

Understanding Tertiary Student Learning: Are They Independent Thinkers or Simply Consumers and Reactors?

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The central place of the learning environment and the personal characteristics of the learner in influencing whether students adopt deep or surface approaches to learning is well evidenced in the literature (for example, Marton & Saljo, 1976; Biggs, 1987; Entwistle, 2001; Ramsden, 2003). For this reason, tertiary educators are constantly seeking opportunities to provide best practice in their university classrooms. Yet simply motivating students to participate in class does not necessarily alter overall learning styles (Herington & Weaven, 2008). Although the term "learning style" is somewhat problematic (Richardson, 2000), previous research has shown that students' tendency towards a particular learning strategy affects their learning-related performance (Heikkila & Lonka, 2006). This suggests that the process of "unlearning" previous learning styles may pose a significant problem for academics if they hope to change their students' learning processes from surface to deep learning. As a profession, teaching at the tertiary level obviously draws upon a formal knowledge base. An important step in the translation of the formal knowledge base to enlightened practice is to draw upon tertiary students' experiential and informal knowledge. What learning-related concepts, and misconceptions do they hold? What is going on in the students' minds? Specifically, this paper will provide information on how three pre-service students currently enrolled in a Bachelor of Arts (Primary) course at the Sultan Hassanal Bolkhiah Institute of Education (SHBIE), Universiti of Brunei Daurssalam, Brunei Darussalam, approach study and how this approach can affect their concepts of learning.

Few individuals would deny that learning is the primary purpose of higher education and that teaching is the foremost means by which that goal is accomplished. Within the educational context of the courses in which the author was engaged to teach at the School of Educational Psychology, Sultan Hassanal Bolkhiah Institute of Education (SHBIE), Universiti of Brunei Darussalam, the two phenomena are so inextricably intertwined that it is often difficult to imagine one without the other.

However, as identified by Boulton-Lewis (1993) and more recently by Perkins (2006), much of the knowledge about teaching and learning within the tertiary arena is fragmented. This fragmentation restricts both the understanding of these important processes and the extent to which the relevant knowledge base can influence educational practices in higher degree courses (Ramsden, 2003). Teacher competencies and the quality of higher degree teacher education have for some time been of concern in Australia as demonstrated by the establishment and work of the National Project on the Quality of Teaching and Learning and the Council for the Advancement of University Teaching. The goal of this paper is to examine the relationships between approaches to study and the concepts of learning with an eye toward the integration of learning theory and research concerned with the two phenomena.

Specifically, this paper will provide information on how three pre-service students currently enrolled in a Bachelor of Arts (Primary) course at SHBIE, the Universiti of Brunei Darussalam, approach study and

how this approach can affect their concepts of learning. In an effort to investigate the integration and utilization of these students' knowledge of learning, it is first important to briefly address the two main themes of this paper: approaches to study and concepts of learning.

Approaches to Study

The conception of learning that a student holds determines how a student learns and what is learned by that student (Creanor, Trinder, Gowan and Howells, 2006; Biggs & Telfer, 1987). Tertiary students come to the learning situation with previously constructed ideas, knowledge or beliefs that help make sense of new information (Entwistle, McCune & Hounsell, 2002; Schallert, 1982). By the time students enter tertiary education, they more than likely have a consistent way of going about learning and studying. In general that approach to study is derived from the student's metacognition, linking motive and strategy with perceived task demands and desired type of learning outcome.

According to Herington and Weaven (2008), approaches to learning are related to the degree of satisfaction that students experience in their learning. Elliot & Dweck (1988) discussed this balance from two perspectives, a mastery/learning orientation and a performance/ego orientation. According to Dweck (1999), a mastery/learning goal orientation focuses on attaining competence through learning, understanding, and task mastery as measured by self-selected standards, development of new skills, and the seeking

of new challenges. On the other hand, a performance/ego goal orientation focuses on looking competent, demonstrating ability relative to others, and avoiding negative evaluations (Dweck, 1999).

This work was mirrored to some extent by Biggs and Moore who in 1993 identified three distinct approaches to learning: deep, surface, and achieving. Just like motives and strategies, a student's approach to study can be referred to as deep, surface, and achieving, with deep-achieving and surface achieving as other possible combinations.

The Deep Approach

Students who adopt a deep learning approach are interested in the academic task, relate the task to themselves, integrate parts of the task into the whole, and try to theorise about the task (Ramsden, 2003). In addition, students adopting this learning approach actively engage with course content and attend to the meaning and significance of the materials to be studied (Fox, McManus & Winder, 2001; Marton & Saljo, 1976). Because these students attempt to maximise their understanding by reading widely, discussing, and reflecting on the topic, the deep approach to learning usually leads to structurally complex performances and to high grades.

The Surface Approach

Alternatively, students who adopt a surface learning approach see the task as a means of achieving an end, such as gaining a good mark. However, the flip side to this approach is that it generally leads to poorer learning outcomes (Ramsden, 2003). Such students do not relate aspects of the task to a whole, worry about the time pressure involved, and avoid personal meaning (Slee, 1993). The surface learning approach incorporates the use of routine memorization (i.e., rote learning) to recall course content (Entwistle, 2001). Therefore, while the surface approach to learning is generally effective for recalling unrelated detail, it may result in low grades, particularly if students are required to apply those recalled facts in a problem solving task.

The Achieving Approach

Biggs and Moore (1993) also take into account students who adopt an achieving approach to learning. For these students, the purpose of learning is to gain academic qualifications or to gain the highest mark. Such students are concerned with the skills that will optimise the organization of the time and effort that they put into their study. "Achieving" describes a student's need to achieve high grades and be visibly seen to achieve (Entwistle, & Tait, 1994). The

achieving approach to learning usually leads to high grades as the students who embrace this stratagem will allocate time to tasks in proportion to their grade earning potential (Slee, 1993).

Summary

"The link between a person's beliefs about what learning is, and how that person will engage in a task, is a strong one" (Biggs & Moore, 1993, P. 317). Van Rossum and Schenk (1984), for instance, found that surface learners overwhelmingly held a quantitative conception of learning. That is, surface learning approaches are often associated with rehearsal behaviour, and they often result in fatigue and a dissatisfying learning experience (Ramsden, 2003). Meanwhile, deep learners hold a qualitative conception to learning and are more likely to be interested in the task itself, to engage in personal reflection, and to search for inherent meaning within the task. Such a learning approach frequently results in reports of high levels of learning satisfaction (Lonka, Olkinouora, & Makinen, 2004).

Ramsden (1992) advocates that "good teaching implies engaging students in ways that are appropriate to the deployment of deep approaches" (p. 61). Similarly, Biggs (1999) and Karns (2005) suggest, that to change a student's approach to study, it is necessary to induce an appreciation of higher conceptions of learning through the teaching environment. Good teaching should minimize those factors that lead to surface learning and should maximise those factors leading to students adopting deep and achieving approaches to learning.

Approaches to Learning

Adapting learning styles has also been found to be related to the students' perception of what is required in a course. Marton and his colleagues at the University of Gothenburg (Marton, 1976; Marton & Saljo, 1976) have approached the study of student learning from a phenomenological stand-point: *What a student learns can only be gauged from the student's own perspective.* This viewpoint has a further corollary, as Marton believes, that learning can only be evaluated in terms of the content of learning. A learning "process," over and above the content learned, might be a useful abstraction for psychologists to use, but it has nothing to do with assessing a particular interaction, here and now, between a student and the content she or he is studying.

This notion led Marton to assess learning in terms of what students said they understood from a particular learning episode (e.g. reading a short passage, or answering a question that poses a problem requiring specific knowledge for its solution). In general, Marton

(1997) found that students' responses could be classified into four levels, each level showing increasing grasp of the complexities of the material (see also Marton & Sailjo, 1976). As it turned out, these levels were virtually identical to the first four SOLO levels (Biggs, 1980, 1987).

Student Learning and the SOLO Taxonomy

Biggs and Collis (1982) developed a system of learning which summarises possible learning outcomes called the Structure of the Observed Learning Outcome (SOLO) taxonomy. SOLO is based on neo-piagetian ideas and has been influenced by information processing concepts. The SOLO taxonomy is aimed at detecting the quality of students' learning by finding out where the student is in terms of a cycle of learning. The cycle of learning (or the taxonomy) describes five general levels of learning outcomes that range from incompetence to expertise (Biggs and Telfer, 1987).

Biggs and Collis (1982) developed the SOLO taxonomy as a means of evaluating the quality of student learning outcomes. As an analytical tool, the SOLO model has the potential to evaluate student responses and to distinguish qualitatively different levels of student performance along a developmental continuum (McPhan, 2008). This taxonomy has been widely used in educational research as a means of determining the complexity and depth of student learning outcomes (Hawkins & Hedberg, 1986;; Tang & Watkins, 1994; Holmes, 2004).

Within the SOLO model (Biggs & Collis, 1982; 1991), student responses can be classified according to five levels of inherent complexity. Responses may be classified as prestructural, unistructural, multistructural, relational, or extended abstract (Biggs & Collis, 1982). Each level is related to the number of elements which are evident in a student's response. In the following section, adapted from Boulton-Lewis (1993) and Slee, (1993), the five levels are modified to apply to knowledge of learning. These levels are

1. Prestructural - At this level in the cycle, the student can attempt a set task, such as answering a question, but is capable of very little else. There is no evidence of any knowledge of the process involved in learning and the likely response is, "I don't know."
2. Unistructural - At this level in the learning cycle, the student will focus on the question posed or the activity to be learned. Typically he or she will focus on just one relevant aspect of learning which is understood.
3. Multistructural - Here the student can attend to more than one aspect of the task, and several relevant independent aspects of learning are

presented. However, these are not integrated into an overall structure.

4. Relational - According to Biggs & Telfer (1987) the relational level in the cycle is a higher level of functioning that enables the student to attend to parts of the whole in an integrated fashion. Consequently, relevant aspects of learning are integrated into an overall structure.
5. Extended Abstract - At the highest level, the individual is using abstract reasoning to think about strategies and tactics involved in the task and to appreciate the aesthetics or underlying philosophy. Thus, the integrated knowledge of learning is generalized to a new domain.

Summary

Biggs and Telfer (1987) place a great deal of emphasis on the concept of the learning cycle, arguing that it is a process through which an individual moves in learning a task. They believe that overall the SOLO taxonomy has a wide application in the learning setting (Power, 1986). The sequential progression through the learning cycle towards levels of higher abstraction in an ever upwards process has been termed the course of optimal (cognitive) development (Biggs & Collis, 1989). In later developments of the SOLO model, there have been refinements to incorporate linear development within a mode. This is known as 'unimodal' learning, and development across the modes has been termed as 'multimodal' learning (McPhan, 2002). For an overview of the SOLO model in terms of modes, learning cycles and forms of knowledge see McPhan, 2008.

Method

The aim of this paper was to investigate the approaches to study and the conceptions of learning of three pre-service university students. Who are these learners, how do they learn, and what kind of learning strategies are they using? There are just a few of the questions which this project set out to investigate. The methods and procedures used in this study are outlined below.

Participants

The subjects consisted of three pre-service education students enrolled in a Bachelor of Arts (Primary) program at the School of Educational Psychology (SHIBE) Universiti of Brunei Daurssalam. In semester one, 2006, 36 students enrolled in the unit PP 3212 – Inclusive Education.

Of the 36 students who were initially invited to participate in this investigation, twelve students nominated their interest in involvement in the study.

From those 12 responses, 3 students were randomly selected to participate in this study (i.e., every fourth respondent was chosen). The 3 students – 2 females, Kym and Sam (aged 19 and 20 years respectively) and 1 male, Milo (aged 20 years) – participated fully in the study. Pseudonyms have been used throughout this paper to protect the identity of the students.

Procedure

An introductory letter explaining the aims of the study and what was involved was distributed to the students enrolled in the unit PP 3212 Inclusive Education during the first week of semester one, 2005. During the first PP 3212 tutorial, students were invited to nominate if they wished to be fully involved in the study. Three randomly selected pre-service primary teachers were then invited to participate in this study.

The author interviewed the students individually and audio-taped the students' responses which were based on a semi-structured set of questions regarding the nature of learning concepts. A sample of the questions are: *What is Learning?*, *When you learn something yourself, how do you learn?* *What influences the way that you learn?* *What do you think is the role of the student in learning?* The final question was open ended: *If you could finish the sentence, "Learning is....." How would you finish it?* The major focus of the interviews was on how these students understand learning and their approach to learning.

The data was collected through separate face to face interviews conducted by the author in a quiet classroom at the university. The students were interviewed on one occasion, and all interviews were undertaken within the same week. Each interview took between 30 – 45 minutes. The students gave their permission for their interview to be audio-taped. The interviews were transcribed by the author within one week of each interview, and then members checked (Lincon & Guba, 1986) for quality assurance purposes so as to create reliable and trustworthy data.

Data Analysis

The interview questions were open-ended, and the data was interpreted in two ways. The first method of analysis used a phenomenographical approach (Marton, 1994). The second method interpreted the students' responses from the perspective of the SOLO model (Biggs & Collis, 1982). The use of graphical forms of representation – such as a table or a matrix –

has been proposed for some time (e.g., Miles and Huberman, 1994; Nadan & Cassell, 2004; Schwab, 2005) as being useful in unpacking the complexities of interview data. Consequently, tables were used in this paper to organize and depict the qualitative research findings in relation to the two approaches used to analyse the data.

In the first instance, a phenomenographical approach to analysis (Marton, 1994) was adopted in order to elicit the highly personal views which the study required. As the study focused on the very broad area of approach to learning, it was important to explore the students' conceptions of learning in everyday life and how this in turn might impact on their approach to learning at university. Consequently, an interpretive phenomenological approach was selected to encourage openness and informality during the interviews.

Interpretive phenomenological analysis has to date been mainly used in health and psychology disciplines (Reid, Flowers, & Larkin, (2005). It relies on a very open approach to interview, as well as on the assumption that the interviewee is an expert on his or her own experience. It does not seek to test assumptions, but rather depends on the emergence of themes as the interview progresses (Creanor, Trinder, Gowan & Howels, 2006). In line with this approach, Marton (1981) and Marton, Dall'Alba & Beaty, (1993) found that learning generally was understood in six qualitatively different ways: increasing one's knowledge, memorising and reproducing, applying, understanding, seeing something in a different way, and changing as a person.

The second method of analysis, the SOLO Taxonomy (Biggs & Collis, 1982), was used to assess the students' general conceptions of course work (Prosser & Trigwell, 1991; Trigwell & Prosser, 1991a, 1991b) and for assessing students' understanding of content taught and their knowledge of learning (Boulton-Lewis, 1993). The SOLO taxonomy has previously been used to examine interview data to ascertain the degree of deep learning that has occurred throughout a university course (Slack, Beer, Armit & Green, 2003). These authors believe that the strength of the SOLO model is in delineating conceptual processes.

In addition, Boulton-Lewis (1993), Chan, Tsui, Chan & Hong (2002), and Holmes (2004) have also applied this taxonomy to the knowledge of learning at the tertiary level. Each of the 3 student interview transcripts in the current study was classified from pre-structural to extended abstract depending on its complexity and relevance to the discussion. The consistency of the codings was checked for interrelater reliability by a research assistant and the author.

Table 1
The Categorization of the 3 Students According to Their Approaches to Study

Name	Approach to Study	Application to Learning
<i>Examples from students' interview transcripts</i>		
Sam	Surface-achieving	I would learn it for the exam or know enough to be able to at least pass my assignments, but I would not do any more than I had to on that subject. I would do what I had to do.
Kym	Surface-achieving	I would have to go back and memorize it if there was a test. I did learn it. In fact I learnt it again last night because I have done this before in another course, and I think I could maybe pass a test on it. But in a few weeks – I would have to relearn it again because I do not need to use it right now.
Milo	Surface-achieving	Well, if the topic is boring and frequently they are, unfortunately. There is an expectation that it will be interesting - but pretty much I take quite a mercenary approach to it. I think, "What is the bare minimum that I have to do to meet all the requirements?" and I will look into things that I find interesting in my own time.

Table 2
The Categorization of the 3 Students According to Their Conceptions of Learning

Name	Conceptions of Learning		Application to Learning
	Phenomenological	SOLO Taxonomy	Examples from students' interview transcripts
Sam	Memorizing and reproducing	Uni-structural	Because basically someone is teaching you something and if you can reproduce it – either on paper, or say it, or teach someone or tell someone about it, well that shows that you have learnt it. Otherwise you haven't.
Kym	Applying, understanding	Multistructural	Learning is the processing of new information and the filtering of any new information at it comes into your head.
Milo	Applying, understanding	Multistructural	Learning is knowing about many different types of knowing. But it is especially about knowing when you don't know how to know, and how to find those skills, to know.

Results

The major focus of the interviews was on how the students interpret their learning and their understanding of learning. All of the students interviewed appear to use a surface-achieving approach to their tertiary study. Table 1 identifies segments of the participant's interview transcripts characterizing this preferred approach to learning.

Table 1 illustrates that the three students' approach to learning resulted in a surface approach to their university assignments. Work pressures from university assignments and part-time work obligations were cited as reasons for tardiness. As previous research has shown, perceptions of being pressured coupled with limited time to meet deadlines, work against deep approaches to learning and the associated extended reflective activity that facilitates deep processing and the personalization of knowledge (Biggs, 1987; Entwistle, McCune & Hounsell, 2002).

Table 2 substantiates the participants' conceptions of learning phenomenologically and by means of

utilizing the SOLO taxonomy. After this analysis, results indicate that two students hold multi-structural conceptions of learning and one student holds a uni-structural conception of learning.

Results reported in Table 2 imply that the quality of learning outcomes may be improved through the provision of a learning environment characterized by learning activities and teaching strategies designed to promote students' control of their own learning, constructivist approaches to learning, and relational understanding of the material. That is, there is evidence of a positive relationship between the conception of teaching, teaching approach, and student learning outcomes.

Reflecting on Active Understanding

When reflecting on their teaching and learning, to what relative extent do tertiary students draw on their own experience as learners, or their informal knowledge of learning, or their taught knowledge? Perkins (2006) believes that students in under-graduate

teacher education programs (such as the Bachelor of Arts (Primary) at the Universiti of Brunei Darusalam) bring with them considerable informal declarative knowledge of learning processes and of psychological concepts related to classroom learning. Such knowledge is of two kinds: general conceptions of learning and teaching and specific concepts about learning and teaching. Of central issue in the case of post-service teachers is that it is important what beliefs such university students hold about their learning, because such cognitions are very likely to determine either effective teaching and learning practice or counter-productive classroom practices.

Reflections on How Participants' Approaches to Study Are Related to Conceptions of Learning

Clearly the three participating students' conceptions of learning are influenced by two major views. The first is a belief that learning is a constructive rather than reproductive process (Biggs & Moore, 1993). That is, the learner does not merely record the material to be learned. Rather, the learner constructs his or her own mental representation of the material to be learned, selects information perceived to be relevant, and interprets this information on the basis of his or her existing knowledge and current needs, adding information not explicitly provided in order to make sense of the new material.

Below are some examples from the participant's transcripts which support this notion. Although the theme of constructivism runs through all three interviews on learning, there is considerable variation in the philosophical and theoretical underpinnings of the various perspectives taken by the three students involved in this study.

At high school, I enjoyed science and maths subjects. I would always write it. I write it down. All of my formulae are written down. My work would be done on paper. That would be at high school level. Now for my Uni, if I am learning something, I think about it. Are the concepts clear to me? If it is clear to me in my mind, if it is clear to me – then I have learnt it (Sam).

All of my undergraduate, all of my education and even in life interaction – something is being filtered in and you are always processing new information – and obviously my University courses have helped that. Learning is life long – every interaction, what you read, what you see, write, anything is learning. You are processing it. It is coming into your head and you are learning (Kym).

I see teachers as facilitators - they are to gently help students to make the connections but not giving them a formal structure and not in an overbearing way. It must be gentle. I think that is so exciting to be able to do that. It is about life-long learning (Milo).

The second major view held by the three participants in this study is that learning is primarily a social, cultural and interpersonal process that is influenced as much by social, emotional and cultural factors as by cognitive ones. Once again, there are variations in the perspectives taken by different investigators, with some emphasizing social-psychological issues (Goodenow, 1992), whereas others emphasize the sociolinguistic and sociocultural issues (Collins & Green, 1992).

This concern for the social context of learning clearly needs to be added to the suggestion that the meaningful learning of complex material (in contrast to the acquisition of isolated information, which in certain cases is still necessary) may be characterized as being active, constructive, cumulative, self-regulated, and goal oriented (Shuell, 1986, 1988, 1990).

The following segments from the participants' transcripts, exemplify this notion of the social context of learning.

It is giving them the knowledge, telling them but it is also about guiding them to further ideas. Picking those who have an interest to go further, selecting those who have the ability to go further, and giving them more work. But at the same time, for those who can not understand it – to encourage the ones who can do a bit more and support them as well. It is giving more to those who have the ability and supporting those who are having trouble (Sam).

I learn best by interacting, I need a high interest level, the size of the group that you are learning in – I learn best in small group settings. The learning environment is important to me. I learn through understanding and a good mood influences my learning (Kym).

I size up the politics of what I am learning and who I am learning from, and I would go to someone who was an expert in whatever it was that I did not know and ask them to help me to develop my skill in that area. Knowing when you don't have the skill to learn something and then knowing who to approach and who will help you in a safe way. That's the big thing (Milo).

The learner-centred orientation inherent in the three students' views of learning has important implications for instruction, including increased emphasis on self-regulated learning (e.g., Corno, 1987; Zimmerman, 1989; Zimmerman & Schunk, 1989) and studying (eg. McClintock, 1971; Rohwer, 1984; Thomas, 1988). However, for purposes of learning from instruction, perhaps in the tertiary arena more emphasis needs to be placed on the instructional variables that influence learning (Shuell 1988, 1992).

Factors which Seem to Influence Tertiary Students to Adopt a Surface or a Deep Approach to Learning

All of the participants interviewed characterized their approach to study at University as being a surface-achieving approach. These students tend to value achievement and would view their ability as improvable. They tend to attribute their success to effort, use of the right strategy, and obtaining sufficient knowledge. However, these students tended to lack a strong sense of their own competence. Consequently, it is expected that their own self-worth would often separate them from their performance. In other words, they probably feel only as smart as their last essay mark or their previous semester's grade.

Attribution theory (Weinstein, 1991) suggests that the explanations people give for study behaviour, particularly their own successes and failures, have strong influences on future plans and performance. One of the important features of an attribution is whether it is internal or external and beyond control (Ramsden, 2003). All three students talked about not being able to retain material learned in subject areas outside of their chosen field (e.g., History, Maths, English etc). As pre-service School of Education students, they have clearly found a pattern of effort and strategy which works for them and one by which they achieve significant success. The following statements highlight these students' approaches to learning.

Well the motivation would be to complete my BA. If I had to do it, I would do it. I would spend as much time on my assignments and on my research, everything that needed to be done would be done because I know that my degree was dependent on that. But I would forget about some parts of the course, once I had my degree (Sam).

I like Uni, but I there are some aspects of courses that I don't think I need. For instance, statistics. I may need to know about standard deviations if I go on to do a PhD. Then I will need that. But at the moment I don't see the need to learn that. So I feel that I am learning about statistics differently to other information. I know I will just forget it after

the test. It was just one of those lessons that had to be learnt and it had to be taught, but it is not one of those things that I feel I need now (Kym).

I don't read from cover to cover. I read the footnotes, the intro, the conclusion. I read widely but I get bored and I jump all over the book. I twist a situation to fit into a structure. I go for what looks good and what's effective and what meets the criteria. Somehow, I always manage to do pretty well in my subjects that way (Milo).

Lecturers may cue students' attributions by the way they respond to their students' work. If tertiary students believe that their ability is fixed, then they tend to set performance goals and strive to protect themselves from failure. In this way, their explanations, justifications, and excuses influence their motivation and study behaviour. For example:

- If I had to do it I would do it.....But I would forget about it once I had my degree
- It is not one of those things that I feel I need right now, and
- I twist a situation to fit into a structure.....I go for what looks good.

Surface-achieving students (such as the participants in this study) may choose to enroll in subjects and indeed courses in which they feel they have a better than reasonable chance at passing. That is, they believe that they would have a good chance at success in a particular tertiary course without having to move out of their approach to study comfort zone. However, as Biggs and Moore (1993) have identified, when students believe ability is improvable, they tend to set learning goals and handle potential failure constructively.

Thus tertiary educators need to know beyond expert knowledge of their subjects and the pedagogy of teaching and managing students. Tertiary educators need to know how their higher degree students learn in classrooms and how they approach their study. Further, university lecturers must comprehensively understand theories of knowledge acquisition and the social nature of learning in classrooms to define and clarify their roles as effective tertiary educators.

Conclusion

Historically, the difficulties in defining learning at the tertiary level have been attributed to attempts to consider the concept of learning as a single phenomenon: the acquisition of knowledge (Martin, Prosser, Trigwell, Lueckenhausen, and Ramsden, (2001). As a result, researchers in the past have looked for common elements amongst learning activities

(Saljo, 1988). The problem with viewing learning in this way has become apparent with the mounting realization that tertiary students' learning and remembering are crucially affected by what they already know (Hollingsworth, 1989).

Tertiary students come to the learning situation with previously constructed ideas, knowledge or beliefs that help them to make sense of new information (Schallert, 1982). Students (such as the participants) who are part way through their undergraduate teacher education programs, for example, have definite ideas about teaching and learning, although their ideas cannot always be articulated (Lonka, Olkinouora & Makinen, 2004; Zeichner & Liston, 1987).

That is, pre-service education students begin with loosely formulated philosophies of education that personally explain what they think lecturers do and how tertiary students learn in classrooms (Buchmann & Schwille, 1983). These perspectives serve as culturally based filters to help make sense of the university program content, their roles as students, their observations of lectures and tutorial classrooms at work, and their translation of program content into teaching/learning activities in tertiary courses (Hollingsworth, 1986, 1989; Nespor, 1985).

According to Perkins (2006), "...our everyday way of talking about understanding is dominated by metaphors of possession. We speak of having, or of possessing an understanding, of acquiring knowledge, as though it was something stored in the basement. We speak of grasping something, which is a metaphor of taking possession. Or informally, we speak of 'getting it' – as in 'You either get it or you don't'. In this notion either one manages to take possession of a complex concept or if not: it slips through one's fingers and it's gone" (p. 29). This language, though, is completely alien to personal understanding that unfolds over time with greater effort and thoughtfulness.

Consequently, beyond knowledge of the subject and pedagogy of teaching and managing students, lecturers need to know how higher degree students learn in lectures and tutorials. That is, lecturers must comprehensively understand both theories of knowledge acquisition, approach to study, and the social nature of learning in classrooms to define and clarify their roles as effective "teachers" in the tertiary learning environment.

A commitment to quality teaching and learning includes a responsibility to voice and lead the development of quality practices beyond an individual academic's own units. The design of every teaching and learning sequence should be informed by a careful analysis of past student feedback, particularly with regard to the type of things that would motivate them

as individuals and as a group to become engaged with the material. Effective tertiary educators need to try to ensure that students feel valued for their comments on their lecturers' approach to teaching and learning. In summary, it needs to be the aim of all academics to develop their students as independent thinkers rather than simply consumers and reactors.

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