finally that the student who conceptualises knowledge as holistic/deep has the greatest capacity to adjust their learning, either because they have the most strategies available to them or are the most willing to consider the element of "risk" in adopting new strategies.

For this study, students who had an holistic conception of knowledge construction and a deep approach to learning seemed most able to effectively undertake the study process.

Data obtained through the Study Process Questionnaire does not disclose whether the role of memorisation is strategic or dysfunctional. Student interviews that for some students strategies such as memorisation were the result of improvident strategy acquisition while for other students memorisation was part of a carefully constructed process of acquiring understanding. For some courses, memorisation may have an important role, such as the need to know a particular formula in order to be able to apply it. As Sadler-Smith and Tsang (1998, p.91) point out, systems of assessment at the tertiary level may demand contrasting behaviours, "deep approaches and memorisation" respectively. Perhaps this requirement is recognised by this group of students.

### *The Relationship Between Background Characteristics, Approaches to Learning and Academic Performance*

The reconceptualisation of the description of the learning processes identified by this group into the four categories, holistic/deep; serialist/deep; holistic/surface and holistic/deep it is suggested, gives a more accurate explanation of student academic performance. Finally, evidence from this study suggests that, unless, the international student can be given the opportunities to reflect on his or her own learning processes then, even after a number of years of study, the student may continue to experience academic failure with no real insight into the causes of the problem. Even though approaches to learning may appear to be slow to change, the evidence suggests that over a period of time changes in approaches to learning can be identified. This provides an important ongoing recognition of the need for quality in teaching.

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## **Appendix 1**

### Interview Questionnaire

#### *General information - the meaning of learning*

Q.1. The first question, can you give me some of the reasons why you decided to study in Australia?

Q.2. And what do you hope to achieve?

Q.3. What are you enjoying about studying in Australia and particularly things within your undergraduate study.

Q.4. What are the things that are worrying you about your academic progress?

Q.5. The next questions relate to how you are trying to cope with that. So let's just go into some general questions. Try and think back now to something that you had to learn and how you actually went about learning it.

Q.6. Now that you have explained how you go about learning, I want you to give me an example of what you think learning means in general.

Q.7. Tell me about something that you have understood; you have looked at it and you really understood what it was. Give me an example.

Q.8. What made you understand?

Q.9. Is there a difference between learning something and understanding something?

Q.10. How do you remember things?

Q.11. Is there a difference between remembering things and understanding things?

Q.12. Can you remember though, without understanding?

Q.13. So what do you do when you don't understand something?

Q.14. Do you do anything other than just reading to try and understand things?"

Q.15. Is it possible for you to memorise and understand something at the same time?

Q.16. Do you ever translate back into your own language to try and understand something? Do you think in English?

*A comparison with previous learning*

Q.17. Tell me how often you had to do major examinations at school and in Foundation?

Q.18. What form of assessment did those examinations usually take?

Q.19. Did any particular subjects focus on particular ways of assessing you?

Q.20. Was all your secondary schooling in English?

Q.21. When you were studying for examinations, how did you decide what was important?

Q.22. Did you order the things so that you could choose from the most important to the least?

Q.23. Was studying in Foundation more like how you studied in your secondary schooling or is it more like your undergraduate study?

*Studying at undergraduate level*

Q.24. So just describe how you would revise the material that you would be studying for an exam. You could choose just some subjects. Start at the beginning of the study period and continue describing what you do until the end of the study period.

Q.25. What did you do when you came across material that you just could not understand?

Q.26. When you have got a lot of material that you have to read, and you need to read it and study for an exam, how do you try and read a large book of information?

Q.27. How do you combine notes from class, material you have collected yourself and broader knowledge?

Q.28. Do you try to put it in a form?

Q.29. What other strategies do you use to test yourself to know that you understand?

Q.30. Do you use different strategies for a subject you like compared with studying for a subject that you don't like?

Q.31. How do you organise your study environment, so that you have your space that you are studying in?

Q.32. Do you organise it in a particular way?

Q.33. What do you first do?

Q.34. What do you think are the best strategies you have used to study for an examination and why do you think those particular ones were successful?

Q.35. And are those same strategies working for you here?

Q.36. Will these strategies be useful do you think?

Q.37. Have you considered any different sorts of strategies?

Q.38. When you are actually doing the exam, how do you recall the information that you need?