Using complexity theory to understand the teaching and learning process

Gregory Walker

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Acknowledgments

Statement of Authentication

The work presented in this thesis is, to the best of my knowledge and belief, original except as acknowledged in the text. I hereby declare that I have not submitted the material, either in full or in part, for a degree at this or any other institution.

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Abstract

This thesis explores the proposition that in the development and application of effective principles and the practice of teaching at a tertiary level of study, complexity theory can complement current, established theories of learning, including the social learning theory of Bandura, the socio-cultural theory of Vygotsky, the student-centred learning of Rogers and Farson, the experiential learning theory of Kolb, the stimulus response model of Skinner and the constructive dialogue of Socrates.

There are two aspects to this argument. The first is that complexity theory enables the teacher to move beyond the detail of events, to achieve a strategic view of the teaching and learning process and its effect on student behaviour. It can be viewed as the equivalent of a pedestrian surrounded by noise and confusion at ground level, moving to an elevated viewpoint and from that higher level looking down on the crowds below, observing and interpreting the patterns of pedestrian traffic. The second aspect is that complexity theory can provide the teacher with a meta-language which enables description and understanding of the sequence and content of events over a semester of study. The perspective here is that complexity theory is able to translate and accommodate the ideas of a range of existing theory and practice of teaching and learning at an undergraduate level of study.

An example of undergraduate study over the period of a semester was used to provide a frame of reference from which to consider this proposition. The subject of this study was a tutorial group for the unit 200148 Business, Society and Policy in autumn 2013 on the Parramatta campus of the University of Western Sydney.

The research process for the study used a combination of methods to collect the range and depth of data required for description of events in the teaching and learning process over a semester of study. Data such as student attendance of tutorials and performance in assessments provided context for qualitative research using written, semi-structured observations of student behaviour. The intent was to collect thick information, to enable thick description and then thick interpretation.

Chapter 1 Introduction and Context

1.1 Introduction

This thesis explores the proposition that complexity theory can complement the currently established theory and practice of teaching at a tertiary level of study in two separate but interconnected ways; by providing a meta-language to better describe and understand the teaching and learning process and by enabling a strategic perspective in the teacher's selection and application of established theories of teaching and learning in the classroom.

I have made an assumption that my audience for this research is primarily academics with an interest in established teaching and learning theory and practice at a tertiary level of study, for example the majority of teaching academics in the School of Business on the Parramatta campus of the University of Western Sydney. Discussions with members of this group show that while the majority have some knowledge of established theories of learning, most had little or no knowledge or experience of complexity theory, other than perhaps attending a session on this subject at a conference or seminar. A second audience might be found in those academics with an interest in complexity theory and its application in education. This grouping would include academics at locations in other teaching institutions in Australia and overseas. My supposition is that both audiences will be familiar with theory and have experience of practice in teaching and learning at a tertiary level and that they can act as the independent observer(s) defined by Husserl (2012). This view of the academic audience for this study has guided and bounded the explanation and example that I have included in this thesis.

1.2 Aims

The aim of this research is to explore the proposition that complexity theory can complement the current theory and the practice of teaching and learning and make an empirical and applied contribution to knowledge of the teaching and learning processes at a tertiary level.

1.3 Definitions

There are frequent references in this thesis to the *praxis* and the *practice* of tertiary teaching and learning. I have defined praxis as the integration of the theory of tertiary teaching and learning into the practice of the classroom teacher.

For the purpose of this thesis, *teaching* is defined as providing and *learning* as acquiring, knowledge, understanding, and skills, with a measurable longer term effect in student(s).In part the limited scope of this definition reflects the difficulty in finding agreement on the meaning of the key terms of teaching and learning (Davis & Sumara 2007; Hoy 2010; Pritchard 2008), and the broader question of whether it is possible and practical to separate teaching from learning (Brekelmans, Sleegers & Fraser 2002; Shuell 1993). In my review of the literature it was apparent that there was sometimes quite marked variation in the definitions (Pritchard 2008) (De Houwer, Barnes-Holmes & Moors 2013; Hoy 2010). It appeared that the choice of language and emphasis of definitions of teaching and learning was dependent on a range of factors including the *life stage* of the student, for example, between child and adult, the *life circumstance* of the student, including physical and or mental disabilities, the *discipline* under study, for example mathematics and literature, the *purpose* of learning, for example is it to fire a gun or conduct a critical analysis?. Then there is the *context* of that learning, such as through discussion with a group of friends, the structured learning process of university study or personal search of the internet. Finally there is the *world-view* of the authors in expressing their perceptions of the roles of the teacher and students in the learning process, for example, master and apprentice, expert and novice, leader and follower.

After critically reflecting on the literature, I concluded that because understanding of learning is context driven and dependent, there is no possibility of a universal definition; the practice does not allow a 'one size fits all' approach. I experimented with using the above criteria to develop a definition of learning for my story of an example of the teaching and learning process. I concluded that in the context of this study, teaching involved dealing with students in the discipline of business management, for the purpose of their acquiring the knowledge, skills and understanding needed to pursue a career in related employment. In this context the role of the teacher was to act as an expediter in their discovery of knowledge and construction of understanding. When I tried to apply this description to construct a

succinct, insightful and useful definition of learning for this thesis, the results were either so simplistic or so detailed, that they were impractical to apply.

Details on these and other issues concerning the theory and the practice of teaching and learning can be found in my literature review in Chapter 2. My point of view which uses the concepts of complexity theory, is that the teaching and learning process is best viewed as a continuous flow of energy between teacher and learner (Biesta & Miedema 2002; Shannon & Weaver 1959). In this view teacher and student maintain an open stance in their dialogue, with constant interaction to evolve understanding. This definition and description of learning is detailed in section 1.10 Theoretical Framework.

Then there is my use of the terms *ethnography* and *autoethnography* in describing and explaining my approach to research. Ellington & Ellis note that 'the meanings and applications of autoethnography have evolved in a manner that makes precise definition difficult... whether we call a work an autoethnography or an ethnography depends as much on claims made by the authors as anything else' (2008b, p. 449). In this thesis the terms ethnography and ethnographic relate to the design of my enquiry and I have adopted Cresswell's (2013) definition that 'Ethnography is a design of inquiry coming from anthropology and sociology in which the researcher studies the shared patterns of behaviours, language, and actions of an intact cultural group in a natural setting over a prolonged period of time. Data collection often involves observations and interviews'(Creswell 2013, p. 14). In that design I was conscious of Wolcott's note that 'Ethnography refers both to the research process and to the customary product of that effort – the written ethnographic account ... Ethnography means, literally, a picture of the 'way of life' of some identifiable group of people':(Wolcott 1980b, pp. 156-7). The definition of autoethnography that I have used in this thesis draws on the work of Marechal (2010, p. 43) 'autoethnography is a form or method of research that involves self observation and reflexive investigation in the context of ethnographic field work and writing'. In summary, I view autoethnography as a research method, which complements the ethnographic strategy that I have employed in my enquiries.

It is also worth noting that I make use of words such as *narrative* and *case study* to describe how I approached presenting and explaining the results of my research. In this thesis my narrative is a written account of the interconnected events of the teaching and learning process. I have chosen to present that narrative and the

associated evidence in the form of a case study because I needed to describe student behaviour over a period of time.

1.4 Autoethnography and I

As noted above I view autoethnography as a method of research and I have dealt with the subject of autoethnography in more detail in Section 4.3 Research Design. However I have had to introduce it at this early point in my discussion because of its influence on the construction and the expression of my points of view.

My interest in completing the process of postgraduate study came from the research questions that had emerged from my teaching experience. As a first step I developed a plan for research which in my experience would provide me with the range, depth and quality of data needed to reach a considered and informed opinion. It was only then that I enlarged my view to consider this research design in the light of relevant literature on research. This process of reflection started with considering the assumptions and world-views that had played a part in that design. What was my philosophy? As a final step I compared this research design and philosophy with academic thought on the role and focus of education research.

During the development of this thesis I faced conceptual difficulties in synthesising the roles that I had played in the cycles and processes of postgraduate study, first in the formulation of my argument, then the design and conduct of my research, and finally the conclusions that I reached on the research propositions and questions of my thesis. I needed to provide the independent observer with the assumptions, experiences, influences and processes that played a part in shaping my thoughts. After a process of search I decided that the solution was to adopt an autoethnographic (Maréchal 2010) stance in constructing and reporting a narrative for my audience. My interpretation of autoethnography required me to play a visible part and open my thoughts, impressions and conclusions to the readers. Initially I had reservations about adopting this stance. While I could see benefits for me in the freedom it gave to communicate my thoughts (de Vries 2012; Du Preez 2008; Ellis 2000), I could also see some risks. Firstly, because I agreed with Atkinson and Delamont (2010) comment that to adopt an autoethnographic method was to run the risk that, unless the researcher found a means to maintain contact with the reality of a situation, the research could degenerate into narcissism. The second problem that I faced was that locating myself in the research process, contradicted a

fundamental rule of my role in commercial research; I was a specialist resource and expected to stay out of public view. The switch from behind-the-scenes, to centre-stage in this research was not something with which I was comfortable. The decision to adopt an autoethnographic stance reflected my pragmatic view of the requirements of research and I monitored my comments to ensure that they clearly reflected my records of events. Adopting this autoethnographic stance worked well for me in arguing my case in this thesis.

1.5 Background

The history of this thesis begins with my commencement of work as a sessional tutor in 2006, in the School of Business at the University of Western Sydney, New South Wales, Australia. With no previous experience of teaching, I was motivated to undertake a process of research to judge my progress as a teacher, and obtain a wider view of the theory and the practice of teaching and learning at the tertiary level. This process of self-education has continued over time as I gained experience and knowledge, beginning with an informal process of following up ideas mentioned in discussion with colleagues, or encountered in the literature.

I began my research by monitoring the progress of students in my tutorials. These reviews were self-reflective and limited to factors such as student performance in assessment and tutorial attendance, keeping notes of what worked and what did not, in tutorial exercises and of student behaviour and commentary in class. I sought to assess the depth of their understanding, and address how I could improve my delivery. Over nine semesters, I conducted reviews for twelve iterations of units of undergraduate study of business management. These included core and elective units of a Bachelor of Business and Commerce at the University of Western Sydney. In parallel I asked questions of experienced colleagues about the teaching and learning process for units where I was employed, to establish an understanding of the connection that they as practitioners, saw between the practice and the theory at an undergraduate level of study. I used their mentions of specific theories of learning as a point of departure for my research, first in consulting the literature and then in seeking evidence of the use of these theories across the units in which I was employed as a tutor. Over time I developed a list of theories which my research suggested were important in the practice of the undergraduate study of business management at this university. Additions to the list were the result of a three-stage

process, guided by three questions. First, what theories did my colleagues see as underlying their practice? Second, did their comments and explanation of the concepts agree with the literature? Third was there evidence that theoretical concepts were being applied in the teaching and learning process for a range of units in the practice of undergraduate business management study at the University of Western Sydney? This process has so far resulted in the identification of six theories of learning which I perceive to be influential in the practice of teaching and learning, at least at an undergraduate level of study of business management at the University of Western Sydney.

These theories, their authors and the date of the first publication are shown in the table below.

Author	Theory
Bandura (1986)	Social Learning Theory
Kolb (1984)	Experiential Learning
Rogers (Rogers & Farson 1957)	Student-centred Learning
Skinner (1953)	Operant Conditioning
Socrates (Smith 2011)	Socratic Method
Vygotsky (1978)	Socio-Cultural Theory

I included Bandura (1986) and Social Learning Theory on this list in 2009 after I had questioned the number of group exercises in the session plans and assessment steps in a unit. I had found group-working to be an often volatile process and I was confused about why this method of approach was being used. A colleague suggested that while group exercises could be problematic, students would learn from each other.

The inclusion of Kolb (1984) and Experiential Learning in 2011 reflected the attention paid by colleagues to this theory in workshops, seminars and discussions. I also saw evidence of Kolb in the feedback process following assessments, as students would read and act on my written comments.

Rogers (1957) and Student-centred Learning was added to my list in 2011 following a conversation with a colleague during which we spoke about my growing interest in theories of learning that I thought were implicit in the teaching and learning process. His response was that at that stage my research was lacking the emphasis on and attention paid to student-centred learning in the teaching of business management within the School of Business.

I explored Skinner (1953) and Operant conditioning in 2012 after reviewing the assessment process and marking rubrics for the units in which I had taught. In all cases there were rewards and penalties, and the standards set in assessments gave students direction in modifying their behaviour.

Socrates and Socratic Method (Smith 2011) were added in 2013 after a discussion with a colleague about the principles of a Confucian approach to learning, As I understood it, taking a Confucian approach to a subject (Smith 2012) required the student to follow a process of first memorising then understanding followed by reflection and only then moving on to questioning in a subject. To me this offered students the possibility to find greater depth of understanding of a subject. My colleague's response was that while he could see reason to include elements of a Confucian approach, it appeared to contradict the focus on Socratic Method in tertiary education. When I reflected on my experience as a teacher and reviewed the Learning Guides and sessions plans for the units in which I had worked, it was apparent that the Socratic Method is fundamental to the current paradigm of teaching and learning in undergraduate business management at this university. In each unit I reviewed, students were required in assessments and class exercises to develop a considered opinion on a subject and then to argue their case, most often in the form of an essay but also in classroom and on-line debates.

Vygotsky (1978) and Socio-Cultural theory was actually the first entry on my list of theories in 2007 after I queried a colleague about the reasons for an assessment process in a unit, which showed increasing levels of difficulty at each stage over a semester of study. The response was that it represented a scaffolding approach to learning, and this was associated with the ideas of Vygotsky.

As a result of that process I concluded that the six individual theories of teaching and learning provided by Bandura (1969) Kolb (1984), Rogers (Rogers & Farson 1957) Skinner (1953) , Socrates (Smith 2011) and Vygotsky (1978) were evident and

important in the context of the undergraduate study of business management in the School of Business at the University of Western Sydney.

When I reviewed my placement of the six theories within the behaviourist, cognitivist and constructivist (Jarvis, Holford & Griffin 2003; Leonard 2002) framework that I employed in Chapter 2.3, I found I had classed one theory (Skinner) as having a behaviourist point of view, another (Kolb) a cognitivist point of view and four (Bandura, Vygotsky, Rogers and Socrates) a constructivist point of view. This result reflected a mix of approaches in the current practice of teaching and learning and that the balance in this mix favoured a constructivist approach. It was apparent that all six theories had wide acceptance and application in educational practice outside the School of Business. Further detail is shown in Section 2.3.

I determined to pursue these theories to construct a perspective from which I could compare and contrast the concepts of established theories of learning, with the concepts of complexity theory. To do this I needed to collect evidence and examples of their application in practice and consider their ability to fully explain my experiences in teaching. My first step was to compare the concepts of each of the six theories with the practice of the teaching and learning process as revealed in the Learning Guides for each unit. Learning Guides are published for students prior to each semester and include detail of the learning objectives of the unit, a description of content, process and standards in learning and assessment, and the location of learning resources such as journal articles. My experience in teaching is that these guides act as a contract between student and teacher – each party may have reasonable expectations but must also accept reasonable responsibilities. In practice both teacher and student expect that what is stated in the Learning Guide is what occurs in the teaching and learning process. I found only one reference to teaching and learning theory (Brookfield 1987) in the Learning Guides that I reviewed and this was presented to summarise the approach to teaching employed in the unit. Inclusion of a theory of learning on my list was based solely on the inferences that I drew from reviews of the physical evidence provided by Learning Guides, my experience in working as a tutor, and from conversations with colleagues.

While I was satisfied that these theories did play a significant part in the teaching and learning process in the School of Business, it was also apparent that none provided a complete explanation of the events that I observed over each semester of

study. For example, the social learning theory of Bandura did not provide me with a full explanation for the intricacies and uncertainties of group working, and while Vygotsky's concept of scaffolding worked well in the practice, it did not explain sometimes unexpected leaps in student understanding. I also concluded that even within the framework provided by these theories, I was still faced with the question of how as a teacher I could integrate the theory of learning into my practice of teaching, to achieve a unified whole. For example, in planning my sessions I could include group working (Bandura) in class exercises; scaffold the tasks in assessment (Vygotsky); provide students with the resources and facilitate their progress (Rogers); mandate students to pause and reflect on their progress through feedback on assignments (Kolb); require them to construct and deliver an argument (Socrates) and shape student behaviours through the marking rubric (Skinner), and still have a learning program which was a collection of bits, rather than the unified whole that in my experience was necessary for students to find depth in understanding.

It was also apparent that the resulting plan incorporating the six theories would still not reflect all aspects of how we teach and how we learn (Jarvis 2006b), nor would it acknowledge my experience of the dynamic and to some extent often unpredictable nature of human interaction in the classroom, over the time period of a semester of study. I felt that in the current paradigm of teaching and learning there was an implicit assumption that a student with application, could expect to follow a smooth path from a state of not knowing to one of knowing a subject. This perceived assumption contradicted my teaching experience, that the speed and the path of student progress was to some extent unpredictable and characterised by fits and starts where there would be sudden bursts of effort and student insight, but also periods of inactivity and apparent lack of progress. Often there were no immediate reasons to explain these changes, or so many possible causes that it was not possible to claim cause and effect.

It should be noted that I make frequent reference to *behaviour* and *behaviours* in this thesis. In all instances these refer to observation of what the students and I the teacher did or said. For the students I made notes on their behaviour as expressed in comments, voice tone, seating posture, eye contact, interaction with classmates, performance in assessments, and attendance at tutorials. As the teacher my behaviours included my comments and questions in interaction with students and I included these in my notes shown in Chapter 5 Narrative of Events. My focus on

recording behaviours draws on comments by anthropologists such as Bernard (2011) and Geertz (1973), that to understand a culture there is a need to closely observe, report and interpret the behaviours of individuals in their interaction with others. The observations of behaviours recorded and reported in this research are limited to what was visible to the teacher.

Reflecting on my questions about teaching and learning outlined above, I searched for other ways to think about the process. After discussions with a colleague I started a review of the literature on complexity theory, with specific focus on its application in education. This process of review and then reflection led me to conclude that at an undergraduate level of study, complexity theory did appear to offer a meta-language that I could use to understand and explain the teaching and learning process. Further explanation is provided in section 2.4. Moreover I felt that complexity theory could provide me with a perspective which enabled strategic thinking in my tactical application of established theories of learning in the teaching and learning process.

These conclusions, hunches or propositions (O'Leary 2010) led me to enrol in further rigorous study and the development of a research program using an example of the teaching and learning process to consider the research propositions and questions shown in the following sub-section.

1.6 Research Propositions

There are two research propositions:

1. Complexity theory can be useful in describing and interpreting the events and processes associated with teaching and learning at an undergraduate level of study of business management.

2. Complexity theory can play a useful role in the development of effective teaching praxis, at an undergraduate level of study of business management.

These propositions reflect the *deductive* and *inductive* nature of this thesis. It is deductive in the sense that it seeks evidence to support or deny the concepts of complexity theory, and inductive in that the thesis seeks to apply the concepts of complexity theory to the practice of teaching at an undergraduate level of study.

To be deductive I needed first to verify the concepts of complexity theory using evidence of the teaching and learning process. For example by adopting the perspective provided by complexity theory, I should find evidence of students self-organising into communities of interest. If I did find evidence that the concepts of complexity theory could describe and interpret events (point 1 above), then my focus was inductive, exploring how, where and why these concepts could be applied. Using the earlier example if students do self-organise into communities of interest, how do I as a teacher employ this behaviour in my teaching plans and processes?

1.7 Research Questions

The research propositions described above were used to develop the following research questions:

a) To what extent can complexity theory be useful in describing and interpreting the events and the stages of a cycle of learning at an undergraduate level of study of business management?

b) What role can complexity theory play in the development of appropriate teaching strategies in order to achieve the learning objectives of a unit of study?

1.8 Purpose and Scope of Research

The purpose of this research is to explore the potential of *complexity theory* to complement the current theory and practice of teaching and learning at a tertiary level of study. In this thesis the teaching and learning process contains the events, actions and behaviours that characterise the interactions of teacher and the students in each repetition of the teaching and learning process.

For the purposes of this research, complexity theory refers to the study of complex systems composed of interconnected parts (Agar 1999; Allen 1998; Byrne 1998; Davis & Sumara 2012; Kuhn 2007; Semetsky 2008). In this instance the complex system is an iteration of the teaching and learning process in the undergraduate study of business management, over the time period of a semester.

In the progress of my enquiry I encountered a number of issues that needed to be addressed to answer the research propositions and questions described above. Could I demonstrate that the concepts of complexity theory could be used to describe and interpret the events of an iteration of the teaching and learning process over a semester of study? There was a range of evidence of use of the concepts of complexity theory in the social sciences over an extended period of time and with a noticeable progression across disciplines (Agar 1999; Allen 1998; Byrne 1998; Kuhn 2009). However I could not locate examples of the concepts of complexity theory being used to describe the teaching and learning process over the time period of a semester. There was the related question of whether and how complexity theory could provide me with a wider and elevated strategic point of view of the teaching and learning process.

I was willing to accept that even if complexity theory could be used as a meta-language and provide a strategic point of view, it still left the question posed by authors such as Rosser (1999) and Murray (2003) as to why and how the use of complexity theory would enable me to achieve a better result in terms of student understanding of a subject. In section 2 of chapter 5, I explain how I used aspects of the established theories of learning and complexity theory to describe and interpret the events of the teaching and learning process to address the question of which perspective demonstrated most ability to explain events. Indeed, was there any evidence to suggest that complexity theory provided a strategic perspective on the teaching and learning process?

1.9 Context of Research

The review of the literature of teaching and learning that I completed for this thesis revealed a number of themes. Most apparent was that I was completing my studies in a period of substantial change in thinking and practice across the Australian landscape of tertiary teaching and learning. There appeared to be two key drivers for this process of change. First, reviews of the role of tertiary education in society and the economy and the part to be played by universities (Bradley et al. 2008; Burke 2012; Kniest & MacDonald 2011). Second, the impact of technology in particular the internet on education (Bull, Bossu & Brown 2011; Marland 2012). Similar themes were apparent in the United Kingdom (Alexander & Doddington 2010; Coffield 2000; Cotton & Winter 2010; Reay, Crozier & Clayton 2010; Wolf 2011). Less evidence was available on this process of change in the United States; the academic

and other published works that I encountered were the result of the work of an author or group of authors operating at the local level of individual universities, not the national level of an institution such as a Federal government department or a committee of enquiry. See for example articles by Tagg (2012), Lawrence, Ott and Bell (2012) and del Favero and Bray (2010).

My review of the content and focus in both academic and mainstream electronic and print media led me to reach the conclusion that the current, visible changes in education at a tertiary level, were a factor of larger scale and seemingly fundamental change in the structure of the Australian and international societies and economies.

This review also uncovered a range of fundamental issues that in combination act to question the current paradigm of teaching and learning at a tertiary level of study.

I have included a listing of the twelve themes that I had uncovered because they describe and define the context of my research. Each of these themes has been expressed as a question with no attribution of greater or lesser importance to each. The three themes that I have sought to address in this research are shown in bold. I have not sought to place them higher in this list because their current position (which was where I added them to my list) illustrates the complex and interwoven nature of all of these themes.

What part does and should education play in this society? Is the function of education as described by Hirst (1965) solely to develop the student's rational mind, with knowledge acquired for its own sake? Should it also have a focus in future economic or other benefit for the student (Biesta 2012; Chambers & Gopaul 2008; Nickolai, Hoffman & Trautner 2012; Tweed & Lehman 2002)?

Should teachers treat students as the tabula rasa of Locke (Axtell 1968), *ready to be filled with knowledge?* Should we also acknowledge the influence of experience, and enable them to incorporate this in their learning (Jarvis & Watts 2012; Merriam 2001)?

What are the appropriate roles and positions of the teacher? Is it to supply what is perceived to be the 'right' information (Allen 2012; Biesta 2008; Foucault 1977; Freire 2000; Galloway 2012) and instil the 'right' virtues in students (Dewey 1986; Grant 2012; Locke 1847)?

What part does the student play in the teaching and learning process at a tertiary level of study? There is extensive evidence in the literature of the need for the student to be involved in the process of learning. However, I found that the form of this student engagement and participation and the part played by the teacher was not plain (Aspland 2009; Balasooriya, Toohey & Hughes 2009; Biggs & Tang 2007; Jungert & Rosander 2009; Miller & Parlett 1974).

Is the human presence of the teacher really necessary? A number of researchers address this question, but none provided a clear picture of what is emerging (Jarvis 2006a; Jarvis & Watts 2012) in the new technologies, channels and sources of learning that have emerged from the internet (Holmes 2005; Lee et al. 2011; McLuhan et al. 2011; O'Malley & McCraw 1999; Sherry 1996). My review suggested that a key question on the future of tertiary education will be whether a student can develop deep understanding (Entwistle 1997) with no need to connect and interact with a structured teaching and learning process, or if there is a continuing need for that structured approach and the physical and electronic presence of the teacher. Note that I have used this 1997 paper from Entwistle throughout this thesis because it enables a consistent frame of reference when I address student understanding.

Should learning (and teaching) at an undergraduate level only be through application of the Socratic Method? Review of the literature showed that at an undergraduate level of study of business management, there was a reliance on the Socratic method (Garside 2012; Smith 2011) where the student finds personal understanding of a subject through rigorous enquiry. However there was also very active debate on the need for other paths of approach (Nisbett et al. 2001; Tan 2011).

***As practitioners how do we incorporate and apply the plethora of theories* (Hoy 2010; Leonard 2002; Moore 2012; Murphy, Alexander & Muis 2012)** *of learning in the practice of teaching?* Each of the established theories of teaching and learning that were uncovered in my review of the literature claims its own point of difference in addressing aspects of teaching and learning. For the theories considered in this thesis, a depth of research evidence supports their conjectures and the parts they can play in the teaching and learning process.

Is it possible to find a single and unified theory of teaching and learning? Authors such as Jarvis (2006b) and Coffield (2005) conclude that within the current paradigm of teaching and learning a comprehensive, overarching theory is unlikely. In part this is perceived to stem from the barriers and boundaries applied by the various disciplines; although it also reflects the range and diversity of context.

Is it possible to create a common language for teaching and learning? Boyer (Glassick 2000) calls for a new form or conception of scholarship, one which adopts a common language as a means to integrate research and teaching and unify disciplines. The move to adopt a trans-disciplinary approach with a common language is inherent in the works of other authors such as Morin (1992). However, while the inadequacy of a single discipline approach to teaching and learning is acknowledged, questions are also raised about what is possible and practical (McClam & Flores-Scott 2012).

What part is to be played by universities and other suppliers of tertiary education into the future, and what will be the role of the scholar? Schon (1995) argues that the research university which he perceives emphasise the use of the reductionist and experiment based research of the range of elements that underlie and impact on a process such as teaching and learning, was ill equipped to deal with the messy reality of that process.

Are we at a point of radical change in the dominant paradigm of tertiary teaching and learning? As noted previously there is evidence of quite radical and fundamental change in the praxis of education in Australia and overseas, and it was evident that these changes will have an impact well into the future. Authors such as Gladwell (2000) publicised the work of researchers in areas as diverse as sociology, economics, physics, climatology and zoology who found that small changes in the variables of a complex system could occur without noticeable effect until at some unpredictable point there was major change. The question is whether this point of change has been reached in the complex system of tertiary education, with a new paradigm set to emerge.

If the current paradigm of teaching and learning at a tertiary level of study is replaced, then what will be its replacement? I accepted the warnings of authors such as Geertz (1973) about the need to resist the influence of fashion in creating or subverting the dominant discourse of accepted practice as described by Foucault and

Hurley (1990). However my review of the literature showed that the model of education that now applies in Australian tertiary education emerged in the nineteenth century (Watson 2006), and is now judged as needing substantial change if it is to meet the changing needs of society (Deiaco, Hughes & McKelvey 2012); E&WR (2011); (Kniest & MacDonald 2011; Marland 2012). The question that remains for me is what will be the shape and the content of this new paradigm at an undergraduate level of business management study at an Australian university?

When I reflected on the questions that had emerged from my research, it was apparent that they had defined my perspective of the context of this study, and influenced my view of established theory and practice. It was evident to me that the practice of teaching and learning was undergoing a process of major change and that accepted practice now would not necessarily be the practice of the future. This context supported the need for new perspectives on the teaching and learning process at an undergraduate level of study.

1.10 Theoretical Framework

The section outlines and illustrates the frame of reference that was used to interpret the events of the teaching and learning process recorded in the narrative story employed in this thesis.

This framework conceives the teaching and learning process to be a dialogue between a student and teacher, using forums of communication such as lectures, tutorials, readings and discussions, to enable the student to find understanding of a subject of study. This dialogue is conceived as occurring within a complex and dynamic environment and the teaching and learning process is viewed as an interactive, iterative, ongoing process over time.

The framework used in analysing and interpreting events recorded in the narrative story, was underpinned by eight concepts drawn from complexity theory: *self-organisation, strange attractors, connectivity, feedback, emergence*, *evolution*, *negative entropy* and *requisite variety*.

Teachers and students *self organise* (Ashby 1962) around communities of interest (Allen 1998), which centre on points of mutual interest (*strange attractors)*. The

concept of strange attractors is often associated with the work of the meteorologist, Edward Lorenz (1963), which sought to describe the behaviour of complex weather systems. In this view the attractors were the physical values such as temperature, humidity and wind speed toward which a weather system tended to evolve. These physical values could and would change sometimes unexpectedly and new patterns (fine, cold, stormy) would emerge. In this thesis the strange attractors of the teaching and learning process and their communities of interest include the assessment tasks, group exercises and class debates. Like the weather, the dynamics of a classroom can change, sometimes unexpectedly, because of seemingly minor changes in the values or perhaps more usefully the perceived importance of key aspects of the teaching and learning process such as attendance records, class exercises and assessment results. In my experience, a teacher can observe the progress of the teaching and learning process to be messy and disorganised-chaotic, in the classroom. While there will be an underlying form and steady progress in student understanding of a subject over a semester there will also be constant variation in their performance from week to week. The students and the teacher are reliant on their *connectivity* for effective and timely communication and cooperation.

In this model realising the learning objectives of a unit of study is dependent on the quality and content of the *feedback* that each party provides in guiding and shaping understanding (Mainzer 2009; Shotter 1991). Over time there will be *emergence* and *evolution* in the depth of student understanding of a subject area. Because of the interconnected nature of the teaching and learning process there will also be emergence and evolution of the teacher's assembly and delivery. Inherent in this model is the concept of and need for *negative entropy*. Entropy was explained by Schrodinger (1992) in his note that complex systems will run down over time unless they import energy. In the context of the model employed in this thesis, maintaining progress in the teaching and learning process requires constant addition to energy levels from both student and teacher through their comments, questions and answers. This model assumes that communications between the teacher and the student will have the capacity (*requisite variety*) required to carry that information content between the two parties (Ashby 1962; Shannon & Weaver 1959). This means that the richness of the content of the teaching process should reflect the richness of the subject. This requirement has implications for teachers in their selection of materials and explanation of concepts. It also leads to the question of how to

integrate all of this detail into a sequence of events over a semester of study with positive learning outcomes in the depth of students' understanding of a subject.

It should be noted that I have made an assumption that the content and explanation of a topic will never be complete, because the complexity or richness of a subject will always exceed the complexity or capacity for richness of the teaching and learning plans and methods (Ashby 1962; Cilliers 2005). I have also assumed that it is impossible and misleading to distinguish clearly the boundaries in roles and responsibilities of the teacher and the students (Shuell 1993). It seems to me that 'who', contributes 'what' to the process of teaching and learning is problematic, and that there will be frequent swapping of roles between teachers and students over the cycle of a semester of study. In this model success is dependent on the working relationship that exists between teacher and student over a semester of study.

In conclusion, in this thesis teaching and learning at an undergraduate level of study of business management at the University of Western Sydney is an interactive, iterative and evolutionary process, over time. Through factors such as class attendance, behaviours, questions and queries, students play an active role in helping to drive the process of learning. Their interaction with the teacher and other students helps to shape the content and focus of information and the interpretation of meaning. This view argues that the teaching and learning process is dependent on a multitude of external influences and cannot be conceived or delivered as a linear process consisting of discrete sequential steps. This view also assumes that there is no certainty of the result in terms of the depth of student understanding (Entwistle 1997).

1.11 Significance of Research Contribution

The research presented in this thesis is significant in a number of ways. First, it addresses a gap in the literature of empirical research into the application of complexity theory in teaching and learning. This research addresses another apparent gap in empirical research, longitudinal studies which view the teaching and learning process over a relevant period of time.

Second, this research will make a useful contribution to the debate as to whether and how complexity theory can contribute to higher education by complementing

established theories of learning. Some authors (Axley & McMahon 2006; Davis & Sumara 2010; Jörg, Davis & Nickmans 2007) argue that the complexity lens avoids the limitations inherent in the narrow focus of each of three main schools of thought (behaviourist, cognitivist, and constructionist). For that reason they argue that complexity theory offers the means to adopt a wider perspective in designing and implementing programs of teaching and learning. At the extremes of this argument, complexity theory is seen to be able to replace the existing theories of teaching and learning based on behaviourist, cognitivist or constructivist paradigms (Axley & McMahon 2006; Davis & Sumara 2012; Jörg, Davis & Nickmans 2007). Another point of view evident in the literature was that complexity theory adds little more than 'beguiling metaphors' (Rosser 1999) to discussions in teaching and learning (Goldstein 2000; Horgan 1996; Murray 2003; Norman 2011; Patton 1999; Rosser 1999). This research tests that form of criticism by employing the concepts and the metaphors of complexity theory to describe and interpret an iteration of the teaching and learning process. Then there are authors including Geertz (1973) and Horgan (1995) who caution against the influence of fashion in recording and interpreting behaviours, with specific reference to the emerging body of theories that seek to deal with complex systems. I judged this cautious attitude to be both reasonable and prudent, at least in the initial stages. However my review of the literature showed that the range of applications of complexity theory in the social sciences has expanded steadily since the 1980s. I think it reasonable to treat complexity theory as a recognized part of the landscape in the social sciences.

Third, the research for this thesis provides another example of the application of the concepts of complexity theory, in this instance in the context of undergraduate study of business management at an Australian university. My point of view on possible roles for complexity theory in tertiary education, most closely aligns with authors such as Mason (2009), Morrison (2006) and Kuhn (2008) who argue that complexity theory provides a strategic viewpoint and a meta-language which enables the teacher to better deal with the complex and dynamic nature of the teaching and learning process. In this thesis, the teacher and the student would view the teaching and learning process through the lens of the behaviour of complex systems, using the language and the world-view of complexity theory. In this view complexity theory complements established theory and practice in teaching and learning at a tertiary level of study.

A fourth reason to claim that this research will be significant is its empirical contribution to the larger body of knowledge on the teaching and learning process at an undergraduate level of study of business management. The story of an example of the practice of teaching and learning provides detailed evidence of the process. Apart from providing a framework for consideration of the two propositions of this thesis, I anticipate that this study can also provide a useful point of reference in considering alternatives in curriculum design.

1.12 Summary of Contents

This first chapter has outlined the propositions of this thesis, the purpose and relevance of the research. It included explanations of the context of this study, and my intent to explore the theory and the practice of teaching and learning in undergraduate study of business management at the University of Western Sydney in Australia.

Chapter 2 summarises the results of a review of two aspects of academic literature as they apply to higher education: the established theory of teaching and learning and the concepts of complexity theory, with a focus on their application at a tertiary level of study.

Chapter 3 addresses my research philosophy and the consequent assumptions that I have made in constructing, completing and reporting of the research. It also addresses the constraints that applied, in particular the requirement to record events in the teaching and learning process over a meaningful period of time, in this case the semester.

Chapter 4 explains my rationale in using an example of the teaching and learning process to address the propositions of this thesis. It includes explanation for using a mix of research methods including the reasons that lay behind my selection of these tools and how I applied them to collect the data needed to construct a narrative of the teaching and learning process.

Chapter 5 contains the story of events over the semester of study. I used this story to provide a framework to consider the thesis propositions. This story incorporates summaries of data collected in my research. It extends to include two interpretations

of events; the first is provided by the six established theories of teaching and learning; the second through use of the concepts of complexity theory.

Chapter 6 considers the propositions of this thesis in the light of these interpretations, to reach conclusions as to whether complexity theory can complement the current theories of learning employed in units of study for an undergraduate degree in business management at the University of Western Sydney.

Chapter 7 describes the limits to this study and the conclusions that I have reached. It explores the ways this study has contributed to the body of knowledge, including the further questions that emerged. I sketch the forms and programs of qualitative research that could be used to address these questions. As a last step I include a summary of my conclusions on what I have achieved.

Chapter 2 Review of Relevant Literature

2.1 Introduction

The following chapter summarises my review of the literature on established theories of teaching and learning and the application of the concepts of complexity theory in tertiary education. It is worth noting that while established theories of learning do have meaningful points of difference in the ways they address the teaching and learning process they all originated from our understanding of how we learn. In contrast, the concepts of complexity theory draw on our understanding of the behaviour of complex systems. While these concepts can be used to describe human behaviours in the teaching and learning environment they require the user to regard the classroom and its students as a complex system subject to the same types and patterns of behaviour exhibited by a chemical reaction or a weather pattern. While established theories and complexity theory have little or no connection in my view they all enable some level of interpretation and understanding of the teaching and learning process.

2.2 Literature Search: Process and Limits

I started by tracing the origins of academic thought on teaching and learning and the range of theories (Leonard 2002) which exist within the framework provided by the broad groupings of the behaviourist, cognitivist and constructivist paradigms described below. I have not included detailed results of that search, firstly because of limits to thesis length, and secondly, because that extended description would not assist me to address the proposition that complexity theory can complement current theory and practice in tertiary education.

As noted earlier, this thesis is empirical and applied with consequent attention to practice, albeit in the context of theory. For that reason I moved the focus in my review to the specific of application of theory in the practice of teaching and learning at a tertiary level of study. This specific and focussed level of detail is reported here.

The learning theories included in my review were not intended to be a complete list of all theories of teaching and learning in use in the School of Business at this

University, but only those that were evident to me in my review of Learning Guides, teaching plans and exercises and from discussion with colleagues and then only at the undergraduate level of study. Using this method, I identified six theories that played a part in the praxis of undergraduate study of business management in this university (Bandura (1969), Kolb (1984), Rogers (1957), Skinner (1953), Socrates (Smith 2011) and Vygotsky (1978)). For further detail see Section 1.5 Background.

Summarised below is a critical review of each theory in the context of their place in academic thought and the practice of teaching.

2.3 Review of Theory and Practice of Teaching and Learning

What was apparent was the plethora of theories and the range of approaches to the practice of teaching and learning at an undergraduate level of study (Leonard 2002). I found evidence that the number of theories of learning has continued to expand since Leonard wrote about it. This state of expansion in theory is not unreasonable given continued improvement in understanding of how we learn, and expansion in the ways that we can learn. However, it did emphasise the need for boundaries to the scope of my view of established learning theory.

A review of the literature showed theories of learning were typically clustered or organised into separate schools of thought. These groupings exhibited great diversity (Jarvis, Holford & Griffin 2003; Leonard 2002), (Hoy 2010), although in each case that I reviewed, typically three major schools of thought were described, namely, behaviourist, cognitivist, and constructivist. In the summaries below I have provided my understanding of each of these groupings. This includes location of the six theories that I had identified as being important in the practice of undergraduate study of business management at the University of Western Sydney.

In the *behaviourist* point of view of researchers, for example Skinner (1953), Thorndike (1913) and Watson (1913), learning is considered purely as a function of stimuli from and responses to the external environment, with no apparent requirement for the instructor to consider the student or their thought process in instructional design.

The *cognitivist* point of view espoused by writers such as Bode (1929), Atkinson & Shiffrin (1968), Baddeley (1992) and Kolb (1984) maintains a link with the behaviourist approach in its acknowledgement of the importance of repetition in reinforcement of a lesson learned. However in the cognitivist view this reinforcement is framed as a factor of feedback and the means to coach students, in acquiring and then organising blocks of knowledge into a coherent whole (Good & Brophy 1990; Marton & Trigwell 2000; Mezirow 2000). In this respect, a cognitivist approach represents a progression, from a concern only with the effect of external stimuli on learning, to include acknowledgement of the internal processes of the student, in particular on how information is received, processed, stored, retrieved and forgotten.

In the cognitivist view the sources of this information also expand, from just the teacher, to include a much wider range of learning sources. For example Bandura's (1969) social learning theory has a concept of students learning through observing modelled behaviour (vicarious experience). However, Bandura's concept of learning from others and my experience of the results in terms of student understanding, concur with my perception of the constructivist point of view and I have included this theory in that grouping.

In the *constructivist* point of view of authors such as Piaget (1983), Bandura (1969), Vygotsky (1978), Rogers (1957), Socrates (Smith 2011) and Bruner (1966) students are viewed as developing their own view of a question or the content of a subject. However, there is still an important role for the teacher in providing the framework from which a student can grow his or her understanding; one example is the use of scaffolding in the teaching process. While the teacher plays an active role, the involvement of the student is now an integral part of the process. In this view it is important that students construct his or her own individual understanding of a subject.

It should be noted that the views of Rogers and other authors such as Dewey (1986) are often included under a broad heading of humanist theories of learning. I included Rogers and his ideas on student-centred learning in the constructivist group because of the emphasis that this author places on the role of the teacher to provide the resources and construct a dialogue with students to facilitate but not control or direct the process of learning – it is very much a factor of the student

using the combination of all the resources, including the teacher, to construct his or her own understanding.

Ertmer & Newby (2008) make the point that at least in adult education, it does not have to be an either or choice between these three schools of thought. Instead these authors suggest that the decision about which theory to employ should depend on the situation; a simple-low cognition task with a learner who has little or no knowledge suits a behaviourist approach, while a complex high-cognition task with a learner who has solid experience in the area of study suits a constructivist approach. An example of a cognitivist situation and requirement is apparent in Marton & Trigwell's (2000) article on the need for both variation and repetition if a student is to construct his or her understanding of a subject.

When I considered my experiences of the complexity of the teaching and learning process at this undergraduate level of study, I formed the view that the teaching and learning process must draw from across the range of these points of views.

My examination of the literature indicated continuing academic discussion and debate in each of the three schools of thought. However, there were marked differences in the numbers and the focus of peer-reviewed articles. It was apparent that if I was to identify the communities of interest in academic thought in established theory of learning, I needed to find a means to judge their relative importance in academic thinking. I chose two points of comparison firstly, the numbers of academic and other articles published on each of three subject headings, 'behaviourist', 'cognitivist' and 'constructivist', over a comparable time period. The second point of comparison was provided by analysis of peer-reviewed scholarly articles for each of these three broad headings. There were two sources of data; the peer-reviewed articles accessible through the University Library and the wider perspective of publications available through Google Scholar. A search of the library of the University of Western Sydney conducted on 9th October 2013 for scholarly and peer-reviewed journal articles published since 1999 showed 2,391 references for behaviourist approaches compared with 46,285 references for constructivist approaches. It was not possible to match the time span in a search for references to the cognitivist approach. However, since 1992, 3,330 journal articles have appeared in this library on this subject. Use of Google Scholar to search for articles on each of these three subject areas showed 16,000 listings for behaviourist, 15,300 listings for cognitivist, and 106,000 for constructivist oriented works published in the period

between 1999 and October 2013. While only some of the articles listed by Google Scholar are peer-reviewed, the broad results in terms of the proportions of articles in each area mirrored the results of the search of the library listings. These results demonstrate the weight of attention paid by academics and other authors, to the constructivist point of view.

During the search, I took notes on the clustering of subject headings for each because I assumed that these subject headings would reflect the focus of the authors. This research showed quite marked variation between the three frames of reference. For instance the library listings showed that the top three subject terms for a behaviourist approach were Learning (81), Teaching Methods (66) and Teacher Education (44). In contrast the top three subject headings for a cognitivist orientation were Philosophy (195), Cognition (141) and Literature (73) and for a constructivist perspective, Education (1957), Teacher Education (900) and Learning (851).

The results of these two forms of research show that, viewed in terms of the number and focus of peer-reviewed journals and other articles, the constructivist point of view has most influence in scholarly thought and discussion of learning. Evidence was als0 found of this constructivist approach in the praxis of teaching. In particular authors such as Biggs and Tang (2011) note the need to align the content, delivery and assessment in teaching at a tertiary level of study, to provide a framework by which a student can construct their own understanding. The behaviourist point of view continues to attract attention from educators. This is most evident in textbooks dealing with early education, ranging from kindergarten to primary, and to a lesser extent, secondary education (Hoy 2010; Martens et al. 2011; McNamara 2012). The part that can be played by a cognitivist point of view in tertiary education was not immediately apparent in the library listing of the main subject headings for this subject area. Nonetheless, my review of the literature showed that a cognitive approach still has influence in both academic discussion and in the practice of teaching and learning. Atherton (2003) summarises the results of research on how students choose to learn, do they seek depth in their understanding, and if they do, how do they approach it? This focus on students acquiring deep learning of a subject was apparent in all the units in which I worked as a tutor. The question of how and why students choose to take a deep rather than superficial approach to learning continues to be an important debate, with a direct effect on teaching practice.

Then there is the article by Kitchener (1983) on the three levels of cognition (cognition, meta-cognition and epistemic cognition) and the need for a student to progress from recognising an issue, to defining the key elements and finally, to reaching a decision about what we can and cannot know about that issue. This article was passed to me for reading early (2007) in my studies, with the comment that it was essential reading if I wanted to understand how and what we learn. On reflection this understanding and insight provided by Kitchener was apparent in the differences in the language used in the marking rubrics for the units of undergraduate study of business management. For instance, in a first year subject, the instructions for an assignment could be 'list' and 'describe', while in later years of undergraduate study the instruction is 'explore' and 'construct'.

Kolb's views (1984) on experiential learning are covered in more detail below. It is evident that his ideas are fundamental to the concepts of experiential learning. In his view, the student continues to refresh and refine their understanding over time. In my view this is a process of that student rearranging and reconfiguring their understanding as new experience is acquired. In the terms of complexity theory this would be described and understood as a process of emergence and evolution. Marton and Trigwell (2000) provided valuable insights into the cognitive process, in their argument on the need for repetition and variation in the teaching and learning process. For example, in each reading of a text for a subject, a student would find a progressively deeper level of understanding, because each reading would help them to clarify their thoughts. However, the teacher also needed to provide variation in each of these repetitions. Through this process of repetition and variation students accumulated and organised their experience and understanding. A further example of the importance of acknowledging the cognitive process in teaching and learning was evident in the work of Meyer and Land (2005) who note that there are often threshold concepts in a unit of study, that students must understand before they can reach any depth in understanding of a subject. They also note that students can find these concepts to be troublesome knowledge, difficult to comprehend. They provide an example of a threshold concept in the idea of 'opportunity cost'. If a student can find understanding of this concept, they have acquired a means to access deeper understanding of Economics. In my teaching experience, threshold concepts were fundamental to all the units in which I had worked as a tutor, and it was true that students sometimes found those concepts to be troublesome knowledge. One example in this study was the concept of ideology, which I saw as essential to

student understanding of the interaction between business, society and government. My observation notes show a period of three tutorials where students continued to show very limited understanding; they could recite a definition of ideology but could not apply it. In the fourth tutorial their comments showed that they understood the idea and appeared rather puzzled that I was apparently labouring the topic. As an aside, I have no idea of how or why they made the jump from not knowing to knowing. Another example of a threshold concept can be found in the idea of leadership, which is central to business management. Over a period of six semesters of tutoring in a subject where leadership was discussed, despite my best efforts I never felt that students had achieved any real depth in their understanding. However, when I reflected on my own experience I was not sure that I fully understood the concept myself.

Land, Cousin, Meyer and Davies (2005) deal with the possible reasons that students find some threshold concepts to be troublesome. They define threshold concepts as 'concepts that bind a subject together, being fundamental to ways of thinking and practising in that discipline... on acquiring a threshold concept a student is able to transform their ideas of a subject' and note that the difficulties that face the student include 'letting go of earlier, comfortable positions and encountering less familiar and sometimes disconcerting new territory' (Land et al. 2005, p. 54). This can include a shift of personal identity, for example learning how to adopt the perspective and follow the sometimes implicit rules of their discipline. They describe another possible barrier where students may grasp a concept such as opportunity cost but have no idea of how that concept can unlock their understanding of how our economies allocate scarce resources.

Some authors such as Perkins (2006) would describe the progression of a student in finding understanding of troublesome knowledge, as a matter of the student constructing a new point of view and perspective of a subject. That may well be true of the end result, although I believe that the new perspective will be a result of a cognitive process which will involve moving through the three stages described by Kitchener and summarised above. This point of view would appear to be apparent in the observations of Land et al (2005) that there is good reason to review curriculum design and delivery to better address the challenges posed by threshold concepts that students find to be troublesome. This could be done specifically by reviewing the sequence of content of program delivery, setting the stage for learners to develop

and refine their capacity to 'approach, recognise and internalise threshold concepts. We would argue that this process of the student's learning, their encounter with threshold concepts in a given subject, might be considered as akin to a journey or excursion'(Land et al. 2005, p. 57) They also conclude that dealing with threshold concepts requires the teacher and the student to be able to recognise when threshold concepts have been internalised, and this may require change in our assessment of achievements.

2.4 Review of Selected Theories of Learning

In the following review I have considered six theories which I found to be central to the practice in the School of Business at the University of Western Sydney. Wherever possible and practical I have referenced the initial publication that introduced the concepts of each. I took this path because I wanted to present and apply the threshold concepts of each theory (Land et al. 2005), in my explorations of whether and how the concepts of complexity theory could be useful in teaching and learning at a tertiary level of study. In essence I have sought to discover and display the 'underlying game' (Perkins 2006) of each theory. I have followed a similar path in my treatment of the concepts of complexity theory and again with the objective of finding that underlying game.

These threshold conceptions are fundamental to my argument and employed in sections 5.2. Interpretation of events and section 6.2 Research: Propositions, Questions and Commentary.

In my review of established theories of learning shown below I have expanded on each of these concepts by tracing their influence and evolution in academic debate over time. What is apparent is that these theories (and their authors) are not perceived to be of equal value and importance, and that whilst all of the theorists that I had selected played an important part in the current paradigm of teaching and learning, none of them could be considered to be the sole creator of a particular line of thought on teaching and learning. For instance while Rogers (Rogers & Farson 1957) is given credit for making an important contribution to thought on student-centred-learning this author and his ideas are only part of the range of research and discussion in this area. It was apparent that a student-centred focus is a core assumption of the existing paradigm of teaching and learning. Similar comments

apply to the work of Skinner and his theory of operant conditioning. My review of the literature showed only limited direct references to Skinner's work and yet it was evident that the idea of (in this case) a student adapting to the demands of their environment is another core element of the existing paradigm of teaching and learning at an undergraduate level of study.

Bandura (1969) is associated with Social Learning Theory which posits that students learn from a range of sources including observing the attitudes and the behaviour of others. There is frequent reference to this concept in the literature, often associated with self-regulated learning (Ryan-Rojas, Douglass & Ryan 2012; Schunk & Zimmerman 2012). Other points of focus can be found in a range of studies from a variety of disciplines that seek to assess the importance of this form and source of learning (Brauer & Tittle 2012; Pratt et al. 2010; Rodela 2013).

Search of the Google Scholar listings on 21st November 2013 for the terms Bandura, and Social Learning Theory, showed a total of 18,500 publications since 2009. The Library listings showed 12,933 scholarly and peer-reviewed articles published since 2001. The top three subject headings were Self-efficacy (1,384), College Students (391) and Academic Achievement (377). When I restricted my search to include only articles that deal with tertiary education, the number of peer-reviewed articles published since 2001 dropped to a total of 780 and the major topic headings changed to Self-efficacy (66), Foreign Countries (38), Academic Achievement (24), Higher Education (24) and College Students (23). Sampling of these peer-reviewed articles showed a centre of attention in the exploration of the correlation between self-efficacy, defined by Bandura (1997, p. 3) as referring to 'beliefs in ones capabilities to organise and execute the courses of action required to produce given attainments' and the result in terms of how students approach learning (Phan 2011).

It was apparent that while Bandura was typically credited with defining the idea of self efficacy this concept has since evolved to enjoy widespread acceptance and employment in education across a range of disciplines and contexts (Alivernini & Lucidi 2011; Allred, Harrison & O'Connell 2013; Caprara et al. 2006; Klassen & Chiu 2010; Pratt et al. 2010). The studies that I uncovered in my review of the literature most often focussed on the relationship between student and teacher self efficacy and academic performance. What was apparent to me was that the use of quantitative methods of analysis showed inconsistencies in the results – not all

teachers or students will exhibit similarities of results in the connection between student and teacher assessments of self-efficacy and their achievement. It is not that there is no relationship or connection but that there are so many variables involved that it is difficult to establish any cause (self efficacy) and effect (academic or other achievement relationships). For example Klassen and Chui (2010) employed the results of sampling 1,430 practising teachers to examine the relationships among their years of experience, personal characteristics such as age and gender, three of which the authors cite as domains of self-efficacy (instructional strategies, classroom management and student engagement), two types of work stress (workload and classroom stress) and teacher self evaluation of their job satisfaction. I found the results to be interesting because of their marked variation in results, depending on the context and the personal circumstance of the teacher. So for example 'female teachers had greater workload stress and higher classroom stress from student behaviours and lower classroom management self-efficacy. Teachers with greater work load stress had greater classroom management self-efficacy, whereas teachers with greater classroom stress had lower self-efficacy and lower job satisfaction. Those teaching younger children (in elementary grades and kindergarten) had higher levels of self-efficacy for classroom management and student engagement. Lastly, teachers with greater classroom self management-efficacy or greater instructional strategies self-efficacy had greater job satisfaction'(Klassen & Chiu 2010). A further example of attempts to apply the concepts of social learning theory in an educational environment was found in the article by Allred et al (2013) which reviewed changes in self-efficacy among a sample of students studying in an exchange program where courses include college students (outside) and people who were incarcerated (inside) studying in a prison classroom. In summary they found that, while the self-efficacy of outside students stayed constant, that of inside students showed marked improvement over time. They attribute that improvement to their program of service-learning: 'a form of experiential education where learning occurs through a cycle of action and reflection as students work with others through a process of applying what they are learning to community problems and, at the same time reflecting upon their experience as they seek to achieve real objectives for the community and deeper understanding and skills for themselves': (Allred, Harrison & O'Connell 2013, pp. 215-6).

Another very useful article on self-efficacy that I found in my review of the literature was a meta-study completed by van Dinther, Dochy, and Siegers (2011) reviewing

the range of evidence on what factors effect student self-efficacy in higher education. Firstly they defined the four main sources of information most often seen to shape student self-efficacy: *effective mastery* (students have had success in dealing with a particular issue), *observational experience* (students observe the behaviour of others as a means to find a sense of self), *social persuasion* (positive or negative environment and feedback) and finally, their own *internal state*, affected by stress, anxiety and personality. This listing illustrates the importance of the teacher and the teaching process in impacting on effective mastery, by providing opportunities for observational experience and through positive, supportive, social persuasion. After a detailed review of the research these authors concluded that it was possible for the teacher and the teaching and learning process to influence student self-efficacy, and that a range of factors were significant. Effective mastery was most important, which implied the need for an emphasis on providing students' with opportunities to practise their skills. What was surprising to me was the conclusion of van Dinther et al. that 'although vicarious experiences (learning from others) as a second source of efficacy information are often mentioned and argued, we found mixed evidence for their effectiveness' (2011, p. 105). This is an interesting result in the light of my review of the units in which I had worked as a tutor. All showed an emphasis in their practice, on students learning through interaction with other students. However, it was also true that the assessment process did provide the student with self-efficacy and a belief in their own ability through achieving effective mastery. In their review of the literature van Dinther et al., found verbal persuasion, to be important in students learning. They clearly distinguish this attribute from other closely related sources of information such as social persuasion. In my experience of teaching, written and verbal comments to students could have quite a marked change on their behaviour and in class debates students most often reached a consensus quite quickly.

Despite the ongoing debate it was apparent to me that the concept of self-efficacy is a fundamental element of the current paradigm of teaching and learning.

Kolb (1984) is associated with Experiential Learning, the idea that experiences viewed through reflection, evolve to become concepts which provide guidance for application and experimentation, including selection of new choices. My review of the literature show a range of writers who employ this concept in their discussions on teaching and learning (Beard & Wilson 2002; Boud, Keogh & Walker 2013; Roberts 2011). It is apparent that the concept of a student learning from experience is an important element of the existing paradigm, with evidence of the application of this concept across the range of disciplines. I have provided further examples in my following discussion.

There were two points in Kolb's ideas that I thought were important for this thesis. The first is that learning is a cyclical process, a transaction requiring interconnection of learner and environment over time, and the second is the importance of feedback in this process. According to Kolb 'ideas are not fixed and immutable elements of thought, but are formed and re-formed through experience' (p. 26). In his view 'Knowledge is continuously derived from and tested out in the experience of the learner' (p. 27). Evident in these comments is Kolb's conclusion that all learning is in some sense re-learning; the student is not the 'blank slate' of Locke (1847) to be filled by the teacher.

Kolb conceives the role of the educator as 'not only to implant new ideas but also to dispose or modify old ones' (1984, p. 28). At first glance I was uncomfortable with this interventionist aspect to Kolb's views because this contradicted my view of the independent learner finding individual understanding through personal enquiry, and brought to mind the view of Friere (2000) on the role of the educator to reorient student perceptions, beliefs and behaviours so that they play their allotted role in society. On the other hand, it could be argued that explanation is an essential precursor to student understanding. On reflection, it was apparent that the role of the teacher had always included this responsibility, which still left me with the question of whether the teaching process enabled or directed understanding, and what was the influence of the teacher's beliefs and experience in this process. I found a range of evidence that a teacher's beliefs had a direct effect on the content and the conduct of the teaching and learning process. For example, there was the empirical study by Trigwell, Prosser and Waterhouse (1999) on the relation between a teacher's approach to the teaching and the student's approach to learning. In summary, they found that qualitative differences in a teacher's approach to teaching led to qualitative differences in the students approach to learning. These authors

note that 'the results indicate that in classes where teachers describe their approach as having a focus on what they do and transmitting knowledge, students are more likely to report that they adopt a surface approach to learning' (1999, p. 57). They go on to note that there was some evidence to suggest that where teachers reported adopting approaches in their teaching 'that are more oriented towards students and to changing student conceptions', that students are more likely to report adopting 'significantly deeper approaches to learning' (p. 57). The interconnected and interdependent nature of the teacher-student relationship is apparent. Another example of the connection between teacher and student can be found in the results of a meta study completed by Maggioni and Parkinson (2008) on teachers preferences in their selection and adoption of teaching practice. They found that this choice was very much dependent on whether the teacher had a world-view that there was only one truth, or that in any subject there will be many truths. Maggioni and Parkinson note the connection between these dichotomies and the capacity of a student to achieve epistemic cognition of a subject as defined by Kitchener (1983). With a teacher who held a world-view that there were many truths, there would be a focus in teaching on introducing students to alternatives. Presumably this wider view-point enables the student to find greater depth of understanding.

Kolb's ideas continue to enjoy widespread attention in the literature. A review of Google Scholar listings (21st November 2013) using the search terms 'Kolb' and 'Experiential Learning' gave a return of 13,300 articles published since 2009. The university library listed 2,150 scholarly and peer-reviewed articles since 2003. The top three subject headings were Experiential Learning (308), Teaching Methods (157) and Learning (140). Review of the journals under each topic heading showed a spread of applications of the concepts of experiential learning. For example an article by Terry (2001) notes the requirement for students to be able to work effectively across a range of teaching formats , including lectures, tutorials, group assignments and individual work. He sees that requirement as indicating the need to 'examine the relationship between student learning styles and these instructional contexts.' (p. 68). Terry cites Kolb's Learning Style Inventory as a psychometrically reliable instrument (2001, p. 70) and applies this inventory to reviewing classroom practices. A similar theme was evident in a paper by Chavan (2011) which dealt with a teaching model based on experiential learning. This view 'begins with the learner engaging in 'direct experience', followed by reflection, discussion, analysis and evaluation of the experience' (p. 126). Chavan details the results of a study

conducted with university students which assessed their progression through the stages of the experiential learning process and measured their resultant capacity 'to explore the association between theory and practice'. 'The respondents were strongly of the opinion that the experiential learning activities helped them learn' (2011, p. 126).

A further example of the application of the principles of experiential learning is a paper by Estepp, Roberts and Carter (2012) which dealt with using the experiential learning model in teaching the teachers of students of agriculture how to teach, using 'field experiences, reflection and peer observation to help college instructors to learn how to implement and use various instructional methods' (p. 79).

I found these examples interesting because they reflected the flexibility and range of applications of Kolb's concept of experiential learning. Also apparent was the range of academic research which supported Kolb's ideas, including the role of feedback in assisting students to reach understanding. For example, Anderson (1997), in his study of first- and third-year undergraduate perceptions of what are appropriate or inappropriate teaching actions and roles for a tutor, explored the accepted wisdom that the role of the tutor was to provide a climate and a platform for learning. Student comments did show the expectation that the tutor's role was to stimulate and facilitate debate, with tutors performing this role in what Anderson described as an 'authentic and engaged' manner. Aspland (2009) provides a further example with her study of first-year university students expectations of their lecturers and her finding of the central importance of feedback to students during the learning cycle.

Miller and Parlett (1974) illustrate another aspect of the interconnection of teacher and student, in their study of how students and teachers react to the assessment methods employed in a unit. In particular, what were the effects of these methods on teaching and on how students prepare for the examination process?

Rogers (Rogers & Farson 1957) is associated with Student-Centred Learning, the idea that the focus in teaching should be on encouraging and enabling students to take charge of their progress and not rely on the teacher to set objectives, or supply needed resources.

I had selected Rogers because of his prominence in the academic literature on teaching and learning, and because of my personal experience of the successful

application of his concepts in the classroom. However, when I conducted my review of the literature it was apparent that while Roger's idea of a dialogue between student and teacher is important and widely accepted, it does not fully reflect the range of discussion and debate on this subject. For example a search of Google Scholar listings conducted on 21st November 2013 using the search term 'Rogers' and 'Student-centred Learning' showed 16,700 articles published since 2009. However when the university library is searched for scholarly and peer-reviewed articles, only 57 articles had been published since 2004. The top three subject headings were Foreign Countries (5), Nurses (4) and Teacher Education (4). When I revised the terms of this search down to only 'Student-centred learning' I found comparable numbers of publications (16,800) on Google Scholar: however the content was quite different. It appeared that the concepts of student-centred learning and student-centred learning environments are seen to be an important element of the existing paradigm of teaching and learning (Baeten et al. 2010; Jonassen & Land 2012; Struyven, Dochy & Janssens 2010).

An article by Tangney (2014) provided detail on the spread of influence of this concept in academic debate and in the practice of teaching and learning. However, it also highlighted the fragmented nature of that debate with likely effect on the practice. Tangney notes that 'the term student-centred learning is ubiquitous throughout the pedagogic literature ... and appears in many university strategy documents ... Whilst student-centred learning is often ill-defined, what is apparent in the literature is some similarity between the language associated with constructivism and that associated with writings on student-centred learning. Ideas around purposeful active engagement, discovery learning, creating one's own understanding, building on prior knowledge, reflection and creating dissonance all feature... However, the idea of a holistic approach, of ideas such as empowerment and emancipation that also feature in writing about student-centred learning are not generally discussed by constructivists; these are more aligned with humanist conceptions of learning' (Tangney 2014, pp. 266-7).

There was evidence of the direct application of a student-centred approach in teaching and learning. For instance, an article by Edwards, Botwright and Acuna (2011) on a project at the University of Tasmania to place more emphasis on student-centred learning. This includes reviewing the role of the assessment process, in enabling students to take charge and accept the responsibility for their progress.

The proposal is to explore the benefits of flexible assessment methods where the student effectively decides when and how they are assessed, 'even crafting their own assessment'. The aim is to explore whether enabling students to take charge of the assessment process 'results in improved learning outcomes' (2011, p. 22). A further example is to be found in the article by Vale, Weaven, Davies and Hooley (2012), on a pilot program in Victorian state schools, to adopt student-centred approaches to learning as a means to improve mathematic outcomes for students from low socioeconomic income households. From my point of view the importance of this article was its description of how a network of resources was made available to teachers in the field, to enable them to take charge of their own progress, there was a teacher-centred focus in the implementation.

Skinner (1953) is associated in the literature with Operant Conditioning, which draws attention to the part that repetition of stimuli can play in the development of a conditioned response. In Skinner's view, learning was based on transmission rather than on discovery of knowledge. In Skinner's view of operant conditioning the student is expected to react to and learn from punishment and reward for their behaviours. My review of the literature showed little evidence of direct reference to Skinner's ideas in academic debate on the theory and the practice of teaching and learning at a tertiary level of study. Possibly because it is associated with rote learning (Marton & Trigwell 2000), which contradicts the assumption of the student as an independent thinker creating their own version of the truth in a subject of study (Smith 2011).

The absence of direct references to Skinner in the peer-reviewed journals of tertiary education overlooks his contribution to the larger body of education research and practice. Childhood education (Becker 1969; Hoy 2010; McNamara 2012) is one obvious exception, where behaviour modification is seen to be a basic tool and requirement in teaching at that level of study. There is also an apparent role for Skinner's theory in the field of instructional design where a behaviourist approach is seen to be appropriate in teaching required skills and reactions in some occupations. Ertmer and Newby (2008) make the point that the approach in teaching must reflect the requirements of the learner and the context, a behaviourist (stimulus and response) model may be appropriate in adult education when teaching repetitive tasks and tasks which require an instinctive reaction.

A search of Google Scholar listings conducted on the 21st November 2013 for the search terms 'Skinner' and 'Operant Conditioning' showed 4,540 articles published since 2009. The library listing of scholarly and peer-reviewed articles showed 335 published since 2005. The top three subject headings were Learning (37), Operant Conditioning (29) and Conditioning Operant (26). Review of the articles showed that most often they demonstrated the use of his ideas of the stimulus and response model in descriptions of an organism adapting to and being conditioned by (learning from) its environment (Hull, Langman & Glenn 2001) however, there was an interesting article by Glenn who takes the concept of stimulus and response and contends that 'cultures are nothing more than learned behaviour and its physical products, in the same sense as living organisms are nothing more than chemical elements' (2004, p. 223). A number of the articles that I discovered were published by Skinner. One of the articles that was of direct interest to this research was his view that theories of learning are unnecessary because 'There seems to be no *a priori* reasons why a complete theory of learning is not possible without appeal to theoretical processes in other dimensional systems' (1950, p. 215). His apparent dismissal of the need for all other forms of thought on learning helps explain why Skinner was such a controversial figure.

It is not surprising that Skinner has low prominence in current thought given apparent gaps in referencing his work. For example a review by Jensen & Burgess (2012) showed that when 'Fifteen introductory psychology textbooks are examined to determine the accuracy and completeness of their treatment of B.F.Skinner's approach to human activities commonly referred to as cognitive processes. Six of the textbooks ignore Skinner's contribution to the study of cognitive variables altogether, four deny that Skinner had anything to say about such processes and five textbooks acknowledge elements of Skinner's viewpoint, though the acknowledgments are incomplete and suffer from inaccuracies' (2012, p. 221). Jensen & Burger cite Lattal's comment that this gap exists despite the facts that 'His [Skinner's] work spawned a division of the APA (Division 25 , Experimental Analysis of Behaviour); an independent professional organization (the Association for Behaviour Analysis) with more than 2,200 members; two private foundations dedicated to the advancement of behavioural psychology ; and a host of journals-at least 23 by one count ... Among the personal accolades bestowed ... that reflect the impact of his work are 30-odd honorary degrees from colleges and universities around the world, consistent ranking by psychologists as among the most important

thinkers in both contemporary psychology and in the history of psychology. (Lattal, 1992, p. 1269)

Richelle (1993) also describes and acknowledges the rich contribution of Skinner to the field of 'behaviourism' but notes that 'Skinner's theoretical endeavour has mainly consisted in elaborating further the concept of psychology as the science of behaviour, originally formulated by Watson early in the century. In that regard Skinner could be viewed as derivative and not central to discussion of behaviours. This author goes on to note another possible reason for why Skinner is overlooked in the comment that 'Skinner has been bold enough to apply to human affairs at large the conclusions of his scientific analysis of animal behaviour' (1993, p. 8). This view would offend those who hold the view that humans are superior and that we are not animals.

What is apparent is that while Skinner was a controversial figure he made significant contributions across a range of debates including language, psychology, biology, education and in the book Walden Two, the larger subject of society (Skinner & Hayes 1976).

Use of the **Socratic** Method is seen to be inherent in western education (Gorry 2011). In this paradigm the student is viewed as an independent thinker, with the teacher's role limited to assisting them in finding understanding. Conversation with colleagues and observation of the teaching and learning process indicated that a Socratic approach was fundamental to all the units of study in which I had worked as a tutor (see section 1.4 Background). A search of Google Scholar listings conducted on the 21st November 2013 using the search terms 'Socrates' and 'Socratic Method' showed 6,560 publications since 2009. The library listings of the university showed 222 scholarly and peer-reviewed articles published since 2001. The top three subject headings were Philosophy (20), Socrates (20) and Plato (15). Refining the search to include only articles on 'teachers', 'teaching methods' and 'teaching' reduced the total to 49 peer-reviewed and scholarly articles. There were some interesting articles, most confirming that the concepts of Socratic Method and Socratic Dialogue do play an important role in higher education (Boele 1998; Goldin et al. 2011; Morrell 2004; Saran & Neisser 2004), including teaching teachers to teach (Knezic et al. 2010). These authors note that a review of the literature and their empirical research 'supports the claim that Socratic Dialogue promotes student teachers interpersonal sensitivity while stimulating conceptual understanding'(p. 1104). They

go on to note that 'it may be worthwhile stating that there are many other types of dialogic methods which claim kinship to Socrates' Method' (p. 1105). They define Socratic Dialogue as 'a philosophical group dialogue in which the participants guided by a facilitator and a number of ground rules strive to reach a consensus in answering a fundamental question on the basis of a real-life example or incident, with the purpose of achieving new insight' (p. 1105) and note that the debate could last anywhere from a few hours to a number of days. It should be noted that while the broad principles of the Socratic Method and use of Socratic Dialogue were apparent in the assessment processes and class exercises of the units in which I was employed as a tutor, they did not incorporate this time span, or place this level of reliance on oral dialogue.

Vygotsky (Vygotsky 1978) is associated with Socio-Cultural Theory, which proposes that learning occurs within a context, and that social learning precedes personal development. Review of the literature showed that his ideas have continuing appeal for those with an interest in dealing with the globalisation of learning (Anh & Marginson 2013) and also in the practice of teaching and learning across a range of disciplines and for a variety of objectives (Barker, Quennerstedt & Annerstedt 2013; Dang 2014; van Compernolle & Williams 2013). For me the importance of Vygotsky's ideas was that they changed the model of learning, from the teacher instructing the student(s), to one where the students played an active role in learning and the teacher's role was to facilitate that process.

Search of Google Scholar listings conducted on the 21st November 2013 using the search terms 'Vygotsky' and 'Socio-cultural theory' showed 16,300 publications since 2009. The library listings of scholarly and peer-reviewed articles showed 2,590 articles published since 2004. The top three subject headings were Teaching Methods (227), Foreign Countries (193) and Second Language Learning; (177). Review of the literature showed most attention on the use of the principles of socio-cultural theory in the teaching of languages. Nevertheless a range of articles were relevant to this thesis. For instance, Wass Harland and Mercer (2011) dealt with the use of scaffolding in a three-year study of undergraduate zoology students, learning how to think critically. The objective was to address 'concerns that much of the factual material taught at university is soon forgotten or becomes outdated and that the ability to think critically is a longer-lasting legacy of higher education' (p. 317).

An emphasis in their process was on building relationships with teachers and peers, and learning from experience gained from curriculum exercises appropriate to their discipline. The authors note that 'although curriculum planning and course activities scaffolded the development of critical thinking over the three years, data showed that less formal or unplanned social experiences were also essential' (2011, p. 324). Wang, Bruce and Hughes (2011) provided another example in their review of the principles of socio-cultural theory in developing the information literacy of undergraduate students in three Australian Universities. Curriculum design groups researched the potential to integrate information literacy into the curriculum over years 1 to 4 in undergraduate study. These communities of practice 'worked collaboratively by building on each other's knowledge and developing scaffolding teaching material with which to assist students in their learning' (2011, p. 301).

It was apparent that all of the theories of learning that I considered in my review had different but not conflicting perspectives on teaching and learning and my experience as a teacher provided evidence to support each of their individual claims. When I reflected on my experiences of teaching it was apparent that these and other accepted theories of teaching and learning did not provide a complete explanation of the events that I observed over each semester of study. For example, they did not fully address the reasons for student progress in finding understanding of a subject and it was often not apparent to me what enabled evolution of understanding, no immediate cause was apparent to explain an observed effect.

My conclusion that existing theories of teaching and learning did not provide a complete explanation was supported by Jarvis (2006b), who addressed three questions. Firstly, is it possible to have a comprehensive and universal theory of learning? Secondly, is it possible to research learning? Finally is it possible to control the learning process to the extent that the teacher can expect a guaranteed result from employing existing theories of teaching and learning? Jarvis concluded firstly that there was no possibility of this comprehensive theory, secondly, that it was possible to research learning, although the researcher must acknowledge that there would never be complete understanding and, finally, that the teacher could have no expectation of a guaranteed result. His conclusions stemmed from a combination of two factors; the complexity of the teaching and learning process with its susceptibility to unplanned events, and because to some extent what occurs in this process is not open to complete discovery and understanding. An example is the

difficulty of accessing and interpreting the attitudes and experiences which shape student behaviour.

Jarvis conducted a review of the concepts and the assumptions of his interpretation of the main schools of academic thought on learning, using three broad groupings of learning theory, 'learning in action' (behaviourism, social learning, action learning) 'cognitive' (Confucian, gestalt, cognitive development) and what Jarvis describes as 'experiential learning' which in his view included Dewey (1986), Rogers (1957), Knowles (1978) Kolb (1984) Cell (1984) and Weill & McGill (1989). I found these groupings confusing and at odds with my understanding of the concepts that underlay these theories. For example, Rogers and student-centred learning did involve a dialogue between student and teacher and it did incorporate the idea of learning over time. However, for me the true value of Rogers' ideas was in his view of the teacher facilitating the process of the student constructing understanding. Another example can be found with Dewey and his conclusion that what and how we learn will evolve over time. While there is certainly an important element of evolution in this idea, the value to me was in the acknowledgement that the student plays an active constructivist part in finding understanding.

What was valuable in the work of Jarvis was his meticulous summary of the concepts and detailed documentation of established theories of learning within his groupings. Jarvis criticised individual theories on the basis of whether each addressed all sources and means of learning. He found the majority had value, although all were narrow in their focus and addressed only a limited range of the combination of processes by which we learn. The limits to the coverage of the processes of learning documented by Jarvis was apparent in the six theories that I had identified as playing a part in the practice of teaching and learning at an undergraduate level of study of business management. I concluded that within the current paradigm of teaching and learning I can never hope to find a complete understanding of teaching, learning and the teaching and learning process at a tertiary level of study.

As a means to test my list of theories I had made enquiries with a colleague who had experience of both the philosophy and practice of the study of business management, of where and how learning theory was applied in the School of Business. I had found no physical written evidence that there is an existing formal policy of incorporating theories of learning in undergraduate study of business

management. However a paper supplied by a colleague proved useful to me in its documentation of a three-year process of change in the undergraduate business degree at the University of Western Sydney (Mitchell & Cornish 2008). This review was the result of feedback from students and employers on perceived deficiencies in the Bachelor's degree. This provided an example of how established theories of learning can be applied to guiding the teaching of a subject. Central to that process of change was the use of a constructivist framework by Briggs (2003) who notes that 'a poor system is one in which components are not integrated and are not tuned to support higher level learning' (2003, p. 13). The stance of this author on the subject of learning and the responsibility of the teacher is evident in his statement that 'the teacher's job is to organise the teaching and learning context so that all students are more likely to use the higher order learning processes which academic students use spontaneously' (1999, p. 57). Evident in the work of Biggs is a structured process which focuses on the content, sequence and alignment of the elements of the learning process, with less focus on how the results of the process of alignment will be applied in the classroom, and with no evidence of considering individual theories of learning and the part they can play in the practice of teaching. For me the important aspect of Biggs ideas was his view of the educator's role, to construct a teaching and learning process which was internally consistent and focused on higher order learning for an agreed set of learning objectives. This need for consistent focus agreed with my teaching experience of the discontinuity and disconnection that can occur between the content and delivery of teaching and the assessment of learning.

Biggs locates his ideas under the label of constructivism. In his view constructivism and phenomenography (Marton 1981) are the two main theories of student learning where the research is 'focusing attention precisely on how students go about learning' (1999, p. 41). My understanding of phenomenography shows that while it is true that Marton (1981) describes his research as aimed at 'description, analysis and understanding of experiences' (p. 177), there appears to be a much deeper level of enquiry contained in his definition and explanation of phenomenography. This is apparent in the work of researchers such as Anderson (1997) studying first- and third-year students for their perceptions of what are the appropriate and inappropriate teaching actions of a tutor and Entwistle (1997) with his concept of deep versus superficial levels of learning by students and his note that different forms of assessment engender different learning approaches. In both of these examples there is a focus on how students go about learning although it is in the context of the larger dialogue between teacher and student. In Marton's view some

teachers seem to be able to provide students with 'a vicarious experience of learning which evokes a deeper approach to the course' (1981, p. 181). The importance of the teaching and learning process is evident in Marton's note that 'process and content are two aspects constituting a logical unit; there can be no 'process' without 'content' and there can be no 'content' except in terms of a 'mental activity'. However Marton goes on to sound a note of caution in his comment that 'we must be aware of the fact that what we can see from one point of view may not have any representation from another point of view' (1981, p. 184). Despite this limitation what is evident in the work of researchers such as Entwistle, Anderson and others is the interactive and interdependent nature of the relationship that exists between student and teacher.

2.5 Applying Complexity Theory in Teaching and Learning

The origin of complexity theory can be traced back to the work of researchers such as Poincaree in the 1880's (Alhadeff-Jones 2008), who noted that the behaviour of complex systems was unpredictable, with no guarantee of a specific result. While the origins of complexity theory were in the 'hard sciences' such as physics and mathematics, over time the concepts have extended to the 'soft sciences' including education (Byrne 1998; Davis & Sumara 2007; Doll 2008; Kuhn 2008; Lemke & Sabelli 2008).Review of the literature on complexity theory showed that a wealth of terms have evolved to describe the behaviour of complex social systems. A powerful insight into the essence of complexity theory can be found in Morrison's (2006) description of complexity theory as:

> 'theory of change, evolution and adaptation, often in the interests of survival, and often through a combination of cooperation and competition…It breaks with straightforward cause-and-effect models, linear predictability, and a reductionist, atomistic, analytically-fragmented approach to understanding phenomena, replacing them with organic, non-linear and holistic approaches, in which relations within interconnected networks are the order of the day' (p. 1).

This description from Morrison defines the issues faced by a teacher in acknowledging complexity theory in the classroom. Adopting the perspective provided by complexity theory includes acknowledging that, even if a teacher and students follow the principles of a particular theory or combination of theories of teaching and learning, there is no promise of a guaranteed result in student understanding of a subject. Kuhn (2008) notes that this uncertainty could be disturbing to a teacher working in a teaching and learning process judged by

expectations and standards of performance, set against criteria such as marking rubrics for assessments.

Mason (2008b) notes that complexity theory 'concerns itself with environments, organisations, or systems that are complex in the sense that very large numbers of constituent elements or agents are connected to and interacting with each other in many different ways' (p. 6). This implies constant change in the connections and interconnections that exist between the primary stakeholders such as students, teachers and administration staff in an iteration of the teaching and learning process over a semester of study. My experience of the teaching and learning process is that it is constantly evolving, with different individuals and groups playing different parts on the way. For instance, the administration staff plays an important but largely invisible part in the management of student records, although they are highly visible and wield authority when it is time for teaching staff to supply scores for student assessments. Another example is unit assessment tasks which require groups to work outside the classroom. In that work the student must take charge of their own progress, the only involvement of the teacher is to field student comments or questions in class.

A further implication for teaching and learning, lies in the likelihood of continual change in the connection and interconnection of these internal stakeholders to external agents located outside the micro-environment of a cohort of undergraduate students and the teacher in the physical and electronic classroom. In other words a multidimensional interactive process ensures that while there will be broad similarities for instance, between tutorial sessions and between semesters for a specific aspect of teaching and of learning, there will also be differences.

In the framework provided by Morrison and Mason, the teacher and theorist cannot hope to fully map and describe the individual elements of the teaching and learning process, or predict a guaranteed result from a specific action. For example, I can set a task for students to complete which I believe will enable them to construct their individual understanding of a subject. I can know what information and explanations I have provided, and I will be aware of the other information and explanation that the students can access in the tutorial from their classmates and from other university based sources of knowledge such as the library. However, I will have no access to, knowledge of, or control over the other resources a student

might employ and I have no guarantee that the results in terms of a student's understanding will be a 'deep' as opposed to a 'surface' understanding of a subject. While I can set the initial conditions of study and do my best to be supportive of their efforts, I will never fully know the internal path that these students take in achieving the epistemic cognition described by Kitchener (1983).

Another implication supported by my experience, is that the teaching and learning process is too fast moving and subject to so many agents and influences that the 'real' reason for any event often has no identifiable central origin and is not subject to reduction (Allen 1998; Kuhn 2007; Prigogine 1978; Stengers & Lissack 2004).

The framework provided by complexity theory implies that the successful teacher must acknowledge the sensitivity of the teaching and learning environment to what may appear to be minor change in environmental settings. An example of this can be found when the due dates of student assessments for a range of units coincide. During that period students appear to pay less attention to class work. While this period when students are distracted by their larger environment is in my experience guaranteed to occur at some stage over the semester, the degree of that effect cannot be predicted. At the extreme, students stop attending tutorials while they complete and submit other work.

Horn (2008) argues that while the teacher must be reconciled to dealing with uncertainty and unpredictability:

> 'Every teacher can and should understand the underlying big picture of the new sciences, for with that understanding necessarily comes the realization that she [sic] has been placed in charge of a sensitive learning ecology whose directions can be altered by small changes in the boundary conditions and interaction patterns of the classroom. In the most tangible sense, complexity places the teacher and the students at the locus of control in terms of classroom learning, while at the same time acknowledging the larger institutional systems with which classrooms and individual schools are linked' (2008, pp. 141-2).

Based on the review of the literature on complexity theory and in particular the characteristics of complex systems (Ashby 1962; Morrison 2012), I conceived a picture of the teaching and learning process as a complex and to some extent unpredictable world, with no possibility for full knowledge of agents, influences or events. This conclusion was a close match with my experiences of teaching. This should not be read as rejecting research to better understand the driving forces in

learning. It is simply an acknowledgement by me that there can never be complete knowledge of teaching and learning, or a complete description of the teaching and learning process.

A further implication of the view of the teaching and learning process provided by complexity theory is that what is perceived to be true and informs the practice of teaching and learning at this moment will not be perceived as being true at some point in the future because the environment will demand change. As described in Chapter 1.8 Context of Research, there is a range of evidence that education in general is in a period of what could be quite profound change. Further support for the conclusion that there is a need for ongoing change was found in the review of the academic literature on complexity theory. For example Burkitt (1994) addressed the idea that 'human reality including social life is the product of conversation or discourse ' (p. 7) and the subject of these conversations change over time. Olssen (2008) describes the complexity theory view of the universe as 'an infinitely open, complex whole, characterised by unpredictability, uncertainty and change' (p. 101). Kuhn (2002) questions the content and value of knowledge generated by self. This author posits that the complexity theory emphasis on uncertainty and exposure of the illusory nature of truth leads to 'intellectual acumen, authenticity and humility' (p. 39).

My review showed an evolution of thought and practice in teaching and learning over time. Murphy, Alexander and Muis (2012) addressed the nature of knowledge and knowing and its interaction with educational psychology, by listing then describing several established philosophical theories (foundationalism, coherentism, contextualism, pragmatism, structuralism and postmodernism). The authors then moved to 'examine knowledge and knowing through the lens of six learning theories: behaviourism, information processing, radical constructivism, social constructivism, socio-culturalism, and situated cognition' (p189) and finally contrasted the difference in the views provided by each of these theories. I found this argument both interesting and persuasive. Firstly it supported my conclusions on both the divergence and convergence of the concepts embedded in the various theories. Then there was the realisation that the emergence, evolution and adoption of these philosophical and learning theories have led to a marked evolution in teaching practices over time. For instance, we could contrast the role of the pedagogue in the nineteenth century with the emphasis in the teaching and learning process on the

three R's of reading, writing and arithmetic and the use of memorisation of multiplication tables, with the pedagogue of the twenty-first century dealing with the same subjects of reading, writing and arithmetic but perhaps addressing the 'how to think about numbers' as much as the processes such as multiplication and calculation. Another example of this evolution is the continuing debate on the role of the student. Is it to be passive and accepting of what is provided by the teacher? Or should the student be active in searching for understanding (Freire 2000; Galloway 2012)? From the point of view provided by complexity theory, the task of the teacher is to create an environment which will attract the student's attention so that they will engage in the teaching and learning process and play an active part in constructing their understanding. However, it was evident in the literature that the role of the student will be viewed in the context of the teacher's perception of their own role (banker, midwife, coach, expeditor, enabler), with important implications for their teaching practice (Entwistle et al. 2000; Feiman-Nemser & Floden 1984) (Maggioni & Parkinson 2008; Trigwell, Prosser & Waterhouse 1999). The interconnected and interdependent nature of the relationship between the teacher and students was also apparent in my teaching experience. The idea of interconnection and interdependence, also agrees with the conditions of complex systems in general, and is included in the theoretical model employed in this thesis (Chapter 1.10) .

A review of the literature showed a range of research focused on applying elements or concepts of complexity theory in the classroom. What was apparent in the research that I viewed was that the application of complexity theory in education was *prescriptive* rather than *descriptive*. Examples included research which focussed on assessment and experiment in the application of one variable, for instance, using classroom exercises to gauge the role of self organisation by students (Davis, Sumara & Luce-Kapler 2008) or varying the role of the teacher to experiment with the objective of triggering the emergence of a desired pattern of student behaviour (Bright et al. 2012). In both examples the research focused on experiments with a single aspect of the behaviour of complex systems, in these examples they were self organisation and emergence. I have a number of issues with this approach. The focus on measuring the influence of a single aspect of the behaviour of complex systems suggests an objectivist and reductionist approach, with an assumption of direct and reliable linkage between cause and effect. I think that there is an inherent contradiction in authors such as Davis, Sumara and Kapler (2008) and Bright (2012) claiming complexity theory as a theoretical framework for

their experiments. The characteristics of complex systems include unpredictability with no means to completely describe or forecast the result (Cohen, Manion & Morrison 2011), (Mainzer 2009) (Semetsky 2005). In my experience of teaching and research, the limited approach adopted by researchers such as Davis, Sumara, Kapler and Bright also holds real risks of misinterpretation and misunderstanding. For example, while we can expect a complex system such as a cohort of students to self organise, a study focussed on that single variable ignores the other elements such as interconnectivity and feedback that will be involved in that process. They also ignore the conclusion of authors such as Mason (2008b), Kuhn (2007) and Morrison (2006) that complexity theory requires viewing the whole, not seeking to isolate the individual parts. The limited focus and prescriptive application of the concepts of complexity theory in educational research by authors such as Davis and Sumara (2008) and Bright et al. (2012) are also at odds with the concepts of complexity theory outlined and described by authors such as Kuhn (2007), Morrison (2006) and Mason (2009). In their view the role of complexity theory in education is *descriptive* not *prescriptive,* acting to provide the teacher and the researcher with an interpretive lens for viewing the complex process of teaching and learning. In this descriptive view of complexity theory, self organisation and emergence are viewed as the means to describe, explain, and to some extent predict student behaviour in the classroom. However this descriptive view would not encourage experimentation with changes to a single variable, arguing that this is meaningless in an interconnected environment where a number of influences will apply to shape the behaviour of students (Morrison 2012).

In this perspective complexity theory can influence understanding of what is observed and assist the teacher in making decisions on the sequence, timing and delivery of teaching plans. However, these teaching plans will continue to feature the application of established theories of teaching and learning.

I found further reason to question the approach to research adopted by authors such as Davis & Sumara and Bright, in the point made by Haggis (2008) that:

> 'By focusing on interactions, rather than static categories, complexity theory also makes it possible to consider different aspects of *process.* It does this not only in the general sense of providing a language with which to talk about dynamic interactions, but also specifically in relation to the importance of histories of *interactions through time* (without time, there is no emergence)' (p. 173).

In this view, the research of authors such as Davis and Sumara is a static, snap shot of a teaching and learning event, unable to provide the teacher with an active view of that process over time. In my experience, the results of this type of research can be misleading because they have no context and seek to simplify a complex interaction, which is not open to reduction. Morrison (2012) makes the point that seeking or assigning causation in complex systems, which is inherent in the research by authors such as Davis and Sumara, can be actively deceptive. The point is that there are so many agents and influences that interact and impact on the teaching and learning process, that a simple cause and effect model involving only one variable such as self organisation is incomplete.

The results of my review of the literature led me to view attempts at a prescriptive approach to the application of the concepts of complexity theory in the classroom, as also contradicting the conclusions drawn by Morrison that 'to move from a descriptive to a prescriptive theory is to commit a category of mistake, to mix fact and value, to derive an ought from an is, to commit the naturalistic fallacy' (2006, p. 26). I interpreted this comment as suggesting that researchers who sought to move from a descriptive to prescriptive stance risked moving from a point of view informed by understanding what complexity theory can do (describe the teaching and learning process), to what the researchers want to do (prescribe the steps and content of the teaching and learning process). I feel that the adoption of a prescriptive stance is indicative of the reductionist scientific view that experiment will reveal the innate unchanging truth of a situation. Kuhn (2002) describes this scientific world-view as holding the assumption that there are knowable laws of nature because the world is a mechanical system which can be relied upon to behave consistently. In this view, it is simply a matter of research to uncover the key variables so that we can take control of events in the future. So for instance, if I experiment with aspects of complex systems, it will lead to a generalisable truth. For example, if I the teacher take this form of action, then that student will always respond by. It is this seeking to take control of the learning environment which conflicts with my interpretation of complexity theory. As a teacher I can try to nudge students along a path of learning over a tutorial session or a semester. I can never assume the speed off their progress in constructing their understanding, or the depth (Entwistle 1997) of that understanding. In this teaching and learning process, I must deal with the whole of that event and not seek to reduce it to its components parts, because it is too complex to fully comprehend. I will never have full control of

that process because it is susceptible to change in circumstance that is outside of my control. Nevertheless, I can still manage the teaching and learning process indirectly, by influencing the content and focus of student attention.

This position emphasised that I needed to view the whole rather than the parts of the teaching and learning process. An example can be found in my observations of student behaviour in this research. My analysis and interpretation dealt with the total of the cohort rather than the individual student.

Another issue encountered in my review of the literature was that I could not find any evidence of research conducted to map the teaching and learning process over time. This was despite the depth of evidence that learning is very much a factor of evolving understanding. In the literature of established theory of learning, there is Knowles (1978) and the concept of the continuing to learn over our lifetime and Kolb (1984) with his idea that we must continually use our experiences to refresh our understanding of events. Further examples are available in Jarvis (2012) who cites Kant (Ellington (1785/1981) and Dewey (1958) on the need to relate time and space to provide context for comprehending and interpreting our experiences. The need to consider events over time is also implicit in the concepts of complexity theory. Dillon (2000) notes that complex systems are characterised by formation and reformation of their elements, interconnections and behaviours over time. However 'what is not deterministic need not be random' (p. 9). In this view, by identifying recurring patterns of events over time, our understanding of a subject can and will emerge. This begs the question of what constitutes an appropriate length of time. Authors such as Knowles, (2011) make the point that the individual continues to learn over their life time. For this research, there are shorter but still meaningful periods of time from which to view the teaching and learning process. In this instance it is the basic unit of undergraduate study-the semester.

Chapter 3 Research Philosophy

3.1 Introduction

As noted in the introduction to this thesis, because of my career experience in commercial market research, the development of research questions was my first step, followed by selection of research instruments including observations of behaviour and (initially) plans for face to face interviews, then to consideration of the research design and method, only then turning to definition and substantiation of the research philosophy that best described my creation. This bottom-up approach appears to be somewhat unusual when compared with the top-down approach adopted by authors in the subject areas of research philosophy (Cohen, Manion & Morrison 2011; Creswell 2012; Holloway 1997; O'Leary 2010; Pring 2005). This approach required me to consider a wide range of questions about the planned research. It also avoided the possibility of confusion inherent in a researcher trying to compare what was planned in research practice with the plethora of theoretical approaches contained in text book descriptions of the options in research philosophy.

This chapter of the thesis has been organised according to the three steps that I took in identifying the research philosophy of this thesis. Firstly, there are the results of the search of literature in the subject area using those references that proved helpful to me in exploring the options. Secondly I have listed the assumptions and the constraints that I felt were evident in my research plans. This leads to a summary of my perceived research position and philosophy. In a concluding section I have summarised the results of my research of academic thought and practice in the area of descriptive interpretation in education research.

3.2 Results of Search

One useful means to identify and elucidate the research philosophy of this study was found in an article by Holden & Lynch (2004). Using a framework provided by Burrell & Morgan (1994) these authors posed three questions that needed to be considered in academic research:- How to Research? What to Research? Why Research? For the purposes of this discussion I interpreted the 'how to' question as relating to the research design and the methods that will be used in addressing the questions posed for this research. The combination of design and method reveals the philosophy of the research and vice versa because the philosophy of the research also influences the research design and method – there is both interaction and interdependence. The question of 'what' to research addresses the propositions of this thesis and the resulting questions. I saw the 'why' of the research as relating to the focus of my research. Was it concerned with theory, with practice, or theory and practice? I found my answers to the question of why I was conducting research in the conclusions I had reached and the questions that emerged when I used the concepts of complexity theory. I had concluded that we exist in an unpredictable and to some extent, unknowable world where we can never hope for complete knowledge or any certainty on future events. For example, while we can be certain that there will be cycles of booms and busts in the share market, the timing and the degree of severity of the peaks and troughs of each cycle will be unknown until after their occurrence, and even then we are not likely to ever have complete knowledge of the causes. However, a key concept of complexity theory is that, while the behaviour of complex systems can appear to the observer to be chaotic (messy, confusing, disorderly), they are in fact always searching for a point of stability or balance (Ashby 1962; Byrne 1998; Schrödinger 1992). My assumption was that it should then be possible to identify and describe that balancing act. The teaching and learning process provides a good example of this concept. In my experience there appeared to be infinite variation in student behaviours in each tutorial and sometimes they were messy, confusing and disorderly events. However, there was also similarity in patterns of student behaviour over the time period of a semester. My conclusion is that within the boundaries applied by the teaching and learning process we can to some extent, describe and anticipate the future. For example, in teaching a subject of study our experience is that for a wide range of reasons a proportion of students will fail, others will pass, some will get a credit and so on. However, assuming that teaching staff do not seek to manipulate the results, we can

also never forecast with complete certainty or accuracy the proportions of those students who will fail, pass and achieve a credit in each semester. Despite our best efforts it seems unlikely that we will ever truly know the results of the teaching and learning process in terms of the depth of student understanding. Despite all of these caveats and limitations, there is more than adequate reason for research to explore these conclusions.

Authors including Creswell (2012) and Denzin & Lincoln (2000) note that it was possible to adopt a position that accepted that there were rules that to some extent regulated society, while also acknowledging the events of recent history which showed periods of quite substantial and unexpected change (Tarnas 1996; Watson 2006). The implication is that the research completed for this thesis at this point of time can be useful in addressing the questions of this point of time. While this research will have some relevance for the future, the exact sequence and content of events recorded in this piece of research will never be completely repeated, because the context of each new piece of research will be different. Nevertheless, where there is consistency and continuity in content and delivery of the teaching and learning process, we can presume to generalise.

Creswell (2012) and Cohen et al. (2011) both make the point that the objectivist and subjectivist question in academic research should be viewed as a continuum, with most programs of research containing both objectivist (testing, experimenting) and subjectivist (inquiring, exploring) elements because they are a function of strategies of enquiry. In that respect, research method must be dependent on the question and the context.

Finally, there was the question posed by Holden and Lynch (2004) of the researcher's view of humanity. Are human beings free agents, or is their behaviour subject to at least some constraints applied by society? I reached the conclusion that in the teaching and learning process at an undergraduate level of study in an Australian university, the student and the teacher both had some limited level of choice in their behaviours, although they were also constrained by a range of interconnected and interdependent factors including the teaching and learning system, and the expectations of the university and of society.

As noted previously, I had selected and combined a range of research instruments for construction of the study, without giving any thought to the philosophy behind it. My choice of instruments was based on my experience of dealing with the complexity of recording and interpreting human behaviour. The detail and variety of human behaviour necessitates detail and variety in the forms of research. For example, if I wanted to track students' behaviours then simple visual observation would suffice. However, if I wanted to understand the reasons for their behaviours, I needed to add additional forms of research such as face-to-face interviews and analysis of student performance in the assessments. This resulted in selection of a range of instrument; some were structured, and others semi-structured. I intended to present the results as a story contained in the format of a case study.

It was evident that the research that I planned to conduct for this thesis focused on exploring not experimenting with the teaching and learning process. I found a valuable reference in Creswell's (2012) note of the need for the student to identify the assumptions and belief that drive, shape and focus the design, fielding and interpretation of their research. Creswell sees an interconnection between world-views, research design, strategies of enquiry, and research methods. He identifies five key world-views or belief sets (post-positive, social construction, advocacy, participatory and pragmatic). I found some connections with my research across this range of possible views. For instance, I was aware that my personal beliefs and experience would influence what was observed (post-positivism) in the research and I was of the opinion that the content of the teaching and learning process was dependent on how society constructed the role of education; advocacy was to some extent inherent in my decision to undertake postgraduate study and my research made use of participant observation. It was Creswell's note on the pragmatic point of view that struck a particular chord:

> 'For many pragmatism as a world-view arises out of the actions, situations, and consequences rather than antecedents (as in post positivism) there is a concern for application-what works-and solutions to problems ... instead of focusing on methods, researchers emphasise the research problem and use all approaches available to understand the problem' (2012, p. 10).

This pragmatic stance was evident in the design of my research. I had selected research instruments for their capacity to deliver the range of data that I required to address the research questions of this thesis - the function of my research determined the form of that research. Denzin & Lincoln noted that the role of the

researcher was to act as 'a *bricoleur*[1] a Jack of all trades stitching together the research techniques which will fit the situation and the circumstance' (2000, p. 4). They note a range of possible roles for the *bricoleur*: interpretive, narrative, theoretical, political, and methodological. On reflection it was apparent that the closest fit between the statement of theory by these authors and my proposed role in research, was that of the *interpretive bricoleur* where the researcher's task is to provide the observer with a '*bricolage* – that is a pieced together set of representations' (p4). This description also contains the view that the *bricoleur* is first concerned with function then with form in research design.

Acceptance of the interpretive role for the researcher can also be found in Cohen, Manion and Morrison (2011) who note that educational research has absorbed 'two competing views of the social sciences'. The first point of view follows in the footsteps of the hard sciences with their focus on applying the scientific method to 'discovering natural and universal laws regulating and determining individual and social behaviour'(p. 7). They go on to describe an alternative 'interpretive' point of view which seeks to describe and interpret a 'reality' where there are multiple and ever changing 'realities' and where no event has meaning except when it is viewed in context (Cohen, Manion & Morrison 2011). I felt that this interpretive stance was inherent in my design of a research strategy, selection of a research method and the sequence and content of each step in gathering data.

However, my experience of teaching and of research was that it was not possible to create a complete record of a teaching event, mostly because of the limitations of research methods, but also the capacity of the researcher to assimilate the data. In this respect there are clear limits to what we can know. This reflects the point of view expressed by Ashby (1962) that to be able to comprehend a complex system, an observer must have a matching complexity in research and analysis. This suggests that there are boundaries to our capacity to comprehend let alone to accurately and completely record reality (Cilliers 2005).

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[1] In this thesis, emphasis (italics) is in the original cited text unless otherwise stated.

There is still the option, which was taken in this study, of constructing a research process which recorded the perspectives of a range of participants. All would be incomplete in some respect, and influenced by the individual experience and recollection. Despite this, in total they could provide an independent observer with the range and depth of information that they required to construct their own interpretation. In the research conducted for this thesis the role of the researcher was not and could not be to construct the one or only point of view of reality. Instead, to use the metaphor employed by Levi-Strauss (1966), it was to act as the quilt maker building a pattern with meaning for the viewer, using the shapes, colours and textures of what is available.

3.3 Assumptions and constraints

In this section I have summarised the major assumptions and constraints that guided my research design:

1. Learning can only be understood when it is observed over time.

2. The teaching and learning process is complex, the research instruments are blunt and not all relevant data is available.

3. It is possible to comprehend and describe reality most clearly where there is a range of perspectives on view.

4. What is true of reality at any one moment in time will evolve over time.

5. However, apart from major change in context or circumstance, the truth of the future will share some of the characteristics of the truth of the present.

6. Research must be a pragmatic process. The researcher selects from what is possible, practical and most effective in collecting that range of required data.

7. The role of the researcher is to act as a recorder, analyst and interpreter, providing an independent observer with a perspective from which that observer can reach an informed conclusion.

8. What is collected in research and how it is interpreted will be influenced and shaped by the experiences and beliefs of the teacher, the researcher and the self.

9. Interpretation of the results of this research will be influenced and shaped by the experiences, beliefs and preferences of the observer.

3.4 Summary of Researcher Position and Philosophy

The following list summarises the elements of my research position and its underlying philosophy and provides examples of their application in this thesis:

a) Pragmatic and subjective

The research for this thesis was subjective in exploring the teaching and learning process. In the design and conduct of the research I maintained a pragmatic focus on what types of research instruments would be required to deliver the range and quality of data needed to consider my propositions. This pragmatic focus also included employing an autoethnographic method in this research.

b) Qualitative and quantitative

The focus of the research was on exploring the teaching and learning process through recording and interpreting the behaviours of the students and the teacher. My experience was that I needed qualitative research instruments such as observations and face to face interviews to uncover the attitudes and opinions that drove those behaviours. However, while student comments and questions in tutorials could lead me to conclude that they showed evidence of reaching a certain level of understanding of a subject, I would still need the reality check of the scores achieved by these students in assessments, and their self assessment of personal progress in finding depth of understanding.

c) Descriptive interpretation

I conceived my role to be that of the recorder, the analyst and the reporter of events. I described and interpreted what occurred in my narration of the story of an example of the teaching and learning process.

d) Participant Observer

As a teacher and researcher I was located inside the story of the teaching and learning process. My adoption of that 'emic' position reflected the need to gather a wide range of data in a circumscribed period of time. Being a part of the process expanded my access to data. Playing a part in the process also enabled me to record and interpret the culture of this iteration of the teaching and learning process. In this respect I was drawing on the ideas of authors such as Geertz (1973), (1988) and Bernard (2011) and the works of urban anthropologists such as Liebow (1967). The point that I took from their work was that if I wanted to understand this culture I had to be part of the interplay between the students and the teacher

e) Empirical and applied

This thesis explores the proposition that complexity theory can complement the currently established theory and practice of teaching at a tertiary level of study. This required observation and recording of the role of theory in the practice of teaching and learning and then definition, explanation and example of how and why the concepts of complexity theory can be applied in undergraduate study. The aim is to contribute to the body of knowledge of the practice of teaching and learning at an undergraduate level of study of business management.

3.5 Place in Academic Thought

In parallel with the research completed to define the philosophy and design of research, was a review of the literature of research for education. I sought to compare the assumptions, knowledge, experience and individual influences that were embedded or inherent in my selected research process, with academic thought and practice.

I found a very close fit in the research objectives, methods and processes in the field of descriptive interpretation (Erickson 1985). The most frequent experience was to encounter this train of thought in the fields of nursing research (Oliver 2012; Thorne, Kirkham & O'Flynn-Magee 2008). In this field the objective was to improve nursing practice through observation and examination of the nursing process. There was a concentration in their research on recording and interpreting the interaction

between patient and carer over time. This description of their research appeared to be a close match with the requirements of mine. There were also references to descriptive interpretation in the field of primary and secondary education. Most notable for me were the writings of Erickson (1985) who traced the origins of the interpretive approach in educational research back to the 1960s in England, spreading to Australia by the 1970s. Erickson uses the term interpretive to 'refer to the whole family of approaches of participant observation and containing a range of methodologies (ethnography, case study)' (1985, p. 119). In Erickson's view, interpretive research was inclusive of both quantitative and non-quantitative methods, 'with a central research interest in human meaning in social life, and its elucidation and exposition by the researcher' (1985, p. 119).

Erickson's comments on the research philosophy, design and research instruments employed in education research were focused on students at a primary and secondary level of study. What struck me was how closely they matched my research design. To me this commonality and similarity of approach provided further evidence of the importance of context in guiding and shaping the research philosophy, design and instruments. When I used the concepts of complexity theory to view this coincidence, it provided a good example of the self organisation of the research process to address the context. In this view the environment of the research provides the direction in research design, the personal preferences and experience of the researcher are secondary.

Chapter 4 Research Design

4.1 Introduction

The following chapter documents and explains the strategy of enquiry, the research methods and the research process that are contained in my research design (Creswell 2013). As a final step I summarise the underlying assumptions and conclusions that shaped and bounded (Cousin 2005) this design.

4.3 Strategies of Inquiry

Ethnographic and Emic

In this thesis I have employed an *ethnographic perspective* in constructing and reporting my research, where 'Ethnography is a design of inquiry coming from anthropology and sociology in which the researcher studies the shared patterns of behaviours, language, and actions of an intact cultural group in a natural setting over a prolonged period of time. Data collection often involves observations and interviews'.(Creswell 2013, p. 14)

Woolcott (1980a) notes that 'ethnography refers both to the research *process* and to the customary *product* of that effort, the written ethnographic account', going on to note that 'my image of ethnographic research is an image of people. The ethnographer is the research instrument, the villagers are the population' (pp. 156-7).

The selection of an ethnographic strategy of enquiry in research reflected my judgement that the context of this study was the culture that forms around the interaction of students and teacher over a semester of study. However this stance needs to be viewed in the context of Wolcott's question 'To what extent, for example, does culture consist of what people *actually* do, what they *say* they do, what they say they *should* do, or to the *meanings* they assign to such behaviour' (1980a, p. 156). In this thesis, culture is portrayed by my interpretation of what people, students and

teacher, actually do. This is a limited and personal perspective although it did provide a framework and boundaries for my recording and interpretation of events. Wolcott goes on to define areas of influence on the ethnographer in the field. He notes that in education research 'we face the problem of trying to conduct observations as though we were in a strange new setting, one with which we have been in more or less continuous contact since the age of six' (1980a, p. 157). Wolcott describes ethnographic research as 'fluid in its ability to adapt to circumstance, but with no one set of prescribed techniques'. In his view ethnography 'is not a reporting process guided by a specific set of techniques. It is an enquiry process carried out by human beings and guided by a point of view that derives from experience of the research settings ' (1980a, p. 158). In my view this conclusion by Wolcott matches the role of the role of the *interpretive bricoleur* (Denzin & Lincoln 2000) outlined in Chapter 3 Research Philosophy.

Other writers and researchers in this area added to the framework from which I considered the detail of the proposed program of research. For instance, Bernard's (2011) notes on recording and interpreting notes taken 'in the field' affirmed my plan to use a semi-structured approach, and to keep detailed records of my observations.

The note from Geertz (1973) on the difficulty for the researcher in noticing and interpreting behaviour in a culture also made sense in the context of my research. I was dealing with the culture of a cohort of students and teacher over a semester of study and two immediate issues emerged. The first was that my experience in tutoring in business management subjects meant that the study cohort was to some extent familiar to me as a teacher and a researcher, with consequent possibility of assumptions and influence in both my teaching and research. The second issue was that the students and teacher in this study came from different generations with a forty-year age gap. This gap opened the possibility that I would overlook or misinterpret important signifiers of student learning over the semester. A case in point was the apparent sophistication and ease of student use of technology to search for information and evidence in tutorial sessions. By comparison, I started using computers in 1984 in the days of MS-DOS, I carry a mobile phone which is capable only of phone calls and text messages and I have a preference for using hard copy in both my teaching and my studies.

Of particular relevance was the advice of Geertz that one needed 'thick research', to complete that 'thick analysis' which could lead the researcher to 'thick interpretation'. This point emphasised the need for a mix of research instruments to provide a range of perspectives from which to 'tell the story'. It also implied that the viewpoint that I created would by itself be insufficient in depth and subject to my individual perspective on events. I needed to provide the observer with as wide a frame of references as possible and practical, including other perspectives of what occurred.

In this study the term *emic* (Lloyd 1985) describes the position in this research. As an experienced teacher who also acted as the researcher, I have insider knowledge which enables me to reach insights not readily available to the outsider (*etic*) researcher.

4.5 Method of Research

Autoethnographic

As noted earlier, the strategy of enquiry in my research was ethnographic: recording the detail of the culture of a cohort of undergraduate students over a semester of study of a unit of business management. In implementing that strategy I had made the decision to use an autoethnographic method which 'involves self observation and reflexive investigation in the context of ethnographic field work and writing' (Maréchal 2010, p. 43). This meant that I had to define the role(s) that I was to play, for two key reasons. The first was the need to understand my role in this postgraduate landscape. The second was to keep me aware (and signal to the observer) that a range of factors had influenced the way I addressed the research propositions and questions of this thesis.

I defined three distinct roles that I played in the construction and implementation of the study and the consideration of the research propositions of this thesis. Firstly, there was the 'Teacher' planning, conducting and reporting on teaching sessions. Then there was the 'Researcher' searching the literature, designing, constructing, fielding and reporting other research. Lastly, an overarching third role, that of 'Self', Me, I, who accessed and interpreted the work completed by the Teacher and the Researcher, to consider the proposition of this thesis.

The question that I faced was how to acknowledge the presence and influence of these roles in the story contained within the case study, and in my subsequent analysis and interpretation. All three entities, Teacher, Researcher and Me had different roles and consequently different perspectives. They were also subject to different sources and forms of influence. For the 'Teacher' the influences included past experience in teaching at an undergraduate level of study of business management, for the 'Researcher' there was the influence of a business career largely spent designing and conducting research studies focused on one or more aspects of human behaviour. For 'Me' there was my background as a small business owner, working for the owners and the managers of Australian shopping centres. On reflection it was apparent that this history and the range of experiences influenced my attitudes to the role played by research, to the form of my study and to my interpretation of the results. My business experience also shaped my choice of language. In my career I wrote to a high standard of Business English which tends to be declarative and assertive. In my experience this has some quite distinct points of difference from Academic English, sometimes exemplified in a focus on a tentative and modulated discourse containing a narrative.

There were also the influences of factors such as my gender, personality and other life experiences to add to the complex mix of influences in the research, interpretation and conclusions of this thesis.

Review of the literature showed the autoethnographic stance is a relatively recent emergence in the mainstream of qualitative research in the social sciences. However, Anderson (2006) notes that 'there has always been an autoethnographic element in qualitative sociological research' (p. 375), and dates its emergence to shortly after World War I, but with real growth in academic attention only in the period starting in the mid-1990s. To assess the degree of academic attention paid to autoethnography in education, on Friday 26th October 2013 I conducted a search of the library listings of the University of Western Sydney for peer-reviewed and scholarly articles using the subject headings of 'Autoethnography', 'Education', 'Learning' and 'Teaching'. In this search I used these headings as sets of enquiry, with two points of comparison – the number of articles in the library and on Google Scholar, and the top three subject headings in the peer-reviewed articles. I did not apply any filtering by date of publication on the first round of the search, but I repeated that search refining the list to those articles published in the past 10 years.

Note that the library records did not allow a complete match on dates. The dates covered are shown in underline. The results of these searches were as follows;

'Autoethnography': *UWS Library* 2,167, peer-reviewed, 1,883 (87 per cent) published after <u>2003</u>. Top 3 subject headings Autoethnography (329), Ethnography (206) and Qualitative Research (105); *Google Scholar* 15,300 articles.

Autoethnography AND Education: *UWS Library* 1,416 peer-reviewed, 1,200 (85 per cent) published after <u>2005</u>. Top 3 subject headings: Autoethnography (156), Ethnography (153) and Qualitative Research (81); *Google Scholar* 14,600 articles.

Autoethnography AND Learning: *UWS Library* 1,375 peer-reviewed, 1,184 (86 per cent) published after <u>2003</u>. Top three subject headings: Autoethnography (178), Ethnography (127) and Qualitative Research (68); *Google Scholar* 14,200 articles.

Autoethnography AND Teaching: *UWS Library* 955 peer-reviewed, 818 (86 per cent) published since <u>2004</u>. Top three subject headings: Autoethnography (95), Ethnography (79) and Qualitative Research (40); *Google Scholar* 12,700 articles.

Autoethnography AND Education AND Learning AND Teaching: *UWS Library* 735 peer-reviewed, 536 (72 per cent) published after <u>2005</u>. Top three subject headings: Autoethnography (66), Ethnography (60) and Teacher Education and Teaching Methods, both with 31 references; *Google Scholar* 10,400 articles.

The majority of these publications had occurred in the past ten years which supported comments in the literature that the idea and the validity of an autoethnographic method in research is a relatively new entrant to the field of ethnography (Anderson 2006; Wall 2008), which in turn is a member of the larger field of qualitative research. The top three subject headings for the peer-reviewed articles were Theory of Autoethnography (17 per cent of total), Ethnography (11 per cent) and Qualitative Research (6 per cent), for a total of 34 per cent of all peer-reviewed articles, published at any time. Review of these articles showed a focus on the question of how an autoethnographic approach fitted into the academic landscape. It was only when I tightened the search to include all four variables that the linked subjects of teacher education and teacher method emerged. Articles that dealt with teacher education and teacher method contributed fewer than 2 percent

of the peer-reviewed articles that dealt with autoethnography. Review of these articles showed a wide range of subject matter and differences in their use of an autoethnographic approach. My impression was that the majority viewed autoethnography as a philosophy which does not agree with my view that an autoethnographic approach is a method of research. The literature did show use of an autoethnographic approach in the field of education (Atkinson & Delamont 2010; Ellis 2000; Hamilton, Smith & Worthington 2008; Jones & Delamont 2012; Wall 2008). However, none of the articles that I sighted dealt with the experience of the teaching and learning process over time. There were also references to the use of an autoethnographic approach in nursing although the majority of the articles that I sighted had some reference to the humanities.

What was evident was the flexibility of format and expressions and the power of the language in providing a reader with insights into a subject. I found a good example of this in the paper by Ellis (2000) where she explored how she evaluates narrative ethnographies submitted by her students and formulates helpful feedback in her replies. I found myself reading her story and comparing her comments and opinions with my own experience, and in so doing revisited my teaching practice. Another example was the article by de Vries (2012) in which he employed a dialogue between his 'Self now' and his 'Self prior' to undertaking his study for a doctorate. This provided him with a very effective platform from which to consider the origins of autoethnography and document its application in education. I found myself drawn into his story, on the way comparing and contrasting my experiences of postgraduate study.

It was apparent that de Vries is a strong advocate of an autoethnographic method; nevertheless he makes the point that, for the researcher, placing the Self in the landscape risks being solipsistic and self-indulgent. The discourse of the writer overwhelms other voices in the narrative. The result is only one side of the story being reported – an example of 'one hand clapping'. De Vries agrees with Geertz's (1988) warning on the need to avoid 'author saturated text', and with the comment by Atkinson & Delamont (2010) that adopting an autoethnographic approach could degenerate into narcissism. My review of the literature did show a range of articles with individual and often very personal themes (Adams 2012; Tillmann 2009).

De Vries signals a further issue in the requirement to expose oneself to the public eye. 'One of the hardest things to pull off successfully is to bring your private (the inner) life in to the public arena' (2012, p. 361). This represents an ongoing problem for me; I am not comfortable with sharing my inner thoughts. This is partly because this contradicts my perception of the role of the researcher, but mostly because I believed that adopting a 'confessional' approach would invite a narcissistic focus which could bar or confuse the critical analysis that I needed to employ to address the propositions of this thesis.

Another influential article was provided by Wall (2008), primarily for her acknowledgement of the part that can be played by reflexivity, 'in which the researcher pauses for a minute to think about how his or her presence, standpoint or characteristic might have influenced the outcome of the research process' (2008, p. 148). I think that this requirement goes further, and includes ensuring the audience is fully aware of these influences. Wall goes on to note the varying degree of emphasis placed by authors on the 'auto' (self), 'ethno' (the cultural link) and '-graphy' (the application of the research process): 'this variable emphasis on the separate dimensions of the autoethnography results in the production of manuscripts that differ significantly in tone, structure, and intent' (Wall 2008, p. 152). She goes on to note that 'I was disappointed to find that much of what was written on autoethnography was highly abstract and lacking in specificity,[and] I came to wonder whether autoethnography is less of a method and more of a philosophy' (2008, p. 152). My own readings had also showed an abstract and non-specific content in many of the articles that I viewed. However, there was also a range of evidence that this method of approach is unfolding in research practice across a range of contexts and disciplines (Clegg & Smith 2010; Holstein & Gubrium 2008; Lucas 2011; McClam & Flores-Scott 2012).

In the view adopted in this thesis, the autoethnographic method employed in research and reporting of the events of the case study (shown in Chapter 5) complements the ethnographic strategy of my enquiry. In this regard I felt that it was important for my audience that I maintained a distinction in my use of language. On the one hand I was conducting research to explore and record the events of a culture. In this task it was essential that my collection and recording of data was dispassionate and minimised the influence of my personal experience and interpretation. On the other hand I was then using an autoethnographic method to

interpret those results; to test the propositions of my thesis and then explain my conclusions to my observer. I thought it important that these observers could identify these different forms of data. I found the means to separate these two aspects of my research by my choice of language. In Chapter 5 Narrative of Events where I document the results of my observation of students and analysis of their performance I use neutral, clinical and dispassionate language. In the remainder of this thesis where I have employed an autoethnographic method in my research I have used my learned language of 'Business English' which is analytical and assertive.

It was evident in the literature on the subject of autoethnography, that there were two key streams of thought in its application - evocative and analytical. The differences are summarised by Ellington and Ellis (2008a) as:

> 'Analytic auto ethnographers focus on developing theoretical explanations of broader social phenomena, whereas evocative autoethnographers focus on narrative presentations that open up conversations and evoke emotional responses' (p. 445).

While I felt there was a role for evoking emotions in this thesis, I saw this as being subordinate to analysis and interpretation. I felt that there was a close fit between the context and circumstance of my research and the concept of analytic autoethnography expressed in the comments below:

> 'The five key features of analytic autoethnography that I propose include (1) complete member researcher (CMR) status,(2) analytic reflexivity, (3) narrative visibility of the researcher's self, (4) dialogue with informants beyond the self, and (5) commitment to theoretical analysis' (Anderson 2006, p. 378).

The idea of an analytic version of autoethnography proposed by Anderson was criticised by Denzin (2006):

> 'He [Anderson] wants to define and then claim ownership over at least one version of autoethnography, what he calls analytic autoethnography. He is impressed by the success of evocative or emotional autoethnography. But he fears this success may eclipse other versions of the method.' 'The work of the good realist ethnographer has always been to study and understand a social setting, a social group, or a social problem. Good ethnographers have always believed in documenting and analysing those phenomena for fellow scholars. They have gone for the best data, never losing sight of their research focus, even when studying insider meanings, including their own' (p. 421).

In some ways I found Denzin's statement reassuring because it freed me to be both analytical and evocative in my employment of an autoethnographic method in my research. However, the apparent rejection by Denzin of the need to consider the context and the topic when employing an autoethnographic approach contradicted my perspective of research. An example of this issue appears in Lee's (2010) use of an autoethnographic approach to her description of using music therapy after eye laser surgery. To me her topic requires a different language set, level and form of rigour when compared to my use of an autoethnographic method to consider the proposition that complexity theory can complement current established theories of learning at a tertiary level of study. There was definitely a requirement for an analytical and critical element to my narrative.

Mix of Research Instruments over Time

Cresswell (2003, p. 4) cites Cresswell and Plano Clark (2007) in their note that use of a mix of research instruments 'is an approach to enquiry that combines or associates both qualitative and quantitative forms... it also involves the use of both forms in tandem so that the overall strength of the study is greater than either qualitative or quantitative research'.

My decision to use a mix of instruments was pragmatic and based on two factors. The first was my experience of methods of research that could collect and record student behaviours over a semester of study. The second factor, of equal importance, was to enable an observer to reach informed conclusions on the propositions of my thesis. My experience was that a variety and range of perspectives would need to be included and my role as the researcher was to construct the mosaic of Cunliffe (2002) or the quilt of Levi-Strauss (1966) to tell the tale.

Sources and forms of data

Two sources of data were employed in research. The first was the primary qualitative data collected and constructed using observations of student behaviours in tutorials. I used a check-list of questions to ensure consistency in my enquiry and kept detailed written records of my observations. Excerpts from those observations are shown in Chapter 5 Narrative of events. The second source was data assembled from my review of records of student attendance at tutorials and their results in assessments. This was an important aspect of my research because it provided a triangulation point (Baker 2006) from which to view my observation and interpretation of student behaviours. It also provided a means to augment and provide further context to the primary qualitative data described above.

Sequence and Content of Research Process

The table below describes the sequence and content of data collection.

Table 1: Sequence, Content and Process of Research

Frequency and form of research	Source of data	Collection and review process	Application of data after analysis
Qualitative Component			
Weekly	Observation	Written observations completed by tutor immediately following each tutorial using a semi structured questionnaire	Changes in student behaviour and engagement in the learning process over the semester
Quantitative Component			
Weekly	Attendance Records	Comparisons for retention and for tutorial attendance over the semester	Changes in behaviours over time. Cohort behaviours compared to School averages
On completion of marking of the assessments	Assessments of Students	Comparison of tutorial level performance in assessments over the period of a semester	Trends in student understanding and skills. Assessments of understanding compared with unit learning outcomes.
End of semester	Assessment of Teacher	Comparison of student ratings of teaching compared with averages and review of student comments	Control for teaching effect - better than worse than average

Ethics of Research

I sought and received NEAF approval for this research and I valued the rigour of the process because it was of central importance to me that my research should not in any way affect the students. There were two reasons, the first was that I had a professional and ethical responsibility to do my best as a teacher for the benefit of those students and I could not allow my research to interfere with their progress. The second reason was that I was relying on developing a record of events in the teaching and learning process over a semester that was not influenced by the research process or my personal and research objectives. My solution to address both of these issues was to separate the data collection and data analysis process. In this research the observation reports and analysis of student progress were written from my point of view as a teacher; on completing a tutorial I would then sit down and write short but internally consistent summary notes on aspects such as the number of students who attended, my teaching objectives and plans, the events of that tutorial (in sequence) and the observed result for the students in terms of their participation and their communication with the teacher and with other students. All of my notes dealt only with the group and not the individual student. In effect the process of observations and the write up of my notes were an extension of the reflective notes that I kept on all the units where I had taught in the past and my objective in writing these notes continued to be to monitor my performance and to look for ways to assist student learning. It was only after the last tutorial and the return to students of their final assessment that I adopted the role of the researcher, compiling the observation notes for each week and reviewing the summary analysis of cohort performance, then moving on to apply this data in considering the propositions of this thesis.

The students in this tutorial were aware that I was making notes on the events of each tutorial and their progress because I made a point of summarising and presenting my comments to the cohort when I was handing back their assessments. This feedback has always been a part of my teaching practice because I have found find that students value and act on my suggestions. This cohort was no exception and there was evidence in the observations and in their performance in assessments to show that they took notice of my comments and suggestions.

4.4 Characteristics of Research Design

The following points summarise my critical analysis of the research design that I outlined above. I have included this analysis here to enable an observer to review my perceptions of the underlying assumptions and the limitations of this research.

Empirical and Applied

This research focused on observation of the teaching and learning process as a means to contribute to the praxis of teaching and learning at an undergraduate level of study. My view of the role of research and the researcher concurs with the comment by Stake that 'the function of research is not necessarily to map and conquer the world but to sophisticate the beholding of it' (Stake 1995, p. 43).

Multiple roles played by the researcher

My review of the literature included the views held of the role of the researcher in academic studies. Most resonant with my experience was the note by Stake (1995) that the role of researcher included acting as a teacher, an advocate, a biographer and an interpreter. This comment emphasises the multiple interconnected roles that I needed to play, firstly to construct the research, then to communicate the results.

Idiographic

The research focused on the individual, in the anthropological understanding of this concept. Bernard (2011) notes that study of a culture must include at least a base unit of the society under study. It could be family, or an interest or employment group. In this case the unit of analysis is a cohort of students in a semester of undergraduate study of business management. In this research, all interpretation addresses the group, not the individual members.

Narrative story over time

A detailed story of an iteration of the teaching and learning process provided the framework from which to consider the proposition of this thesis. It should be noted that the use of a narrative story contained in a case study was only a device that I employed to display the range of data to the observer and reflected the need to report the story over time – it does not reflect strategies of enquiry.

I had seen a range of examples of this method of approach in the teaching materials of the units in which I have worked, most notably in a unit which employed the Case Study Method (Dallimore, Hertenstein & Platt 2004) in teaching. I saw a case study as a practical means to display and portray the events of a semester of study.

It should be noted that in my experience of behavioural research it is impossible to compile a complete record of a complex event such as an iteration of the teaching and learning process. Not all detail of what transpires during a semester is available to a researcher and the teaching and learning process is so fast moving as to remove the possibility of keeping a full record of events. For example consider the limits to my ability to observe and absorb all the detail of the interactions of student and teacher over the time period of a tutorial session: I had only to be looking the wrong way or listening to a particular student to miss detail on the behaviour of the rest of the audience.

There is no intention to generalise from this research which reflects my need to limit the scope of my enquiry. Nonetheless, in my experience of teaching and in the context of complexity theory, it could be expected that the patterns of student behaviour described here are broadly indicative of the behaviours and performance of students as a whole. For that reason there may be a possibility for limited generalisations.

Selection of the undergraduate unit for this study was information oriented (Cousin 2005). The content and process of study in this unit were a known quantity and could be expected to deliver the range of information required to explore the propositions of this thesis. As a core unit of study this unit could also be judged to be representative of the teaching and learning process at an undergraduate level of study of business management at the University of Western Sydney.

This is a personal narrative with a limited scope, intended only to provide a perspective from which to consider the propositions of this thesis. Barkhuizen (2011) notes that telling stories, which he sees to be implicit in a case study, is an essential element of conveying understanding to an audience. Telling a story was central to the best examples that I had encountered in the various case studies that I reviewed. What struck me was how they presented and sequenced data to enable their audience to form an opinion on a chain of events over time. I have followed their examples.

Limited and Partial

This thesis is *limited*, because it is impossible to identify, record, and interpret every event of a semester. No researcher or observer can ever truly claim to know all that occurred. The teaching and learning process is too fast moving, and subject to so many agents and influences, that events often have no identifiable central origin and are not subject to reduction (Allen 1998; Kuhn 2007; Prigogine 1978; Stengers & Lissack 2004). Complete information is not available to the researcher. The effect of changes in the personal circumstance of students on their engagement and performance is but one example of relevant data not readily available to view. The research completed for this study was also limited by the concentration only on aspects which enabled addressing the proposition of this thesis. This was because the instruments of research that I employed could not collect all events and influences, and I could not absorb and synthesise all that occurred. More to the point, I was only interested in capturing data of significance to the research questions of this thesis.

As noted before, I have assumed that the audience for this thesis will have a depth of experience of the process and of the typical pattern of events of the teaching and learning process over a semester. While there will be limits to the detail offered in this case study, the range of information included can still provide this readership with the means to reach their own conclusions on what occurred and whether there is evidence to support my conclusions on the propositions of my thesis.

The enquiries conducted for this thesis were *partial,* influenced by my assumptions as to what is and is not important in recording and reporting the events of the teaching and learning process. Kanuha (2000) and Ohnuki-Tierney (1984) both

make the point that while the partial point of view of the *'emic'* researcher will influence the result, the alternative, where the *'etic'* researcher maintains a distance from the situation so as to remain impartial, risks that they will be unable to interpret events because they do not understand the context. I was embedded in the teaching and learning process in this research which enabled elements of personal narrative and insight. To avoid entanglement I maintained a detached perspective in recording and analysis. To minimise the possibility that my circumstance and experience would distort my interpretation and perhaps mislead an observer, I have ensured that details of the research process and the results are available for their review (Creswell 2012; Denzin & Lincoln 2003, 2011; Holloway 1997).

Qualitative research employing a mix of methods

While autoethnography was the method employed in my research strategy there was a range of data collected to consider the propositions of my thesis. In this thesis the emphasis in my choice of instruments and plans for this research has been on qualitative research as expressed by Denzin and Lincoln (2000):

> 'Qualitative research is a situated activity that locates the observer in the world. It consists of a set of interpretive, material practices that make the world visible. Their practices transform the world. They turn the world into a series of representations, including field notes, interviews, conversations, photographs, recordings and memos to self. At this level, qualitative research involves an interpretive, naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of or interpret, phenomena in terms of the meanings that people bring to them' (p. 3).

A range of research instruments could be applied to develop the story of events over the semester of study. In defining and describing these instruments I have employed the following definition 'primary data are collected by a research group for the specific analysis in question, whereas secondary data are collected by someone else for some other purpose' (Salkind 2010, p. 1330). In this study the primary data are collected through observations, while secondary data are collected from student attendance in tutorials and their performance in assessments.

All research instruments have both strengths and weaknesses. For example, while research which collects original content provides the means to directly address a subject of interest, in my experience it requires secondary data to provide the context. In the teaching and learning environment of this study, it was evident that primary and secondary data were required if I was to construct a useful narrative of

events. It was through the total of their contribution that I could hope to communicate to my observer the nuances and influences that operate in complex systems such as the teaching and learning process. Review of the literature shows ongoing debate on the use of qualitative and quantitative methods. This is evident in the comment by Bernard:

> 'There has always been a certain tension in the discipline between those who would make anthropology a quantitative science and those whose goal it is to produce documents that convey the richness – indeed the uniqueness of human thought and experience' (2011, p. vii).

Bernard was addressing the discipline of anthropology although his comment is valid for other areas of research, including education. Review of the literature showed that research in this field will often be either qualitative or quantitative, and it could use primary or secondary sources of data, although most did not appear to acknowledge what I saw to be the need to collect and synthesise a range of perspectives to provide a reader with the detail they would require to reach an informed opinion.

My adoption of a mix of forms of research in this study should not been seen as an outright rejection of research that utilises only one form of approach. Nevertheless, I am of the opinion that the use of a single type of research risks overlooking the variety of influences and agents that could be involved and removes the possibility of viewing the results in the context of other perspectives.

Cousins (2005) notes the that use of a single type of research removes the opportunity to 'strengthen evidence through triangulation' (p. 426). This use of the concept of triangulation appeared to be somewhat unusual. Review of the literature shows that triangulation is most often associated with the requirement to test the results of a specific step in research through reference to the results of other research (Baker 2006; Johnson, Onwuegbuzie & Turner 2007; McFee 1992). In this thesis triangulation has been employed to test my conclusions and to add depth to content. For example, the reports of the observation study provide a perspective of events. The data taken from secondary sources such as student attendance at tutorials and their performance in assessments provide reference points and associated detail over the time period of the semester.

Deductive and Inductive

The analysis conducted to consider the proposition of this thesis is deductive because it employs the concepts of complexity theory to explain the events contained within the teaching and learning process over a semester of study. However, inductive reasoning is also employed in my considerations of whether the results of the research support the proposition that complexity theory can complement currently established theories of learning at a tertiary level of study. For instance, if we accept the proposition of complexity theory, then we would expect to find evidence that complex systems, in this case a tutorial group, will self organise around communities of interest (Allen 1998; Ashby 1962). If that is the case, then this and other aspects of complexity theory should be available to explain and to some extent predict student behaviours.

Reflective and Reflexive

The position outlined above led me to select research techniques which both require and enable a reflective–reflexive approach. In this view both teaching and research involve a process of constructing explanations for events and taking consequent action based on experiences. This differs from an approach which favours setting or constructing hypotheses and then seeking evidence to support or deny a position in research, or following a teaching plan with no ability to adapt to unforeseen events.

While I gathered detail of events in tutorials and reviewed the results of assessments, I reflected on what I was seeing. I reacted to my conclusions with changes in the way I dealt with students in tutorials and in the range of data that I collected in my observations. An example of this reflective and reflexive process was my conclusion that stable and effective working groups had evolved in the cohort. Typically there were three to four members to each group, each group worked as a team in class debates, most often a group had a speaker, with other team members contributing their points of view to reach a group conclusion. This was a spontaneous process with stable groups formed within the first four weeks of the semester. When I realised what had happened I paid attention in class to the activities of these groups and I made more use of activities which involved working in groups. This proved to be a very effective method of approach with a very positive effect on student engagement.

Cunliffe (2002) commented on the interconnected, interwoven and disparate nature of the process of gaining knowledge. In his view learning was a 'bitty' process that did not follow some preordained course and likened the construction of understanding to building a mosaic. It is only at a distance that the total picture is visible, and constant referral to reality is needed to guide design and change in behaviour and perspective in order to react to events.

The need for a reflective and reflexive approach to research and to learning is described by Du Preez (2008) as the means to locate the researcher and in this case the teacher in the process. The article by Du Preez uses an autoethnographic approach to construct the story of his postgraduate study. This includes constructing a narrative of student answers to his question 'how is it that you are here, now, as a mature age student, starting an undergraduate degree?'(2008, p. 4). Du Preez notes the importance of reflection to postgraduate and undergraduate study and the requirement to alter one's thinking on a subject and to adjust the questions asked in research as the need emerges. This is evident in his citing of Bandura's comment that:

> 'If there is any characteristic that is distinctively human, it is the capability for reflective self-consciousness People not only gain understanding through reflection, they evaluate and alter their own thinking by this means'(1986, p. 58).

I viewed the interactive and iterative process of reflection and reaction described by Cunliffe and illustrated by Du Preez as being essential in my studies. In my research this process enabled me to achieve insights into events in the tutorial sessions and adjust my focus accordingly. Teaching allowed my development and delivery of teaching plans that were effective in reflecting feedback from students. On a personal level it was useful because it enabled me to reflect on my studies and how I had reached that point, and then to use my conclusions to plan my future steps.

Multiple perspectives, for triangulation and amplification

Denzin & Lincoln (2011) and Cunliffe (2002) note the need for the researcher to provide the observer with a range of perspectives, first and most important to overcome the limited nature of a single source of data. They provide the observer with a means to compare and contrast reports of events to triangulate results. A further important reason for multiple perspectives can be found in their combined capacity to amplify and emphasise consistent themes (Cousin 2005).

Thick description for **thick analysis** for **thick interpretation**

The story of an iteration of the teaching and learning process constructed for this thesis should be useful to others who have an interest in teaching and learning at a tertiary level of study, but who will not have had direct experience of the circumstances described. Geertz (1973) notes that for an independent reader or an observer to reach reasoned conclusions about an event requires the researcher to supply *thick description* as a means to conduct *thick analysis* so as to complete *thick interpretation*. Ponterretto (2006) describes thick description as:

> 'the researcher's task of both describing and interpreting observed social action (or behaviour) within its particular context. …assigns purpose and intentionality to these actions, by way of the researcher's understanding and clear description of the context under which the social actions took place...leads readers to a sense of verisimilitude, wherein they can cognitively and emotively 'place' themselves within the research context'(2006, p. 3).

I agree with Ponterretto's comments on the researcher's role of creating a view of events which includes the context and purpose of what occurs. I would add that for a researcher, a reader or an observer to draw meaningful and substantiated conclusions requires access to a depth and range of data. Without depth of analysis I could not undertake a detailed interpretation of the propositions of this thesis. For an observer to reach a considered opinion on the propositions of this thesis they needed to test the validity of my claims, by triangulation of the data, my analysis and consequent conclusions (Guion, Diehl & McDonald 2011; Silverman 2013) (Moran-Ellis et al. 2006). The book by Silverman was of particular interest in its dissection of the various methods and forms of qualitative research, explanation of the parts that they play in research design and importantly for me evidence of their application in case studies prepared from the research diaries of three of his students. I found this to be another very useful path of approach because it helped me link the theory with the practice expressed in the experiences of these students. The inclusion of their case studies also provided me with another useful means to assess and compare my progress and an example of the practice of case study method.

Chapter 5 Narrative of Events

5.1 Introduction

To consider the proposition of my thesis I constructed a narrative story contained in a case study (Cousin 2005) of an example of the teaching and learning process at an undergraduate level of study in business management. This case study was developed to provide me with a point of reference for consideration of the two research questions of this thesis. My data was the record of events over the semester, which I interpreted in the context of my experience of teaching.

The unit selected for the study was 200148 Business, Society and Policy (BSP) a core unit for the Bachelor of Business and Commerce degree at the University of Western Sydney. This unit was ideal for my purposes because of its stated focus on applying the concepts of complexity theory in the teaching and learning process. The subjects of this study were a cohort of undergraduate students at the Parramatta campus in the Autumn 2013 semester. The case study documents the progress over that semester. The most valuable source of data was the written observations of student behaviours in tutorials. I interpreted these observations with reference to secondary data such as student attendance in tutorials and performance in assessments. The theme of the story told in this case study is that of students finding understanding and skills over a semester of study.

5.2 Reading this Chapter

Two sections follow. In the first I summarise elements of the story of 200148 BSP in Autumn 2013, using excerpts from the observation reports, summaries of data on student performance over the semester and the documentation of the teaching and learning process contained in the Learning Guide for this unit. In the second section I employ two perspectives to interpret the results of this research. The first is provided by the concepts of the six established theories of learning that my research had shown to play a part in the practice of undergraduate study of business management at this university (sections 1.4 Background and 2.3 Review of Theory and Practice of Teaching and Learning). The second perspective is provided by the concepts of complexity theory, described in section 1.1 Theoretical Framework and

in further detail in section 2.4 Applying Complexity Theory in Teaching and Learning.

In the following Chapter 6 Conclusions, I compare and contrast these perspectives to reach a conclusion on the proposition of this thesis, that complexity theory can complement currently established theories of learning in the development and application of effective practice of teaching.

Section 1: 200148 Business, Society and Policy, Autumn 2013

The following section draws on excerpts from the observation report and analysis of student data on tutorial attendance and performance in assessments, to narrate the events of the semester of study. To set the scene it starts with relevant excerpts from the Learning Guide, goes on to exhibit summary data taken from the observation study and analysis of student performance and ends with my conclusions on the depth of understanding reached by the students.

<u>This marks the start of extracts from the observation report.</u>

Unit Introduction

'The Business, Society and Policy unit examines the complex and, at times, contradictory relationships between the sectors of business, government and society. In this unit, you will be asked to analyse different models of relationships between businesses and their multiple stakeholders, critically evaluating the consequences of business decisions and practices, and the challenges and ethical dilemmas emerging out of the conflicting interests of different sectors. The unit emphasises the social responsibility of businesses and the role of ideology as it is used to justify the actions of business, society and government (policy).
Through social inquiry, reflective thinking and critical analysis, you will be introduced to the importance of key social, economic and political issues that affect business organisations within the framework of internationalisation and globalisation. The unit adopts an historical perspective to sensitise you to the processes and events that led to the emergence and development of capitalism, and to the different roles played by the state (government) in managing the impacts of business activities on society and vice versa. Particular attention is paid to the different ideologies used to legitimise the actions of business, the responses from civil society, and the role of the state in regulating the interactions' (Learning Guide p1)

Assessment Tasks

Assessment Number	Assessment item and due date	Learning Outcomes
1.	Online discussion and critical comment (650-800 words) **Due:** Week 6 tutorial	2 and 5
2.	Analysis of cases Individual report (30%) (1,500 words) Group conclusion (10%) (500 words) **Due:** Week 10 tutorial	1, 3, 4 and 5
3.	Research report (2,000 words) **Due:** Week 14 lecture	1, 3, 4 and 6
		Learning Guide pp3-4

Learning Outcomes

Learning outcomes for the unit are outlined below.

1.	Explain the social impacts of business practices in national and global contexts.
2.	Reflect on the links between personal experiences and social issues emerging from their interactions in society and with business and government organisations.
3.	Apply different concepts from theories and models used to analyse the interactions between Business and different stakeholders.
4.	Identify and critically analyse different ideologies used to justify the actions of business, government and society.
5.	Demonstrate a thorough understanding of the importance of business ethics and social responsibility and the positive outcomes of these principles for society.
6.	Research social issues emerging out of the reciprocal impacts of business, government and society in the context of the economic, social and political global environment.
	Learning Guide p3

The Students

Shown below is an excerpt from my observation report for Week 1 which included a self introduction by students. It should be noted that the proportions quoted are my estimations, whilst I knew how many students had attended the session I did not have the time and this was not the place to be taking notes.

'A total of 41 students attended this first tutorial. The teacher's impression was approximately 60 per cent female and 40 per cent male students. 80 per cent of the students were business majors with the next largest group from human resources majors. Around half (50 per cent) were enrolled because this was a core subject with most of the remainder nominating either personal interest in the subject or a connection between this subject and their specific career objectives. Two students noted that they selected the unit at random mostly because it looked interesting. Student objectives for the unit ranged from four students who wanted to achieve a pass for this core unit. Around twenty of the students aimed to achieve a credit. The majority of this group expressed confidence that they could achieve this result. The remainder nominated a distinction as their desired outcome. The voice tone and body language of most of this group suggested that this aspiration was an 'ideal'. However, five students gave the impression of being focussed and determined on achieving a distinction'

Week 1 Friday 1st March 2013

Extracts from Observation Reports

In each of my observation reports I included details of a range of aspects including the numbers of students who attended each session, my objectives for that session, the events of that session and the level and form of student engagement. The following are extracts from two aspects (Student Activity and Content of Student Communication) of each week's observation report. I have also included my reviews of student progress over the semester; in terms of their engagement with the subjects of study and my assessment of the depth of their understanding. In presenting this documentation I have used the three study modules to group the various reports. However it needs to be understood that because of the coincidence of Easter (Week 7) and STUVAC (Week 8) return of the first assessment was delayed until Week 9.

In all cases where the depth of understanding is assessed the frame of reference is that of surface versus deep learning described and defined by Entwistle (1997). Entwistle's focus was on the difference in the student's approach to learning, and the consequent depth of their understanding of a subject. In this thesis, surface learning exists when a student can recite the definition of a subject but demonstrates little evidence of a wider understanding. Deep learning exists when the student can recite the definition and go on to assess the implications and applications. In this respect, surface learning is the cognition, and deep learning the epistemic cognition defined by Kitchener (1983).

Module 1 : Week 1-3 and Week 4 On Line Discussions

Week 1 Friday 1st March

Student Activity

Student activity was primarily focussed on asking questions of the teacher. There was some isolated evidence of student discussions with each other that were directed at course content and this type of behaviour became more frequent over time.

Only a few (five or six) students took notes in any detail. Ten to twelve had one or more of the lecture and tutorial notes. Five of the students showed evidence of reading the notes and the chapters

A group of three students conducted audible personal conversations throughout the session, but the majority had very limited personal discussions.

Week 1 Friday 1st March

A total of eight students made (brief) use of their phones during the session, all appeared to be checking emails.

Content of Student Communications

The majority of student questions focussed on the 'mechanics' of the unit. In particular the content and sequence of the Assessments and the role of the Journals.

Student comments showed the importance placed by some on detailed feedback from the teacher.

There were some questions and answers directed at the concepts of this unit. In particular what was 'critical analysis' and how should they complete one. There was good comment on factors such as context and assumptions from (only) five or six students in the Badgerys Creek example. Comments included 'living near the airport suits his job, what about everyone else', 'I saw a report which said that high noise levels damage your health' and 'is this some sort of joke, I live in Marrickville and I know what the noise is like'.

However there was no evidence yet of understanding the process of critical thinking expressed by Brookfield (1987) and summarised in the section 'Approaches to Teaching in a table of the Learning Guide.

This group of students continued to be involved and another three or four students joined in during discussions on the difference in perceptions of Capitalism between Engels, Paglia and WSJ article. However there was no evidence to suggest any depth of understanding of the assumptions and the context of each quote.

In particular the Paglia quote triggered confused and bemused questions and answers on the connection between capitalism and the emancipation of women, and also enquiry as to who Paglia was. 'I don't get the connection between capitalism and feminism (emancipation) and who is she anyway?', 'is she talking about feudal hierarchies?', 'is she talking about present day hierarchies?'

The quote from the WSJ (crony capitalism) appeared to be accepted at face value and students appeared to be both quite well informed and somewhat cynical about business ethics and the function of government assistance to business.

Comments included (on government hand outs to business) 'I don't understand the excitement, this is how the system works isn't it?', 'but you have to keep business going they give the jobs', 'yes but the bosses get the money'.

Other questions and answers suggested that the majority of student understood who the key stakeholders groups of B-S-G were. The teacher worked with the class to develop lists of who was in each grouping. Comments included 'business is easy, it's all the big companies', 'and then you have 'small business' government 'state, federal, local ' 'you've got the public servants and the politicians all in one bunch'

Week 1 Friday 1st March

(*Where do unions and organisations like Greenpeace fit?*) 'they're all part of society, we pay for them'.

Although none of the students showed any noticeable evidence of awareness or understanding of the B-S-G connections and interactions. This gap was most evident in discussion; Students had real difficulty in providing current examples of concepts such as 'social impacts of business'. However it appears likely that this result is at least partly a factor of the way the teacher introduced and led questioning. In retrospect it was confusing and there was not sufficient time available for student discussion.

Week 2 Friday 8th March

Student Activity

Observation that students spent a higher proportion of time and effort (than Week 1 tutorial) in communicating with other students in their immediate vicinity – typically a cluster.

Observation of higher participation rate (than Week 1) of students in class discussions – now with an active core of ten to twelve students dotted throughout the room asking questions or making comments. The remainder appear to be paying attention to discussions, but focussed on incorporating points made by the teacher and other students into their tutorial sheets

While there was consistent interaction with teacher there was no direct interaction / acknowledgement of students outside their immediate seating group.

However themes did emerge in the teacher / student interactions that suggested students were paying attention to other student comments and 'evolving' their personal point of view – it is a form of group working but with the teacher appointed to an intermediary role filtering and refining.

A total of twelve students had either the lecture notes and / or the tutorial sheets.

The remainder either moved close to these students (who volunteered their assistance and made room) or got the tutorial sheet and lecture notes on line from this unit's web site on the (vUWS) University system.

A group of three students continued to have audible conversations throughout the tutorial, although it was noticeable that two of the three involved appeared to progressively pay more attention to the session – evident in posture and facial expressions (in the class versus not in the class).

All students took notes either on their tutorial sheets, note paper or online.

Week 2 Friday 8th March

Content of Student Communications

No attempt was made by the teacher to assist students who were not prepared (did not have their tutorial sheets) to answer questions 1 – 3 on the tutorial sheets.

This led to (embarrassed) questions from three students about what they should do – which led to other students (with their tutorial sheets) volunteering their assistance (see above) and the teacher's suggestion that students who did not have their tutorial sheets should consult vUWS if they had a phone, laptop or tablet, pay attention to the session and take notes.

A total of five students did use vUWS but some also moved to sit closer to a cluster.

A total of ten minutes was allocated to students completing their initial answers to questions one to three on the tutorial work sheets. A walk around the classroom during this time showed only eight students writing up notes and or reviewing what they had written – the remainder made some attempt at first definitions of Sociological Imagination (SI), Ethical Reasoning (ER) and Critical Thinking (CT) but it appeared that only the eight students (above) had done their readings.

Discussions of the Mills concepts of Troubles and Issues showed students able to identify personal troubles and the larger issues. However their body language and absence of feedback from teacher's questions suggested that they found real difficulty in linking troubles, such as the cost of electricity, with issues such as power supplies.

In part this appeared to be a factor of limited life experience but mostly it appeared to stem from an inability to connect the troubles of the 'individual' with the issues of the 'group'.

Teacher used board review of complexity concepts of 'interconnection' 'self organisation' and 'emergence' as one means for students to conceptualise interaction of Business Society and Government (BSG). However there was very little response evident in their facial expressions, and none of the students followed up with questions. The majority appeared to be interested in the ideas behind these three concepts, but confused as to how they could be applied,

There was good commentary received from students on listing the issues and the troubles of, in particular, power supplies in NSW, public transport in Sydney and legalisation of drugs.

However, it was evident in their comments and questions that while they had personal opinions ('public transport out here is lousy, it took me an hour and a half to get here today'). When they were asked what the larger issues were their answers reverted to personal solutions ('more trains more often from Penrith', 'better bus services around my place') rather than the larger issue of the public and private transport system in Sydney.

Week 2 Friday 8th March

Board then class review of the requirements of Assessment 1 showed continuing confusion ('I didn't know that I had to include the tutorial work-sheets', 'so I'm supposed to have one posting from me and one from someone else, how do I pick which one to choose?', 'when is the on line discussion on?',' what are we supposed to do in the discussion?').

It was evident in these remarks that all but five or six students had either not read or had not paid much attention to the learning guide. Even those students who had read the instructions still showed confusion ('so what's the connection between the on line discussion and the commentary I still don't get it').

Board review of the marking criteria and standards for Assessment 1 received very few responses and those that did emerge were confused ('what theories are we supposed to be using, where do they come from').

Board review including putting Brookfield points on critical analysis (shown in the Approach to Teaching section of the Learning Guide) up on the whiteboard and then class critical review of Michael Moore statement on capitalism. This led to very strong (twenty plus students) class participation in questions and answers. It was evident that a substantial proportion agreed with the first statement (capitalism is an evil) 'you have to admit that capitalism has some bad bits' but others disagreed with the statement 'we're all sitting here and we're doing okay, food, clothing a home'.

None of the students showed any real understanding of the connection of this first statement with the following statement 'capitalism is good for all people' ('what's the connection between capitalism and democracy I don't get it') and there was some limited questioning of the assumption that democracy is 'good for all people' ('that's not true, there are always winners and losers').

There was no time available to 'discuss with reference to contemporary interactions' taken from the instructions for the topic statement, however the comments received from three students showed that they had noted the difference in assumptions and conclusions between the topic statement and Moore's statement(s) and felt that neither fully described their (personal) experience.

At the close of the tutorial five students stayed behind. Their questions were mostly directed on the detail of the on line posting ('it says 250-300 words of collated postings, what's collated?' but there was also concern about their capacity to deal with the content of this unit 'I did my readings, I listened in class, I still don't get sociological imagination, I feel like we've been dumped in at the deep end, I just don't get [any of] this'.

However their questions and comments about SI and CT suggested that they did in fact understand the basics of the concepts discussed and were seeking reassurance that their ideas and understanding did make sense. Teacher reiterated that there was no right or wrong answer, it all came down to taking a position (having an opinion) and then developing a (strong) argument to support their point of view

Week 3 Friday 15th March

Student Activity

Observation that students did not interact with other students to the extent of Week 1 and 2. In part this reflected the teacher driven nature of the session – students were given no more than three or four minutes to discuss their points of view with other students before continuing the class conversation.

However the majority of class asked a question of the teacher or made an observation to the class at large during the session discussions.

Student comments and questions suggested that some had completed the readings. All but three or four students had all the notes needed for the session and the majority of students swapped their attention back and forward between the discussions and filling out these tutorial notes during the sessions.

The changes in seating position in Week 2 while students sought access to work notes has resulted in students who were sitting alone now sitting in the (discussion) proximity of other students. Perhaps for this reason students gave the impression of being more connected (and interconnected) as a working group.

The group of three students who conducted separate audible conversation in weeks 1 and 2 has dissolved with one (of the three) students sitting in a different location. All of these students made an effort to contribute to discussions.

Observation of student body language (relaxed and open to the class), facial expression (animated and focussed) and the frequency and content of their comments and questions suggests that students are increasingly comfortable with having a point of view and making it known to the class. However there were still subjects where they were either uncertain of what should be their attitude, or embarrassed about being seen to agree or disagree on a subject. In particular the quote from Ian Smith (ex-PM of the then Rhodesia) lauding the benefits of colonialism stopped the class conversation in its tracks – the situation was not aided by the presence of an African student in the class.

Content of Student Communications

Teacher nominated three scenes from the film 'Go Big' (bar scene, dress shop and entrepreneurs search for an office) then after time for discussions led review of each from point of view of SI, ER and CT.

The Bar scene worked well in students stepping out of the female character's situation and into another wider scale perspective of society (and business) expectations of how to dress and behave ('she wasn't wearing the uniform, you have to dress for the part in business, a lot of it's about how you look').

The dress shop scene was useful in students identifying conflict between society's expectations of how they should look (size 6) and the reality of their body shape (size 8) 'that's the problem we're supposed to dress for business but the fashion doesn't match up with our bodies', 'the mythical size 6'.

Week 3 Friday 15th March

The scene with the two entrepreneurs scheming to acquire an office to impress possible investors led to quite (unexpectedly) spirited debate with ER applied by students to the entrepreneurs behaviour and the conclusion reached that their actions were ethically wrong because they were lying. The process students followed in reaching this conclusion was their collective choice – the teacher made no attempt to doing anything other than act as a moderator. 'yeah I know they're great guys but they're liars and that's wrong', 'why do they have to lie about it?'.

Board presentation then teacher led class discussion of three quotes (Slides 5-7) – one on capitalism (John Maynard Keynes) another on colonialism (Ian Smith ex Rhodesian PM) and a third on globalisation (Roberto Managabeira Unger, Brazilian philosopher). All had been selected for the likelihood that they would be perceived as contentious.

The Keynes quote on capitalism was received by some as being self evident 'well you have to admit that capitalism isn't there to make everyone happy, it's all about the profit and people get hurt'.

The quote from Ian Smith extolling the virtues of colonialism appeared to lead to quite widespread confusion, on the one hand students saw colonialism as morally wrong ('they took people's countries over') but on the other hand colonialism had provided benefits (perhaps) in the form of education and health. 'I don't know what you can say about this one it's all about where you're coming from'.

Students did not appear to understand the Unger quote on mobility of capital but not of labour. Even when this quote was linked by the teacher to the boat people of today, the issue of 457 visas, and the waves of settlement of Australia by economic refugees. They did not appear to come close to comprehending the issue that Unger was signalling.

Discussion on globalisation (Slide 8) as a contemporary capitalism was very quick (five minutes). Students quickly found a consensus in the conclusion the capitalism would always be looking for new markets or new resources and that meant they had to look world wide – capitalism was driving globalisation.

Students were often unsure of whether this constituted colonialism – companies weren't seeing to be trying to take over countries ('yeah but it's not like you're invading someone'), but there was the problem of influence ('if you're a big enough company and you employ a lot of people in a country you get a lot of say about what happens in that country if you want to').

Discussion of the Marx quote (Slide 9) took more time but student's comments and questions quickly evolved into a general agreement that his comments on capitalism written early in the 19C were still appropriate and accurate now. However there was quite widespread questioning of why interdependence between countries in trade was a bad thing, from their personal point of view it all made sense 'I love my Samsung TV' and 'it [offshore manufacturing] employs lot of people in a lot of countries'.

Week 3 Friday 15th March

Students watched ten minutes of the Charlie Chaplin then addressed the four questions in their tutorial sheet (shown in Slide 10). In the space of ten minutes they noted the scenes of Chaplin on the assembly line as possible in the time period (early 20C) however, they were of the opinion that it could not happen today at least in Australia ('you can't do that today... regulations from government... unions would strike...someone would report them').

However the majority of students also believed that business could not be trusted, they had to be watched over and their behaviour regulated by government *('do you think that business can be trusted?'*, 'it's always for the profit motive, businesses don't care about anyone').

Student comments showed that they could define the differences in the behaviour of capitalism between the era of that film and now. However they ascribed changes in business behaviour solely to the effects of regulation and public opinion, not to a change in business ethics or perceptions of a social role for business ('all that stuff you get about how they are all clean and green?, you read the fine print and mostly they're lying', 'there's no way that you want to have business running around with no one watching them, that's how we got the global financial crisis').

Discussion of what was required of them in the Week 4 on line discussions was brief because it was evident that they had all signed up to discussions groups, but there were several questions about what role they should play 'so I put up my post and then I get involved?', 'what am I doing in the discussion?'.

Week 4 Friday 22nd March - On-line Discussion

Introduction

The following section reports the results of on line discussions conducted by four groups of students over the two hour period 1400-1600 on Friday 22nd March 2013.

These discussions were the first of two stages for the first Assessment. In these discussions students debated the topic 'Capitalism benefits everybody'. This activity contributed a maximum of six marks however it is the first chance that students get to apply the concepts of SI, ER and CT. It also requires students to group work to manage their discussions – the teacher is there solely as an observer.

Students had organised their group membership and there was an average of ten students in each group.

Session numbers and contributions

Forty three students are on the class list and forty students participated by posting to the discussions for their group, with an average of seven postings per student. However, there was a wide spread in participation, with (for example) one student making seventeen posts, but another student making only one posting.

Week 4 Friday 22nd March - On-line Discussion

What were the assessment objectives?

The stated aim of the on line discussions are to 'generate collective learning through interaction and sharing ideas with other students' (LGp4)

The focus in this process is to assess student understanding of the key concepts of sociological imagination, ethical reasoning and critical thinking in the context of the interaction and inter relation of business, society and government in a capitalist environment.

Applying these concepts and working in groups is essential to completing the following two assessments.

To ensure consistency in assessment a grid was constructed which reviewed each students total of postings, in the light of five criteria taken from the rubric (preparation, participation, understanding, insights and reference to theory) with five standards (none , little, limited, some, good) of performance.

The teacher's judgements for each of the five criteria were then used to develop a description for each student. This description was then used to develop a score (marked out of six) to reflects the contribution (6 per cent) of the on line discussions to all three assessments.

When student contributions were reviewed and rated for each of the five criteria (preparation, participation, understanding, insights and reference to theory) a wide range of performance was apparent. For instance the posting of three students showed no evidence of preparation while the postings of ten students showed evidence of good preparation.

While there were in general good levels of participation in terms of the numbers of student posts there was marked variation in the content of those posts. In five cases there was consistent evidence of thoughtful participation, however there were another ten students who (in some cases) made significant numbers of posts but with each post being little other than agreeing with another student.

There was also marked variation in the level of understanding shown by students of the key concepts of SI, ER and CT with twelve showing limited understanding, but another five students showing good understanding. There were slightly better results for the attribute (student had gained) insight, nine students showed no evidence of insights but another twenty five students demonstrated some or good insights.

Use of or reference to theory was quite poor with eleven students making no use of theory, twenty one students making some use of theory but with no students judged to have made good use of theory.

Week 4 Friday 22nd March - On-line Discussion

Student Activity

Review of student posts over the two hour period showed very good levels of interaction between students with the majority making an attempt to contribute to discussions. However it was also noticeable that in each of the four discussion groups one or two individual leaders set the direction by suggesting new areas for discussion or adding a clarifying comment, and in some case defusing tensions emerging between other students.

Content of Student Communications

The process, content and tone of each of the four discussions were in general positive and supportive of others. However in all four groups there were one or two instances where the debate was showing signs of getting heated. In each case one or more of the students, most often the leaders identified above, would lodge posts designed to take the heat out of proceedings – in general students exhibited good standards of self and group management.

Summary Comments

When the posts made by students are assessed for demonstrated understanding of the concepts of SI, ER and CT students showed little other than a superficial understanding of either the theory or the application of each concept and their understanding of capitalism was in most cases a textbook definition with little evidence of understanding the implications inherent in a capitalist economy / society.

There were some students who showed more depth but even here this gap was noticeable. However this result does not appear to be a factor of lack of (student) effort but at least partly a result of the limited life experiences of this young audience. For instance to apply the concept of sociological imagination requires some awareness of what other perspectives are available. This in turn requires some depth and breadth of personal experience.

Module 2: Weeks 5-7

Weeks 5&6 Friday 5th April

Student Activity

The body language and behaviour of the majority of students suggested that they were not very interested in participation. Their facial expressions and posture suggested both fatigue and apathy.

The majority of student had bought only their Week 6 work sheets. It was apparent that only one or two students had completed the Week 5 readings and none appeared to have completed the Week 5 tutorial sheets.

Once they had signed in their first Assessment only a few (six or seven) students participated in classroom discussions and observation was that the content of group discussions was superficial and perfunctory. Five students left the class early and without prior notice. However it was noticeable that the majority did take at least some notes of discussions.

The one activity which did cause a marked reaction was the Blood, Sweaters and Sears clip followed by viewing the top 10 shock ads used by Benetton. During the showing of the film there were comments about the ads however when they were shown those judged as most shocking in a following slide show sequence it sounded like some students had been punched in the stomach 'you're kidding...he did that?'. However when students were then shown the pyramid of Corporate responsibility and were asked to judge to what extent business should be involved in social issues there was very little comment to suggest that students had formed any opinion on what (if any) limits should apply. However their comments, facial expressions and posture suggested that this lack of response was at least partly a factor of their shock at what they had seen.

Content of Student Communications

There was little feedback and commentary received from all but five or six students in this tutorial. In part because of what appeared to be a combination of apathy and fatigue in students, but also because they had been exposed to some very confrontational advertising. The series of press adverts that the teacher showed students are notorious because while they were very successful in positioning Benetton as an 'edgy' fashion brand the ethics were questionable and its images confronting.

Week 7 Friday 12th April 2013

Student Activity

Questioning of students showed all but five had bought their tutorial work sheets and a substantial (ten to fifteen) proportion had read the lecture notes in preparation for the session.

The body language and facial expressions showed engagement throughout the session. The level of engagement was in complete contrast to the very low levels of engagement in the previous week (6).

In particular the use of the Gunns case study gained their full attention and the majority made a comment during class work to identify the stakeholders ('what about ANZ, what part did the banks play?', 'but that means one of the politicians joined the board of Gunns?', 'if you look at the share price the shareholders sold them out', *'should a company pay attention to managing their stakeholders?'*, they'd better if they want to stay in business'.

However there was also widespread class involvement in the analysis of the problems presented in the case study on Sydney, identifying stakeholders and the conflicts 'if you live around there (the airport) it has to be horrible for noise', 'but the politicians would love it... they'd love the taxes', 'have I got it right that Macquarie Bank owns the airport and the roads that go there?... so who owns the railway station?, because that's a rip off'. Student comments showed quite high levels of understanding of the issues and the interested parties, and four or five students had some quite perceptive interpretations of the interactions between (political) government and business.

Students self organised to form their groups for the second assessment. By the end of the session they had eleven groups of three, each member with a nominated Business, Society or Government role. However at least seven students who were absent have not yet formed groups and this will require attention in Week 9.

Content of Student Communications

As noted above students showed higher than previous levels of engagement during class discussion with all but two or three making one or more comments. In particular five students were notable for their contributions and these and another ten or so students showed evidence of having read the lecture notes; at least to the extent of defining stakeholders as 'they're the ones who can affect your business'. To some extent student showed signs of starting the sessions with more knowledge of the subject area than in previous subject areas. In part this appeared to be a factor of previous experience of the concepts of stakeholders 'we did stakeholders in Management Dynamics' (another core unit of undergraduate study of management)

Module 3: Weeks 9-11 and Week 12 Researching positive and negative aspects

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Week 9 Friday 26th April

Student Activity

The presentation and explanation of the results of the first assessment took twenty five minutes to complete, in part because this assessment included scores for both the on line and written sections but also because of an extension of the marking system to include qualitative feedback of the themes evident in student results. In particular the connection evident in student results between those who had prepared for both the online and written section and higher than average scores, but also a requirement for more evidence and example to support their claims. Student body language and facial expressions showed close attention to the feedback and there was ongoing discussion and comparison of results. However, there was no real sense that these points had been taken into account for their future work in this unit.

During this review the teacher also conducted a brief qualitative survey of student understanding of concepts such as sociological imagination (SI), ethical reasoning (ER), critical thinking (CT), theories of capitalism, and their capacity to describe the BSG system.

The results were both encouraging and discouraging. Students were aware of all of these components and the majority had some explanation for all 'capitalism ... it's all about making a profit', 'SI, it's when you step away from what you think and look at it from the point of view of everyone in society', 'ER you have to look at what you're doing and make up your mind about whether it's the right thing to do'.

However it was noticeable that their explanations were often simplistic and that usually the example given came either from the lecture notes or past class discussions. Student comments also showed a focus on individual elements (SI or ER or ...) but with no real sense that they had achieved a clear understanding of the connections between the concepts (SI etc), the theory (capitalism) and the process (BSG triangle).

This result suggests that at this stage of the teaching and learning process student understanding is surface rather than deep as defined by Entwistle (1997) and employed in this thesis.

A total of eleven groups with a total of thirty three members were self organised and listed by students in Week 7. During this (Week 9) session another six students formed groups for a total of thirty nine students enrolled to complete this second assessment. Based on the class list of forty three students there is a shortfall of four, however three of that total have not attended a tutorial and did not attempt the first Assessment.

Review of the requirements of the second assessment resulted in an extensive question and answer session however it was noticeable that this was limited to five or six students with the majority of the class focussed on reading or discussing their results in the first assessment.

Week 9 Friday 26th April

Student questions focussed on the respective requirements of being 'government', 'society' and 'business' 'so I'm putting up the government point of view?... but what does that mean? ... what do I have to do?...' should I list what they did (in this case study)?,'in the summary what are we doing? Are we listing what we said in our own reports?'.

The (five to six) students who actively participated in discussions appeared to be aware of what was required (marking rubric) but somewhat confused on what each of the criteria implied and required 'so I'm analysing what they did?'. However the content and tone of their questions suggested that they were most often seeking reassurance that they did understand what was required in this second assessment.

There was very little class involvement in reviewing questions 2 – 5 until discussion was led to a focus on first listing known multinational companies then reviewing their involvement in the markets in which they operated. Two students raised examples of companies (Nike) and industries (coffee growing) which could be viewed as taking advantage of cheap labour. However the majority of comments focussed on the benefits of those multinationals for the lives of individuals.

There was no sense of SI or for that matter application of ER in this process. In particular Apple was seen as having enabled substantial change in how they led their lives. However they showed little interest in where (and under what conditions) Apple products were manufactured. When I raised recent press complaints about the working conditions of Apple's suppliers there was little reaction. Corporate responsibility was not mentioned. When CSR was raised for discussion student reaction was limited and then somewhat equivocal 'yeah but it's still a job', 'but that stuff gets sorted out because they (multinationals) can't afford a bad reputation'.

It was evident that only two or three students had any real understanding of the concepts and the implications of the globalisation of poverty and wealth. However, when prompted by a short reading by the teacher of a relevant excerpt of that week's reading, around ten students made one or more comments and contributions, although most often it was to agree with both statements – both could and were true of their understanding of multinational business and of use of low cost labour 'but it's a bit of both, it's not one or the other, they're both true'

When student attention was drawn to Question 5 of the tutorial work sheet ('Discuss how working your way through responses to questions 1-4, will assist you in undertaking assignment') student facial expressions and lack of any comments or questions suggest that all but three or four students had no idea. It was very apparent that the majority of students were still grappling with the requirements of the second assessment. There was some mild resentment expressed at the pace of work for this unit 'I'm still trying to read the case study for this one', 'do we ever get some time to sit and think about anything?'

Week 9 Friday 26th April

Content of Student Communications

As noted above the attention of the class was split between review and discussion of their results for the first assessment and the classroom tasks and discussions outlined above.

Communication between student and teacher was most often in the form of questions about one or more aspects of the first and second assessments.

While fifteen to twenty students made some contribution to class work the remainder were content to sit on the sidelines and observe, or focussed on review and comparison of the first assessment.

Week 10 Friday 3rd May

Student Activity

Student comments suggested that a number of Assessments were due that day and around twenty left the session after their hand in of the second assessment for this unit; presumably to complete work for other units of study.

The remainder participated in all of the group and class work. Student questions and comments showed that they were taking note of what was said in discussions and half (ten students) played an active part in discussions.

However the quality of student commentary, their facial expression and body language all suggested that they were physically and mentally tired.

A total of thirty eight students submitted individual reports (one group member did not attend) and thirteen group reports.

The hand-in process went very smoothly with members of each group present to supply their individual and group reports. Student comments showed that with the exception of one student who was a member of a group but did not attend, all the others had made a contribution to their group report. Their body language and comments suggested that they were all quite comfortable with each other and satisfied with their working relationship.

The body language, facial expressions and range of partners in classroom discussions suggest that there are now quite strong (inter) connection between students. While they continue to sit with their peers, they are now much more likely to also say hello and goodbye and to have quick chat to a wider group. These interconnections appear to be a result of working together in this unit and in many cases because they have units of study in common.

Week 10 Friday 3rd May

There was no evidence that any of the students had completed the reading for that week, however those who stayed on (see above) all had bought their tutorial sheets and took notes.

Content of Student Communications

Students were inclined (initially) to take the article from the CEO of Gap at face value i.e. to accept what was said without question. It was only when the teacher a 'deconstruction' of what was said that (only some) students started to see a divergence between the apparent and implied content of this press statement 'he keeps on about how they're going to do something, but he never tells you when or what, and he keeps oncoming back to how hard it will be' 'then why did he make this statement?', 'because they got caught with using sweat shop labour?'.

However only three or four students appeared to have real insight in interpreting the Gap statement. There was also no real evidence in student comments and questions to suggest that the message, to apply this questioning approach in their case study research had got through. Student analysis of the requirements and possible application of three of the possible research questions for the third assessment received quite good commentary which suggested that these students had the skills needed to break a question down to its 'parts' ('why do companies use sweat shops? ... that's the first bit... then what are the effects (impacts) is the next' However it was unclear whether they understood the idea of using a research question to guide their research for their case study. Students were reasonably well informed on examples of issues such as sweatshop labour 'that was Nike in Vietnam using child labour 'growing coffee in Africa?' and discrimination but there was no real sense that they were connecting these examples with possible stories for their case study.

Around twenty minutes were spent on firstly board presentation then class discussions and questions and answers on the third assessment. While four or five students showed evidence in their comments and questions that they understood both the objectives and the requirements of this assessment, the remainder appeared to have little other than a superficial appreciation of what was involved 'so it's a case study like that one with the needle stick?, we just have to make up a story?'.

Reaction to the issues outlined in the film *The Dollar a Day Dress* was very limited. Part of this appeared to be due to what appeared to the teacher to be student 'video fatigue' However there was also a feeling that students had heard this (or a similar) story before and were to some extent desensitized. There was no evidence in their comments or questions to suggest that the story of this film could be used in framing their case study. There were some quite perceptive comments about the links between this story and a previous discussions of the Benetton advertising campaign in Week 6 'they pay these guys nothing then they charge you a fortune (for the garment) and they tell you stories about how wonderful (socially responsible) they are .' There was some apparently bemused comment on the pace of work for this unit 'I've just handed in the second assessment and now you want to me to start thinking about the case study?'

Week 10 Friday 3rd May

However the students appeared to be quite relaxed with their progress and their ability to keep up with what was required. Some students reported that they were actively enjoying both the fast pace and the content of this unit 'at least you're never bored', 'it's interesting stuff'.

Week 11 Friday 10th May

Student Activity

There was a low attendance of this session. Comments and question suggested that all but five or six had done no pre-reading and only three or four had attended the lecture.

In part based on their comments this low attendance could be attributed to their workloads for other subjects. However it also reflected some resentment at the pace of work in this unit 'you haven't given me back the second assessment yet and you want me to start thinking about this one?, what is this?'. There was a sense of quiet rebellion in the air.

It was noticeable that because the tutorial work sheets are not required in their submissions for the third assessment, most students had little interest in taking notes and there was also a sense of lower involvement because all but five or six were not viewing the questions in the work sheets. Their comments have suggested real irritation about keeping sessions notes (Tutorial Sheets) for each session, and the requirement to hand them in with the first and second assessment – they do not have any appreciation of the part that these notes can play in their learning.

It was also noticeable that while students comments suggested that they were quite well informed and quite concerned about issues such as the environment and consumer protection, they had no real understanding of why they were being asked to create a case study in this third assessment, or how to 'tell the story' of an issue.

Their comments and questions also show that while they now appear to be familiar with concepts such as SI, ER and CT and can apply them in discussion, their posture, facial expressions and lack of comments and questions suggest that students had no depth of understanding in how to apply these (and other concepts) in their case study.

In some senses current levels of student understanding could be described as a narrow and 'textbook' rather than 'real life' view.

Week 11 Friday 10th May

Content of Student Communications

As noted above students in this session appeared to be experiencing some difficulties in extending their understanding of the concepts of BSP to the real world of their experience.

It was also noticeable in their discussions, questions and comments that students appeared to have little depth in their world-views – while they were broadly aware of issues such as recycling and pollution they had little or no depth to their knowledge on any particular subject and no apparent understanding of the involvement and the interconnections of BSG in any area of discussion.

Student questions also suggested that they had little or no idea of how to construct a case study – were they supposed to have the detail of a case study such as the Becton Dickinson Needle Stick? . The Teachers response was to point to the Gunn's case study of Week 7 (*'The rise and fall of Gunn's' – ABC*), the Benetton example of Week 6 *'Blood, Sweaters and Sears'* and the story of the *'Dollar a day Dress'* in Week 10 as examples of stories that addressed issues.

It was also apparent that some students would be tempted to 'borrow' existing case studies (Nike) in part because it removed the need (and the pressure) to write their own story. My review of student submissions for the first two assessments showed that of the total of thirty eight students who submitted both assessments, twelve had real difficulties in constructing an argument and four had real problems with basic grammar. Of the total of second assessments marked only five had real competence in either area.

Week 12 Friday 17th May

Researching positive and negative aspects of business

Variation to teaching plan

The teaching objectives and plan for this session (shown below) reflected adherence to the schedule for this unit, with the session content (see slide show) focussed on enabling students to make decisions on the topic, question and content of their case study.

Because of the ongoing concern that students would need further direct support (see report of Week 11 and Review of Module II) the decision was made with a colleague (Dr. Roseanna Henare-Solomona) to conduct joint sessions with our respective tutorials. The plan was to focus on stimulating students to discuss and consider possible topics, the form and content of questions and the sources and types of data that would need to be provided to support a case study story.

Week 12 Friday 17ᵗʰ May

Researching positive and negative aspects of business

As a result, after handing back the results for the second assessment the proposed teaching plan for the session was abandoned, with the time instead devoted to joint leadership of discussion by the two tutors working in tandem. In effect this meant that the time allocated to view and discuss the film *'Something in the Air'* and review of the components (subject headings) of a case study was instead devoted to class working in discussion of the possible content.

The format for this discussion was quite simple, each tutor led the other tutor's class in developing a list of possible topics and then specific questions for a number of students; then shared management of a debate with students, aimed at assisting them to refine these and other possible question and to plan steps in research.

What was the observed result for the students?

Student Activity

The point was made to the class by this teacher that following hand back of results work would then continue on the Third Assessment and that they had a choice of staying and participating or leaving the session. In fact all but eight students stayed for the full session and even these individuals stayed for thirty or more minutes before vacating.

The body language and facial expressions of the students suggested that they were at first dumbfounded by being confronted by two teachers working in tandem, however they quickly became engaged in the course of work during this session.

Content of Student Communications

Hand back of Second Assessment

Prior to hand back of their individual and group results students were first provided with a detailed visual and verbal review of results (see Tutorial slides 3-4).

Experience has proved this approach to be risky with students losing interest in the rest of a session as they review and discuss their results. This was to some extent a result in this case with students switching back and forth between these results, and the classroom work. However past experience also shows that this sequence can act to encourage students to pay more attention to the requirements of following assessment tasks.

Response to their results for the Second Assessment were quite positive in that student comments and questions showed acceptance and apparent understanding of why they had got their scores, and of the steps required for improvement that were contained in the written comments provided by the teacher.

Week 12 Friday 17th May

Researching positive and negative aspects of business

Teaching in Tandem

As noted above, after initial confusion when the two tutors commenced this part of the tutorial session, student body language, facial expressions, comments and questions showed widespread and consistent engagement in the course of work.

However most of the students in this session had to be directly questioned before they would venture a topic or a question for discussion.

Their comments and questions suggested that this reticence appeared to stem from a number of factors, possibly most importantly most student had not given any time to considering the third assessment, but also because the majority had little idea (or confidence) of how to formulate a question, conduct the research and construct a case study.

It was apparent in comments and questions that despite their experience of University and its requirements of undergraduate students, only three or four of these (second and third year) students had any confidence in their ability to conduct research using the resources of the UWS library, and despite their likely exposure to the use of case studies in this and other units, none showed any real familiarity with how to structure a case study.

This result should be viewed in the light of the submissions for the Second Assessment (See Review of Module II) which showed that only eight (of the forty active) students demonstrated any real skill in constructing and communicating an academic argument (and achieved a distinction), and another eight or nine students showed weaknesses in their use of language to convey their ideas. Five of these students failed this assessment. The combination of the weaknesses evident in the second assessment and then in this tutorial would argue against a universally strong result in this third assessment. To some extent (as a teacher) this is a pity because the comments and questions of these students over the semester showed that all but one or two have been attending sessions and do have reasoned ideas and opinions on the concepts and questions of this unit of study.

Only ten or twelve students played an active role in this tutorial by asking questions or making comments. This is close to the average in earlier tutorials and those posing questions are also often those achieving high scores. However it was interesting to observe the dynamics of their individual support groups – the students posing the questions often appeared to be acting as a spokesperson for their group working.

Week 12 Friday 17th May

Researching positive and negative aspects of business

Over the course of this session it was apparent in comments and questions that the majority of students were developing possible questions and looking for reassurance and advice on how to progress. Their first point of reference appeared to be their peer group. Questions directed to the tutors most often appeared to be because their group did not have an answer, or towards the end of the session because they felt that they did have a question worthy of consideration but wanted reassurance from those who would be judging their work that their ideas were worth following 'what about cruise liners visiting the barrier reef, would that fit under (E) the environment question?', 'can I just use McDonalds for my case study story?' (D Consumer protection), 'can I at least mention Nike on the way? They're an important example' (A 'sweatshops'), 'what if I want to do racial prejudice in a company (Australia Post) that I worked for? That's what I want to do' (C discrimination).

Student questions continued after the session with both teachers interacting with individual and small groups of students.

Assessment of Student Progress over the Semester

There was a marked improvement in student scores over the three assessments. Student comments and improvement in their performance showed the majority did pay attention, and respond to teacher feedback on their assessments. To some extent this could be attributed to a learned response to the expectations of this unit. However, it also showed signs of being a result of steady improvement in student self confidence in their ability to gather and then synthesise data about a given case study.

Table: Achieved scores over time

	Fail	Pass	Credit	Distinction	High Distinction	Total and Average
Assessment 1	10	18	7	3	0	38
	26%	47%	18%	8%	0%	56%
Assessment 2	5	16	11	8	0	40
	13%	40%	28%	20%	0%	63%
Assessment 3	0	18	8	6	3	35
	0%	45%	20%	15%	8%	67%
All Assessments	4	17	15	4	0	40
	10%	43%	38%	10%	0%	59%
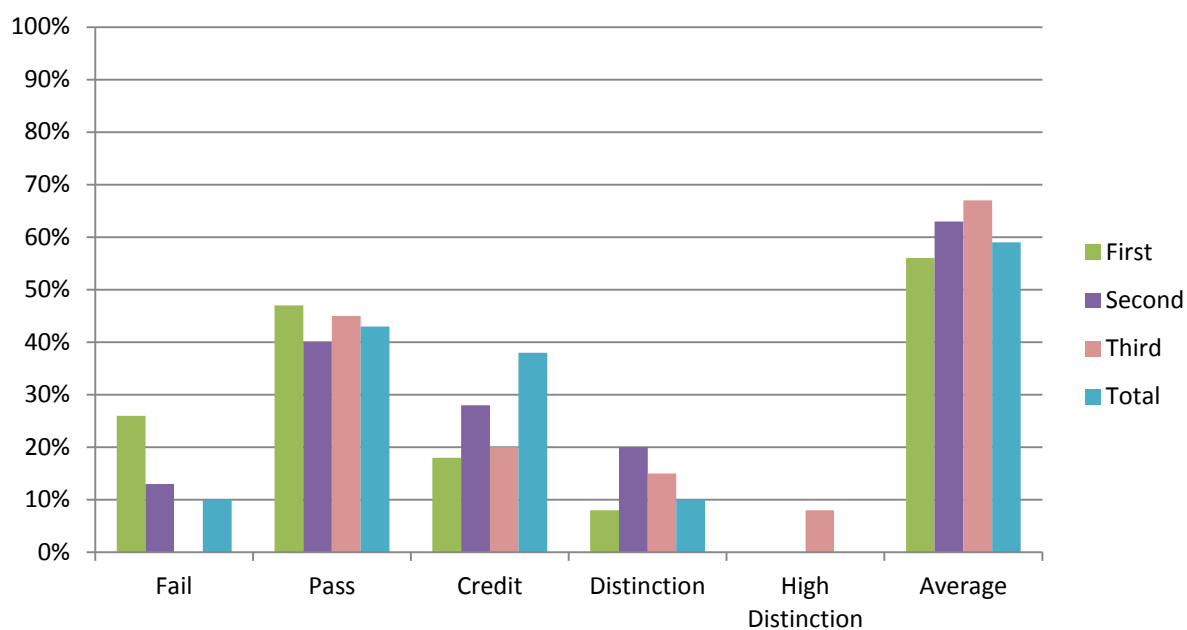
Figure: Achieved scores over time

In general the assessments submitted by students and their comments and questions in tutorials suggested a steady improvement in their awareness and understanding of the <u>definitions</u> of the key concepts of this unit and in their ability to apply these concepts in analysis of an issue. Nevertheless as noted earlier it is arguable whether students achieved more than a superficial frame of understanding. This shortfall appeared at least partly to be a factor of them not as yet having the life experiences needed to provide a context.

If we view these results over a longer time frame it seems reasonable to suggest that there would likely be improvement as a result of these experiences. For instance, if we meet up with these students in ten years' time, what is the likelihood they will have applied the analytical skills and social understanding of this unit to their view of the world? The answer is unknowable; however, measured in attendance of tutorials, submissions for assessment and their comments and questions, student engagement in the subject was quite high compared to other units of learning of which I have experience. It was also evident that a lot of the concepts of the unit and the issues uncovered had real meaning for them. They could see a connection with the events and experiences of their lives thus far. For those reasons I think that there is at least some probability that this cohort will retain and apply at least some of the concepts and the skills that they acquired in this unit in their lives and careers.

Student performance over the semester

Compared with the marking rubrics

Shown below are the tables of analysis completed for each of the three assessments. In each case the assessment was the degree to which students met the criteria set by the marking rubrics. What was apparent in this result was the steady improvement in both the standard of the work submitted by students, and in their development of an understanding of the principles and the practice of critical enquiry. As noted previously there were limits to the depth of student understanding of the concepts, but this was not due to lack of effort on their part.

Using a scale of None, Little, Limited, Some, Good applied to the key words of the marking rubrics for each of the assessments;

First Assessment – Debate and Critique

Online

Limited preparation, good participation, limited understanding, limited insight, little theory

Written

Limited preparation, some understanding, limited evidence and example, some insight, little theory,

Second Assessment – Analyse Case Study

Some preparation, some analysis and insight, limited application of concepts, some argument, limited substantiation.

Third Assessment – Create and Analyse Case Study

Limited originality of case and quality of sources, analysis and use of concepts, substantiation of arguments and quality of discussion, limited critical thinking, quality of conclusion, good organisation, some referencing and clarity of expression

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Compared with unit learning outcomes

Table: Assessment of depth and breadth of student understanding

1.	Explain the social impacts of business practices in national and global contexts.
2.	Reflect on the links between personal experiences and social issues emerging from their interactions in society and with business and government organisations.
3.	Apply different concepts from theories and models used to analyse the interactions between Business and different stakeholders.
4.	Identify and critically analyse different ideologies used to justify the actions of business, government and society.
5.	Demonstrate a thorough understanding of the importance of business ethics and social responsibility and the positive outcomes of these principles for society.
6.	Research social issues emerging out of the reciprocal impacts of business, government and society in the context of the economic, social and political global environment.

Learning Guide Page 3

The commentary shown below synthesises the comments and questions of students in class and their performance in the assessments, to reach an opinion on the extent to which they have achieved each of the learning outcomes for this unit of study and assess the depth of their understanding.

As noted before, by Week 12 students were demonstrating competency in applying the key concepts of this unit. An important exception was the concept of ideologies and the consequent belief systems that guide the decisions and shape the behaviours of business, society and government. Despite frequent in-class discussion and regular reference by the teacher over the weeks of tutorials, the concept and the application still eluded many of the students. For example students could refer to concepts such as 'Neo liberalism' in explaining business behaviour, but showed only limited understanding of the implications of this ideology for the interactions of business, society and government.

This gap in understanding put students at a disadvantage in comprehending and explaining the behaviour of the three sectors. To some extent the concept of ideology is the 'troublesome knowledge' and 'threshold concept' defined by Meyer & Land (2005). The teacher doubts whether students have anything other than a static view of the interactions of Business, Society and Government. This is an example of a concept whose full meaning will only become available with life experience. Similar concepts apply to the idea of and need for business ethics, in particular business taking responsibility for their actions. Student assessments of ethics in the second and third assessments were very clear – it was either 'good' or 'bad'. Their comments suggested that an opinion was most often based on existing personal beliefs rather than critical analysis, or academic and philosophic frames of reference.

The subject of ethics is introduced in the prerequisite unit 200571 Management Dynamics. Questioning of students who had completed this unit showed very low level of recall and no connection to their thinking in this subject. One possible reason for this result is that the students' appeared to find it difficult and perhaps irrelevant to spend much time or effort on considering other points of view on what is ethical behaviour: they had already reached a conclusion. However, their comments, questions and behaviours also made it evident that ethnical behaviour was important to them and that regardless of the source or nature of their beliefs on what was ethical, they did try to behave ethically.

The personal nature of their views of business behaviour precluded some students from any depth of analysis and it is difficult to find evidence that any of these students had achieved a wider view of ethics either in business, society or government. There was the sense that their understanding was fragmented and that they had no consistent frame of reference from which to take a 'world-view' of the ethics of the three 'players' in any social issue. Based on this conclusions ethics is another example of a concept which needs life experience for depth of understanding.

There was wide variation in the demonstrated ability of students to research a topic. Of the thirty five students who made submissions for this third stage in assessments eight students showed marked ability in research, evident in the range, quality and application of the results in their third assessment. In particular, these students were more likely to have found and used very high quality and appropriate

references. However another ten student submission's showed very superficial research with no real sense that they saw any connection or value of research in preparing their case studies. In these instances the most frequent reference was to sources such as the printed media and blogs and, while these students did have the required two refereed papers, these papers were most often 'marginal', originating in quite obscure journals, and usually with a subject matter that allowed only limited reference in the student effort.

Based on their comments and questions, in tutorials and written assessments, students in this cohort can identify, describe and to some extent explain the behaviours of business, society and government. However, their view is still to some extent static and frozen in time, with no real sense that students could form a view of continuous change in positions and practices over time. To a large extent this appeared to be the result of not being familiar with the concepts of this unit and at this stage not having the 'life experience' needed to trace change in society over time. As a result the majority of students showed evidence of a mechanical and static rather than organic and evolutionary point of view of the interaction and behaviours of business, society and government.

Comparison of Study Cohort with Bankstown and Parramatta

The following analysis reviews the performance of the total of students enrolled in the Bankstown and Parramatta tutorials in comparison with comparable performance data for the Parramatta study cohort. There were two reasons for this review. The first was to review whether the performance of the cohort under study (TU) was in any way exceptional compared with the total of students enrolled in Bankstown and Parramatta (B+P). The second was to identify any points of correspondence in student progress over the semester, as measured by their performance in the three assessments, and in total. It should be noted that while there were 267 students in the B+P sample, there were only 43 students in the TU and for this reason all the comparisons of results should be regarded as indicative. This analysis was completed and included because it provided me (and my observer) with evidence that the students in the TU could be regarded as representative of the total cohort.

Table ?: Comparison of Student performance over the semester

B+P : Total of Bankstown and Parramatta Cohorts   TU : Cohort of Parramatta Study Unit

Numbers	Assess 1		Assess 2		Assess 3		Total	
	B+P	TU	B+P	TU	B+P	TU	B+P	TU
No Scores recorded	39	5	39	3	46	8	35	3
Failed	42	10	4	5	13	0	21	4
Pass	104	18	131	16	110	18	121	17
Credit	58	7	70	11	71	8	75	15
Distinction	23	3	23	8	15	6	14	4
High Distinction	1	0	0	0	12	3	1	0
Total	267	43	267	43	267	43	267	43

Percentage	Assess 1		Assess 2		Assess 3		Total	
	B+P	TU	B+P	TU	B+P	TU	B+P	TU
No Scores recorded	15%	12%	15%	7%	17%	19%	13%	7%
Failed	16%	23%	1%	12%	5%	0%	8%	9%
Pass	39%	42%	49%	37%	41%	42%	45%	40%
Credit	22%	16%	26%	26%	27%	19%	28%	35%
Distinction	9%	7%	9%	19%	6%	14%	5%	9%
High Distinction	0%	0%	0%	0%	4%	7%	0%	0%
Average	57%	56%	63%	63%	64%	67%	60%	59%

Source: 200148 BSP Records Autumn 2013

The following compares the results for the cohort comprising the Bankstown and the Parramatta (B+P) and the cohort of the test unit (TU).

TU was 16per cent of the total of the combined cohort of Bankstown and Parramatta students enrolled in this unit. The TU had a marginally higher retention rate (measured by the indicator 'no score recorded). The TU retained 93 per cent of the enrolled students, while the B+P retained 87 per cent. TU (8 per cent) and B+P (9 per cent) had comparable failure rates. The TU had lower proportions of students who passed (40 per cent TU compared with 45 per cent B+P) but higher proportions of students who achieved a credit (34 per cent TU compared with 28 per cent B+P) or a distinction (9 per cent TU compared with 5 per cent B+P). The average results for each assessment and in total were directly comparable (60 per cent average total score for TU compared with 59 per cent average for B+P).

The progress of the students over the semester exhibited similar patterns in the TU and B+P performance data for the three assessments. There was a high failure rate in the first assessment (23 per cent TU and 16 per cent B+P), then marked improvement (lower failure rates) in the second assessment (12 per cent TU and 1 per cent B+P) and further improvement in the third assessment (nil in the TU and 5 per cent in B+P). There was a marked increase in the numbers of students with 'no score recorded' in the third assessment (19 per cent TU and 17 per cent B+P).
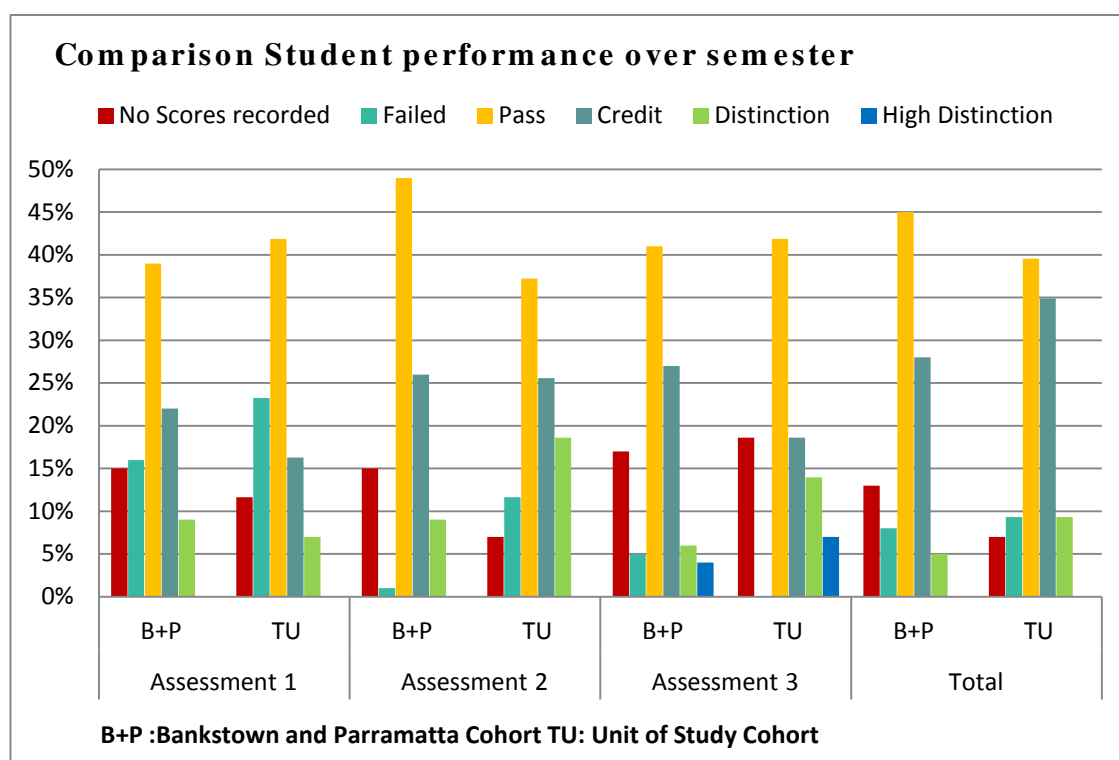
While the students of the test cohort (TU) did relatively well in comparison with the (B+P) cohort, I can find no evidence to suggest that the students of this test cohort were not typical of the total. This assessment confirms my observation that the demographics (gender, origin, age etc) attitudes (to study, to research) and behaviours (involvement in sessions, submissions for assessments) of the students in the test unit were representative of the students that I had encountered in working as a teacher in undergraduate study of business management at the University of Western Sydney.

Nonetheless this cohort included an unusually high proportion of students (ten out of the forty who attended tutorials) who showed well above my experience of self organisation and a close focus on their studies. There was also evidence that the remaining students were also above the average of my experiences. Then there was the aspect that this cohort worked well together, and could take responsibility for self organising and achieving their group work. These observations should be viewed in the context that the majority of my teaching experience has been with first year and often first semester students while this study cohort was composed of second and third year students who have more experience of the teaching and learning process at an undergraduate level of study. Another influencing factor may have been that the test tutorial was held one hour after the lecture. Anecdotal evidence is that this place on a teaching timetable attracts the highly organised and focussed student looking to minimise the time spent hanging around between sessions.

The levels of achievement (scores in assessments) and patterns of behaviour (submitting, not submitting) of the test cohort, were reflected in the levels of achievement and patterns of behaviour of the results of the total (B+P) cohort. As an aside this coincidence of patterns at both the micro (TU) and macro (B+P) level is consistent with the concept of 'fractality' employed in complexity theory. In this view in a complex system such as an iteration of teaching and learning, coincidence (mirror imaging) will be evident at all levels of observation.

This marks the end of extracts from the observation report.

Section 2 Interpretations of Events

In this section I develop two interpretations of the events of this semester using my observation notes and reviews of student performance. The first perspective employs the concepts of the six established theories of learning discussed in Section 1.4 Background. The second perspective interprets the teaching and learning process using the concepts of complexity theory described in Section 1.10 Theoretical Framework. Further detail can be found in Chapter 2 Review of relevant literature.

(a) From the perspective of established theories of learning

Author and	Theory
Bandura (1986)	Social Learning Theory
Kolb (1984)	Experiential Learning
Rogers (Rogers & Farson 1957)	Student-centred Learning
Skinner (1953)	Operant Conditioning
Socrates (Smith 2011)	Socratic Method
Vygotsky (1978)	Socio-Cultural Theory

I start my analysis and interpretation for each of these theories by reference in italics, to extracts from my work in section 1.4 Background and section 2.3 Review of Theory and Practice of Teaching and Learning. These references signal the aspects of each theory that I felt were germane to this thesis.

Bandura and Social Learning Theory

> ***Bandura*** *(1969) is associated with Social Learning Theory that posits that students learn from a range of sources including observing the attitudes and the behaviour of others. Sampling of the peer-reviewed articles showed a focus on exploration of the correlation between self-efficacy, defined by Bandura (1997, p. 3) as referring to 'beliefs in ones capabilities to organise and execute the courses of action required to produce given attainments' and student approaches to learning (Phan 2011).*

Learning from others was an important feature of the teaching program for this unit. It started with students working in groups in the on-line debate of the first assessment and continued in the requirement for students to work in groups of three, with each required to address a specific point of view (business, society, government) in their analysis of the case study *('Becton and Dickinson Needle Stick')* in the second assessment. Further use of this group approach to learning was evident in the learning plans for each session which always featured short tasks which required class participation.

What I found interesting was the stability of the group memberships that had formed early in the semester. Each week students sat in the same spot and talked to the same group of two or three other students. In a session of around thirty-five students which was the average attendance of tutorials students, only two or three students by choice sat by themselves. The remainder were a member of a group which in turn was part of a larger network within the class. This was most evident when I gave the class a question and asked them to spend two or three minutes forming their first impressions, then I would go around the room asking for their collective comments. In a very short space of time each group formed a common pattern, each had their speaker, the one who answered questions and got involved in class debates, and other group members put in their comments or if they had a smart phone or tablet looked it up on the web - they worked as very effective teams. There was also a common pattern in which group would go first, second, third and so on in answering questions and participating in frequent debates that emerged during sessions.

While some students were sitting and working with friends, my observation was that the majority had only met in this unit, but had found common ground and apparently enjoyed each other's company and worked well together. On the basis of my observation of events over the semester, students did learn from each other.

However my impression was that this learning was more than simply a matter of swapping 'data' or ideas, and included skills in group working and in constructing and conducting an argument. What was also evident in my observations was that over time, students were increasingly confident of their ability to develop and then argue a point of view on a subject. I saw this behaviour as evidence of the students increasing their self-efficacy, the belief that they had the ability to find their own way to understanding.

Kolb and Experiential Learning

> *Kolb (1984) is associated with Experiential Learning, the idea that experiences when viewed through reflection evolve to become concepts, which then provide guides for application and experimentation, including selection of new choices learning is a cyclical process, a transaction requiring interconnection of learner and environment over time, and the importance of feedback in this process, learning from experience as one means to gain deeper understanding.*

A range of evidence supported my conclusion that the principles of experiential learning were being applied in the teaching and learning process.

The idea of experiences evolving over time into understanding of concepts was apparent in my observations of the process of students achieving understanding and some expertise in the use of Mills concept of sociological imagination. Understanding of this concept was essential for students to trace the interconnections and assess the implications of the behaviours of business, society and government. It took students three tutorials to assimilate the idea of sociological imagination and a further three or four tutorial sessions to develop the skills and personal self-confidence that they needed for them to expand their views of the issues discussed. By the end of the semester student questions and comments showed that that they were very comfortable with and fluent in the use of this concept. Another less successful example was the concept of ideology and its influence on the behaviours of business, society and government. At the end of the semester all the students knew the definition of ideology. However, my observation was that few if any of these students had a clear idea of how and why ideologies shape the behaviours of business, society and government because the depth of understanding of complex concepts such as ideology is reliant on life experiences to provide a context.

Based on my observations and illustrated in these two examples, Kolb's view of learning as a cyclical process requiring interconnection and time does enable but does not guarantee that students can fully evolve their understanding of a subject in the limited time span of a semester of study.

Roger and Student-centred Learning

Rogers (Rogers & Farson 1957) is associated with Student-centred Learning, the idea that the focus in teaching should be on encouraging and enabling students to take charge of their progress and not rely on the teacher to set objectives, or supply needed resource.

The test unit for this thesis (200148 Business, Society and Policy) made a wide range of resources available to students through the lecture and tutorial session notes, video case studies of subjects under discussion and library resources. There was also a policy of making students aware that while I was there to be of assistance, it was very much up to them to construct their understanding.

My observations showed that students did achieve understanding of subjects over time, although I doubt that these resources played anything other than a supporting role. I could see evidence of only five or six out of thirty or more students having done the reading for each of the tutorials and only eight or ten students in this cohort attended the lectures each week. Most students disliked the session notes that they were required to complete each week because they did not see them as a means to organise and record their thoughts. By the end of the semester students were heartily sick of viewing videos and my observation notes show only two *Big Red* (Week 2) and *Blood Sweaters and Sears* (Week 6) that had any noticeable effect on student understanding.

What impressed me was the central importance of the dialogue between student and teacher. While the resources made available to students were not the only or even the most important source of information and understanding, in combination with the dialogue with the teacher they signalled a possible method of approach and line of enquiry that students could follow in their studies. An important example of this is the information and explanation contained in the Learning Guide for this unit. The Learning Guide is a step by step breakdown of what the unit is all about, what will happen in workloads, what the students will have to do in their assessments. My impression was that at least in the early days of the semester students had little

familiarity with this document. They learned to consult the Learning Guide, in particular when they were assembling their assessments, but also for getting a hint of the subject focus for each week. As a tutor new to this unit, I made regular reference to the Learning Guide to answer my questions on the expectations for each of the three assessments. I thought that this guide played an important part in shaping and focusing the dialogue of the teaching and learning process.

Skinner and Operant Conditioning

> *Skinner (1953) is associated in the literature with operant conditioning, which draws attention to the part that repetition in stimuli can play in the development of a conditioned response' ... articles which referenced Skinner demonstrated use of Skinners ideas of an organism adapting to and being conditioned (learning from) its environment (Hull, Langman & Glenn 2001).*

The concept of operant conditioning where repetition of stimuli can help develop a conditioned response is evident in the marking rubrics and the assessment process for the test unit. Over the semester, student comments and questions showed that they were taking notice of and acting on my feedback which was based on these rubrics. At the most basic level their response was apparent in changes in the layout, detail and editing of their submissions. Over time this response extended to include change in student approach to a subject: it became more analytical and considered. I felt that this was clear evidence that the operant's (students) had been subject to repetitive stimuli (my verbal and written feedback within the framework provided by the rubrics) and developed a conditioned response. I also felt there was evidence in this research to support the view of operant conditioning as an ongoing process, requiring continual adaptation in our responses over time.

Skinner (1950) was bold enough to claim that there was no real need for any further theories of learning other than his model. The ongoing process of stimulus and response was sufficient to explain and to shape the way we evolve physically and mentally over our life spans. While I regarded this statement as something of an ambit claim, it was apparent that interaction with and response to an environment is fundamental to all aspects of learning and evident in this example of the teaching and learning process.

Socrates and Socratic Method

> *In this paradigm the student is viewed as an independent thinker, with the teacher's role limited to assisting them in finding understanding.* This view of the teaching and learning process involving a dialogue between student and teacher over time is a close fit with the view of Kenzic et al. that Socratic Dialogue *'is a philosophical group dialogue in which the participants guided by a facilitator and a number of ground rules strive to reach a consensus in answering a fundamental question on the basis of a real-life example or incident with the purpose of achieving new insight' (2010, p. 1105).*

The use of the Socratic Method was evident in the three assessments for this unit. In the first assessment students were required to participate in an on-line debate on the role of capitalism, then construct a critical review of what was discussed. In the second assessment students had to take a position on the role of either society, government or business in order to review the set case study, then contribute to a short group report summarising their various arguments. In the final assessment students constructed a case study to illustrate and to argue a point of view. Over these three assessments there was a continuing and evolving dialogue between student and teacher.

My observations were that over the period of the semester, there was a noticeable improvement in students ability to research a subject and then to construct and deliver a reasoned and detailed argument.

Vygotsky and Socio-cultural Theory

> *Vygotsky (1978) is associated with socio-cultural theory, which proposes that learning occurs within a context and that social learning precedes personal development. What was important to me was that Vygotsky's ideas changed the model of learning, from the teacher instructing the students, to one where the students played an active role in learning, and the teacher's role was to facilitate that process.*

Review of the literature had showed widespread use of Vygotsky's concept of scaffolding student learning. At the most basic level it was in the form of assessments which required students to address progressively more complex assignments, acquiring and then employing new skills and insight as they progressed. This scaffolding process was very evident in the test unit for the case study. Students have firstly to construct a critical analysis, then use those skills in analysis of the case study in the second assessment. In the third assessment students

must employ their analytical skills and their experience of the interactions of business, society and government to construct a case study based on a real life issue.

My observation of their behaviour and review of the work that they handed in for assessments, showed evidence of a movement from viewing the interactions of business, society and government as akin to the operation of a set of mechanical cogs, to a much more organic view which included a growing appreciation of the complexity, volatility and lack of predictability of their interaction. While my observation was that students did construct a personal point of view over the semester, I would expect the depth of understanding to improve with life experience.

Conclusions on established theory

This interpretation of events employing the points of view provided by six established theories of learning confirmed the conclusions that I had already reached from my experience of teaching. The first was that all six theories were true in the sense that there was evidence to show the part they had played. The second conclusion was that whether I viewed their individual or combined contributions, I was still left with a very fragmented and disconnected explanation and understanding of events. It was also apparent that these established and accepted theories of learning did not provide a complete explanation of the process. This conclusion was significant for me because it confirmed my original decision to undertake research on whether complexity theory could play a useful part in the teaching and learning process by complementing these established theories of learning.

(b) From the perspective provided by complexity theory

In this section I employ the eight concepts of complexity theory that comprise my theoretical framework (section 1.10) to construct another interpretation of the events recorded in my observations of students. The concepts were *self-organisation, strange attractors, connectivity, feedback, emergence, evolution, negative entropy* and *requisite variety*.

One of the two research propositions of this thesis is that complexity theory can be useful in describing and interpreting the events and processes of teaching and learning at an undergraduate level of study of business management. In this section I explore the capacity of complexity theory to act as a meta-language, describing and interpreting my observations over the semester of study. In writing this section I have grouped these concepts into four sets of related pairs. This reflects the interconnection between the elements in this theoretical model.

As in the previous section I have included excerpts (shown in italics) from my writing in Chapter 1.3 Background and Chapter 2.5 Applying Complexity Theory in Teaching and Learning. These references signal the aspects of each concept that I felt relevant to this thesis.

Self-organisation and strange attractors

In this view of the teaching and learning process at an undergraduate level of study, the teacher and students in the teaching and learning system self organise (Ashby 1962) around communities of interest (Allen 1998), focused around points of mutual interest (strange attractors).

Ashby noted that complex systems which appeared chaotic would in fact always be searching for a point of balance. These points of balance were focused around factors which Ashby defined as strange attractors, and that Allen (1998) referred to as communities of interest. In my experience of teaching these strange attractors and their associated communities of interest most often centred on the requirements of the assessments.

The results of this research showed that the assessment task and the assessment process did act as strange attractors around which communities of interest formed. Over the semester, I watched these communities evolve and adapt at both an individual and a group level to the demands of each stage in assessment. This was not a smooth process. It was characterised by elements of unpredictable and erratic (chaotic) student behaviour. While student performance improved over the semester, there was substantial variation in the levels of their engagement in tutorials. In the first assessment students formed groups and conducted an on-line debate. In the second assessment they re-organised and worked in groups of three on the case study subject. In the third assessment while they constructed individual case studies my observation was that they spent considerable time discussing their ideas with their respective work groups.

Student self organisation into communities of interest, around centres of attention was also apparent in a number of other forms. For instance the work groups that the students formed over the first and second assessment were reflected in their seating in the classroom, they tended to sit and work in groups of three or four students and my observation was that these groups worked very well together. This self organisation also apparent in the regular classroom debates. It was evident that students were most engaged when I presented them with a contentious statement relevant to the topic for that week, gave them three to four minutes to prepare a group response and then asked them for their conclusions. No matter how fast the pace and complicated the ideas, students became focused on quickly finding a response. As described earlier I noted that each group (and there were typically 8-10 functioning groups in each session) self-organised with each student having a role. One student was most often the speaker when they were asked for their point of view, another would be the student 'Googling' the question that I had asked, and they would all work together contributing their ideas to reach a consensus. Then it would get interesting as groups sought to have the best ideas. It was evident that students' enjoyed the competition. Over time, my observations showed increasing speed in students forming a response, and the emergence and evolution of their skills in critical analysis (see later in this section).

There was another example of self organisation around communities of interest in the students working as a class to organise groups for assignments. Part of the advice that I was given by other teaching staff was to stand back and allow students to evolve their solutions to a question or a task. I found this idea a bit nerve-

wracking at first - what would I do if everyone just sat there? It worked well in practice and my observation was that students took pride and enjoyed being in charge. I found an amusing example of this in my attempt to assist students to organise a class exercise. I was asked very politely to exit the debate because I was getting in their way. I went for a short walk and when I came back they were ready to go.

Connectivity and Feedback

> *The students and the teacher are reliant on their connectivity for effective and timely communication and cooperation. In this model realising the learning objectives of a unit of study is dependent on the quality and content of the feedback that each party provides in guiding and shaping understanding.*

Allied to the idea described and illustrated earlier, that complex systems will self organise around strange attractors in communities of interest, is another set of ideas; that complex systems are characterised by connectivity, and shaped by feedback. A simple example of this is the behaviour of a crowd. If someone panics or becomes violent then it can quickly spread, because of the interconnection between individuals and feedback in the form of body language and behaviours.

In this case the cohort of students could also be viewed as a crowd with interconnections evident between student(s) and teacher. The feedback from the student is in the form of comments, questions and group behaviours in tutorials. From the teacher it is in the form of written notes on assessments and answers to questions in tutorials and on-line.

What was evident in this cohort were the interconnection and connectivity of students, at first in their work groups and over time across the cohort. As noted earlier students self-organised into very effective working groups which took an active part in class debates. In debates they showed evidence of interconnectivity. Their comments and questions emerged and evolved over time, based on the feedback they received from their classmates. It also became a common event for students to ask for my point of view. In most cases this appeared to be because they were comparing what I said and most importantly the examples I gave with their initial impressions which were based on their group experience. There was also an element of challenge: I was being asked to state my position.

Students made very effective use of other forms of connection and feedback. One example is the feedback that I provided to students for each assessment. A review of total class performance (see earlier in Section 1 Case Study) in the tutorial complemented my written comments on their individual performance compared with the marking rubrics. To provide a means to track their progress I had kept copies of the summary marking sheet for each student for each assessment.

What was evident was progressive improvement in the standards of their work over time. This was manifest in my assessments of student performance and engagement, using a qualitative rating against key aspects of the marking rubrics (see Section 5.1 Case study above). It was clear that they did react to my comments and suggestions for their improvement. At the basic level this included higher standards of presentation in their submissions, although over time I saw individual improvement in their higher order skills in critical analysis.

Emergence and Evolution

Over time there will be emergence of knowledge and understanding of a subject for a student although the process will include evolution in the depth of student understanding of a subject area.

In my observation notes, there was regular evidence of student understanding of a topic emerging in class discussions and then evolving over time. In some cases this evolutionary process appeared to result in students replacing their initial understanding and opinion. Most often it appeared to be a process of organising and reorganising their information and experience, to construct and evolve a fresh perspective for viewing a topic or question. This process of evolution included a progression in their comments, questions and submissions, from a superficial to a deeper understanding of complex topics such as capitalism. My observation was that they completed this process by progressively incorporating examples of the interaction of business, society and government, first to construct and then to progressively refine the context of their understanding. My observation notes show that this process of emergence and evolution takes time and repeated experience(s) to achieve. As an extreme example, it was evident that as a sixty something, ex-businessman who had mostly worked in the retailing and property industries, my understanding of the interactions of business, society and government had more depth than those of twenty year old students, with little or no business experience and only recently out of high school.

Negative entropy

> *Maintaining progress in the teaching and learning process requires constant addition to energy levels from both student and teacher. These can be conceived as taking the form of comments, questions and answers which act to drive the learning process over in this case the time period of a semester of study.*

The idea of entropy was used by Schrodinger (1992) to describe how complex organic systems would run down over time and eventually cease functioning unless there was continual addition to their energy levels. Schrodinger was addressing the characteristics of complex organisms. An example of this is the need to take in food and water if we are to survive. I felt that his conclusions also applied to the complex teaching process. One example is the lecturer or tutor droning on with no attention paid to engaging students. My experience is that the likely response is that students complete the minimum of required work and achieve only superficial understanding of a subject.

The need to import energy into the teaching and learning process became very apparent in this study when, because of Good Friday in week 7 followed by STUVAC in week 8, the return of the first assessment to students was delayed from week 7 to week 9. This meant that students had very little time to review the results and work on their second assessment due in week 10. This delay had quite a marked negative effect, apparent in lower attendance of and reduced participation in tutorials. Students had lost their sense of involvement and engagement. They recovered their enthusiasm somewhat when they got this first assessment back. I still felt that the students never fully recovered from this loss of momentum. On the positive side it did provide me with an example of what happens when I am not able to import energy, in this case in the form of my feedback, into the teaching and learning process.

What was also very noticeable in my observation notes was the energising effect of factors such as class debates and feedback on assignments. I had observed this reaction before in other classes which I had taught. It was most notable in a unit which employed the case study method in teaching. This requires students to present and argue their response to case study questions. In that case I had found that this process of engagement and involvement played a significant part in student learning.

This conclusion reinforced the findings of other researchers on the need for connection and interaction between student(s) and teachers. For further detail see sections 2.3 Review of Theory and Practice of Teaching and 2.5 Applying Complexity Theory in Teaching and Learning.

A further instance of the need for negative entropy applied to my teaching plans and session notes. In each tutorial I could have followed the detailed session notes for this unit, limiting tutorial discussions to the questions asked in those notes. While this approach would have worked, I felt that it would be limited because of its lack of immediacy. As a result, while I completed the subject matter and the set questions of the session notes, I also incorporated additional current examples to contribute to the energy levels of their learning process. My observation was that student reactions to this additional material were variable. It ranged from confusion about the meaning of a comment by Camille Paglia on the part played by capitalism in breaking down hierarchies, embarrassment about a comment from Ian Smith extolling the virtues of colonialism, to apparent shock when I played them the top ten 10 'shock ads' of the infamous Benetton advertising campaign; the images of this campaign are confronting and its ethics questionable. Whatever the reaction it was evident that these examples and those contained in the notes and videos of this subject stimulated and focused student attention on the subjects under discussion in each tutorial.

A final example of the importance of importing energy into the teaching and learning process can be seen in my observation notes for the last few tutorials. By this stage students had completed two of the three assessments and were faced with the final assessment which required them to construct a case study based on issues associated with the interactions of business, society and government. My notes for this period showed mental and physical fatigue had set in. While student comments showed that they found the unit interesting, they had also found it to be challenging. The content and construction of this subject meant that there was never an easy answer available in the text book or through class exercises. Students had to reach their own conclusions, which required them to collect and then critically review a range of evidence. It was apparent that students were at a stage where they were losing their capacity to think about the assessment. This was apparent in their limited responses to questions in tutorials and could be seen in their negative reaction to the prospect of constructing a case study for this third assessment. None

of the students had any experience of constructing a case study. The thought of selecting then researching a subject, followed by constructing a story through which to argue their opinions, was both overwhelming and exhausting.

As noted in the case study I had raised my concerns about student fatigue with one of my colleagues who had extensive experience of teaching this unit. To address my concerns, we conducted a dual teaching session with each of our tutorial cohorts. The results of this cooperation are show in Chapter 5 Section 1 (Week 12) of the case study. After initial confusion, students in both cohorts became involved and enthused about selecting a subject and building a case study. Their comments also suggested that as a result of this session the majority had reached a conclusion on the story they would use and the positions they argue. I was impressed by the quality of the work that students submitted for this third assessment and their deep level of engagement with the issue they were addressing. Most often their case studies dealt with the use of child labour in offshore manufacturing by Australian companies, or instances of the need for consumer protection and better information about the products offered to Australian and other consumers. Student choice of language in their case studies showed quite deep levels of empathy with their subject, sometimes to the extent that emotion overwhelmed their analysis. My impression was that this result for this third assessment could have, and I think it likely would have been different (lower quality and higher numbers not submitting) without that importation and addition to energy levels supplied by the use of tandem teaching. As mentioned earlier, prior to this session student behaviour suggested disinterest in putting anything more than the minimum of time and effort into the third assessment: then came the tutorial session with both teachers raising ideas and guiding student discussion, so that by the end of that session, student behaviour was open and enthusiastic and was reflected in the quality and originality of their case studies.

Requisite Variety

Means that the richness of the content of the teaching process must seek to reflect the richness of the subject area.

Ashby (1962) and Shannon and Weaver (1959) had supplied an important element of my theoretical model, with their individual conclusions that to be in charge of a complex process, in this case teaching at a tertiary level of study, the variety (richness) of that process and its content of information and explanation, must match the variety of the subject matter.

My review of the documentation for this unit showed a wide variety of information and analysis was available in the lectures, readings and class exercises. Variety was also evident in the teaching plans and teaching resources for this unit. For example, in each tutorial session students had access to lecture and the session notes and questions for the tutorial, the majority of tutorial sessions incorporated one or more video clips and all tutorials had some element of group working and class debate. As noted earlier, I had sought to add to that variety with additional examples and further explanation.

Nevertheless despite the range and depth of information, it still proved impossible for me to completely cover off a subject such as capitalism or ideology in a single tutorial because of the sheer complexity of these and other concepts that are embedded in this unit of study. What I was able to do was provide students with a range of skills and examples relevant to a subject under discussion, which they could use to develop and then refine their understanding as they gained further experience. My hope was that this further experience would add to the variety (richness) of their understanding. My conclusion was that this process of refinement would occur over time. Given that the focus of this study unit was on the interaction between business, society and government, it is likely that this learning process will end only with death or dementia.

Conclusions on complexity theory

As noted before, one of the two research propositions of this thesis is that complexity theory provides the teacher with a meta-language that can be used to describe and understand the teaching and learning process and the concepts and perspectives provided by complexity theory can complement the established theory and practice of undergraduate education.

Review of the literature had shown a wide and expanding range of examples of applying the concepts of complexity theory to describe and understand the behaviour of complex systems. Examples included Agar's (1999) use of complexity theory to review the rates and patterns of heroin addiction, the study of the behaviours of commercial fishermen by Allan (1998), Byrnes (1998) examples of the application of complexity theory in the fields of epidemiology (tuberculosis) and urban design (pedestrian flows), or Kuhn (2009) with her use of the concepts of complexity theory in a study of a licensed club. My use of complexity theory to describe and explain the recorded events of this example of teaching and learning is a further example of the capacity of complexity theory to act as a descriptive and interpretive language.

Authors including Rosser (1999) and Horgan (1995) question whether the language of complexity theory adds any value to the level of understanding that is already available through the language of existing learning theory and teaching practice in their respective fields of economics and management. It is true that my interpretation of events using the concepts of six established theories of learning resulted in a range of perspectives of the teaching and learning process. When I viewed these perspectives in combination, they did provide me with an incomplete but still coherent view of events. As a teacher my criticisms of established theories of learning are the gaps in their coverage of how we learn and no sense of how these theories which can be applied to constructing and delivering the teaching and learning process. I liken this to being a chef, surrounded by ingredients and equipment but without a recipe to guide their preparation and combination. In contrast, I found it to be a relatively simple and quite informative process to view the events of the semester through the lens provided by complexity theory. It resulted in positive changes in my teaching style and appeared to encourage higher levels of student engagement.

I do not have sufficient evidence and experience to reach a firm conclusion on the value of applying the concepts and the perspectives of complexity theory in the teaching and learning process. Nor do I fully understand how to apply these concepts in session design and delivery.

Chapter 6 Conclusions

6.1 Introduction

In this chapter I draw on the results of my research to reach conclusions on the two research propositions of this thesis, by answering their associated questions (shown below).

I was unable to complete the full program of research including conducting face to face semi-structured interviews with students, consequently the analysis and interpretation in this Chapter and in Chapter 5 are limited compared with what I had hoped to achieve. I was relying on the students to jog and audit my memory of events. I also needed their comments and their view of events to triangulate and amplify my observations and add to the detail and the commentary contained in the case study.

Shown below are tentative and summary commentaries and conclusions based solely on my observation and analysis of student behaviours and achievements over the semester.

6.2 Research: Propositions, Questions and Commentary

The two research propositions and their associated questions for this thesis are shown below and followed by my commentary.

Proposition 1

Complexity theory can be useful in describing and interpreting the events and processes associated with teaching and learning at an undergraduate level of study of business management.

Question 1

To what extent can complexity theory be useful in describing and interpreting the events and the stages of a cycle of learning at an undergraduate level of study of business management?

Commentary on first proposition and question

I was able to apply the eight concepts taken from complexity theory to interpret the events of the teaching and learning process over the semester of study and concluded that this perspective did provide a means to understand and interpret the events of the teaching and learning process. I also found that using the concepts of the established theory of learning resulted in another useful perspective and description of events (see section 5.2 Interpretation of Events).

The most apparent point of difference between these perspectives was that when I viewed the teaching and learning process using the lens of complexity theory, I could see this process as the operation of a complex system. While this system was not predictable, some aspects or characteristics such as self organisation and communities of interest could be expected and there was a feeling of viewing a whole world. By comparison the interpretation that employed the concepts of six established theories of learning was disjointed and composed of fragments of understanding with no sense of connection.

When I applied the concepts of complexity theory I looked at the whole rather than the parts of the teaching and learning process. Connections and interconnections quickly became apparent. In seeking proof of self organisation among students, I uncovered evidence of interconnectivity, understood the importance of feedback and watched student understanding, emerge and evolve over time. The result of these discoveries was a dynamic and global view of the teaching and learning process.

There were limits to my interpretation. I had taken a minimalist approach to the employment of the concepts of complexity theory, restricting the set employed in the model to eight concepts, *self organisation*, *strange attractors*, *connectivity*, *feedback*, *emergence*, *evolution*, *negative entropy*, *requisite variety*. In the research process they did provide me with a valuable way to view and interpret events over the semester. Nevertheless, in retrospect I would include a further concept in my model, that of *'sensitivity to initial conditions'*. Originating in the world of theoretical physics (Fuentes, Sato & Tsallis 2011), this concept is also relevant and important in the teaching and learning process. One simple but important example is that my observation notes showed that the initial conditions of a class debate or a group working exercise were important in determining the result in student engagement and learning.

For instance: What was their attitude: was it interested or disinterested? Were all the needed explanations and information in place? What was the quality of that explanation and information? If everything clicked into place first up, the tutorial work would usually go smoothly and assist students to find understanding. Conversely, if the tutorial work started badly the reverse was true, and it was often difficult to change the path.

As noted earlier, while the interpretation that employed complexity theory proved useful in describing and understanding the teaching and learning process, I also found value in the perspectives provided by established theories of learning because they gave me a direct connection to my students in planning and delivering teaching sessions. I thought both perspectives were required if I was to improve my understanding and my management of the teaching and learning process.

When I viewed the teaching and learning process from the perspective found in combining the concepts and insights of established theories of learning and complexity theory, I still felt that I had gaps in my understanding of this process. On the basis of the evidence contained in this story of a semester of study, I have concluded that the teaching and learning process will never be truly knowable. It is an example of Ashby's (1962) point that the complexity of a system can and in this case does exceed our capacity to understand. One consequence is that we can never hope to be fully in charge of the process.

I concluded that these two perspectives were complementary to my view of the practice of teaching and learning at a tertiary level of study. The concepts of complexity theory supply an interpretive language and a strategic and elevated perspective from which to describe and interpret the teaching and learning process. This complements the tactical application of the perspectives and the teaching tools of established theories in the classroom.

Proposition 2

Complexity theory can play a useful role in the development of effective teaching praxis at an undergraduate level of study of business management.

Question 2

What role can complexity theory play in the development of appropriate teaching strategies in order to achieve the learning objectives of a unit of study?

Commentary on second proposition and question

I was not able to reach informed conclusions on this proposition and question because I lack data on the student perspective. Shown below are notes drawn from my observations of student behaviour and analysis of their performance.

As noted in the introduction to Chapter 5, the teaching plans and processes of this test unit sought to incorporate and apply the concepts of complexity theory in the practice of undergraduate study. I was not given any advice about what this meant in terms of unit and session design and delivery. While the language of complexity theory had proved useful in understanding and interpreting events, it did not answer my question of whether there were any meaningful and important differences in approach when complexity theory is employed in the teaching and learning process.

When compared with my experience of other units I did notice some points of difference. Most notable was the importance placed on enabling but not directing students to self-organise and establish connections in class. There was also evidence of change in the strange attractors and the communities of interest for students in each of the three study modules of this unit. I attributed much of this organisation and reorganisation of their focus to the difference in the demands of each of the three assignments and I assume that this change of focus was planned.

These changes in the centres of student attention also appeared to reflect changes in the content and context of teaching plans over the semester. In the first few weeks, the emphasis in teaching was on definition and then refinement of their understanding of key concepts such as sociological imagination. This was followed by a stage of exposure to examples of the interaction of business, society and government. In the final stage, students created their own examples of this interaction. Over that period a change in student behaviours became noticeable.

Student use of resources such as the media and their questions and comments in tutorials moved from seeking the facts (the one truth) of a situation, to exploring the options (many truths) for interpretation.

There were other examples of where the teaching and learning process of this unit appeared to differ from my experience of program design and delivery. My focus on teaching and on recording student behaviours largely precluded anything other than a fleeting realisation that this unit did adopt a different method of approach. My observation notes show that students did notice a difference in this unit, summed up in this students comment:

> 'I did my readings, I listened in class, I still don't get sociological imagination ... I feel like we've been dumped in at the deep end... I just don't get any of this'

(Week 2 Friday 8th March 2013).

Despite this, my notes show that while students may have been initially confused and bemused by the content and design of the unit, they quickly developed an ability to work effectively in the process. They also appeared to enjoy themselves and some students appeared to have gained a lot from the ideas on a personal level. At the last tutorial I had three students come up to say that they found the insights of this unit to be life-changing. That type of reaction was a first for me as a teacher and reflects the deep level of engagement of students in this subject. It had a direct connection with issues and questions that they cared about and it gave them the critical skills and self confidence that they could now reach their own conclusions. I regarded this as an example of effective mastery in this subject.

When I reviewed the Learning Guide, another point of difference was the diversity in requirements of students over the semester. In class work alone this included on-line and classroom debates, group working and individual creativity.

A further point of difference was the degree of connection between the theoretical content of this unit with the reality of their student worlds. At first this interconnection and interaction with the environment appeared to confront, confuse and intimidate students; perhaps because I had selected contentious subjects for discussion taken from news reports in the press or on the internet. Over the time period of the semester, this initial caution changed to acceptance and engagement

with the issues discussed. Students also appeared to be making more use of news reports and keeping in touch with what was going on.

I do not have the range and variety of data needed for me to reach an informed conclusion on how and why the concepts of complexity theory can contribute to the praxis of teaching and learning at a tertiary level of study. My instinct is that it can make a contribution, although it faces a possibly significant barrier to understanding and use. For teachers to employ complexity theory they will need to understand and apply the note by Horn that:

> 'Every teacher can and should understand the underlying big picture of the new sciences, for with that understanding necessarily comes the realization that she [sic] has been placed in charge of a sensitive learning ecology whose directions can be altered by small changes in the boundary conditions and interaction patterns of the classroom. In the most tangible sense, complexity places the teacher and the students at the locus of control in terms of classroom learning, while at the same time acknowledging the larger institutional systems with which classrooms and individual schools are linked' (2008, pp. 141-2).

From my experience of teachers and teaching, to understand that underlying big picture, then to make use of that knowledge to promote student learning, will require additions to the conceptual frames of reference of teachers, and some level of comfort with viewing, interpreting and treating the classroom as a complex system.

Chapter 7 Context, Contributions, Possibilities and Conclusions

Introduction

In this final chapter, I describe the context of my research and the influences that helped shaped my conclusions. I go on to review the contribution made to the body of knowledge of the praxis and practice of teaching and learning at an undergraduate level of study and summarise possible areas of further enquiry. I end this chapter with my conclusions on what I have achieved in my studies.

Context of Research

Experience of behavioural research in my business career and my attitudes to and experience of teaching and learning are central to this thesis. They have coloured my considerations and both enabled and constrained my conclusions.

The events of this semester of study will never be fully replicated in future iterations of this unit. While limits are applied by the learning plan, the sequence and content of events over each semester are dependent on the context of the students and the teacher and susceptible to larger environmental influences. Both complexity theory and personal experience support the idea that while there will be difference in the events of future iterations, there will also be similarity. We can learn from experience.

The narrative story employed in this thesis is not a complete record of all that occurred. In part this reflects the limits that apply in research – we will never have complete access to all relevant events. Even if we did, we would still face limits in our ability to record or interpret everything that occurred. Despite these limits I can still hope that the independent observer defined by Husserl (2012), can interpret the patchwork quilt of Levi Strauss (1966), constructed by the interpretive *bricoleur* of Denzin and Lincoln (2003).

In reviewing my conclusions about the teaching and learning process there is cause for caution in the structure and content of the test unit 200148 Business, Society and Policy (BSP). BSP is focused on students acquiring the skills needed to interpret the

interaction of society, government and business and uses a range of topical issues in student discussions and assessments of progress.

This focus on issues that students thought important was evidently attractive and engaging; reflected in the positive commentary recorded in the observation reports. This also made it an enjoyable unit to teach which has influenced my commentary.

I was not able to complete all three planned steps in research. The observation study and my review of secondary data such as student attendance and their performance in the assessments worked well, although both were based only on my perspective. I was reliant on student commentary for comparison and contrast, evidence and example. This gap in data crippled my capacity to critically assess the second proposition of this thesis, that complexity theory can play a useful role in the development of effective teaching practice at an undergraduate level of study of business management. Having said that, the depth of evidence provided by the observation reports and documents such as the Learning Guide was substantial and enabled me to reach tentative conclusions. Nonetheless, from my point of view there is still cause for caution. These conclusions stem only from my point of view, with no point of contrast or comparison. Hopefully the observer(s) will have sufficient knowledge and experience of the teaching and learning process to reach an informed conclusion as to whether my reporting, analysis and interpretation of events are credible.

Contributions to knowledge

In Chapter 1.11 Significance of research contribution, I summarised how my research could be employed in exploring the propositions of this thesis and contributing to the larger body of knowledge of the practice of teaching and learning at an undergraduate level of study. Firstly there was my claim that this research would address a gap in the literature of empirical studies of teaching and learning over time. Despite an extensive search, I had not been able locate any evidence of a longitudinal approach in the research dealing with teaching and learning at a tertiary level of study. In that respect, this research which records and interprets the events of the teaching and learning process over a semester of study does appear to be unique. Of greater importance to me is that this study provides a body of evidence which can address a range of questions above and beyond the scope of this thesis. I have explored some of these ideas below.

The research for this thesis provided the perspective from which I could contribute to the debate on whether and how the concepts of complexity theory can make a useful contribution to higher education. I employed observations of students and assessments of their performance over the semester to construct two interpretations of events. I used the points of view provided by complexity theory and the established theories of learning considered in my review of the literature (Chapter 2.4). I concluded that both perspectives were of value in describing and interpreting events. In combination, they provided both depth and breadth to my ability to notice and then to interpret the events of the teaching and learning process. This result is significant because it suggests new paths of approach in teaching and teacher education

This study provides another example of the effective application of the concepts of complexity theory in describing and interpreting the behaviour of complex systems. It echoes successful use across a wide range of questions, in disciplines as diverse as epidemiology and town planning. My research provides further support for the idea that the concepts of complexity theory can provide the universal interpretive language of Morin (1992). Moreover, it appears that the concepts and language of complexity theory could also support Boyer's (1996) call for a common language, intelligible across the range of disciplines in the scholarship of teaching.

This research supported my supposition that I could describe and interpret the teaching and learning process using a theoretical model which contained nine concepts of complexity theory and treated the teaching and learning process as the operation of a complex system. As noted earlier, I had found it impractical to develop a definition of learning using the concepts of established theory. In contrast, the concepts from complexity theory that were employed in my theoretical model provided a perspective of the teaching and learning process as a dynamic, interactive, iterative, ongoing and evolutionary process over time. What was also of interest was how easy it was to keep these concepts in mind and employ them in understanding and managing the teaching and learning process. I could not find any evidence in the literature of using complexity theory to define and describe the teaching and learning process. It would be interesting to see whether the theoretical model of this research could be used by an independent observer to construct an explanation and interpretation in other business disciplines, for example Employment Relations, Law and Accounting.

I was not able to address fully the question of how complexity theory could make a useful contribution to the design and delivery of teaching at an undergraduate level of study. Despite this, my impression was that the concepts of complexity theory provided a useful position from which to interpret student behaviours and made a positive contribution to the way that I taught. It would be interesting to test these conclusions in further episodes of teaching.

My experience was that applying the concepts of complexity theory in the practice of teaching and learning does not require marked change to the content of the process, or the ways in which students are judged. Most often, it appeared to be a matter of change in my timing and in my explanations to students; allowing students' time and giving them reason to self organise is one example. It was also evident in the structure and content of the three stages in assessment. Each assessment led the students to change (self-organise) their focus and the level of their cognition as defined by Kitchener (1983).

Applying complexity theory in the classroom did require me to move from a possible role as a 'director' and 'driver' of student learning, to that of an 'enabler' seeking to 'influence' their progress. I had to let the students be involved and to some extent take charge of the process. This requirement reflected my personal preference in teaching so I was comfortable with that role and the implicit change in the balance of power between student and teacher. I made changes to my method of approach in the classroom and they worked well in terms of student engagement. This degree of comfort reflects my age, personality and life experience and will not be true of all teachers.

Adopting a complexity point of view led to quite substantial changes to my perspective of the interaction between teacher and student. In the past I had viewed and interpreted the events of a tutorial or a semester from the points of view provided by established theories of learning. Now I had to move to a perspective which viewed and interpreted events, using a model of teaching and learning which drew on knowledge of the behaviour of complex systems. To make that transition, each time I wrote an observation report documenting the events of a tutorial, I went on to make notes reviewing those events in the framework provided by my theoretical model. This took time and practice although it quickly became second nature.

I found this new perspective complemented rather than precluded my acknowledgement and employment of established theories of learning. For instance, while I now viewed the teaching and learning process as the emergence and evolution of student understanding over time, subject to the behaviours and uncertainties of complex systems, in each tutorial and over the semester I was still employing the concepts of theorists such as Bandura, Rogers and Vygotsky in my teaching practice. They provided the means to connect the strategic perspective provided by complexity theory, with the tactical practice of dealing with students in the classroom.

I thought my research was significant in other unexpected ways. For example, what was apparent in the observations was the way students' understanding of a subject emerged and evolved over time. This led me to conclude that learning and, by inference, teaching can only be understood in the context of time, in this instance the semester. The requirement to consider time as a dimension also holds implications and possibilities for research design and method. For instance I chose to use semi-structured written observations because this research instrument enabled me to collect records of student behaviours' over time and it worked well in that regard. What also emerged in these weekly reports was a feeling of viewing time lapse photography which gave me a dynamic view of student progress. This unexpected aspect enabled new insights in viewing and interpreting the teaching and learning process. I felt that an observer would also find this research gave ready access to the unfolding story over the semester. The need to consider learning as a time dependent process also has implications for reaching conclusions on the results of teaching in a subject. There is the likelihood, arguably the certainty that the full result of the learning process will only emerge well after students have completed their university studies. For example, in the study unit under investigation students' overall understanding and application of concepts such as sociological thinking and ideology was sound, but limited to the insights gained over the semester. I think it is likely that the level and form of their understanding will evolve as they gain the life experiences needed for a wider and more informed point of view. Based on this result, there is reason to review expectations of the depth and form of understanding of undergraduate students. There is also reason to explore the means to accelerate the process of student accumulation of experience of examples over a semester of study. In this case, a further question is whether this acceleration in process would have any noticeable and worthwhile effect on the depth of student understanding.

What are the limits to an undergraduate student's ability to absorb and assimilate experiences, to construct and then evolve understanding?

The importance of a mix of research instruments that address a range of data sources to provide diversity in the perspectives available to the researcher and the observer is evident in this research. It is only in comparison and contrast of perspectives that a researcher and observer can understand and interpret the complex process of undergraduate study. This begs the question of whether there will be any noticeable and important difference in the interpretations of the researcher and the observer(s).

Finally, there is the contribution of this study to demonstrating how an analytical autoethnography can explore complex subjects. Review of the literature suggests that this study is unique in the field of educational research. It joins other examples across a range of disciplines in the social sciences where autoethnography has been successfully used as a method of approach in qualitative research.

Possibilities for further enquiry

The previous section discussed what I thought were the contributions of this thesis to the body of knowledge and the further questions that emerged. Shown below are outlines for programs of further enquiry. I have concentrated on a form and content of qualitative research which collects and records a wide spread of behavioural data. These studies will address immediate questions and have further value as a data resource.

A priority would be to repeat the research process in the same unit (200148 Business, Society and Policy) with a comparable program of research, including observations, reviews of performance and also semi-structured face-to-face interviews with students. Then the propositions of this thesis can be revisited, namely, that complexity theory can be useful in describing the events and processes associated with teaching and learning and also play a role in the development of effective teaching practice at an undergraduate level of study of business management. It would also be valuable to compare the results of these two case studies for similarities and differences in student behaviour and performance over a semester. As a tutor I have noticed recurring patterns of behaviour as students and teacher work together over a semester and these patterns were also evident in the

observation notes of this study. I think that there is an underlying recognisable pattern that can be identified, described and explained using the concepts of complexity theory. This description could make a useful contribution to a teacher's understanding and management of the practice of teaching and learning in undergraduate study.

The research design of this study can be extended to construct a series of comparable case studies across a range of units of study in business management. These could be compared and described using the theoretical model of teaching and learning employed in this thesis, to explore the capacity of complexity theory to describe and interpret the events and processes of teaching and learning across a range of disciplines. In this enquiry the points of reference would be Boyer (1996) and Morin (1992) with their focus on developing a common language that can cross the boundaries of the range of academic disciplines.

If these programs of research were completed, there would then also be a substantial data base available for other uses. For example, these multiple data bases could provide the depth and range of qualitative evidence and example needed to complete a meta-study which compares and contrasts the strategies evident in the current theory and practice of teaching and learning at an undergraduate level of study of business management at the University of Western Sydney. The search would be for similarities and differences in how teachers interpret and apply learning theory in their teaching practice. Enquiry would draw on the work of Bass (1999) on the means to assess the validity of elements of a teaching and learning process, and that of Trigwell, Prosser and Waterhouse (1999) who note the connection between the teachers view of their role and their approach to teaching and the results in terms of the student's approach to learning.

A range of other possible areas of useful enquiry suggest themselves. For the sake of space I have included summary details for only two examples, both drawing on the data bases provided by the case studies outlined above. In my research I encountered questions as to how we evaluate student learning, and our consequent expectations of the students and the teacher. Based on the result of my research, there is reason to revisit Entwistle's (1997) concept of a surface versus deep understanding of a subject. My findings suggest that because students are reliant on the evidence and example provided by life experience, there are definite limits to their capacity to understand complex subjects. Given the younger average age of

undergraduate students and their consequent limited life experiences, what expectations can we realistically hold for the depth of their understanding of complex concepts? There were the related questions of whether and how it is possible to accelerate the process of students acquiring and then employing experiences? What would be the effect of this acceleration on the depth and breadth of their understanding?

I think that there is also reason to use the time-lapse nature of records provided by observation reports, to explore and describe the process of emergence and understanding of a subject. My research and analysis for this thesis included progressive, structured assessments of student performance over time, using a frame of reference provided by the rubric for each of the three assessments. When viewed in sequence, the results provided a clear view of the emergence and evolution of student understanding and skills. This form of enquiry could be expanded to include gathering further examples of the process and progress of student learning. The points of reference would be Kitcheners (1983) work on cognition, and that of Marton & Trigwell (2000) on the importance of repeated and varied experiences in enabling a student to construct and refine their understanding of a subject.

Concluding Thoughts

This has been a story of personal discovery and interpretation over a period of seven years, centred on addressing questions about teaching and learning that first emerged from my work as a tutor in 2006. Over that period of time I have lived in the academic world, conducting academic research. This has been in marked contrast to my career experience as a small business owner working in commercial market research. I have enjoyed the intellectual challenge, the teaching, the students, the research and the writing.

What else have I got out of all of the effort? Well, I now have a functional knowledge of both established theories of learning and complexity theory and an understanding of their application in the practice of teaching. I now tend to view and interpret the world around me using the concepts of complexity theory because I find it provides a useful if sometimes unnerving perspective. I find it irritating that I still do not have definitive answers to the propositions of my thesis. In part this shortfall reflects gaps in research data, but mostly it is because of limits to my capacity to comprehend,

describe and interpret events. I console myself with the thought that it is likely that the teaching and learning process cannot be fully comprehended, described, or understood.

I have established that the concepts of complexity theory can be used to describe the events of the teaching and learning process in undergraduate study of business management. I illustrated how those concepts can provide a teacher with a valuable strategic view of that process, which complements their use of established theories of learning. I concluded that the concepts of complexity theory enable a definition of learning, which gives new insights into understanding and managing the teaching and learning process.

The research for this thesis demonstrates the need to acknowledge that learning is time dependent. I outlined the implications for program design, delivery and evaluation to recognize the process of emergence and evolution of understanding. Dependence on time also has important implications for research design, in particular the need for longitudinal studies. This change in research design demands research instruments which can document events over time. Observation studies are one example, face to face interviews with students and reviews of secondary data also meet this criterion.

This research has demonstrated that the complexity of the teaching and learning process demands the use of a mix of methods of research which can access a range of data to provide a range of perspectives and the breadth of data needed to describe and interpret behaviours. This diversity also enables comparison and contrast, for verification and for greater depth of understanding.

My research process developed a detailed record of an example of the teaching and learning process at an undergraduate level of study. This data base could address other questions of interest, in complexity theory and in the practice of teaching and learning. I developed a summary of possible lines of further enquiry.

In my experience there is a time to let go of a project and this marks the spot. Thank you for your attention. I hope that this research will be of use.

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