Teachers' creation of blended learning environments at a campus-based university: A New Zealand case study

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Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

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Yvonne Wood

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Confidential Material

The name of the institution has been withheld to provide confidentiality for the participants. The participants selected pseudonyms to protect their identity and the name of the institution has been omitted from the text. To maintain anonymity, all citations and sources that would identify the institution have been replaced with ___University in the references.

Abstract

This research study seeks to explore the role of the teacher in creating blended learning environments. How the teachers integrated the LMS and what influenced them to engage with the design process were of primary importance to this research study. The study investigated the micro course level development and situated these developments within the macro institutional level.

Applying a qualitative case study approach, this research study investigated the practices within a single university in a large New Zealand city. Purposeful sampling including snowballing was used to select the six participants from different study areas across the institution. A two-phase semi-structured interview was the main tool used to collect data, which was supported by demographic details and an examination of the participants' online environment. To increase the rigor of this small sale case study research, the SCOT model was applied during the second stage analysis.

The significance of this research study lies in the dynamic impact that was revealed in the teachers' blended practice. The internal attributes of the teachers' autonomous role, pedagogical goals, and personal commitment together with external influences of institutional support and reskilling, preceded the teachers' engagement with blended learning. The foremost recommendation from the study is to focus on the way in which teachers navigate the process of shaping their blended practice.

Chapter One: Introduction

The ways in which teachers create their blended learning environment at a campus-based university is the focal point of this research. Blended learning environments are the result of incorporating the use of online learning into the teaching of traditional face-to-face classrooms. Current research in the emerging field of blended learning is focused on the use of technologies (for learning activities) and their inclusion in curriculum design. However, there are few accounts of the work involved in creating blended learning environments. This research will centre on the role of the teacher, and the influences and processes that they engage in during the blended learning design process.

In this chapter, I will introduce my motivation and the purpose for conducting this research study. The blended learning field within which this research is located will be defined and described and the role of the teacher introduced. This will be followed by the aim of the research which is then expanded in the research questions, and a justification for this research. A definition of key terms, and a brief outline of the theoretical perspectives and general structure of the thesis concludes this chapter.

1.1 Origins of the study

I am a teacher at a campus-based university and I have a keen interest in developing blended learning environments. My interest in this area of study developed because in the literature about blended learning, I did not clearly see the role of the teacher often described. Therefore, research into the role of the teacher with regard to blended learning within one institution may provide insight to better recognise the aspects of the blended learning design process. At the very least, it will contribute to knowledge about how some teachers have created blended learning environments at the case study site.

My motivation to conduct this research has its origins in two key discussions I had at the start of my investigation into the choice of topic for this thesis. The first discussion was with a colleague who wanted to do more with the Learning Management System (LMS). He summed up his frustration by stating, “if [the LMS] was a car, I just want to drive the thing, I don’t want to tune the engine, assemble the car and paint it.” Many aspects of the LMS use may be as

straightforward as driving a car however, some people have experienced a lengthy administrative setup process prior to being able to engage with the use of the LMS. It is these additional administrative processes that my colleague was referring to in his analogy, which provided insight into the barriers that may prevent teachers from engaging in the use of the LMS and led me to include the questions about support structures and teaching teams during the interviews. Without this insight, I may have limited my interview questions and not sought to deeply understand the differences between how the teachers' roles are structured within the same institution. The second discussion gave me the opportunity to talk about some of my experiences as a business solutions specialist. My key role was supporting the teams who were implementing new technology, ensuring there were adequate support processes for the people involved and that they were positioned to take full advantage of the new software. My work in this field made me aware of the challenges people face in their working environments when they start to adopt and apply the use of new software systems.

The questions that I like to ask can be traced back to these conversations. My focus is on asking if there is a better way to work with technology and to discover how others have approached similar tasks. These discussions allow me to reflect on what I like to do in my role as a teacher at a campus-based university and how I might build on these questions through my thesis research. What this meant for the research study was that the focus was on exploring how teachers were influenced to engage with the LMS. As a teacher of technology, I have a passion for developing processes by which computers make work easier to achieve desired outcomes. In this study I will focus on the ways in which teachers shape their use of the LMS, what influences their use of the LMS technology and the impacts of the environment within which they are developing their blended practice.

1.2 Purpose of the study

The purpose of this research is to investigate the ways in which teachers create blended learning environments at a campus-based university, through the addition of the LMS. The word environment is used to broaden the view of blended learning so that both the micro (course) and macro (institutional environments) of blended learning may be considered. The key focus of this research is on the role of the teacher in creating a blended learning course through the combination of face-to-face teaching with online technology.

Blended learning sits in the field of online and e-learning, which are based in the distance and open learning paradigm (Garrison & Kanuka, 2004; Gerbic, 2009; Moore, 2006). Blended learning can also be located along the continuum between fully online and face-to-face teaching (Garrison & Kanuka, 2004; Picciano & Dziuban, 2007). The term blended learning is gaining use in the literature over other terms such as hybrid learning and mixed mode learning (Picciano & Dziuban, 2007) and is replacing the use of the term flexible learning (Gerbic, 2009).

It is widely recognised in the literature that there are many definitions and variations of terminology currently in use to define the emerging field of blended learning in higher education (Bonk & Graham, 2006a; Garrison & Vaughn, 2008; Picciano & Dziuban, 2007; Stacey & Gerbic, 2009). The definition of blended learning that fits best with the environment I am focusing on is "the thoughtful fusion of face-to-face and online learning experiences... [which includes] a fundamental redesign that transforms the structure of, and approach to, teaching and learning" (Garrison & Vaughn, 2008, p. 5). This frames the area I wish to focus on, which is the role of the teachers and how they engage with blended learning.

1.3 Research aim and research questions

The aim of this research is to make teachers' invisible work visible (Cornford & Pollock, 2002) and describe the ways in which teachers develop blended learning environments. Cornford and Pollock (2002) discuss the necessity of making visible teachers' work involved in incorporating new technologies. Wiesenberg and Stacey (2009) recommend investigation into the policies surrounding how teaching is conducted in blended learning. Prior to looking at the policy, I advocate that there is a need to look at teachers' processes. My research questions are:

- What influences teachers when engaging with the blended learning design process?
- How do teachers go about blending online and face-to-face teaching in their courses?
- How do teachers create blended learning environments at campus-based universities?

The research questions have been designed to focus initially on the participants' own processes in engaging with the LMS. The focus is then shifted to the participants' course, a micro level investigation into the changes that they make. The final research question is an attempt to explore any wider influences that the participant had beyond their course to the broader institutional environment. Is a teachers' influence limited to the (micro) course level or extended further to the (macro) institution environment?

This research study may provide some useful insights to other institutions that are moving from campus-based to blended learning environments, by researching new knowledge about teachers' work. Potentially there could be some findings that may provide a new way of looking at teachers' practice and contribute to knowledge in this growing area of focus on pedagogic practice in relation to blended learning. By enabling a greater understanding of the processes within a specific university, this research may benefit my own practice and also that of fellow teachers.

1.4 Justification

Selwyn (2010) states that there is "a need in the area of education and technology to take stock of who we are, what it is we do, and how and why we do it" (p. 65). By using a case study approach, this research will aim to provide rich descriptions of the ways in which teachers go about creating blended learning environments. This research will move away from focusing on the technology tools in isolation to looking at the influences that might support their integration.

As an interpretive case study, the findings of this research cannot be generalised. However, it is hoped that it will build on creating understanding so that further research may be generated in this field. Revealing the ways in which blended learning environments are created within one university may enable connections to be created with other literature on blended learning environments.

1.5 Theoretical perspectives of the study

In this research I will focus on exploring how teachers create a blended learning environment, using a qualitative interpretive case study approach. Exploring teachers' experiences in depth provides the rational for the case study approach (Cohen, Manion, & Morrison, 2000; Merriam, 1998). This research study has its foundation in Denzin and Lincoln's (2003, 2005) view of social construction,

therefore the participants are seen to be actively involved at a local level, in creating meaning of the blended learning environment. The Social Construction of Technology (SCOT) concept developed by Pinch and Bijker with its interpretive/constructivist perspective was selected to strengthen the data analysis and discussion in this research. The basic premise of the SCOT concept is that there are multiple ways in which technology can be shaped by people (Pinch & Bijker, 1984).

1.6 Definitions

To clarify the scope of this research and the context within which it is created, definitions used in this study are presented in Table 1.1. In subsequent chapters where key terminology is introduced, it will be formatted in bold to facilitate easy reference back to this table. The limited number of definitions makes it preferable to locate the table at the outset of this research study compared to a glossary appendix.

Table 1.1: Definitions used in this study

Blended learning	"the thoughtful fusion of face-to-face and online learning experiences... [which includes] a fundamental redesign that transforms the structure of, and approach to, teaching and learning" (Garrison & Vaughn, 2008, p. 5)
Course	A course is the individual unit of study in which a student is enrolled
Campus based	The case study site was historically a single mode university where courses were all delivered in a physical face-to-face space.
Face-to-face	Physical class room teaching space
LMS	Learning Management System at the case study site was Blackboard™
SCOT model	A model that provides a framework for conceptualising the development of technology across the four interrelated stages which are; Relevant Social Group (RSG), Interpretive Flexibility, Closure and Stabilisation (The individual stages of this model are described together with the literature in Table 2.2)

1.7 Structure of the Thesis

Chapter Two provides a review of the literature, defining the field within which this research study takes place. Connections to important aspects of this research study are made with a review of the literature on the role of the teacher. To fully support this research study, the literature on the specific theoretical model is also reviewed.

In Chapter Three the methodology, theoretical underpinnings and methods used in this research is examined. In the research design, the plan is presented first, followed by an account of the actual process that evolved in consideration to the ethical decisions that needed to be made during the course of the data collection.

Chapter Four provides a description of the context for this research study. The national developments and strategies are introduced together with reports that impacted on policy development at the case study site. The particulars of the university that was selected as the case study site and purposive sampling used to select the participants is described.

In Chapter Five, the findings from the data are be presented in relation to the research questions and the underpinning theoretical model. The data have been organised into themes, and each theme is presented with supporting data from the interviews. At the end of each of the four sections, an advance organiser is presented to visually represent the connection between chapters.

A summary of the main findings in relation to the research questions is presented in Chapter Six. Interpretations of the key findings are discussed in the light of the SCOT model. The findings are then summarised and attention drawn to the implications to the field of research within which this study takes place.

Chapter Seven presents the main findings from this research study together with the implications in relation to each of the research questions. The final chapter then draws together the significance of this research, limitations are reflected upon and recommendations for future research are made.

Chapter Two: Literature Review

Blended learning is a term that has gained increasing use in recent literature, over other terms such as flexible and hybrid learning (Gerbic, 2009; Picciano & Dziuban, 2007). Although blended learning is a relatively recent expression, the concept has developed out of the history of distance and online education. The focus of this research study is on how teachers create their blended learning environments at a campus-based university. This literature review will first analyse general definitions of the field of blended learning. This thesis places blended learning in the wider field of its predecessors, within the context of higher education teaching practice. To support the focus of this research study, the role of the teacher with regard to creating blended learning environments is addressed. Finally, I review the selected theoretical model (SCOT) and identify areas for further research.

2.1 Blended learning definitions

When researching blended learning it is important to examine how the concept had its foundation in, and grew out of, distance education (Graham, 2006; Moore, 2006). Historically, traditional campus-based learning and distance education developed as separate endeavours. The online technologies that enabled the development of distance education are now the technologies that are enabling blended learning to occur across the whole field of education (Graham, 2006). This development has contributed to the uptake of blended learning and Moore (2006) states that:

> The emerging view is of a mutually respectful relationship between teaching at a distance and teaching in the classroom, and the idea that 'each can do its proper work' is now encapsulated in the concept of blended learning.... blended learning is a long neglected idea whose time has arrived. (p. xxiii)

Defining the field of blended learning and its origins is necessary to situate this research study. Graham, Allen, and Ure (2005) provided an example for why it is important to establish a definition for blended learning when they stated that "by nature, both the terms 'hybrid' and 'blended' imply a mixing or combining of *something*. It is that *something* that people do not always agree upon" (p. 253). To

date, blended learning research has been impeded due to a lack of consistency in reporting (Picciano, 2007). This section reviews the way in which blended learning definitions have evolved to provide a foundation for the context and location of this research study.

Blended learning definitions have advanced over time. This evolution can be traced by reviewing texts that present a handbook of blended learning (Bonk & Graham, 2006a), provide research perspectives (Picciano & Dziuban, 2007), and offer examples of research applied to higher education (Garrison & Vaughn, 2008). There is a large body of literature in the blended learning field that could have been used to review the definitions of blended learning. The sample texts are indicative of the research that was taking place at the time (with contributions from over 50 authors) and provide a chronological overview of general trends that were identified which are presented in Table 2.1.

General broad terms that define the field are presented in section one of Table 2.1. This is followed in section two by more specific definitions, which were created to enable emerging research and funding initiatives encompassed by the text. The third section in Table 2.1 shows contextually specific definitions for higher education practitioners. The table is laid out with the definitions in the body of each section and the date range of the literature that informed these definitions in the first column. Table 2.1 concludes with the definition that was selected to support this research study.

The nuances of the definitions in Table 2.1 are now reviewed chronologically. Bonk and Graham (2006a) identified a growing trend in the adoption of blended learning that they documented in a handbook focused on global perspectives and local designs. The three major definitions of blended learning which underpin the collection of descriptions and case studies in that text are presented in the first section of Table 2.1. Cross (2006), contends that blended learning is a complex concept that cannot be described by simple percentages of different items that are blended.

Table 2.1: Progression of blended learning definitions

Years	Analysis statement and key definitions
Section 1:	**Early general broad attempts at defining the field of blended learning**
2001–2006	Sample text: Bonk and Graham's (2006a) **"The handbook of blended learning: Global perspectives, local designs"** Cross (2006) contends that all learning can be seen as blended learning when considering "blended" as comprising different modalities. Yet Cross (2006) is critical of definitions such as "40 percent online and 60 percent classroom" (p. xviii) because a simple division of percentages in either mode does not describe the actual blend that is occurring. To give a broader perspective, citing several authors in an earlier work, Graham, Allen, and Ure (as cited in Graham, 2006) list the three most common blended learning definitions as: • Combining instructional modalities (or delivery media) • Combining instructional methods • Combining online and face-to-face instruction (p. 4) Graham (2006) asserts, "blended learning systems combine face-to-face instruction with computer-mediated instruction." (p. 3)
Section 2:	**More specific definitions created with a focus on setting research parameters**
2005–2007	Sample text: Picciano and Dziuban's (2007) **"Blended learning: Research perspectives"** • Courses that integrate online with traditional face-to-face class activities in a planned, pedagogically valuable manner; (Picciano, 2007, p. 9) • Where a portion (institutionally defined) of face-to-face time is replaced by online activity. (Laster, Otte, Picciano, & Sorg 2005 cited in Picciano, 2007, p. 9)
Section 3:	**Definitions that reflect teachers' actual practice**
2007–2008	Sample text: Littlejohn and Peggler's (2007) **"Preparing for blended e-learning"** • The combination of conventional teaching approaches and e-learning elements within a single course or programme is commonly referred to as 'blended learning', but we can also think of it as *blended e-learning* The blend refers to the proportion of e-learning content within the course. It can be a strong blend (almost exclusively e-learning) or a weak blend (virtually none). (p. 29) Sample text: Garrison and Vaughn's (2008) **"Blended learning in higher education: Framework, principles, and guidelines"** • The thoughtful fusion of face-to-face and online learning experiences... (which includes) a fundamental redesign that transforms the structure of, and approach to, teaching and learning. (p. 5)

Graham's (2006) presentation of the three common definitions put forward, citing numerous authors during the early 2000's, show agreement with the broad view described by Cross (2006). The definitions concerning the modality of learning (or delivery media used), move to a slightly more refined point of blending instructional methods. I argue that these first two common definitions are limited because teachers are constantly weighing up how much to include in the face-to-face aspect of their teaching regardless of modality, and the definitions do not focus on the developments that are currently taking place specifically in relation to blended learning (Cross, 2006; Graham, 2006).

The third common definition presented by Graham (2006) moves the definitions of the blended learning field forward by incorporating the term online instruction with face-to-face instruction. Clearly this aspect of the definition emphasises a specific focus on combining developing technologies (computer-mediated or online) with traditional classroom practices (face-to-face instruction) to produce a new learning environment. Graham's (2006) final definition is in alignment with this research.

In the second section of Table 2.1, creating a rigorous definition that could function as a guiding principal for a collection of research initiatives was the challenge met by the editors (Picciano & Dziuban, 2007). Picciano (2007) recognised a variety of ways to define blended learning from a simple juxtaposition of online with face-to-face elements through to a thorough blending of elements in which the "individual parts are not as discernable as they once were" (p. 8). To illustrate this point Picciano (2007) uses an analogy of mixing paints, where in the final blend neither of the original colours is distinct. While I believe this analogy may have great potential, I find it more descriptive than definitive for the purpose of framing a research study.

Picciano (2007) presented two further aspects of the definition (pedagogical value and time replacement) to ensure that blended learning research moved beyond the limited use of technologies (such as DVD/CD/Video or casual internet browsing) to more planned activities. The impact of this definition is to hint at the underlying motivations and pedagogy that might influence blended learning, beyond the focus on technology. The specified time replacement aspect of the definition is more problematic. An emphasis on measurable time could be beneficial for identifying the funding to be allocated on a time basis. However, there may be wider

implications on teaching workload and allocation of institutional classroom resources impacted by simply measuring face-to-face time replacement. It is notable that in more recent research the specific restriction of measurable time replacement has been revisited (Moskal, Otte, Laster, & Picciano, 2011). That this has now been revisited suggests that perhaps it was a necessary step for the initial developments, however current practice may include a wider range of blended learning models that do not depend on specific time reallocation (as evidenced in this research study).

The definitions in the third section of Table 2.1 are focused on providing advice for teachers in higher education (Garrison & Vaughn, 2008; Littlejohn & Pegler, 2007). These definitions have a greater focus on the individual teacher compared to the earlier institutional level definitions. Drawing on the current research base, Littlejohn and Pegler (2007) collated practical advice for higher education teachers, and present a definition in which the time requirement is absent and instead, the idea of a "strong" or "weak" blend is introduced. There is a sense of transition included in the strong or weak blended learning definition that allows for a gradual shift into a more blended environment, where both aspects of online and face-to-face become more integrated. Littlejohn and Pegler's definition has the effect of making blended learning more inclusive, which has the advantage of making the advice in their book relevant to a wider audience whose practice may have been excluded by earlier definitions.

The final definition by Garrison and Vaughn (2008) is the definition used in this research study. This definition has been chosen because it fits best with my research setting and my pedagogical beliefs. I consider the refinement by Garrison and Vaughn (2008), emphasising the "thoughtful fusion," supports the focus on the role of the teacher and their approach to online technologies in this research study. Although the definition is similar to the Graham's (2006) definition, Garrison and Vaughn's (2008) choice of the term "online" signifies more than the term "computer-mediated" that is used by Graham (2006). The changes that are created by the thoughtful fusion of face-to-face with online tools are broader than computer mediation. The thoughtful fusion brings with it a pedagogical focus enhancing the broad developments of this field beyond the simple delineation of time or place for the learner.

The review of the literature on definitions of blended learning shows that there are a number of different definitions that could be used. To enable this research study to contribute to the study of blended learning, I believe it is vital to recognise that the field of blended learning is built on technologies that were first applied in the area of distance education (Graham, 2006). The blended use of these technologies may be now forging a connection and creating more synthesis between the fields of traditional classroom education and distance education. Ultimately, the term blended learning may be seen as a stepping stone to future developments that will see the term become redundant, because all learning will be blended (Cross, 2006). However, currently it is still necessary to provide clear definitions as the blended learning field continues to develop.

The presentation of definitions in Table 2.1 may oversimplify the concept of blended learning. The complexity of blended learning has been highlighted in the literature (Graham, 2006; Littlejohn & Pegler, 2007; Sharpe, Benfield, Roberts, & Francis, 2006). Sharpe et al. (2006) specifically stated that "the term blended learning is difficult to define" (p. 24). Littlejohn and Pegler (2007) addressed this complexity by viewing blended learning along a continuum of strong to weak blends. Graham (2006) created a model to group the different types of blended learning into the categories of enabling, enhancing and transformative blends. Sharpe et al. (2006) identified eight dimensions of blended learning which they consolidated into the following three broad categories; "[1] the provision of online supplementary resources… [2] transformative course level practices underpinned by radical course designs… [3] a holistic view of technology use to support learning" (p. 26). Graham's (2006) model of blended learning corresponds with the first two categories put forward by Sharpe et al. (2006). The use of Graham's (2006) model in this research study is reinforced by Sharpe et al. (2006) who reflected that their third characterisation is "for the most part aspirational and inspirational rather than evident in institutional practice" (p. 26). The teachers' experiences of creating blended learning environments was pivotal to this research study, therefore the focus of this literature review shifts to exploring the role of the teacher next.

2.2 The role of the teacher in response to blended learning

The role of the teacher in creating blended learning environments is the primary focus for this research study. The choice of the term teacher is discussed in relation to other terms that could be used. The blended learning field shows that practice is ahead of research (Littlejohn & Pegler, 2007), therefore, it is useful to supplement the review with some practice-based literature. The literature on the requirement for policy to support changes experienced by teachers is reviewed, followed by a discussion of policy in relation to teachers and their role in blended learning developments. To conclude, the need for research to add to the gap on blended learning practice is discussed.

Historically, lecturing has been the dominant form of teaching at campus-based universities. Over the past decade there has been a shift of focus away from the lecturer as the source of all knowledge (George-Walker & Keeffe, 2010; Lai, Pratt, & Grant, 2003; D. L. Rogers, 2000). Brunner (2007) recognises that "the transition from sage on the stage to facilitator of learning is painful in practice" (p. 116). There is recognition that a new approach is required for "the brave new online world" (Connolly, Jones, & Jones, 2007, p. 43). However there is still some concern over the concept of facilitator and its underlying role, which does not have the same sound of authority as lecturer (Bonk & Graham, 2006b). In an attempt to make the historic distinction clear, Berge (1995) argues that the term lecturer is used at traditional campus-based universities and the term facilitator is used for online instruction. Brunner (2007) recognises that this move away from the traditional lecturer to a role of a guide or facilitator is not straightforward. Bonk, Kyong-Jee, and Tingting (2006) identify the shift whereby a teacher becomes more of a mentor, coach and guide for students, as a potential trend in blended learning.

In this research study, I use the term teacher to encompass the range of teaching that can take place at the university. The prevalence of learning and teaching committees within the university sector, and their use of the term teaching further supports the term of teacher. Cross (2006) suggests that a new term for blended learning may be developed, which could also lead to a change in terminology in referring to the role of the teacher in such environments. I suggest that a new term for teachers highlighting the role of the person as a learning designer and curator may emerge as the blended learning field continues to be defined. At this point in time teacher is an adequate and appropriate term to use, supported by the fact that

teacher appears in the title of journal articles far more frequently than the term lecturer.

The introduction of blended learning has resulted in the current opportunity for teachers to create a new type of classroom (Hauck, 2008). Kember (1997) stated that it was important to look at the development of academics as teachers first. In relation to blended learning this is a pertinent point because the introduction of new technologies requires teachers to learn new rules of engagement for their teaching practice (Hauck, 2008). Change is an inherent aspect of education. However, with the introduction of online technologies, change is happening at an exponential rate, which is showing no signs of slowing (Washburn, 2009).

Jones (2006) claims that these rapid changes and the recent development of blended learning have created a situation where the teachers' actions are ahead of research into practice. For example, Littlejohn and Pegler (2007) provide practical advice for constructing blended e-learning (as they define the term), with a focus on teachers. These authors have provided a resource for teachers with suggestions and pedagogical advice for creating blended learning environments.

The role of the teacher is more apparent in a recent text by Stacey and Gerbic (2009), which examines the topic of effective practices. This contextual information is useful, with the additional benefit of providing a local context, with 10 out of 16 chapters written from the Australia/New Zealand region. Therefore, the effective practice examples are from within the local policy structure (in relation to the case study site) and make it highly relevant to this research study. The book provides examples based on research evidence, with a focus on what is being done or reactions to this, but does not contain research on how teachers actually go about blending.

Policy is one aspect of blended learning that must be considered in order to situate this research study, due to its impact on the role and work of the teacher. Policy may be created to support changes from an institutional perspective or to take into account changes that have already happened, in particular with regard to teaching style rather than mode of delivery (Blight, Davis, & Olsen, 1999). Blended learning is an area where policy is now required for both supporting and accounting for change. An investigation into the policies surrounding how teaching is conducted in blended learning is recommended by Wiesenberg and Stacey (2009).

Samarawickrema (2005) states the need for broader policy refinement. The impact of blended learning policy needs to be viewed in conjunction with other policies in areas such as workload. The role of the teacher is defined by the institution at a policy level. If the role of the teacher is changing, a corresponding change in policy will be required. McShane (2004) suggests that university policy could be informed by "research into academics' perceptions about the new technologies in teaching and learning" (p. 5). However, if the nature of the new work is not yet fully understood, policy may be difficult to create. Prior to looking at the policy, I advocate that there is a need for research that investigates teachers' processes to inform policy development and that is the purpose of this research study.

The time required by teachers to prepare for blended learning, and identifying consequent changes to the role of the teacher, are necessary to enable the potential of blended learning to be reached. Shifts in policy may be a means to facilitate teachers' adaptation to changing environments (Wiesenberg & Stacey, 2009) and by extension may assist in the systemic change required to incorporate new technologies. Duderstadt, Atkins, and Van Houweling (2002) illustrate this concern by stating:

> To date, the university stands apart, almost uniquely in its determination to moor itself to past traditions and practices.... The very institutions that played such a profound role in developing the digital technology now shaping our world are the most resistant to reshaping their activities to enable its effective use. (p. 18)

More recently Bates and Sangra (2011) concur that universities are "notorious for changing relatively slowly" (p. 152). In particular academics are deeply entrenched in their culture resulting in an organisational structure that is difficult to change (Bates & Sangra, 2011; Trowler, 1998). These views provide strong insights into the challenges faced when attempting to make changes within the university structure. The focus of this research study includes the way in which individual teachers were attracted to the inclusion of blended learning in their courses and the impact of the institutional environment.

Another challenge that teachers face when introducing blended learning into a traditional campus-based university is in the need to redevelop their course. Blended learning is more than the addition of resources. Brunner (2007) cautions that teachers need to guard against the course and a half syndrome, which is

characterised by adding materials to the blended environment without making any changes to the delivery of the face-to-face aspect. Some authors recommend that there may be the need to totally redesign a course when engaging with blended learning (Brunner, 2007; Littlejohn & Pegler, 2007). However, many teachers may require a gradual transition to a more fully blended environment (Littlejohn & Pegler, 2007). George-Walker and Keeffe (2010) argue that not only does courseware need to be redeveloped, but also that multiple resources should be provided so that the students may determine their own blend for learning. McShane (2004) emphasises that teachers "must make some critical decisions as they plan what will happen online or face-to-face, and these decisions will impact on their teaching role and strategies" (p. 14).

The shift to blended learning also raises issues for teachers in regard to workload (Nnazor, 2009). Hofmann (2006) identifies three requirements at the blended learning design phase that stem from the need to; apply a formal design process, recognise that redeveloping an existing programme is not easier than starting from scratch, and create learning experiences that are fully woven together. Hofmann contends that failure to integrate these ideas into the design of blended learning has contributed to blended learning not living up to its full potential. Teaching with blended learning is a shift in paradigm to teaching with ICT, which includes the online and computer tools teachers now need to learn to develop blended learning courses (Nnazor, 2009). Another concern is that teaching with blended learning is also a change to teaching in a way that "many university teachers have little experience of learning in" (Steel & Levy, 2009, p. 1015). Therefore, the work involved in making the change to creating a blended learning environment is hard (Hofmann, 2006), based on a foundation of little experience (Steel & Levy, 2009), and requires institutional level support (Nnazor, 2009), thus highlighting the greater workload required when integrating blended learning.

The autonomy and inherent personal leadership of the teacher that empowers them to make changes to their course design is an aspect of this research. Garrison and Vaughn (2008) state that leadership and technology are the two core ingredients for the change that is happening in higher education (connected to the introduction of blended learning). It is also important to recognise that leadership exists throughout organisations, and that teachers may also be viewed as leaders (Quinn, 2004). Although the full leadership literature is not a focus of this research, it is important

to recognise a few key aspects that pertain to technology. Woods, Bennett, Harvey, and Wise (2004) claim that fostering collaborative practices by leaders has been shown to increase the successful implementation of teaching technologies. Specifically, with regard to further developing teachers use of the online environment, collaborative leadership could be the key to the next stage (Wong, Li, Choi, & Lee, 2008).

The literature shows that with technological advances, there can be a gap or even a chasm between the early adopters who like experimenting with new technology and mainstream application of these tools (Elgort, 2005). In order to ensure technological advances stay in place as newer technologies are introduced, further research focusing on technology delivery strategies is required (Howell, Williams, & Lindsay, 2003). Wong et al. (2008) stressed the importance of sharing innovations. The way in which teachers create blended learning environments is the focus of the research questions driving this research study. The way in which the research questions are explored is through the application of a theoretical model that builds on the social constructivist dimension of technology development.

2.3 The SCOT concept and model

The SCOT model has been applied to this research study. In order to examine the literature of this model, it needs to be located theoretically in the research context. Dominant paradigms within educational research are briefly presented so that the connection from the paradigms to the SCOT concept and model can be made. This section includes an examination of the literature on the SCOT model and theoretical implications for this research study.

2.3.1 Brief paradigm overview

This research study is based in the interpretivist/constructivist paradigm, recognised as one of the main paradigms within the field of education (Mackenzie & Knipe, 2006; Merriam, 1998; Mutch, 2005). There are many different ways to describe the major paradigms in research (Punch, 2009). Essentially a paradigm provides a set of rules to frame "what reality is like (ontology), what the relationship is between the researcher and that reality (epistemology), and what methods can be used for studying that reality (methodology)" (Punch, 2009, p. 16). Merriam (1998) and Mutch (2005) contend that the three most common paradigms within the field of

education are positivist, interpretivist and critical approach, while Mackenzie and Knipe (2006) identify the four major paradigms as positivist/post-positivist, interpretivist/constructivist, transformative and pragmatic. The range of paradigms and the interchangeable way in which terms such as interpretivist/constructivist are used in the literature can create confusion (Mackenzie & Knipe, 2006; Punch, 2009).

Individuals making sense of the world around them is the central concept of the interpretivist/constructivist paradigm (Guba & Lincoln, 1994). The way in which individuals make meaning of the world is seen as either interpreting the world against internal ideas they already hold, or constructing new meanings in response to their experiences (Guba & Lincoln, 1994). In my view, constructivism holds the greatest relevance, in that the participants were developing their use of the blended learning environment through social interaction and individual work with the technology. Further distinctions can be made between constructivism and constructionism. Kim (2001) clarifies the distinction between constructivism and constructionism stating that constructivism allows for interaction with other people and directly with an object such as the LMS. Constructionism however, only allows for interaction with other people; you cannot gain any meaning from your interaction with the LMS (object) directly (Kim, 2001).

2.3.2 Concepts underpinning the SCOT model

SCOT provides a theoretical perspective for understanding technological development from within the constructivist paradigm. Pinch and Bijker (1984) put forward an argument for studying technological developments by linking ideas from the more mature field of sociology of science with the emerging field of sociology of technology. The basic premise of the SCOT concept is that there is no one correct way for technologies to be developed and that variation in development occurs as a direct result of the different people involved and their social connections (Pinch & Bijker, 1984). Prell (2009) puts forward a more elaborate definition for SCOT stating that:

> Technologies emerge from social interactions among social groups... SCOT sees no 'right' or 'wrong' technologies, as all technologies have the potential to be shaped differently based on which groups are involved.... as such, that technologies in general are pliant creatures. (p. 2)

The various ways in which technology could develop, is foundational to the SCOT concept. SCOT developed in the field of science and technology, as a response to technological determinism, which saw the development of technology as fixed (Pinch & Bijker, 1986; "SCOT STSWiki," 2009). Oliver (2011) contends that SCOT can be used as an alternative way to conceptualise the relationship between education and technology which has often been deterministic in nature. Pinch and Bijker's (1986) concept counters technological determinism that allows for only one right way in which technology can develop. Pinch and Bijker put forward the alternative view that there are many ways in which artefacts could be developed ('artefact' is the terminology used in SCOT to describe technological developments), as a result of the different people involved (which in SCOT terminology are referred to as the relevant social groups [RSG]) and the choices they make in the construction of their technology use.

2.3.3 The SCOT model

Pinch and Bijker (1984) put forward a four stage model for SCOT researchers (which is used in the current study) comprised of four interrelated stages which are RSGs, interpretive flexibility, closure and stabilisation (Pinch & Bijker, 1986; Prell, 2009). Table 2.2 is an adaptation of Prell's (2009) presentation of the model with a brief description and key concept displayed beside each of the four stages.

Table 2.2: SCOT four stage model adapted from Prell (2009)

Stages in the model	***Key concepts***
1. Relevant Social Groups (RSG)	May or may not be members of the same institute RSG has a shared interpretation of the artefact
2. Interpretive flexibility	Numerous interpretations of the artefact exist Each RSG has their own interpretation
3. Closure	Multiple interpretations cease to exist Interpretive flexibility diminishes
4. Stabilisation	The development of the artefact within the RSG This happens in degrees

The SCOT assumption that technologies are shaped by the people active in the development process is the starting point for the SCOT model and RSG is the term used to describe those involved in the process. Once the RSG is identified, the focus then moves to the actual development of the artefact. During the development phase, "interpretive flexibility" is the stage where numerous possibilities and variations are explored. When the development phase becomes concentrated on one particular idea, the artefact is said to have reached "closure"

where the RSG reaches agreement to develop aspects of the artefact (for example the LMS) and "stabilisation" when the actual artefact is developed. The literature pertaining to the SCOT model applied to this research study is reviewed next.

2.3.4 SCOT Stage 1: RSG

In the SCOT literature, the RSG term is used to describe groups of people involved in the development of technologies. The term RSG indicates that there can be more than one group, and research can focus on a particular group or several RSGs, which may or may not be from the same institution. The RSG may be a group that has existing connections, or the connection may be constructed entirely for the purpose of the research where people with similar views of the technology are considered as a RSG (who may never have met or have little connection in real life). Defining the different people involved and categorising them into RSGs is the first stage of the SCOT model presented in Table 2.2. RSGs are defined as a group that share a common purpose or understanding of the artefact (Prell, 2009).

The primary reason for identifying a RSG is to provide a useful starting point for research, however it is also noted that some researchers may find this too simplistic (Pinch & Bijker, 1986). Humphreys (2005) recognises that "the choice of relevant social groups is highly subjective and dependent upon the researcher" (p. 234) and that this is a way in which to simplify the focus that may include biases. Failing to identify the dynamics of interrelationships within the RSG is a major criticism put forward first by Russell (1986) and subsequently by Rosen (1993) and Cowan (1998). Humphreys (2005) and Prell (2009) have countered their arguments by refining the RSG section of the SCOT model in their research. Pinch and Bijker (1986) defend their selection of relevant social groups by stating that it is important to consider what would be sufficient for the specific research context. They further support this by arguing that researchers need to aim for an appropriate balance in identifying an RSG because humans are complex and there are many ways in which they can be defined.

Pinch and Bijker (1986) assert that the RSG need not be defined to that degree, rather that the RSG need only be sufficiently defined for the context at hand, and that exhaustive locating of social groups was not the goal since "all groups and structures are themselves embedded within an endless web of other groups and structures" (p. 353). In addition, the point at which the SCOT model has been

applied to this research study permits a focus on the present practical application of an artefact rather than an historic recounting. I defined and identified the RSG, being teachers with broadly similar views of the LMS, as part of the research process going forward, rather than a retrospective historic identification of groupings. This approach is well aligned with social constructivism. The RSG was not a group beyond the confines of this research study.

2.3.5 SCOT Stage 2: Interpretive flexibility

Interpretive flexibility is the second stage in the SCOT model shown in Table 2.2. Creating multiple interpretations for the artefact is the definition of the interpretive flexibility stage (Pinch & Bijker, 1984). This means that there is an explorative phase during which different ways of designing and working with the artefact are explored. The theoretical position of SCOT is that all technologies could be different and the final design is dependent on the RSG (Pinch & Bijker, 1984). The malleable nature of technology is inherent in this stage of the SCOT model; it is the different interpretations of the artefact by the RSG that is explored. Pinch and Bijker (1984) clarified that interpretative flexibility applied to both the way in which people thought about the artefacts and the variety of ways in which the artefact could be designed and used. For the purposes of this research study it is important to clarify the terms, the LMS was the artefact and the development was restricted to the way in which teachers designed their use of the LMS.

Initially Pinch and Bijker focused their examples on the different design elements of what became known as the safety bicycle. MacKay and Gillespie (1992) extended their focus on technology beyond Pinch and Bijker's view of how it is designed, by exploring the actual use of the technology. MacKay and Gillespie stated that an artefact can have many different ways in which it is appropriated. SCOT research then branched out into two distinct areas with a renewed focus on interpretive flexibility–firstly the process of "how technology is made" (Bijker, 2010) and secondly an emphasis on "how users matter" (Oudshoorn & Pinch, 2003). The flexibility of an artefact may therefore either, be closed with few possible ways in which it can be used, or open with multiple uses (Humphreys, 2005; Mackay & Gillespie, 1992). This is supported by Meyer and Avery who noted "studies that unearth the developmental stages of a technology and follow it through its implementation phase show that users are not passive [and] they are capable of interacting with technologies in ways the designers may not have predicted" (2010,

p. 158). Humphreys (2005) contends that there can also be flexibility of structure concerning how the artefact is understood.

The way in which the artefact is interpreted is therefore flexible and socially constructed. Interpretive flexibility is the stage where many possible variations are explored within and between RSGs (Pinch & Bijker, 1984) and also potentially within sub-groupings of RSGs (Humphreys, 2005). The first two stages of the SCOT model are closely connected and in this research study they pertained specifically to exploring the interpretive flexibility of the LMS artefact and how it was applied during the blended course design process of the teachers. Interpretive flexibility provided an in depth illustration of the teachers' socially constructed processes, demonstrating the close connection between social constructivism and the SCOT model.

2.3.6 SCOT Stage 3: Closure

Closure is the third stage in the SCOT model in Table 2.2. At its most simple definition, closure occurs when multiple interpretations by the RSG cease to exist (Pinch & Bijker, 1984; Prell, 2009). Prell (2009) also describes closure as a diminishing of interpretations, and Bruun & Hukkinen (2003) identify closure as the streamlining of interpretations. To clarify the shift from interpretive flexibility to closure, the RSG moves from multiple interpretations in interpretive flexibility to a shared definition of the artefact itself in closure. There are several ways in which closure is reached ranging from a redefinition of the problem, rhetorical closure, or consensus of a definition by the RSG (Humphreys, 2005; Pinch & Bijker, 1984).

By contrast, closure as a popular psychology term refers to "a conclusion to a traumatic event or experience in a person's life" (VandenBos, 2007, para. 1). Another term that may be familiar is cognitive closure, which is defined as "a desire for definite knowledge on some issue and the eschewal of confusion and ambiguity" (Webster & Kruglanski, 1997, p. 133). These terms became commonly used in the 1990s due to their use in the popular media. Research in psychology can be closely related to education and human development, therefore it is important to clearly refute the psychology definition and establish how the term closure is used in this research study.

Closure as defined for the SCOT model and in this research study is, therefore, about the RSG moving through interpretive flexibility to a fixed understanding of the artefact. Closure occurs when the RSG develops a tighter definition for the artefact and defines how the technology has become an accepted part of their practice (Pinch & Bijker, 1984). Bruun and Hukkinen (2003) state that closure is never truly reached and that technology continues to develop. However, this is not necessarily seen as a problem because technologies are constantly evolving, which becomes part of the development cycle (Pinch & Bijker, 1986). For the purposes of this research, inclusion of the LMS within the teachers' descriptions of their practice indicates closure, and the refinement of their practice with the LMS further indicates that they are committed to this new way of teaching.

2.3.7 SCOT Stage 4: Stabilisation

Stabilisation, the final stage in the SCOT model, occurs when the use of the artefact is developed (Pinch & Bijker, 1984; Prell, 2009). Closure and stabilisation are described as "two sides of the same coin" (Bijker, 1997, p. 85). Humphreys (2005) further characterises the distinction by stating, "the most pertinent difference between stabilisation and closure is that closure is about relevant social groups while stabilisation is about the artefact" (p. 243). These explanations provide a simple way to distinguish between the last two stages of the model. Stabilisation may happen in degrees (Pinch & Bijker, 1984) or as a fluid process (Prell, 2009), where the refined definitions attached to the artefact are developed over time both within one RSG or across different RSGs. Rosen (1993) clarifies stabilisation in that "the characteristics of this artefact then come to be 'taken for granted' as the essential 'ingredients' of the technology" (p. 483). Stabilisation can therefore be described as both a social and a slow process. To expand this point further, the development of ideas across the RSG must allow time for the social interactions to take place, and the clarifying of definitions may take several such interactions.

Humphreys (2005) identifies the major critique of stabilisation, in that Pinch and Bijker (1984; 1986) do not state what happens if stabilisation is not reached (they only go so far as to say that it happens in stages). Humphreys (2005) raises concern that this process of stabilisation happening in degrees is insufficient. Humphreys suggests a more flexible approach, by focusing on the way in which the artefact is spoken about, used, and structured. To address these critiques this research study

has combined its focus of stabilisation in degrees with the descriptions of how the LMS is used.

2.3.8 Critiques of SCOT concept and model

There are a number of critiques of the SCOT concept, focused primarily on the RSGs and the overemphasis of their function (Jasanoff, 2004; Russell, 1986; Winner, 1993). Initially SCOT critics argued that SCOT was a form of social determinism (Hughes, 1994; Lipartito, 2003; Russell, 1986) in that although SCOT views the many possibilities for development of the artefact, the choice of and focus on RSGs that shape this development is linear and determined by the researcher who might only focus on the groups that had successful impact on the development, as opposed to groups that did not influence the development, thereby being deterministic in approach. Winner (1993) continues this line of argument by stating that SCOT research is superficially focused on the chosen RSG and does not allow for other groups to be considered.

The next critique takes this point further by stating that SCOT excludes the RSGs who do not influence the development of the artefact (Wajcman, 1995, 2010). The idea that is of note within this critique, is that issues of social power and political standing are not addressed by SCOT (Winner, 1993). The social groups whose ideas are not considered are ignored, and even more concerning is that those without a voice are ignored completely, thus allowing for a selective view of technological development (Winner, 1993). This critique generated a subfield within SCOT research led by one of the seminal authors concentrated on ways in which users (and non users) of technology have important consequences for research (Oudshoorn & Pinch, 2003).

Finally, SCOT is critiqued for focusing too much on the social and not on the actual technical aspect of technology, to the point of ignoring the constraints of the physical world by which we are bound (Jasanoff, 2004). Russell (1986) stated that the focus on the process of development meant that the content of the technological artefact was ignored. For researchers who consider this distinction to be critical, an alternative theory called Actor Network Theory was developed, this theory allowed for agency of both humans and non-human (technological) objects to be explored (Bruun & Hukkinen, 2003; “SCOT STSWiki,” 2011). Alongside SCOT, Actor

Network Theory is the other prominent concept in the field of Science and Technology Studies ("SCOT STSWiki," 2011, para. 3).

2.3.9 Recent developments in the application of the SCOT concept

The current use and relevance of SCOT is evidenced in several Wikis that focus on SCOT. The Wikis range from the academic Science and Technology Studies Wiki ("SCOT STSWiki," 2011) to the entrepreneurial European/International Council for Small Business ("SCOT ECSB/ICSB wiki," 2009), and the general knowledge ("SCOT Wikipedia," 2011). Although Wiki's are not yet accepted as building on formal knowledge, they do show that knowledge is currently being created and added to in this field.

Initially, research focused on the development of several historical technologies, for example bicycles (Pinch & Bijker, 1984), mountain bikes (Rosen, 1993), and Bakelite and fluorescent lighting (Bijker, 1997). More recently SCOT was applied to research focused on software, for example, Gyambrah (2007) who took a theoretical stance to review the provision of e-learning technologies at an institutional level, Prell (2009) who investigated the development of a website, and Bissell (2010) who explored the use of proprietary spreadsheet software. While each of these had an educational context, the focus for all of the research was on how the software was developed rather than the role of the teacher per se. My research extends SCOT to the software (the LMS) and its use by teachers.

Literature concerned with the application of SCOT highlights the need for research studies that focus on the actual use of technology (Bissell, 2010; Edgerton, 2004; Winner, 1993). Specifically, in the area of ICT it has been noted, "the whole area of practical use of ICT-supported learning technologies appears to be under-researched" (Bissell, 2010, p. 539). Winner (1993) critiques SCOT for ignoring the consequences of technologies after they have been developed. Therefore, this research study aims to extend the application of the SCOT concept beyond the development phase through to the practical application of ICT to create a blended learning environment.

2.4 Conclusions from the literature review and areas for further research

Motivation to use blended learning is evidenced in the literature in phrases that allude to "the best of both worlds" (Gruenewald, 2003; Nielsen, 2008; Ward, 2004) and the "hope for the 21st century" (Connolly et al., 2007; Daniel, 1997). Daniel (1997) indicated that ideas for the potential of blended learning have been anticipated for some time. Recent research cited above shows that these ideas for the potential of blended learning are now starting to come to fruition, however much of this research has had a student focus and the area of teachers, which is the focus of this research study, has remained under researched. There is a scarcity of literature that looks at exactly how blended learning environments are created by teachers. However, there is an abundance of literature about advice, design, and reports on what has happened (Bonk & Graham, 2006a; Littlejohn & Pegler, 2007; Stacey & Gerbic, 2009). Accounts of the ways in which teachers are transitioning to blended learning are now appearing in the literature (Samarawickrema, 2009; Wiesenberg & Stacey, 2009; Wilson, 2011) however detailed accounts of the teachers perspectives are yet to be fully explored (Gerbic, 2011).

Specifically accounting for the processes and influences on teachers in their creation of blended learning environments is a current gap in the literature and the application of the SCOT model in this research study attempts to address this in detail. Bijker (2010) emphasises the benefit of applying SCOT as a tool to investigate the process of technology development, which is supported by Jump (2011) and Prell (2009) who utilise SCOT to focus their research on the application of software. Van Lieshout, Egyedi, and Bijker (2001) found in relation to teaching with technology that "it depends almost solely on the intrinsic motivation of individual teachers" (p. 14), which I contend is a valid point in relation to the current technologies and investigation into the teachers' processes.

There is surprisingly little in the research that focuses directly on the role of the teacher in creating blended learning environments. This has led me to review the e-learning literature, where it is recognised that there is "a bafflement of technology available to lecturing staff today" (Brown & Cornwall, 2000, p. 3). Collis and Gervedink Nijhuis (2001) support the challenges of integrating ICT into teaching practice by reviewing the large managerial aspect this introduces, supporting research into the work this would create for teachers. There is also an expectation

in the 21st century that lecturers will need to develop a wide range of technology skills on top of their traditional responsibilities associated with teaching at university (Thirunarayanan & Perez-Prado, 2005). Power (2008) recognises that there is little research to date on the actual work that teachers are now engaging in.

> Online teaching is creating new challenges for faculty and new responsibilities for educational developers. Although there is adequate literature with regard to faculty thinking about course planning in general, there are few publications on how they actually plan for online teaching. (p. 5)

If there is little written about planning for online teaching, there is even less written about planning for blended learning. Researchers in blended learning have found that the role of the teacher is changing significantly (Kaleta, Skibba, & Joosten, 2007) and that teachers are concerned about issues such as workload and the time consuming nature of this change (Kaleta et al., 2007; Krieg, Daniel, Weaver, & Higgins, 2006). The shift to understanding what this may mean for the role of the teacher in regard to blended learning is highlighted by Gerbic's (2011) application of Berge's (1995) framework for identifying the range of online teaching roles. What is unclear from the literature is the reason why this change in the role of the teacher is occurring (Gerbic, 2011, p. 230). How teachers are actually changing their work, and the approach they use when creating a blended learning environment, is the gap on which this study is focused. In the context of academic writing, Murray and Moore (2006) said "if we know more about the complexities of the process, it may be that we can come to terms with the challenges of the content" (p. 1), and in my view the same applies to the creation of a blended learning environment.

The field of blended learning has the potential to bring about transformational change (Graham, 2006; Laurillard, 2008a), and the potential for what this may generate has been identified in the literature (Selwyn, 2007). However, Laurillard (2008a) cautions that education has been on the brink of transformation for some time, necessitating this closer investigation into teachers' practices.

> Education is on the brink of being transformed through learning technologies; however, it has been on that brink for some decades now. ... never before has there been such a clear link between the needs and requirements of education, and the capability of technology to meet them. It is time we moved education beyond the brink of being transformed. (Laurillard, 2008a, p. 1)

This research study aims to address these gaps in the literature by providing visibility into the ways in which teachers create blended learning environments, a necessity argued by Cornford and Pollock (2002). This gap is supported by the call for research into the changing practices of teachers due to blended e-learning (Littlejohn & Pegler, 2007) and the impact of new technologies (Laurillard, 2008a). The requirement for research by teachers is put forward by Selwyn (2010) who calls for teachers to take stock of what it is that they are doing, due to the many changes that have occurred with blended learning, which this research study supports through a case study investigation into teachers' creation of blended learning environments at a campus-based university.

Chapter Three: Research Methodology and Design

The research design is described in this chapter. The paradigm is considered first and the characteristics of the case study approach discussed in relation to this research study together with its limitations and ethical considerations that were taken into account. The data collection plan, an account of the data collection process, and data analysis procedures are presented. To clarify the terms of methodology and methods and how they are used in this research study, I have used the term approach to refer to the underlying principles and methodology of the research. Method has been used to signify specific procedures applied to this case study.

3.1 Overview of the research study methodology

Punch's (2009) pragmatic approach was taken, in which the research questions (presented in Chapter One) were developed first as a starting point for this research study. This was done so that the best method to answer the research questions could be selected, because it was important that research questions drive the method to be used rather than trying to fit the questions to the method (Punch, 2009). The aim of this research was to explore how teachers incorporated blended learning into their teaching environment. Mackenzie and Knipe (2006) stated that in order to select the appropriate research design and method to answer the research questions, the research paradigm needed to be articulated first. The paradigm and qualitative approach that lead to the selection of the case study for this research study follow.

3.1.1 Paradigm overview

Mackenzie and Knipe (2006) recognised that the terminology for paradigms can be confusing due to the different ways in which they are presented and the interchangeable way some terms are used. Denzin and Lincoln's (2003, 2005) interpretivist/constructivist paradigm was selected to support this research study because of the suitability for answering "how" type questions. This approach is recognised as one of the prominent paradigms within educational research (Merriam, 1998; Mutch, 2005). How the participants socially and experientially constructed their knowledge of creating a blended learning environment was the specific focus of this research.

The use of the interpretivist/constructivist label can be traced back to earlier work by Denzin and Lincoln (2003) where they located interpretivism as the overarching paradigm, with constructivism as a substantive-formal theory within the interpretive paradigm. Punch (2009) established that these terms have been used interchangeably in different text, Denzin and Lincoln's (2005) multilayered categorisation avoids these issues. Paradigms provide a means to frame reality as the ontology, a way of clarifying research relationships with epistemology, and to verify suitable methods (Punch, 2009). The way in which this research study has been framed is next presented in relation to its paradigm, moving from a broad to a narrow identification of knowledge creation in this research study.

Paradigm ontology: This research was based on the belief that people (here the participants in this study) made meaning of the world around them and, as such, their reality was constructed locally (Guba & Lincoln, 1994). Synthesising multiple views from the literature, Punch augments the definition of interpretivism and constructivism in the following way. Interpretivism "concentrates on the meanings people bring to situations and behaviour, and which they use to understand their world" (Punch, 2009, p. 18). Therefore, it is the participants' own meaning of the blended learning environment that is the focus, rather than any external definition that has been created elsewhere. Constructivism locates "realities [as] local, specific and constructed; they are socially and experientially based, and depend on the individuals or groups holding them" (Punch, 2009, p. 18), further consolidating the participants' active role in constructing their own teaching reality. The SCOT model described in Chapter Two (Literature Review) reinforces the significance of the participants' socially constructed reality of their blended teaching practice.

Paradigm epistemology: Knowledge about the participants' reality in this research resulted from interactions between the participants and the researcher. This approach to the creation of meaning is described as transactional epistemology, that is meaning was subjectively created as a result of the enquiry that the researcher and participants engaged in (Guba & Lincoln, 1994; Schwandt, 1994, 2001). The focus for this research was the reality that each of the participants had created in their use of the LMS technology, which they were invited to share and discuss, taking an active role in the interviews conducted for this research study.

Paradigm methodology: A multi-faceted process to explore the participants' world was used, which can be seen as an example of Guba and Lincoln's (1994) dialectical creation of knowledge. Dialectical refers to an iterative cycle of analysis used to construct knowledge (Guba & Lincoln, 1994; Schwandt, 1994, 2001), which in this research study included a two cycle deep coding process. A qualitative case study approach was chosen to explore the participants' engagement in the blended learning design process and to investigate how they perceived their blended environment. Merriam's (1998) four aspects of the qualitative method held that: individuals construct reality through social interaction, data is collected primarily by the researcher, the researcher gathers data through fieldwork, and that an inductive strategy is employed (Merriam, 1998). These four aspects of the qualitative method are supportive of the paradigm structure discussed above. The way in which the qualitative case study approach is located within and complimentary to the interpretivist/ constructivist paradigm is presented next.

3.1.2 Qualitative case study approach

Within the qualitative framework, case study is a specific approach that allows a researcher to focus on answering "what" and "how" type questions (Merriam, 1998; Yin, 2009). Merriam (1998) highlighted case study as a useful way for conducting research into educational initiatives and processes. The aim of exploring teachers' experiences further influenced the choice of case study that had strengths in identifying processes and interrelationships (Merriam, 1998). This research focused on the process of creating a blended learning course (the participants' approach to incorporating the LMS) and the interrelationship between the LMS and face-to-face teaching.

Case study is defined as "an intensive, holistic description and analysis of a single unit or bounded system" (Merriam, 1998, p. 12) to provide rich meaningful context specific data. The case study approach is comprised of the following four characteristics: (a) a bounded system in which the research takes place, (b) a case of something presented, (c) a holistic focus, and (d) a variety of data sources and collection methods may be used (Punch, 2009). These four characteristics and how they related to this research study are expanded upon followed by limitations and ethical considerations.

The bounded system: There are many different ways in which the boundaries of a case study can be recognised, for example, by organisation or by decisions and attributes (Miles & Huberman, 1994). A single institution was selected as the case study site for this research study to limit the size of this master's thesis project. Yin (2009) recognised that it can be difficult to distinguish the case from the context, therefore specific contextual information about the case study site and participants is provided in Chapter Four.

A case of something: Punch (2009) stresses the importance stating what the case study is a case of, thereby making explicit the focus of the research. The essence of the research questions is that this is a case of exploring the influences and environmental impacts on the ways in which teachers create blended learning environments at a campus-based university. Looking specifically at six participants' processes in applying the LMS to their teaching practice from different study areas across the case study site.

The holistic focus: Punch (2009) recognises that there is a need to strike a balance between attempting to represent the entire case and the fact that not everything can be studied. Therefore, careful consideration was given to how the participants would be selected within the boundaries of the case study site through targeted sampling based on LMS usage, snowballing and personal connections. The details of participant sampling are described in the plan presented in section 3.2.

The variety of data: Punch (2009) describes the wide range of data sources and collection methods that can be used in case study research and advises that the planning of a research project can be placed on a continuum between tightly and loosely structured design. In this research study, a two-phase semi-structured interview structure and a LMS course analysis/review were chosen. The data gathering protocols that were developed to support the data gathering processes are displayed in Table 3.1.

3.2 Research design

In case study research, common methods of data gathering are interviews, and document analysis (Bassey, 1999; Merriam, 1998; Simons, 2009; Yin, 2009). The plan in this research study was to conduct a document analysis of the LMS and engage in a two-phase semi-structured interview with the participants.

3.2.1 Research structure overview

The structure of the research design and discussion of these methods follows. The data gathering protocols and question prompts that were used to support the data collection are presented in Table 3.1. The plan was referred to throughout the data gathering process to ensure consistency. These questions were paraphrased and adapted to the flow of the interview, and where possible the lead was taken by the participant and the points that they raised.

Table 3.1: Overview of data collection protocol (plan)

	LMS Course Analysis	*Interview Phase 1: Semi-structured Interview LMS Guided Tour*	*Interview Phase 2: Semi-structured Interview Meeting Room*
1. Key experiences	Does more experience lead to greater diversity of content?	How has your online environment evolved over time?	Tell me about your first experience with or your decision to use [the LMS].
2. View of change in own practice from face-to-face	Examples of BL content online	Descriptions of how work has evolved	Describe the ways in which your practice has changed to incorporate the LMS.
3. The work in providing blended learning	Types of product = skills required	Are there aspects which you had assistance with? How does this connect with...?	Describe the types of work that is involved in creating a blended learning environment.
4. The people / team / support involved	Other staff who have access	Who has been involved in creating this environment & to what extent?	Tell me about the wider team and who else does invisible or background work to support you.
5. Complications & challenges/ Lessons Learnt	Any obvious access issues or language in announcements etc.	Could you show me an example of...? How did you create this aspect....?	What are some of the challenges/lessons learnt? Do you think everyone does this sort of work?
6. The potential of BL & ideals	Scope of activities provided	What would you potentially like to be able to develop?	Where would you like to see your blended teaching evolve to? What are your goals?
7. Reskilling / Continual / improvement	Identify types of skills required	How have you learnt these skills? Training, self-taught	How would you describe your approach to using technology?
8. Holistic blend of [the LMS] with face-to-face	References to both / other environment Sense for self-directed, extension or compulsory activity	In conclusion, could you show me something that exemplifies your approach to blended learning?	In closing, how would you describe teaching with the LMS, to a new teacher who is unfamiliar with blended learning?

The plan for the data gathering phase was to first gain access and view the participants' LMS courses, followed by a two-phase semi-structured interview. The first interview was designed to provide background information to the course that the participant had created and to facilitate deeper questioning in the second interview. Each section of data collection was planned to gather greater depth and breadth in the data, with the aim of building rapport and understanding of each participant's context over the cumulative duration of contact with the participant.

3.2.2 Participant sampling

The case study method supports the small sample size of participants in this research, allowing some flexibility in the depth and breadth of material gathered, along with the ability to continue with the study should any participants choose to withdraw. Furthermore the scope of a master's research project was used to limit the range of participants to between four and eight, so that adequate scope and participant availability would not negatively impact on this study. Purposive sampling was used to ensure that participants were selected to represent different teaching settings, study areas and faculties from across the institution. In an attempt to make the case as whole as possible the following dimensions were also considered: study area, class size, range of technology tools used and approach to the use of technology.

3.2.3 LMS course analysis

Online resources can provide a rich source of data. Merriam (1998) identifies that "web pages... can be considered documents that are simply accessed online.... [and items] available in static form to be downloaded by the user can be treated as artifacts" (1998, p. 128). The analysis of the participants' course was therefore planned as a modern application of case study practices viewing the online course as a form of web document. Simons (2009) also recognises a broad range of documents for analysis and suggests that "document analysis is often a helpful precursor to observing and interviewing" (p. 64). In the planning stages it was envisaged that, prior to the interviews, there would be an analysis of the participants' LMS course(s), in order to gain an understanding of the environment in which each participant was working. The purpose of viewing the LMS course would be to provide a source for developing rich interview questions and to provide background information to further understand descriptions and terminology that

might be used by the participant. The strength of this method is that documents were created before the research was conducted, therefore they have not been influenced by the researcher. In this case the documents also allowed for a form of observation of the actions the participants had taken in their LMS practice. The limitation for this method is that documents often require interpreting within the contextual setting of the environment for which they were created. Interviews were selected to provide the required rich contextual understanding.

3.2.4 Interviews

Merriam (2009) states that "interviewing is necessary when we cannot observe behaviour, feelings, or how people interpret the world around them" (p. 88). Patton (2002) makes clear that:

> "we interview people to find out from them those things we cannot directly observe... We cannot observe how people have organized the world and the meanings they attach to what goes on in the world. We have to ask people questions about those things" (p. 340).

For this research study the introduction of the LMS and the ensuing blended learning environment may be viewed as the world in connection to the quote above. Interviews were selected to support the investigation into discovering the new invisible work that teachers are now engaged in with blended learning. To further support the design of this research study, interviews provided a way to address the limitation of the LMS course analysis, the participants were asked questions about their blended learning course design process that they had engaged in.

Interviews were selected to support this research study to gain deep and rich descriptions of the participants' experiences (Merriam, 1998; Patton, 2002; Simons, 2009; Yin, 2009). Interviews are often described in qualitative texts in relation to the amount of structure applied, ranging from highly structured interviews, semi-structured interviews, and informal unstructured interviews (Merriam, 1998, 2009; Patton, 2002; Simons, 2009). Semi-structured interviews can be described as incorporating elements from both structured and unstructured interviews (Merriam, 2009). Specifically semi-structured interviews were selected because they allowed the researcher to respond to the interview situation and to adapt the wording and order of the questions during the interview process.

Limitations of semi-structured interviews are that the researcher needs to guard against personal bias and that the interviews deal with people's views rather than their actions. Interviewer bias may influence participant responses and important issues may be overlooked (Patton, 2002; Yin, 2009). The design of the data gathering process with the two-phase interview structure supporting the LMS review was made in an attempt to maximise the benefits of the methods and reduce the limitations.

The two-phase interview structure was applied to facilitate a deeper understanding of the participants' environment that they had created. In the first interview the participant was invited to give a guided tour of their LMS course. The LMS document analysis was used to inform the second interview and clarify points that the participant raised, and the second interview was conducted in a meeting room interview setting, providing a rich range of data from each participant.

3.3 Data collection process

3.3.1 Participant recruitment

Following ethical approval, recruitment from personal networks and snowballing were the techniques used to approach participants. These approaches ensured a range of six participants from different study areas and teaching levels were selected. The initial invitation to participate in the research project was made either in person or by phone call, and followed up with an email confirmation. There was an open invitation for participants to meet with the researcher and discuss any questions they may have had and they chose their own pseudonym to protect the confidentiality of their responses. Privacy was maintained with the data gathered and consent forms stored in separate locked cabinets.

3.3.2 Data collection preparation

A master index was developed to record all contact with the participants which occurred in the following order:

- Initial contact: request participation in this research study
- Schedule and conduct Interview 1
- Gain access to the participants' LMS
- Schedule and conduct Interview 2
- Send transcripts for verification, proceed to analysis

The order of the interviews and variations between LMS access and interview style are presented in Table 3.2. The initial plan was to conduct the LMS course data gathering and analysis prior to the first interview, however, the participants determined the timing of the access. Two participants requested a single interview rather than the two phase approach, which was accommodated. The interviews were between 45—60 minutes in duration (and the combined interviews were 90-100 minutes long). In one instance there was a recording failure which resulted in a third 30 minute interview. An LMS upgrade during the course of data gathering meant that historical aspects of the LMS usage could no longer be viewed and as such this aspect of data collection was abandoned.

Table 3.2: Data collection order of events.

	LMS access provided	*Interview 1*	*Interview 2*	*Interview 3*	*LMS statistics*
Grace	At Interview 1				Yes
Wally	At Interview 1			3rd interview	Yes
Ben	After Interview 2				No
Mary	Before Interview1	Combined at participants' request			Yes
Ray	At Interview 1	Combined at participants' request			No
Michael	At Interview 1				No

3.3.3 Ethical Considerations

The specific tools used in this research for which ethical approval was granted were a participant demographics form (Appendix A), an analysis/review of the participants' LMS course and semi-structured interviews that would be recorded then transcribed by the researcher. This research focused on the role of the teacher, therefore the LMS analysis was limited to reviewing the range of features present in the LMS provided by the participant. The timing of the interviews and LMS review were adapted in response to the participants' request (Table 3.2), which can be described as applying ethical considerations during the course of data gathering. The participants selected pseudonyms to protect their identity.

3.3.4 Data collection process

The first interview was scheduled in a location that the participant had selected which had a computer with internet access. At the start of the interview the consent forms were signed and a short demographic form (Appendix A) was completed. The participants were then invited to provide a guided tour of their LMS on the computer. Additional questions from the interview schedule (as indicated in Table

3.1) were asked as they arose in response to the tour provided by the participant. Some participants provided screen captures of pertinent examples that they wished to share. At the conclusion of the interview, I requested access to their LMS and set a time for the next interview that would fit with the participants' schedule.

Interview two took place in a meeting room with voice recording technology and note taking. An ice breaker question was asked at the start of the interview where the participant described their first key experience with the LMS, and then followed with the themed questions from the protocol schedule (Table 3.1). With the final participant that was interviewed, considerable time had elapsed between our interviews. As such, I was able to ask questions about plans he had completed. The first three second phase interviews ended with a presentation of the LMS course statistics and document analysis back to the participant. However following this there was a system upgrade and access to this data was lost and therefore I decided to disregard this data and focus instead on the emerging themes of the choices the participants made rather than the LMS usage data.

The original research design plan positioned the LMS course review prior to the interviews. However, the pilot interview and a personal experience prior to contacting my first participant changed the design of this research, as did technical challenges and limited access to the data. The LMS course review therefore became an important step in the process of deepening and enriching the interview and did not form primary data to be analysed. In the pilot interview, I realised that I could not observe what had been created without a guided tour first. I needed the changes and implications explained to me, because I could not comprehend the depth of development by looking at the surface. This insight together with my own feelings when asked to provide access to my LMS courses, altered this step of my research design.

My own personal reaction made me realise that I felt uncomfortable in providing access because I considered the LMS supplementary to my face-to-face teaching, which necessitated a personal explanation. The LMS course had not been created to be used or viewed in isolation from the face-to-face classroom. Therefore, in my own research it seemed more ethically respectful to the participants to let the timing of access arise naturally with the participants rather than to enforce the structure I had put in place from a planning perspective.

Access to the participants' LMS course was used to build rapport in the second interview. This is consistent with the view that "documents of all types can help the researcher uncover meaning, develop understanding, and discover insights relevant to the research problem" (Merriam, 1998, p. 133). Another benefit in reviewing the LMS course was that "documents, however, are usually produced for reasons other than the research at hand and therefore are not subject to the same limitations (as interview or observations)" (Merriam, 1998, p. 112). The LMS review was the aspect that could be viewed independent of the participant. Access to the LMS was used to clarify aspects of the participants' guided tour and to provide the background for developing probing and devil's advocate style questions during the interview process.

At the conclusion of each interview I conducted an interview summary adapted from Miles and Huberman's (1994, p. 53) contact summary sheet, for my own notes. The purpose of this was to capture immediate insights and thoughts to connect with the data, given that there was elapsed time between the interviews, transcribing and return of the transcripts that preceded analysis.

3.4 Data analysis procedures

The interviews were transcribed in full (verbatim with interstitials) and the transcripts were sent to the participants for verification. The participants accepted the interview transcripts, three of the six participants suggested minor corrections that were updated in the finalised transcript. This style of transcribing led to a vast amount of data that elongated the data analysis process. Given the focus of this research study on thematic analysis, NVivo was used to manage the data analysis following Bazeley's (2007) suggested format for setting up a project. The broad process outlines creating codes for thematic analysis and writing memos for personal reflections during the coding process. The choice to use NVivo came from my background of using databases and as a way to obtain a coherent overview of the data. It is acknowledged in the literature that there may be concerns regarding the use of software for qualitative data analysis (Bazeley, 2007; Merriam, 1998), however this was a strength that fitted in with my natural working style and technical background.

Developing the key themes beyond the groupings presented in the plan in Table 3.1 was assisted through writing memos during the coding process. Memo writing is

suggested by Bazeley (2007) and Gibbs (2002) as a key process for developing themes. Bazeley (2007) introduces "the routine of journaling [writing memos] as a way of keeping an audit trail of reflections on the project, spontaneous thoughts and developing ideas relating to the topic of the research as a whole" (2007, p. 55). The memos I created provided the ability to search through the data and confirm my themes easily against the original transcripts. A major breakthrough moment was when my supervisor saw a mind map I had done and suggested I use more mind maps to condense the data. Photographing the mind maps from my whiteboard meant that these could be used as a constant touch point so that my analysis was informed by the view of the participant. Two coding cycles were carried out - an inductive first cycle coding which was followed by an analysis based on the SCOT model.

3.4.1 First cycle coding

Saldana (2010) clarified that "a theme is an outcome of coding, categorization and analytic reflection" (p. 139), which was how I inductively established the five main themes from this initial data analysis. These themes were then reflected upon and as I added detail to each theme, I listed key quotes from the participants and chose one to encapsulate the idea of this theme. This resulted in a shift in my understanding, as I put words and concepts around each theme, and I was able to make the abstraction to new concepts from the data beyond the questions I had been asking. Suddenly that data was speaking to me and I could see different linkages evolving. At this point, I moved away from the data directly and started the phase two analysis structured with the key ideas and the SCOT model.

3.4.2 Second cycle coding

Saldana (2010) described the second cycle of coding as "advanced ways of reorganizing and reanalyzing [coded] data" (p. 149). Considering the data in relation to the SCOT model was a powerful insight. Saldana (2010) further stated that "the primary goal during Second Cycle coding, if needed, is to develop a sense of categorical, thematic, conceptual, and/or theoretical organization from your array of First Cycle codes" (p. 149). Therefore the analysis of the data was enriched by applying the SCOT model in second cycle coding and the original (first cycle coding) themes were refined in the light of the SCOT model. Jump (2011) applied SCOT to case study research as a method to provide greater rigor to the case study

approach. Table 3.3 displays the transition from the original five themes in the first cycle coding to second cycle coding and the connection with the SCOT model.

Table 3.3 Connecting data themes with the SCOT model

First cycle coding	*Second cycle coding*	*SCOT model*
1. Role (who I am) 2. Work process	Influences on choosing	RSG
3. Resources and Assessment	Dynamic Nature	Interpretive Flexibility
4. Outputs / tools refined	Refining Practice	Closure
5. Outputs finished products	Future Direction	Stabilisation

The application of the SCOT model reinforced the focus of the participants' socially constructed reality regarding their blended learning design process. The results of the data analysis and the way in which each of the SCOT model stages relates to the data is presented in the introduction of the research findings in Chapter Four.

3.5 Research Trustworthiness

In order to contribute to the research field and body of knowledge it is vital to articulate the ways in which research quality was addressed in this research study.

> Whoever they are – research sponsors, examiners, community stakeholders - readers of your case study need to be assured that your findings are accurate, credible, plausible and trustworthy given what you are trying to understand in the particular context of your case. (Simons, 2009, p. 132)

Merriam (1998) states that trustworthiness can be established when there is "some accounting for their validity and reliability" (p. 198). Following the criteria set by Merriam this section is discussed under the headings of internal validity and reliability, external validity and generalisability, and concludes with limitations.

3.5.1 Internal validity and reliability

Establishing trustworthiness has been supported by providing detailed descriptions of interpretive/constructivist paradigm and qualitative case study applied in this research study, so that the stance of the researcher is declared. The goal and design of this research have been detailed to demonstrate research reliability, which was presented in section 3.4 describing the data analysis process. To increase visibility into how this research was conducted, a description of the participant sampling and recruitment was provided.

Triangulation and validation are two approaches that can be used to increase the trustworthiness of qualitative research (Merriam, 1998; Simons, 2009). The combined methods of two-phase interviews with the LMS review enabled multiple sets of data to be used to inform the researchers' understanding and validity of the researcher findings were checked with the participants during the interview process. The participants were consulted for feedback on the interview transcript so that they could verify the accuracy and make any changes that they wished to make. Analytical memos were also written during the data analysis process to create an internal audit trail to capture both my own process of inquiry and to provide an audit trail of the analysis process (Bazeley, 2007; Saldana, 2010). The data analysis procedures and description of the two cycle coding process further describe the systematic approach that was taken to enhance credibility. To support the emphasis of qualitative research these details have been provided to demonstrate the dependability and consistency of the findings in this research study.

3.5.2 External validity and generalisability

External validity which is associated with the idea of generalising the findings from one research study to a broader population, are difficult concepts to connect with qualitative case study research (Merriam, 1998). Caution must be used when stating the implications of a case study based research study, due to the highly contextual nature. Providing sufficient details for the reader to make their own decisions regarding the generalisability is an important aspect of case study research (Cohen et al., 2000; Stake, 1995). Providing "rich, thick description" (Merriam, 1998, p. 211) is another way in which to enhance the readers ability to determine the suitability of transferring or generalising findings to other settings.

The context of this research study is fully described in Chapter Four to facilitate generalisability or particularisation of the research context by the reader. Findings from this research may be of interest to staff at the case study site (both those who currently utilise [the LMS] and those who are about to engage in this), and also to the staff development centre that administers this system and creates staff development programmes and training initiatives. This research may also provide some useful insights to other institutions that are moving from campus-based to blended learning environments by creating new knowledge about teachers' work.

3.5.3 Limitations of case study research

Merriam (1998) states that it is important to acknowledge the following limitation of case study research:

> The special features of case study research that provide the rationale for its selection also present certain limitations in it usage. Although rich, thick description and analysis may be desired,... the amount of description, analysis, or summary material is up to the investigator.... Qualitative case studies are limited, too, by the sensitivity and integrity of the investigator. The researcher is the primary instrument of data collection and analysis. (p. 42)

Guba and Lincoln (1994) emphasise the need for ethical behaviour on the part of the researcher that correlates to concerns regarding rigor in conducting such research (Hamel, 1993; Jump, 2011). The ethical considerations that guided this research study are presented in the next section, these are detailed to try and mitigate some of these concerns and state how limitations have been considered.

3.6 Summary

This chapter has provided an overview of the research study methodology situating this research study in the interpretive/constructivist paradigm with a qualitative case study approach. The research design was presented with the data gathering protocols and discussion of the LMS course analysis and interview methods applied. The data collection processes were described providing details of how the research study was conducted. The data analysis procedures including an inductive first cycle thematic coding and deductive analysis using the SCOT model in second cycle coding was explained. This chapter concluded with the methodological limitations, generalisability, adequacy and ethical considerations that must be acknowledged and taken into account. Next, Chapter Four describes the context within which the LMS usage was occurring with regard to national, institutional and the participants' individual contexts to fully situate this case study research.

Chapter Four: Context

The purpose of this chapter is to describe the context within which this case study research took place. Providing the particulars of the case study site in this chapter aims to support the reader to make their own decisions about the transferability and similarities of this research study compared to other settings (Cohen et al., 2000; Simons, 2009; Stake, 1995). The case study site selected for this research study is a campus-based university that has transitioned to blended learning located within the New Zealand tertiary sector. The blended learning developments that supported the implementation of the LMS and created the foundation for blended learning are reviewed. Blended learning developments are described in relation to the national and international e-learning initiatives that instigated policy development at the case study site. This new policy contributed to the provision of a professional development unit and contestable grants at the university. To further situate this research study a description of the participants and their shared views about the LMS which contributed to the selection process and forming of the RSG is provided. The section on information contributing to participant selection contains detailed descriptions of the participants' demographics, the forming of the RSG and their common LMS beliefs.

4.1 Case study site and the blended learning context

This research study was conducted at a campus-based medium sized metropolitan New Zealand university. Strong connections with industry and a vocational focus were key attributes of the university. The mission statement for the case study site is "to foster excellence, equity and ethics in learning, teaching, research and scholarship, and in so doing serve our regional, national and international communities" (___ University, 2002, p. 2). The mission statement clearly positions an emphasis on learning and teaching, which continues to be rewarded at the case study site. At a recent teaching excellence award ceremony the following statement was released:

> Teaching is more of an art than a science. Great teachers have the ability to create some magic; the ability to get students to discover that they have more ability than they realised. That's what we value at [this University] and that is what these [teaching excellence] awards, made by students themselves, recognise. (___ University, 2011a).

The university introduced the current proprietary Blackboard™ Learning Management System (LMS) in 2002, following several other online tools that had been explored. Data collection occurred in 2009–2010 and the range of teacher experiences explored in this research study included developments that took place between 2005–2010. During that time there was much activity focused on developing online learning in the New Zealand tertiary sector, as part of a general worldwide and national trend. Key documentation at a national level included the tertiary education strategy report (*Tertiary Education Strategy*, 2004) the interim tertiary e-learning framework (*Interim Tertiary eLearning Framework*, 2004). Both reports emphasised technology and the use of online learning for New Zealand tertiary institutions.

> This interim framework provides high level direction for the development of tertiary sector elearning capabilities. It identifies seven key action areas where centrally co-ordinated national initiatives are required. To implement the framework, an action plan will be developed over the course of April to July 2004. (*Interim Tertiary eLearning Framework*, 2004, p. 16)

The seven key action areas identified for the tertiary sector were: "developing a 'community of practice', e-learning research, professional development, adopting common technical and design standards, electronic rights management, developing frameworks for recognising flexible learning, improving access to e-learning for marginalised learners" (*Taking the Next Step*, 2004, p. 10). As a concluding point it was emphasised that "finally, New Zealand's e-learning landscape must not be viewed in isolation from its global context" (*Interim Tertiary eLearning Framework*, 2004).

Policy is created in response to demands at an institutional, national and even international level, supporting Evans (2003) claim that policy does not exist in isolation. Support for technology and professional development are evident in the university policy on flexible learning, which can be traced back to the national directive. The purpose of the university flexible learning policy at the case study site was to provide:

> an approach to education that allows for the adoption of a range of learning strategies in a variety of learning environments to cater for differences in learning styles, learning interests and needs and for

> variations in learning opportunities. Online and distance education are included in the meaning of flexible learning (___ University, 2005, para. 6).

The Flexible Learning Policy makes it clear that the policy was created in response to the Strategic Plan Key Strategic Area 7, "to ensure that learning takes place using high quality facilities and technologies" (___ University, 2002, p. 12). The Flexible Learning Policy was updated in response to online learning initiatives and may have been created to support future change from an institutional perspective and/or to take into account changes that were happening at the time, especially the rise in interest in online learning. During this time the staff development centre increased the number of contestable development grants that focused on innovation in teaching and advisors were appointed to support and provide opportunities for staff professional development. The staff development centre had the responsibility for implementing, supporting and developing the use of the LMS. Support for teachers was made available in a range of formats from individual consultation, formal and informal training opportunities and assistance with all stages of the development grant process (___ University, 2006).

Concerns concentrated around workload and technological ability were identified within the case study site in regard to future use of the LMS (Krieg et al., 2006). Workload was not mentioned in the flexible learning policy, which may be an aspect for consideration in future revisions. Policy is generally created with regard to teaching styles, rather than the modes of delivery (Blight et al., 1999), which may be an explanation for why the individual teachers' workload does not appear to have been considered in relation to the introduction of blended learning. Moore (2006) advocates for the sensible division of labour when developing blended learning, by incorporating distance educational practices into the traditional campus-based institutions. However, to achieve the division of labour, a more extensive structure from the distance education model would be required which could be resisted by many teachers, and possibly universities.

The Marshal Report (Marshall, 2005a) was commissioned to evaluate the status of blended learning at New Zealand tertiary institutions, during a time of increased development in online learning. Development of e-learning was measured in relation to five specific processes across nine institutions in the sector. In the specific report for the case study site, these processes listed in the order strength for

were: development, co-ordination and support, learning, organisation and evaluation. The specific Marshal Report for the case study site indicated:

> in the majority of process areas [the institution] has strong performance when compared with the wider New Zealand tertiary sector.... The challenge that faces the institution in further improving e-learning capability is in evaluating and analysing the courses using e-learning technology and pedagogy so as to identify successful practices for reuse and support and to remediate any weaknesses. (Marshall, 2005b, p. 10)

The specific challenges were further identified as the need to continue building capability to "sustain e-learning support of teaching" (Marshall, 2005b, p. 10) with the recommendation for the institution to focus its attention on strengthening the evaluation of e-learning developments from within the institution. In order to achieve such a change in internal processes, the Marshal Report (2005b) acknowledges that the changes "would need to be supported by policy requiring its use as part of a regular independent review of e-learning aspects of courses" (p. 14). Although the Marshal Report (2005b) makes the recommendation to strengthen the evaluation process, the current research study is focused on seeking to understand the influences that impact on teachers when engaging with blended learning within the institutional environment.

The broader national and institutional context within which the LMS was introduced at the case study site has been presented in this chapter. Details of how the participants were selected from the specific university that was the case study site follows.

4.2 Information contributing to participant selection

At the time of the research study, the university consisted of five faculties with a combined total of 14 discipline areas (___ University, 2011b). Participants for this research were selected to provide a range of six different study areas, from each of the different faculties, however specific disciplines have been withheld to protect participant confidentiality.

The way in which the participants for this research study were identified as members of the RSG stemmed from the description of their role that empowered them to make changes with the LMS. Their shared belief was that they could shape the LMS to suit their own teaching practice. For this research study I selected

participants who had actively chosen to use the LMS to support research into how teachers created blended learning environments. This chapter presents the participant details that were used to support purposive sampling and to ensure a range of participants from across the case study site had been selected.

A brief description of the six participants' shared attributes followed by specific demographics of each participant is presented with the aim of providing the reader with sufficient detail to determine the relevance of this case to their own settings. Participant names are formatted in **bold** and the participant voice is presented in *italics in the quotes*.

4.2.1 Participant demographic details

Attributes that all participants shared were the use of the LMS in addition to their face-to-face class, and that there had been no reduction in face-to-face time. Five of the six participants had used the LMS for more than four semesters–considerably more in some instances–however exact details of length of time were not captured. Although the participants had differing roles, each participant was empowered to make decisions regarding the LMS for their papers, which ranged from pre-degree through to post-graduate courses.

Each participant is presented next in alphabetical order, by their pseudonym with a brief description of the key characteristics of their blended environment. This data was predominantly collected from the participant demographic form at the start of the first interview and includes an interview response from the participant detailing how they would describe teaching with the LMS to a new colleague.

Ben had been teaching with the LMS in classes of students numbered in the mid 100s with a team of teachers for several years. The discussion board and chat communication feature was used (by Ben and his team) in addition to announcements and email for communication. Informational uses of the LMS were extended to show video examples, images and resources (in addition to the standard lecture notes, handouts, course materials, learning activities and web links). **Ben's** approach to incorporating new technologies was "second in line–I'll wait for the testing to be done". Notably his students did not have access to computers during class time, and there had been a shift as to how the class time was being used for team based learning assessment.

> *I would sell it to the person as an additional tool, an additional resource and something that they should encourage the students to use. So I yeah, it is a useful tool.*

Grace used the LMS with classes of just below 50 students, **Grace** taught the paper individually. Communication aspects of the LMS used were extended to blogs. Informational uses were extended to video and resources. **Grace** was happy to be first in line and develop the tools that were required, and voluntarily taught an extra class in the self-access lab so that the students could learn to use the tools.

> *We have this online portal which is a link between the students and us... so students they can come into it and take things from it like learning tools and learning handouts... [Teachers] can take from it the fact that ... it gives us more time in the classroom.... So it's a halfway thing between us which improves both of us I suppose.*

Mary had classes of students that were always numbered in the high 100s and grew substantially, which instigated the change in her role to the co-ordinator of the events for the classes and organising the LMS. Communication features that she used were discussion boards, wikis, quizzes and other written assignments. The informational uses included references, video, resources images and the grade centre. (I think most participants used the grade centre however **Mary** was the only one to put it on the demographic form). She also circled *first in line—happy to do the testing [of new technology]* and explained how she had worked with the staff development centre to new develop tools before they have been created (idea seeds). There were no computers used in the classroom, however the class time had been restructured to include time where the students could meet in groups to discuss their WIKI project. **Mary** described her class environment in the following way:

> *A combination of face-to-face and technological means to create the best learning environment for the students, or... perhaps enhancing their learning environment.*
>
> *I have to say for large classes it's about managing the logistics of large classes, so for me it has made my life a lot easier, and I think that's a valid role for technology in a large class.*

Michael had classes of students numbered in the low 100s and was developing resources for teachers to use in another paper (with similar numbers) on which he did not teach. The communication features of announcements and email were used. Informational tools were extended to also use video with podcasts and also Wimba voice tools. **Michael** was happy to be first in line to do testing and develop new ways to use resources for the team that he is in, so that the teachers could focus on the classroom and use the tools when they are developed. **Michael** emphasised that:

> *Yeah it's nothing without that teacher I tell ya. You don't have that teacher... Technology is just a tool, it's not the main, the way you teach is the main key. It's just the addition to that face-to-face teaching that I see as the benefit to the learning and digital resources and the other hardcopy resources that are available, like the text books.*

Ray's classes were up to 90 students and he had been using the LMS for the past two semesters. Email and announcements were the communication aspects that he used. In addition to the informational resources that all participants used, he also included sources for tutorial and references. Although he was not first in line for using the LMS, he was happy to use the technology and often was first in line for other technologies and waited for the product to become more mature and settled before deploying. In class, the students had access to a computer lab. **Ray** articulated:

> *I would walk them through it. I would show them what I do, I'd give them some sense of what they could do.*

Wally had previously used websites and other online tools, however made the strategic move to use the LMS. He had just under 100 students, and predominantly used the LMS tool of wikis, quizzes and movie clip links to augment the tutorial resources with both video and images. His style of using technology was usually "first in line" however with the LMS he had waited because he felt the other online tools were ahead of the early versions of the LMS. There were no computers in his classroom however he would meet with students in an open access type lab for office hours. Wally described that:

The main thing is that it is the centralisation of learning that for the students it is one place where their resources are kept for all their study. It gives them the connections.

It provides a secure place for you [as a teacher] to store your stuff, where it is readily accessible for the students, and you don't have to go public.

4.2.2 Description of the participant RSG

The salient features of the RSG in this research study are that: A single RSG is the focus of this research study and the RSG has been determined by the researcher through careful purposive sampling and recruitment which included personal networking and snowballing techniques.

The RSG in this research study is defined as teachers who had the level of autonomy to choose to implement the LMS into their teaching practice. The participants had a willingness to engage with the LMS, which was further supported by the ways in which they would describe the LMS to new teachers presented above. All members of the RSG shared the view of the LMS as a technology that they were willing to use and engage with as autonomous teachers.

It was important to select a sample that could be viewed as an RSG and to provide representation of the case study site. The participants' approach to using the LMS was important in confirming their contribution to the range of views, settings and approaches represented in the case study. The demographic form (Appendix A) included a question to determine the approach to using new technology ranging from first in line to last in line. These criteria were used to ensure that although the participants were all using the LMS by choice they were not all early adopters of technology. I was also seeking to ensure that a range of LMS interaction and information technologies were present so that there could be variation to the specific developments the participants described. To further validate the responses on the demographic from the participants were asked to describe their early experiences and views of the LMS. These descriptions were used to confirm participant diversity in the approach to using the LMS and their active engagement.

4.2.3 Participant views of the LMS

Ben was a late comer in choosing to use the blended learning platform.

> *I was um initially not too keen on [the LMS] for the very simple reason that I was unaware of what it was really about and personally I don't see myself as a really IT savvy person.*

It was an expectation and common sense that drove **Ben's** decision to get onboard, yet he clearly still saw this as his choice.

> *I was informed that there was an expectation and that this was the way that [the institution] was going to move, and common sense said to me as well, that I needed to get on with this because the old sort of style of teaching... paper based and that is not going to be around forever you know. So you have got to try and move with the times basically, so that's what I did. I made that conscious decision yep.*

For **Mary** there has been a more radical shift towards a team approach within her programme, the very nature of their work has changed radically over the past few years.

> *So it is literally a full time job, and it is a very unusual position.... We are the only people [presently working in this way].*

It is important to note that **Mary** retained contact with the classroom, even though her role had changed significantly. With her team of advanced users who have been using the LMS for some time, her motivation was focused on keeping up with current changes in technology, and adapting these changes into the classroom.

Michael was leading the way and creating resources that could be used by the wider team. **Ray** was part of the decision "*to help push the whole department on*" at the same time, connected with a faculty LMS template development grant. **Wally** saw that it was time to use the LMS because of his change in role.

Grace first appeared to be negative however quickly became positive as she enthused about her use of the LMS.

> *At the time we had [a programme] which was a great learning tool, but they couldn't take it home so, that is... ah... where the whole [LMS] thing came from.... I realised that if they could do something at home, they could then look at the lesson plans... and then they could do this and they could do that, it just went from there mainly.*

Wally was interesting in that he was "not on board initially." His decision to use the LMS coincided with a change in his role to work with the staff development centre. The catalyst to use the LMS was twofold: he felt he had "better eat [his] own dog meat" and he believed in providing the potential for the students. **Wally** said:

> *I have a favourite quote from Dewy: "If we teach today as we taught yesterday, we rob our children of tomorrow, then we are not preparing them for the future but for the past," which I paraphrase as "If we always do what we have always done, we will always get what we have got."*

4.3 Conclusion

Locating this research study in the particulars of the case study site was a vital aspect of defining the case study. Stake (1995) emphasises this point by stating that:

> The real business of case study is particularization, not generalization. We take a particular case and come to know it well, not primarily as to how it is different from others but what it is, what it does. There is emphasis on uniqueness, and that implies knowledge of others that the case is different from, but the first emphasis is on understanding the case itself. (p. 8)

This chapter has described the particulars of both the university as the case study site and the participants that were identified to be the RSG. Building on this foundation of contextual information about the research environment and the participants in this research study, the next chapter provides a thematic presentation of the data.

Chapter Five: Research Findings

The data presented here has been arranged into four broad themes. Key ideas were initially developed through inductive analysis and then the SCOT model was used to deductively connect the concepts with the themes presented in this chapter. The first theme explores the influences and shared interpretations of the participants as a single RSG. The second theme illustrates the ways in which the participants experimented with the LMS, which had a dynamic impact on their face-to-face classroom. Experimentation is connected to interpretive flexibility in the SCOT model. Themes three and four show the maturing development of LMS use. The participants focused on refining their own practice and on how their developments could be used in the future by other users. In SCOT terms, closure and stabilisation represent two sides of the same coin in that refining practice is focused on the teacher/RSG member and the future direction is focused on the LMS technology developments set in place.

5.1 Theme One: Teachers' influences for blended learning–RSG connections

This research study has focused on a single RSG which comprised of six teachers who were regarded as the RSG for the purposes of this research study. The previous chapter provided the details used in identifying the RSG. The data presented in this chapter focused on participants' influences in relation to engaging with the blended learning design process and becoming part of the RSG.

As members of the RSG, the participants described five influences which supported their decision to use the LMS. The participants' influences reinforced their connection to the RSG in this research study and were precursors to their engagement with the blended learning design process. The influences can be organised into three internal attributes of an autonomous role, motivation and personal commitments and two external influences of institutional support and reskilling.

5.1.1 Participants' internal influence: Role and motivation

All participants were teachers who had other roles as well as illustrated in Table 5.1.

Table 5.1: Participant roles additional to being a teacher

Name	*Ben*	*Grace*	*Mary*	*Michael*	*Ray*	*Wally*
Course co-ordinator	x	x	x	x	x	x
Programme leadership role			x		x	
Staff development unit role				x		x

While it is recognised that the participants had multiple facets to their roles, it is the role of teacher and course co-ordinator that the participants had in common. The role of teacher and co-ordinator provided the participants with the autonomy to make the choice of using the LMS in their individual courses. A trend emerged from all six participants in the first interview, when at the point of giving a guided tour of their LMS course, they stated that the autonomy of their role as a teacher and co-ordinator had been pivotal in their decision to use the LMS.

Motivation was described in connection with the influence of the participants' role. All six participants explained what it was that they were trying to achieve, their original motivation. Their motivation has been further categorised into the participants' thoughts, actions and teaching and learning goals presented in Table 5.2.

Table 5.2: Participant motivations

Name	*Ben*	*Grace*	*Mary*	*Michael*	*Ray*	*Wally*
Thoughts	*Common sense said to me I must do this*	*I took over this paper*	*A combined type role with admin too*	*I made these resources for the/that team*	*I was happy to have them forced online*	*I had to "eat my own dog meat" and use the LMS*
Action	Stepped up	Needed to become the expert	New role created to manage this	Seconded to staff develop-ment unit	Influence at faculty level	Seconded to staff develop-ment unit
Teaching and learning goal	Organise resources and students	Develop tools for learning	Create new way to mark online (assess)	Create podcasts and accessible learning tools	Wait until system was ready, wait for right time	Create different tools for student learning

The participants' role and motivation were two important influences which were connected. The connection was demonstrated by the participants who preceded their descriptions of their teaching and learning goal with a statement such as "well you see because of my role..." or "because I am the co-ordinator." **Ben** and **Grace** stated that as teachers and co-ordinators they felt the need to take action. **Mary** and **Ray** in addition to taking action at the paper level also stated that new roles needed to be created and they expected their team to work in a new way with the LMS. **Michael** and **Wally** who were both (in addition to teaching their papers) seconded to the staff development centre expressed a need to show others that they were using the LMS. It is also important to note that some participants chose to use the LMS in order to support their institution's preference for this product, even though they may not necessarily consider the LMS to be the best tool. The differences in the data show that although there were variations in the individual roles, all participants perceived that they had the autonomy to engage with using LMS leading to the blended learning design process.

The participants also described the teaching and learning potential that they saw in the LMS. Some aspect of their work as teachers became easier as a result of the LMS. Each participant made the considered choice to use the LMS, it was neither mandated nor accidental and the LMS had become an integral part of their practice. Rich descriptions of the teachers' rationales presented in the participant's voice follow.

Ben's immediate response was that he saw the addition of the LMS as a resource.

> *It was using [the LMS] as a resource, to supplement or provide additional resources for what we were doing in the classroom... and what I tended to do was try and upload resources, mainly class exercises and any handouts...*

Ben said that initially what was provided on the LMS was also provided in paper copy in the classroom, because he could not be certain that all students had access or would do the work. This data showed that the effort in providing resources on the LMS was a process in progress and that lecturers chose to put material online, even though manual procedures were required initially to ensure that the students had full access to the learning materials. In the near future, he envisaged that he would be able to rely on students accessing the LMS, however for now he could not solely rely on the LMS. Therefore, the pragmatics afforded by the LMS were yet to

take hold in the face-to-face classroom, **Ben** was engaged in the process of making the work easier.

When **Grace** was asked about first experiences with the LMS, it was hard for her to go back to that time to remember, however she could recall the early influence.

> *Thinking more computer stuff... yeah um, sigh, you know it seems so natural that we are using it now that, it's really hard to go back to that time... it was fairly instant, once I started to put things up there it was pretty obvious that it was a good idea. Be it just because the students could use them at home, that was the main push.*

This data shows that the LMS had been fully integrated into **Grace**'s teaching, that there was a shift from thinking "more computer stuff" to "it seems so natural now." This was a huge shift for **Grace** who initially described her level of computer skill as "I knew nothing." **Grace** fully embraced the use of the LMS because it allowed her to provide the students access to learning tools outside the classroom. Once this had become accepted practice, providing worksheets online, the potential to share additional resources such as the lesson plans and additional worksheets was also actioned. It was easier for **Grace** to share the resources online, and the students were gaining benefit and asking for additional materials. The way in which the LMS had become a central repository and a natural place for sharing as many resources as possible was represented by the data in this theme.

Mary introduced the LMS in 2007 to address management of student assignments due to increased student enrolments.

> *I designed and developed over the last 2½ years how to mark things online for us because I was determined to get rid of a thousand people who were handing in paper essays... and it was just a nightmare in how to lose your essay... but you know, this has been a developing work-in-progress... so we used it for our results... so 2007 was the first time we did online assessment for essays.*

The key thing for **Mary** was to develop an approach to address the need for marking online, both for the student to submit their work and then how this translated into actual marking rubrics. A key consideration was the growing size of the class, from just over 500 to over 1,000.

In contrast to the other participants presented so far, **Michael** was very clear on when he first started to use the LMS and the aims that he had.

> *I first started in [year] and what we did then was just develop the digital resources for the... language programme and we decided to make a change in that area. ... So what we decided to do was to ... um convert the analogue resources into digital, so that the students would no longer have to use the audio language laboratories.*

He enthusiastically expressed how he had approached the use of the LMS and what this could provide. The aim for **Michael** was to replace the need for a specific language teaching laboratory to a computer laboratory and to increase access via the LMS. New mobile technologies that integrated with the LMS also had significant impact on the potential that **Michael** designed for with the LMS. The mobile technology provided a catalyst for what was already being set in place with the LMS, it was complementary to achieving the goal of shifting language education out of a fixed language laboratory classroom.

Ray initially stated that the LMS "was just a system with some stuff in it," however on further questioning he revealed his instrumental role in the shift to the LMS.

> *I mean I was actually part of that decision. I was happy for others to be forced to go onto the LMS [chuckle] thought all in all it is the right thing to do, we need it for consistency and for security. I mean one of the things that I was having to live with was when a lecturer would leave then suddenly everything to do with that class disappeared.*

In **Ray's** comment, at first it sounded like the decision had been made for him, however further questioning showed that he had actually had a role in the decision making process, not just for himself, but for the whole faculty. This indicates that there were different approaches to the LMS by the participants perhaps impacted by faculty level decisions within the case study site. **Ray** had only recently started to use the LMS compared to the other participants.

Wally said that the use of the LMS provided the students with a "central core" for their study and that there was a need to do things differently and create tools with a focus on student learning (a common theme picked up by **Grace**). He also emphasised that the LMS was just a tool, and that the skills to use that tool need to be developed (the tool will not do the work for you).

> *For the students, this provides one place for all of their study materials. The LMS is just a tool at the end of the day, it is about how you use that tool and make it work for you.... At the moment, things seem to be caught up on what tool you are using rather than*

the potential and pedagogical application of that tool. We are not there yet.

5.1.2 Participants' internal influence: Personal commitment

The participants reflected on their personal commitment and the effort that had been involved when they engaged in the blended learning design process. The statements presented in Table 5.3 drew attention to how they had been influenced by their personal commitment.

Table 5.3: Participant reflections on personal commitment

Ben	*Why do we do it? Takes so much time [but it is the] way of the future*
Grace	*Was it worth it? Hours and hours [of work were required] if I had known at the start... no way!*
Mary	*This has been a work-in-progress for the past 3 years*
Michael	*Came into teaching same time as tools were arriving. [I] had wanted to work in IT [teaching with the LMS was an exciting way to work with IT tools in a teaching environment].*
Ray	*Wait for system to be ready [I have been] teaching for a long time*
Wally	*Felt like a step backwards from previous tools, [due to my new role, I] needed to get on to the LMS*

The time required and whether the participants felt that it had been worth the personal commitment provided further insight into the work involved in developing a blended environment. Variations were apparent in the amount of time each participant invested in creating their LMS course and also to the timing of implementing the LMS. This ranged from **Ray** who waited for the system to come to him, that he was using blended techniques, just not the LMS initially because he knew it would take a while to "be right" and **Wally** who felt like using the LMS was almost a step backwards. Compared to the tenacity displayed by **Mary** in that her course development had been over three years in the making, to **Grace** who was not sure if she would have started had she known the personal commitment required up front. **Ben** was not sure whether the full benefit was apparent. To concisely summarise this **Ben** stated, "we're not there yet." **Michael** came into his role as a teacher just as use of the LMS was starting, which supported his change to focus on teaching with technology.

To summarise, the participants came into blended learning by making the LMS work for them in their teaching and learning practice. The data from each participant showed that they chose to use the LMS. Rich descriptions of the step by

step procedures were not to be found in the data, and instead, descriptions of the goal and motivation/rationales and the significance of the participants' personal commitment, role and autonomy in decision making emerged as highly influential in their engagement with blended learning.

5.1.3 Participants shared external influencing conditions

Participants also identified what they needed in terms of institutional support and reskilling to develop a blended environment. These are presented as external influencing conditions in Table 5.4. In essence the participants created a blended course through the process of making use of the staff development centre's resourcing for both support and reskilling.

Table 5.4: Summary of external influencing conditions

	INSTITUTIONAL SUPPORT *"What I needed"*	*RESKILLING* *"How I did this"*
Ben	*Time release to fit in materials from team development grant*	*Self-taught–try it out as a team [with] occasional support calls.* *I'm not very techie.*
Grace	*Individual development grant*	*More stuff to learn I needed training, we all need training.*
Mary	*Time created by an internal school change in role*	*Worked out how to do this together with staff development centre [leading to 1:1 learning]*
Michael	*Secondment [time & role change]* *Development grants*	*Made new connections [leading to 1:1 learning with staff developer] It's just happened at exactly the right time!*
Ray	*Template provided through faculty development grant*	*Self-taught... I don't use help menus, would rather crash the system.* *The staff development centre did give an overview [at the start]*
Wally	*Secondment [time & role change]* *Development grants*	*Always think how can I use that for education?* *Went to lots of general PC training in early days*

The common trend that emerged from the data was that all participants required upskilling to use the LMS and invested significant time to do this, often by working on development grants or seconded to the staff development centre. When describing the decision to incorporate new technology **Ben** stated that "when they [the staff development centre] can show me simply where to take my mouse, then I

will use it." This reinforces the data stating that institutional support was required, and the participants received the type of training they needed to suit their own technology learning style.

There were two distinct aspects to the support provided by the staff development centre that the participants had connection with: The staff development centre managed the individual development grant process and provided training for the LMS. For some participants, the link with the staff development centre was made when they became the recipients of an individual development grant, which included a time allowance for development work. Five of the six participants were connected to individual development grants either directly in that they were the recipient of the grant and had written the proposal (**Grace, Michael** and **Wally)** or indirectly (**Ben** and **Ray**) in that they applied aspects of grants developed by other people. **Mary** who was not connected to a grant, was still working with the staff development centre in the same manner that a grant would enable, however focused on doing the work rather than writing a grant to fund the work. The data showed that **Mary** was thinking of innovative solutions that were possibly ahead of grant development. However, she was still receiving grant-like benefits in the form of assistance and development work with the staff development centre as evidenced in the following statement.

> *What we [**Mary** and the staff development centre] did together that was absolutely brilliant was, that we worked very well as a team, and I would say this is what I want to do but I don't know how to do it, and she would say "Oh well, me neither–we've never done that before," so then we would sit down together and work it out.*

This evidences the value of a staff development centre in working with staff in development and grant work.

All participants had assistance from the staff development centre in reskilling (Table 5.4). The participants described variations in how they reskilled, that ranged from a preference for formal training by **Grace** and **Wally**, one-on-one session preference by **Mary** and **Michael**, and self-taught (with phone support if required) by **Ben** and **Ray**. The participants who had not received a grant (**Ben** and **Ray**) showed a preference to upskill by learning on their own. The consequence of this is that **Ben** and **Ray** did not have an existing relationship with the staff development centre from which to request training, compared to the other three participants who

had received grants, and **Mary** who had worked directly with the staff development centre.

To sum up theme one it can be stated that each and every one the participants' became active in shaping the LMS for use in their courses. **Grace, Mary, Michael** and **Wally** sought assistance directly from the staff development centre with the goal of creating a new way to meet students' learning needs as a focus. **Ben** and **Ray,** although they saw technology as malleable, did not see it as their role to go out there and change the technology. They waited for the blended environment to be developed by others and then took an active role in constructing their own implementation. This was described by **Ray:**

> *There is no point until the system is ready–it takes time–you need to wait for the right time rather than let enthusiasm drive it.*

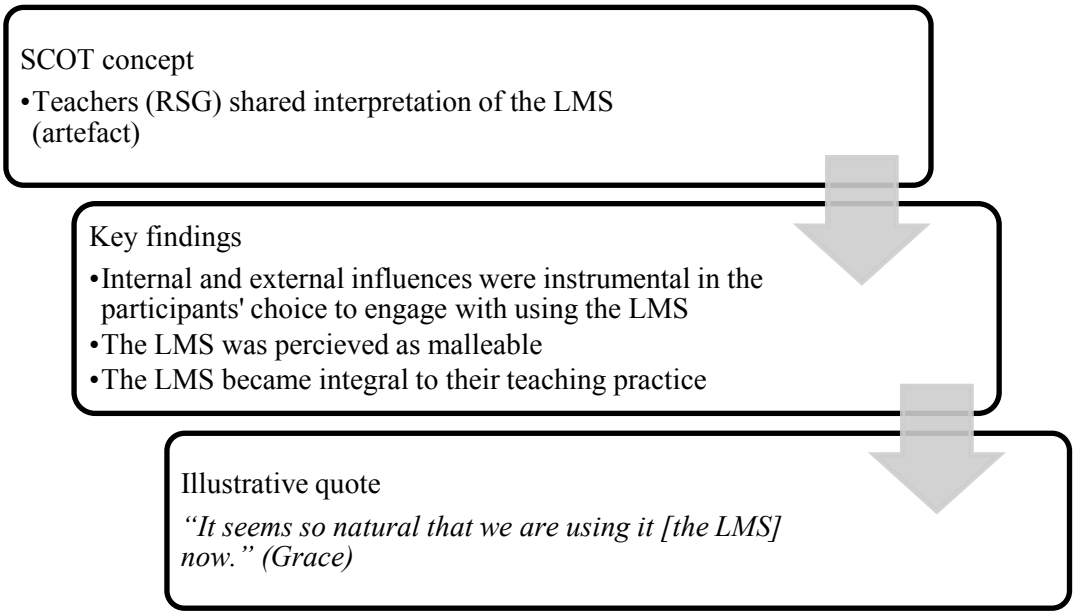
The teachers as the RSG were influenced internally and externally when deciding to start creating their blended learning environments. From the influences presented it can be seen that all six participants viewed the LMS technology as malleable, even though the participants' went about shaping the LMS to meet their needs in different ways. It is not that they knew exactly what they were going to create, it was the fact that they knew they could do something new and different with the LMS, and it was more of a "work-in-process" of becoming blended than knowing what the end product was going to be. The participants shared a commitment to the LMS and it had become an integrated aspect of their teaching practice. From the data in this theme it can be seen that the length of time, diversity of use of the LMS and the participants' role and their approach to blended learning have many similarities and differences. The similarity that the participants shared was their pedagogically driven choice to use the LMS.

5.1.4 Summary

This theme has presented data which showed the participants' engagement with the blended learning design process as a result of the addition of the LMS to their teaching practice. Figure 5.1 is presented next to connect the SCOT concept with the key findings from this theme and an illustrative participant quote has been selected to reinforce the connection. The participants all perceived the LMS as malleable and shared the sense that the use of the LMS had become a natural aspect of their teaching practice. Figure 5.1 is a conceptual overview of this theme

presented to provide an organisational bridge between the chapters of this research study, and the format will be repeated at the end of each data section in this chapter.

Figure 5.1: Conceptual overview of teachers' influences for blended learning—RSG connections



5.2 Theme Two: Blending the LMS and face-to-face settings—interpretive flexibility

The ways in which teachers blended the LMS with their face-to-face teaching is explored in this theme. Interpretive flexibility in this research study was characterised by the participants' experimentation with the LMS and the range of potential they described. The data show an exploratory phase in which the participants focused on using the new tools that the LMS afforded. Exploring the use of new tools led to many interpretations of the way in which the LMS could be used. The surprising aspect of this data was the shift away from the focus on the LMS tools, to a renewed appreciation of the face-to-face classroom. One participant described the shift in focus with the realisation that "*it's nothing without that teacher in the classroom*" (**Michael**). This theme will therefore present the data that displayed the shift in focus, which will be further supported by the participants' responses about what the blended environment enabled, enhanced and transformed.

The data showed that the participants had a rich range of experiences in using the LMS and great variety of tools and techniques were demonstrated in the guided tour (Interview 1) of their blended environments. Each participant had their own views of the ways in which the LMS could be used. This theme describes the ways in which the introduction of the LMS impacted both the online and face-to-face aspects of the blended environment. The participants highlighted the impact of the LMS on the face-to-face classroom, and not the expected detailed explanation of LMS tools.

Ben stated that in his class they had taken some activities (such as discussion forums) from the LMS and brought them back into the classroom format. **Wally** emphasised the classroom by stating that he now had increased interaction with the class, which **Michael** concluded by stating that the LMS is nothing without the face-to-face component. Both **Grace** and **Mary** made major changes to the format of their face-to-face classes. **Ray** took a holistic view describing how he connected to the LMS in the classroom, to make that powerful connection focused from the face-to-face classrooms. The participants described a range of experiences in using the LMS, which resulted in decisions about how to best use their face-to-face time. How these participants blended the two environments showed a shift in focus to what could be altered in the face-to-face classroom, as a result of implementing the LMS. Table 5.5 presents these concepts in the participants' voice.

Table 5.5: Participants' comments

Ben	*In some ways we actually use this (the LMS) less now.*
Grace	*I provide an extra unpaid class in which the students learn how to use the tools [no longer restricted to f2f time].*
Mary	*I have redesigned the classroom format.*
Ray	*Students can access notes without their textbook and I show the students how this all links to their final exam in class (on the LMS).*
Wally	*Lets you be more interactive with the class.*
Michael	*It's nothing without that teacher in the classroom.*

The LMS focuses on tools for teachers to apply. The participants in this research were open to experimentation and applied the LMS to constructing their blended learning course. Graham's (2006) model of blended learning was briefly introduced to the participants. The participants were asked to describe how they considered blended learning to be enabling, enhancing and transformative for their teaching

practice. The participants quickly provided answers for the enabling and enhancing aspects of blended learning presented in Table 5.6. Transformative aspects were more challenging for the participants to describe and these have been presented separately in Table 5.7.

Table 5.6: Participants' descriptions of enabling and enhancing blended learning

	Enable	*Enhance*
Ben	Share and send resources to students Help them problem solve & apply theory Provide resource for teacher	Add material to enhance what was covered in class. Not crucial A grade students use this not C's Enhances technical skills of students & staff just by using [the LMS]
Grace	Student independent work	Enhances learning for shy/older students Levels the playing field
Mary	Communicate consistently and simultaneously with students Easy to moderate Online marking halved the manual process with backup	Fabulous review tool Students can go back and catch what missed [second language, sick, absent etc] Social/sense of belonging? Put notes up in advance
Michael	To add more resources. Enables students to use more resources.	Made language lab obsolete. Added Learning & e-learning Enhances learning experience through tools to practice
Ray	All students get the same Consistent delivery Reduces preparation time [e.g. photocopier]	Enhances teaching through consistency of presentation, not ragged paper Enhances student impressions
Wally	Enables me to say in class "you will find that online"	Pastoral care. Lets students manage difficult concepts. Lets students learn which lets me have time to create more resources that do this – perpetuates the cycle

Table 5.6 indicates that all six participants thought the blended environment enabled student independence and consistency with regard to resources provided, fairness of access and timing of contact to the students. The LMS included functionality such as announcements and emails that, although not the focus of the participants' change, became incorporated in their practice because they provided an additional way to communicate that had not previously been possible or had been difficult to use in the past. The tools (such as email) that simplified the processes of communication were quickly put forward by the participants as a key benefit that the LMS enabled. **Ray** succinctly stated that "all students get the same."

Enhancement was conveyed as the ability to provide additional resources for the students and that this could then empower the students in their independent learning. Student pastoral care, providing for additional learning modalities and student abilities was a key aspect for some participants. **Grace** had the perception that it "levelled the playing field" where **Ben** describes the enhancement as providing resources that the A-grade students would access. Enabling and enhancing descriptions were consistent across all participants. They shared views on enabling student independence through the provision of access to resources, and that empowering the student to be in charge of their own learning as the enhancement that blended learning provided.

The participants had experienced enabling and enhancing aspects of blended learning, however they were not sure if they had yet reached a transformative level. The distinction between the participants became apparent at the transformative level and their ideas are summarised in Table 5.7. While the term *transformative* may have a broader meaning in the literature, the participants' views provide examples of how they perceived transformation and the process of experimentation during the interpretive flexibility stage.

Table 5.7: Participants' descriptions of transformative blended learning

Ben	Transformative would be to get lecturers to appreciate this, not look like a chore [For the student it is a] place for resources, fun and interactive, lets them reflect and develop deeper learning
Grace	Developing rote learning tools that make it fun –give [students] more of what they like Students... achieve in a more time efficient way. Possibly how to learn as lifelong learning
Mary	Focus on what they like, for both teacher and student. Very different ball game [and it] allows interaction across sites
Michael	The free online resources have made it more popular The transfer of responsibilities from the teacher to lecturer assistants that now show students how to use system. Because of the lecturer assistants I can spend time creating more [resources]
Ray	Invigorated, looks fresher, written for the student. Online looks good There are enough books online at the library
Wally	Effortless connections Info need not come from me, can come from web. Shift from linear learning work to their understanding. Mindset change, technology provides the possibility.

Central to the participants' responses was the desire to make the learning environment for their students appealing, fun, engaging and student centred. An important aspect that the participants expressed was discomfort over the term "transformative" in that they did not see that this applied to them (yet). I found it surprising that the participants were reluctant to view their work as transformative especially since many participants were influenced and supported by development grants (which required innovative practice and connections to the strategic direction of the institution). The participants' descriptions showed that they were starting to identify what transformative practice might be, yet perhaps they were humble about the level of their work and had high standards for what they might consider transformative. This was further supported where the participants stated at various points how the blending of their environments was a process with many possibilities, highlighted by **Grace**.

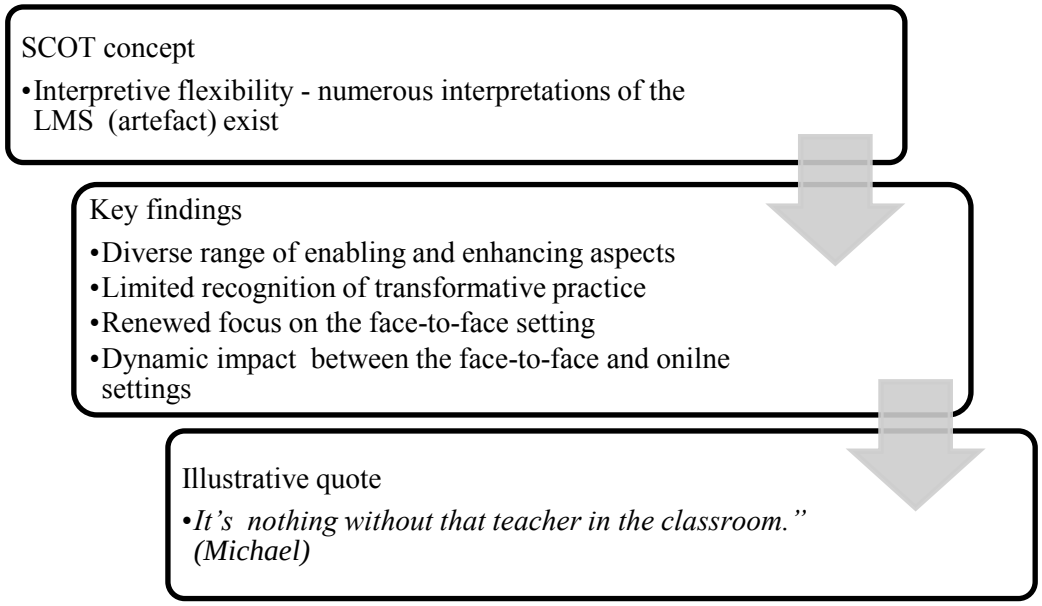
> *The use of blended learning and the use of these tools... is that a transformation? Possibly,... but then you can also help them I suppose in a normal [face-to-face] class room. If you are a good teacher, if you have got time and if you can explain this and so yeah I don't know.*

This theme illustrated that in essence the teachers chose the best environment for their learning content as a result of exploring the LMS options, and decided what to put back into the face-to-face classroom. Inherent in the data presented in this theme was the autonomy (described in theme one) the participants had to experiment and make changes. This amounted to a total redesign where everything was taken out and careful selection went into choosing what was put back into the physical face-to-face classroom. The range of experiences and how the participants and saw the blended environment in relation to being enabling, enhancing or transformative will be analysed against the experimental factors that impacted on interpretive flexibility in the Discussion Chapter.

The blending of online and face-to-face teaching emerged as a dynamic process within the participants' course delivery. The participants expressed that they had explored, developed and experimented with different options to find the best environment, moving items from online back to the classroom and vice versa. This is a cyclical rather than a linear process; the participants needed to experiment and engage in an iterative development cycle in order to get to this point. It was a messier and more multi-stranded approach than the participants first expected. The

online LMS became secondary to the purpose of making the most of the face-to-face time. The use of class time became a celebration due to the use of the LMS. Figure 5.2 draws together the key concepts for this theme.

Figure 5.2: Conceptual overview of blending the LMS and face-to-face settings—interpretive flexibility



5.3 Theme three: Commitment to refining practice—closure

SCOT closure is the stage where the teachers' shifted from multiple interpretations of the LMS through to their development and refinement in the use of the LMS. Closure was demonstrated in the data through the participants' descriptions of the ways in which the LMS had now become an integral aspect of their teaching practice and not an optional extra. The SCOT literature puts forward the idea of temporary closure to take into account the long development processes and innovation cycles of software technology development (Humphreys, 2005). Temporary closure for the purposes of selecting supporting data in this research was identified by seeking descriptions of participants' LMS long term processes and features that they had committed to refining, based on the foundation of blended learning as a permanent feature of their teaching. The participants were constantly updating their teaching resources in both the face-to-face and the LMS aspects of their course. They referred to this as a cyclical process. There was a sense that

these improvements were constantly required. **Wally** stated that he was now entering a phase where he was learning to teach in a way that the students wanted to learn, and that he considered himself to be in "the Kindergarten of blended learning." He implied he still had much to learn and a long term commitment was required when teaching with technology.

5.3.1 Key aspects of the participants' LMS closure

The participants stated that the LMS had become an integral part of their teaching practice and identified with certain aspects of the LMS that they could no longer imagine teaching without. The participants had reached a level of maturity in that they now taught in a blended learning environment. Closure was further evidenced in participant statements that alluded to the fact that they could not even remember back to before this change. Each teacher had identified an aspect of the LMS that worked for them, which they were focused on becoming more proficient in using. In SCOT terminology, closure is viewed as the point where multiple interpretations of the artefact (in this case the LMS) ceased to exist. This was supported by the clear purpose and long term development processes that the participants had planned for their use of the LMS. Closure was demonstrated in the commitment to using the LMS and developing their teaching practice, it is not that all participants used the LMS in the same way, but that they were all committed to developing their use of the LMS for their blended teaching practice.

Aspects of the LMS that became essential for participants teaching in a blended environment are presented below. Therefore, how teachers created blended learning environments, the tools that they now deemed necessary and how they defined the LMS are presented next. The participants had moved away from their multiple interpretations of how the LMS could be used and had individually chosen the aspects that worked for them and that they would continue to develop. These are the aspects of their teaching practice that had become a permanent feature although the participants recognised that teaching was in itself a constant iterative process.

Examples of closure are presented next with two activities the participants had settled on and had decided to develop their teaching practice.

Ben trialled two initiatives first at summer school then rolled these out during the semester to the full course, changing the way in which marking and discussions were conducted by reversing them from LMS to face-to-face and vice versa.

- *Develop online marking with administrative support*
- *Increase Team based discussion and learning in face-to-face class*

Grace wanted to create a tool that did not exist. She tried to pay someone outside the university to undertake this work, however due to the complexity she needed to learn how to do it herself with the assistance of a development grant.

- *Implement two new online learning tools that supported increased access*
- *Provide an extra class structured around computer access to develop student skills in using the new online tools*

Mary had time allocated to do this work with one-on-one support from the staff development centre. The focus was on not just transferring paper systems online, "*what's the point of that",* it was on developing a new way of marking online.

- *Develop online marking system*
- *Developed a project timeline for the steps required to set up the LMS for each new semester*

Michael saw potential especially with the combination of mobile devices, and just kept going faster and faster as new tools came out. Even though the development was reactive to new releases, he also conveyed a sense of sustainable development in that he was focused on providing resources to assist other teachers so they could concentrate on the face-to-face class aspect.

- *Increase the potential to connect anywhere with LMS*
- *Research into the work [within this course]as it happens with Lecturer Assistants*

Ray decided it was time for the whole faculty to go online in a supported manner implementing a template developed by the faculty.

- *Convert and centralise resources to the LMS*
- *Add structure, clear distinction on who edits and updates the different types of documents*

Wally focused on creating and converting one online system into the LMS as a centralised system for students containing all the readings plus extra resources for in class that could then be viewed from the LMS later.

- *Convert previous blended resources into the LMS*
- *Facilitate workshops with students to find out how students want to learn*

Rather than viewing aspects of their teaching practice as closed, it would be more accurate to state that these were the aspects the participants had selected to continue to refine, the presence of temporary closure. The participants had found a way to use the LMS that best suited their teaching practice and they were focused on developing a more refined solution to establish the best use of the teaching and learning spaces (the LMS or face-to-face classroom).

5.3.2 Environmental factors that impacted on closure

The participants' commitment to using the LMS is the closure process that was focused on in this research study. The way in which closure was reached by the individual participants was impacted by the variations in their teaching environmental factors. Although the participants were all teachers within the same institution, there were differences within their roles that must be highlighted. The wide diversity in the level of administrative support, student numbers, grants and experimental approach are presented in Table 5.8.

Table 5.8: Environmental factors

	Ben	*Grace*	*Mary*	*Michael*	*Ray*	*Wally*
Admin Support	Yes	No	Yes	Yes	Yes	No
Class size	100s	-	100s	100s	-	-
Development grant	Indirect	Direct	No	Yes	Indirect	Direct
Experiment	No	Yes	Yes	Yes	No	Yes

There was a clear distinction in views between the participants who had administrative support and assistance in creating their environment, and those who did not. These factors resulted in different ways in which the participants

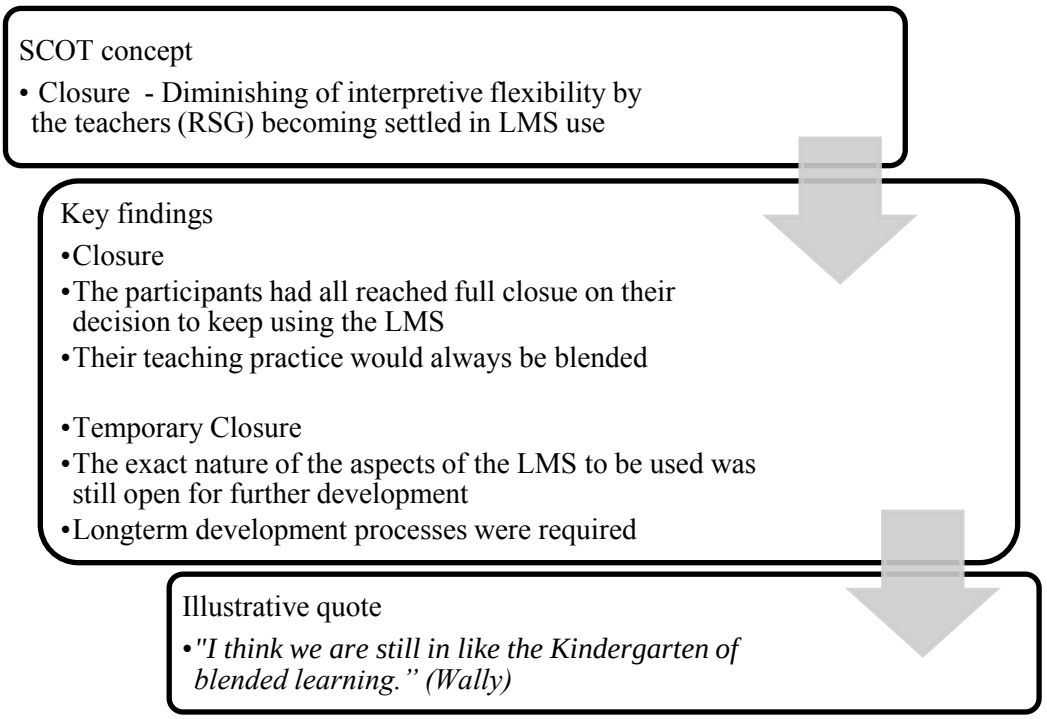
developed their use of the LMS. **Ben**, **Mary**, **Michael** and **Ray** are the participants who had administration support, and they were focused on putting systems in place for their teaching team. **Grace** and **Wally** did not have administrative support and they taught papers individually rather than as a teaching team. **Grace** and **Wally** also shared the experience of having had challenges in creating resources. Although the smaller papers did not have administrative support, they desperately had the desire for administrative support because they were doing so much development and creation of new resources by themselves. **Grace** and **Wally** stated how tired they were due to the extra work that they needed to find time to do.

Class size was also an important variable to consider in relation to the way in which the participants described the way their practice in using the LMS had reached closure. The big classes (those of **Ben**, **Mary** and **Michael**) all received administrative support. In the big classes the teaching team needed to learn about the LMS tools, therefore time was spent developing the use of the LMS with the wider team. In the smaller classes two of the participants (**Grace** and **Wally)** invested time in showing the students how to use the LMS tools at computers, during their office hours. **Michael** built sustainable practices around the work required of teachers through the introduction of teaching assistants mentored into providing LMS support. **Michael's** actions raise the question of whether other areas of the institution would be able to incorporate similar support structures.

Five of the six participants had underestimated the amount of time required to develop their LMS use for blended teaching, which meant reaching closure became a long term development process. The development grants had provided initial support, however much more work was required. Although some participants had greater support that others, there was a sense that due to class size, contact hours or their unique combination, that they were still all investing much of their own time into developing the use of the LMS. This suggests that in order to reach closure in the development of blended teaching practice an extra layer of support could be beneficial to aid the transition. The participants' commitment to the use of the LMS had become a fixed aspect of their teaching practice, however within the use of the LMS there was continual development of their teaching practice in their chosen aspects of the LMS. The participants stated that there was always so much more to be done and that when funding or project time ran out with development grants, a cycle of ever increasing work was perpetuated.

In this theme, the data analysis indicated situations when the participants had reached temporary closure in certain aspects of their LMS usage. However using the LMS was described as an iterative process within their teaching practice and the participants expressed the opinion that they were at the early stages of learning about blended learning. The participants had all reached closure on their decision to keep on using the LMS and to continue to improve their teaching and learning practice. The exact nature of the aspects of the LMS to be used was still open to further development, thus demonstrating temporary closure. Examples have been provided of the areas that the participants sought to continue developing and the different environmental factors which impacted on how they were supported have been discussed. Not all participants were at the same level of closure, some participants were more ambitious in the range and complexity of the initiatives they developed. Other participants restricted their development of the LMS to applying aspects that had been developed and they needed to integrate them into their own course. The next data theme builds on the concept of closure and extends it to viewing how the use of the LMS technology was stabilised. Figure 5.3 reinforces the key concepts to carry forward to the discussion and the key findings are presented in relation to both closure and temporary closure.

Figure 5.3: Conceptual overview of commitment to refining practice—closure



5.4 Theme four: LMS usage and future focus—stabilisation

To clarify the SCOT concepts underpinning the data presented in this theme, stabilisation and closure are presented in the SCOT model as "two sides of the same coin" (Bijker, 1997, p. 85), stabilisation focuses on the technology and closure focuses on the people (Humphreys, 2005). In this theme the data supported the stabilisation of the technology with descriptions of the utilization of the LMS. The technology in this research study was software, therefore it was the use of the LMS software that constituted technological development. The application of the LMS in a way that suited the participants' teaching practice was the development that took place. Within this theme data was also sought to investigate whether the LMS development stayed localised to the teachers' own courses or if there was evidence of development at an institutional level beyond the courses that they controlled. Across the participants there was a range of stabilisation evidenced in the LMS usage from generic LMS tools through to designing modifications that could be added to the LMS. Stabilisation in the data was evidenced by the way in which the participants were; settled in their commitment to the use of the LMS in their teaching, focused on incremental refinements, and preparing for succession in the use of their LMS creations.

The participants demonstrated a maturity in the way that they now thought of the LMS. **Ray,** and to some extent **Wally,** waited for the product to be developed and then got involved at the implementation stage because of their belief that this must be driven from "the institutional structure." **Michael**, **Grace** and **Wally** felt they needed to support the students who were moving into different learning spaces, that they could not wait for developments to happen, and that the time for action was now. Yet **Ben** and **Mary** had the challenge of increased student numbers and large teaching teams, therefore they developed their use of the LMS to solve different issues than some on the smaller papers were faced with, showing their maturity in the use of the LMS.

The participants had committed their time and energy to the creation of a blended learning environment, and several of them held strong views of succession to ensure future LMS use, providing evidence of stabilisation. **Mary** and **Ray** both expressed that the use of the LMS for their course "could continue on without [them]". However they did have reservations because although it would be possible for someone else to teach their course using the LMS, it would be a difficult task.

Mary was focused on setting systems and a timeline in place, which was also a succession plan providing visibility into the work that she was planning to do.

> *This system is in place so that I could be hit by a bus and someone else could do this–it would be hard but could be done.*

Ray emphasised the consistency and succession planning that the LMS afforded, stating: "*A lecturer could leave and this makes sure that all the resources are there.*"

The participants were also conscious that they could continue to develop the use of the blended environment to a greater extent and that there were constantly new LMS features made available. Continual development of the LMS and addition of new features is consistent with stabilisation because the new features are supported by the constant foundation of the LMS utilisation. Stabilisation was demonstrated by the participants' integration of a greater range of LMS features into their teaching practice.

Ben stated he was ready to expand his use of the LMS. He described that he had the content ready to be used however a final review by the teaching team was required before he would make the new LMS content available to the students. The review process he described for implementing new LMS features provided a good indication that he had reached stability in his use of the LMS.

Wally anticipated the continued development of the LMS with a focus on a form of succession planning in relation to student generated input**. Wally** stated that:

> *We are not quite there yet, however the main thing is that it is a step in the right direction, and it builds on previous student input for the current students*

Grace was open and willing to share her tools that she had developed, indicating that the tools had become stable in their use and could be transferred to other courses. However **Grace** was aware that more work needed to be done and she reflected that:

> *Others are starting to use this, not in full. [I] want to develop a few more aspects so that it is a true learning tool as a result of research on students.*

Michael epitomised a key sentiment that the participants shared when he stated, "*I want to create the perfect course before I hand it over fully!*" The challenge with stabilisation and the application of the LMS software was that there were continual updates and developments of the LMS which impacted on the participants' ability to create a completely stabilised LMS course. A perfect course is perhaps an unobtainable ideal due to the nature of software technology development.

Stabilisation is demonstrated by the developed use of the LMS, development plans and the broader use of LMS tools for future development. Stabilisation (like closure) can be viewed as a process that occurs over time and can happen in degrees. When considering the future direction and use of the LMS the participants expressed concern about the challenges they had faced in getting the LMS set up to work for them. They shared a desire to alleviate these challenges for future users, which was expressed in two ways: as either wanting to create the perfect course before handing it on or suggesting there was wisdom in waiting for the institutional support structures to mature. Both of these ideas expressed the sentiment of not expecting others to drive LMS development with their enthusiasm alone. Although the participants were pleased with what they had created, they did question whether the effort and time involved had been worth it. This highlights that often the participants were taking on work that was outside their teaching role. Perhaps one of the challenges faced by the teachers striving for stabilisation of the LMS was that this work became additional to their teaching commitments.

There were two aspects of stabilisation of the LMS that the participants demonstrated. The first level related to the way in which participants integrated the use of the LMS in their teaching practice at a course level, has been described. The second level arose when participants described plans focused on the transferability of their LMS usage to a wider institutional context. Extending the use of the LMS beyond the individual course to use by other people at the institution would be a clear example of stabilisation, because use of the LMS is no longer linked to the person.

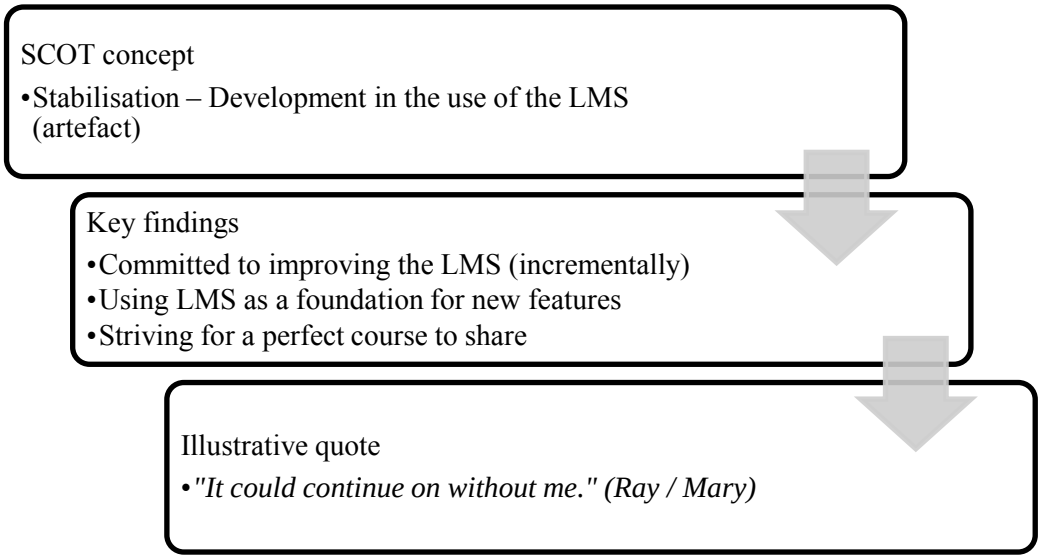
The data indicated two dimensions of stabilisation which were the course level developments and the wider institutional environment. Stabilisation of the LMS was apparent in the participants' usage of the technology. The participants also expressed the desire to share their developments of the LMS with the wider

institutional community of LMS users. It was hoped by many participants that their developments could be used to reduce the amount of work required by other teachers when engaging with the LMS design process, which led to the ideal of participants wanting to create the perfect course first. All six participants were highly motivated in their use of the blended environment to the point of promoting the benefits and being open to share their tools, tips and tricks they developed.

Michael was the final participant that I interviewed. Considerable time had elapsed between our interviews, and as such I was able to ask questions about plans that he had put into action between the interviews. In particular, at a school level **Michael** had been able to put in place research projects that focused on the changes that had been implemented. From this research and connection with the students, he had been able to then employ students to assist in the blended learning environment as lecturer assistants, creating an environment of greater stabilisation. Finally with some new technology that is being introduced at the university, **Michael** was now working in a slightly different manner, in exposing the use of this technology to senior management, to try and connect what teachers are wanting to develop in their environment with the decision makers and direction setters for the university.

The support required to reach technological stabilisation were as diverse as the participants' role. The participants showed diversity through the range of class sizes, support levels and training preferences and depth versus breadth of LMS use. Regardless of the variances within the role of the teacher, technological stabilisation seemed to be the stage where all participants still felt there was room for improvement before they could feel satisfied that their work was finished, providing examples of stabilisation by degrees. In some instances I wondered if these participants ever would see the product as finished, as a natural response to the constant renewal of teaching and technology. Figure 5.4 presents the final conceptual overview, emphasising an illustrative quote from the data and foreshadowing how this will be connecting with SCOT.

Figure 5.4: Conceptual overview of LMS usage and future focus—stabilisation



5.5 Conclusion

The data showed that the work in creating a blended environment is iterative, highly individualised, and that the participants all had a strong degree of commitment and ownership to the environment that they were perpetually creating and refining. The four stage SCOT model was used to present the data in this chapter. The participants were connected to the RSG through their shared belief that they could shape the LMS to their own teaching practice and their personal commitment to using the LMS. Five influences were identified that were instrumental to the teachers engaging with the blended learning design process. The data illustrated the value of experimenting with different aspects of blended learning and provided evidence of interpretive flexibility. However, the teachers were most descriptive about their experimentation at an enabling and enhancing level rather than the transformative. The iterative teaching cycle the participants described, highlighting the need for continual development indicated closure and stabilization. Rather than reaching a conclusion to their blended development the teachers aspired to a new way of teaching that they would continue to develop both in their own personal practice (closure) and development of the LMS (stabilisation). The findings from this chapter will be discussed in relation to the research questions and literature in the discussion, Chapter Six.

Chapter Six: Discussion

The major themes identified in the Research Findings (Chapter Five) are discussed in relation to the literature and the specific context of the case study site, together with the SCOT model. Table 6.1 presents the Research Questions (RQs) in the order they will be discussed, together with an adaptation of Prell's (2009) presentation of the SCOT model, and the data themes that emerged from this research study.

Table 6.1: Discussion chapter overview

Research Questions	*Data themes*	*SCOT Model*
RQ: What influences teachers when engaging with the blended learning design process?	Influences on choosing to blend	Stage 1: Relevant Social Group (RSG)
RQ: How do teachers go about blending online and face-to-face teaching?	Dynamic Nature	Stage 2: Interpretive Flexibility
RQ: How do teachers create blended learning environments at campus-based universities?	Refining Practice & Future Focus	Stage 3: Closure & Stage 4: Stabilisation

6.1 What influences teachers when engaging with the blended learning course design process?

In order to shape their blended practice the participants needed to become engaged with the blended learning design process. Recognition of potential, autonomy in decision making, institutional support, training and time were the five influences that the participants shared. Three of these influences were internal and can be linked to the participant description of their autonomous role, the impact of their goals and motivation (the potential of the LMS) and their reflection on their personal commitment in regards to time and effort that had been involved. The two external influences the participants articulated were the institutional support and training. These five influences on the participants' conscious choice to shift from face-to-face to blended teaching are discussed next within the SCOT framework.

Bijker (2010) reinforced the importance of focusing on the process of technology use by the RSG. The participants were viewed as a group who had made the choice

to use the LMS of their own free will, and while it was strongly supported by the institution, it was not a requirement. Therefore, the influences on the participants' processes and the autonomous manner in which they constructed their use of the LMS are the focal point of this section.

The participants' shared interpretation of the LMS was that they each recognised a potential to improve their teaching practice through incorporating the LMS. The case study showed that each of the teachers had a completely different view about the nature of the potential of the LMS. Pinch and Bijker (1986) stated that it is useful for researchers to identify the RSG and their shared interpretation of the artefact as a starting point.

Individually exploring what could be done with the LMS showed that all the participants perceived the new technology to be malleable, which influenced their decision to engage with the LMS. Researching how teachers used the LMS to create a blended learning course supports Bijker's (2010) recommendation to focus on the process of technology use. The ability to shape technology is a key dimension of the SCOT concept and highlights Pinch and Bijker's (1984) reaction against technological determinism. Technological determinism was initially perceived as viewing technology as being fixed and determining the way in which humans would apply it.

The teachers' all shared the view of the LMS as technology that they could adapt into their course. The RSG in this research study was based on identifying the teacher participants as active users of the LMS. Lindsay (2003) states that users actively co-construct their identity in relation to the technology they use. Meyer and Avery (2010) heralded the need to specifically focus on teachers as users of technology in their discussion of implementing curriculum as technology within SCOT principles. Meyer and Avery defined the curriculum as technology and the teacher as a user. In this research the teachers' application of the LMS provided a straightforward connection of teachers as users of technology. The view of technology as malleable was confirmed by the participants' use of the LMS. The participants' active role in shaping the LMS is discussed in relation to their shared influences which were: acting in an autonomous manner, motivation to improve, tapping into institutional support, seeking out compatible training options, and

committing to the implementation of the LMS in their own teaching practice. An overview of the discussion points in this section is presented in Table 6.2

Table 6.2: RQ: What influences teachers when engaging with the blended learning course design process?

SCOT stage 1 – RSG and the Influences on becoming involved with the LMS
Potential: Being motivated by the potential to pedagogically improve and shape their teaching practice
Autonomy: Acting in an self directed manner
Institutional support: Tapping into the strategic plan and development grants
Reskilling: Selectively attending training opportunities
Personal commitment: Investing their time in shaping their use of the LMS

6.1.1 The potential of the technology to improve their teaching and learning

The participants had a curiosity about the LMS (artefact) and sought out situations where they would be exposed to learning about it. The participants actively applied (and in some instances even modified) the LMS to suit their own course. The shared motivation to actively engage with the LMS because it could be used to improve their teaching practice illustrated Prell's (2009) description of pliancy and Jump's (2011) notion of shaping the artefact. The participants clearly showed they did not view the LMS as deterministic technology, they viewed the LMS as something they could decide how to apply. Both the ideas of Prell (2009) and Jump (2011) (with regard to the pliancy and shaping the use of new technology) may provide a useful insight into what influences teachers when first deciding to incorporate the use of an LMS. The most important consideration was that the LMS was viewed as pliant and that they could shape it to meet their needs within their course. Exactly how they were planning on shaping the use of the LMS was unclear at the time of their decision making. Although the participants had a clear goal and took action in learning about the LMS, their process was exploratory in nature, and was not based on a foundation of research. In this research study some of the participants were aware of this paucity and that they were taking action that was not based on research, others were simply aware that they used the LMS as a solution to address teaching needs not met by other tools. Jones (2006) stated that

"it is clear that the practice of blended learning has outpaced the research, due, in part, to the rapid increase in technology" (p. 182). However as Gerbic (2011) demonstrates in her review, there is now a growing body of literature on blended learning, perhaps one of the perspectives that is missing from the literature is whether the teachers consult the literature on blended learning practice for their own teaching development. The participants decided it was important to engage in the process of starting to utilise the LMS. Some participants discussed a clear plan to conduct research into their own practice at a future date, thereby aiming to contribute to future research in this domain.

6.1.2 The autonomy to experiment with the LMS within their course

The participants were empowered to take an exploratory approach to the use of the LMS within their course. This exemplifies Jump's (2011) description of how artefacts are chosen because they have the ability to work for that RSG. The participants chose to use the LMS because it would allow them to easily make changes within their own course. The participants in this research study exhibited a belief that the LMS was a choice that enabled them to meet their pedagogical goals in their course. The course was where the teacher had the locus of control and leadership potential (Quinn, 2004), allowing the teachers to exercise their autonomy in relation to creating blended learning environments. Therefore part of the autonomy to choose to use the LMS blended learning stemmed from the fact that the participants were all focused on applying the LMS at the course level. Even where there was a faculty template, the subject content was still constructed at an individual paper level by the teacher. The key point was that decisions could be made by the participants at the course level, acted upon and implemented and that was important to them and influential.

The data from this research study confirmed that teachers were acting at the level where they had leadership and were experimenting with their options to explore new technologies. Consequently, an important finding of this research study was that teachers appreciated and were motivated by the autonomy to experiment with the use of a LMS. The participants did not know exactly how the LMS tools would be applied, yet they knew what goal and purpose they were trying to achieve.

The process that started to emerge from the perspective of the participants was that they engaged with the tools, explored what might work for them and had the

autonomy and authority to apply changes to their own teaching practice. However, their work was often isolated within their own course context. This is consistent with Steel's (2009) finding that "many university teachers still work in isolation and miss opportunities to share their innovations and practice approaches" (p. 416). The conditions that influenced the participants might be viewed as opportunities to break the teachers' isolation in blended learning development (Steel, 2009).

6.1.3 An underestimation of the time that would actually be involved

Krieg et al. (2006) found that the major concerns teachers had about blended learning were the hard work required and the additional workload, especially in the initial course creation. The participants in this research study confirmed that there had been a large investment of time and effort in implementing the LMS, especially for those participants who had created their own resources. One participant had been able to reduce his workload by sourcing content from textbook publishers directly and using a faculty template. This exemplifies Bates and Sangra's (2011) demand for the use of "effective strategies for technology management" (p. 175).

An element in blended courses, is that teachers are trying to teach in a way that they have perhaps not learnt themselves (Steel & Levy, 2009). The unknown aspects of blended learning could have contributed to the underestimation (for most of the participants) of the personal commitment that would be required. Hofmann (2006) suggests providing greater opportunities for staff to learn about blended learning by experiencing training in a blended format, and Hallas (2005) recommends creating a platform for sharing previous projects. Both of these suggestions could be a means of socialising teachers into a greater experience of learning about the LMS, providing them with a deeper understanding of the time and work challenges, and introducing them to work that had been conducted previously. The participants' engagement with and perceptions of the process was impacted by the magnitude of work required. If the participants had been aware of the time required from the outset, they had doubts as to whether they would have undertaken this work. Hofmann (2006) contends that there is a misconception about the time required for redeveloping compared to creating a new course, which may be connected to the understandable naivety that most participants exhibited about the time involved. It is possible that the sharing of such research may discourage some teachers from

starting to teach in blended ways, or it might make the institution more aware of the shifts in policy and workload that are required to support teachers in this work.

6.1.4 Connection with institutional strategic plans and development grants

The participants' ideas for shaping their use of the LMS were consistent with the strategic plan for the institution and the fact that they were supported either directly or indirectly by internal development grants. Jump (2011) found in her review that "socialisation into the use of digital technology" (p. 63) and experience in using technology in learning, were significant in terms of student satisfaction of blended learning. This current research contends that digital technology socialisation is also required for teachers, to support them in creating blended learning environments for their students. The institutional support was pivotal in providing this socialisation experience. All participants had knowledge of the development grant process and the staff development unit, and were able to make use of these resources to suit their own preferences.

Strengthening the institutional support may be achieved by teachers when they are exposed to working with a broader team from the institution either directly or a development grant process. Therefore, teachers may reduce some of the isolation (Steel, 2009) while also engaging in collaborative practice that is important for technology development (Woods et al., 2004). Participating in a development grant showed that teachers may then be exposed to a greater range of activities such as other projects taking place in the wider institution setting, allowing the opportunity to socialise and share ideas about the development of blended learning. In order to engage with the development of the LMS, having support structures that suited the teachers' personal preference was a condition that connected the members of the RSG, which is further emphasised in their training requirements.

6.1.5 A range of reskilling options were available

The participants' decision to use the LMS was strongly influenced by the reskilling options that were available to them. An integral aspect for the participants was that they had to learn how to use the LMS. It is not that all participants had the same requirements for learning about the LMS, it is that the training was available to them on their own terms ranging from formal training, one-on-one sessions and reactionary assistance if required.

Kember (1997) emphasised the need to develop academics as teachers first, which appeared to be the approach followed by the staff development unit. Individualised and varied options for training were made available, these were always focused on learning and teaching rather than restricting the training to a single approach that may have been easier to support and provide. Some researchers have recognised that users may find ways of applying technology beyond the developer's original intent (Lindsay, 2003; Meyer & Avery, 2010; Oudshoorn & Pinch, 2003). Therefore, the unpredictable way in which users modify technology, may also be a key aspect in driving the need for a variety of training options. This means that the teachers as users may be adapting the technology in new ways beyond the original scope of the LMS. This study provides evidence of the important role of the institution in supporting the various ways in which technology may be developed by groups of teachers and the influence and involvement that the teachers may have in their own development.

6.1.6 Summary of the influences on the process

This RSG of teachers clearly shared interpretations founded on their willing and autonomous shaping of the LMS to develop their own blended teaching practice. This study shows that the teachers self directed choice to use the LMS, and the influences that supported them, were critical to their engagement in the blended learning design process. The participants all shaped the LMS to their own teaching practice, drawing on the internal influences according to their personal preferences in relation to their autonomous role, personal motivation and reflective practice. The use of institutional support was evident in the range of grants and individual work that the participants undertook utilising a range of training options. Therefore the internal and external influences may be important considerations for teachers generally when engaging with the blended learning design process.

6.2 How do teachers go about blending online and face-to-face teaching?

The data demonstrated the development of the LMS but also the consequential development of the face-to-face environment in response to adding online resources. Awareness of this possibility drove the participants to experiment with the ways in which the LMS allowed them to create the best blend of both environments. The participants focused on what the addition of the LMS allowed

them to then do in their face-to-face classroom, rather than just focusing on the LMS technology and what they could do online, revealing a dynamic impact between the LMS and the face-to-face settings. The participants' experimentation with the LMS will be discussed in relation to Graham's (2006) enabling, enhancing and transformative model of blended learning. Finally, Littlejohn and Pegler's (2007) concept of strength of the blend, and the challenges of implementing change within the institution are discussed in relation to interpretive flexibility. Table 6.3 displays an overview for this discussion section.

Table 6.3: RQ: How do teachers go about blending online and face-to-face teaching?

SCOT stage 2 – Interpretive flexibility and dynamic nature	
• Experimentation	LMS and face-to-face influencing each other
• Enable • Enhance • Transform	Graham's (2006) three levels of blending model
• Strength of blend	Littlejohn and Pegler's (2007) concept of blends
• Change	Comment on culture and leadership

6.2.1 Experimentation

The teachers experimented with adding LMS components to their courses and consequently became aware that the LMS had also impacted on their face-to-face teaching environment. All of the participants changed what they did in their face-to-face class as a result of incorporating the LMS. This exploration can be characterised as dynamic ("continuous and productive activity or change" [Merriam-Webster, 2011, para. 2]) and highlights the breadth of what can be involved with blending online and face-to-face teaching. This dynamism illustrates Pinch and Bijker's (1984) concept of interpretive flexibility, where the meaning of the artefact is shifting and changing in response to new information the participant gains as a result of interacting with the technology.

The ability to experiment with a variety of tools, to see how they worked in practice and then modify their face-to-face teaching was the dynamic process that ensued. The participants discovered how blended learning could be developed within their courses, providing an example of Prell's (2009) concept of pliancy in action. In

addition to pliancy, this also represents the actual shaping that Jump (2011) describes, where the technology is applied in a specific way to meets the need of the participant. Reshaping of the participants' practice was demonstrated by several participants who ran extra informal class sessions with computers available, to assist students in their transition to blended learning. This aspect supports Hauck's (2008) findings that a new type of classroom is being created with blended learning. Moron-Garcia (2006) stressed the importance of viewing the LMS alongside the face-to-face classroom, whereas this research study locates the dynamic and iterative relationship between the two environments as the significant finding. The initial idea was that the participants could do something different with the LMS, however this led to the realisation that because of their experiences with LMS they could also reshape their face-to-face practice.

The SCOT model contends that there are many different ways in which technology can be shaped (Jump, 2011) and that "there is not just one possible way, or one best way, of designing an artefact" (Pinch & Bijker, 1984). The experimentation of adding different aspects of the LMS to their teaching practice and then making corresponding changes to the face-to-face classroom exemplifies the interpretive flexibility of the SCOT model, highlighting the teacher's central role and autonomy in shaping their online and face-to-face course.

6.2.2 Enabling, enhancing and transformative blended learning

One important clarification that Graham (2006) makes is that his blended learning model is not hierarchical, rather the different levels of blends are suited to different situations, reflecting the different possibilities encapsulated within the LMS. These concepts are used to highlight multiple ways in which the LMS artefact could be explored through interpretive flexibility.

6.2.2.1 Discussion of what blended learning enabled

The key enabling aspects of applying the LMS was the ability to provide greater access to resources and having autonomy to experiment. Through their experimentation, the participants realised that it could be beneficial for learning to provide access to a greater range of materials online. This corroborates Graham's (2006) enabling blends: that is, blends that are focused on access, convenience and different modalities. George-Walker and Keeffe (2010) also contended that blended learning can enable the provision of learning resources that cater to

different learning styles, thereby giving greater choices to students. The participants found the opportunity to meet individual needs of the students in the online environment, allowing them to provide greater access and convenience. The ability to send email and announcements via the LMS was also seen as an enabling benefit that let the participants communicate consistently with their students and to advise them of the increased access to provided materials. There was almost a sense of the classroom growing in that no longer was the class constrained by what there was time for in the face-to-face setting. Teachers open to the potential of enabling greater access and student focused convenience may be able to construct their blended learning without being limited by the constraints of timetabled classes or restricted access.

Importantly, the course was the setting in which the participants were experimenting with dynamic changes. These changes started with the addition of the LMS in a course where participants were the teacher and coordinator, thus giving them both leadership and control within this setting. This confirms Garrison and Vaughn's (2008) assertion that leadership and technology are two key ingredients for changes that are currently happening in higher education. The participants benefited from being in a position where they had autonomy to make decisions about how to use the technology in their course. Quinn (2004) also endorses leadership and control, the important implication being that the participants were able to experiment because they were acting at a level at which they were empowered to make decisions and changes. As McShane (2004) indicates in her discussion of the transition to blended learning, the participants were able to make their own decisions about their pedagogy and how the LMS would support them.

6.2.2.2 Discussion of what blended learning enhanced

The participants' description of the ways in which blended learning was an enhancement of their teaching practice focused around the key ideas of empowering the students to engage in student driven learning. The participants also recognised that this could be of particular benefit for categories of students who may be shy, older or seeking excellence. This is consistent with Graham's (2006) description of enhancing blends that allow for incremental changes through both additional resources and supplementary materials. Hauck (2008) emphasises the point of transition by stating that there are now new rules of engagement for teaching

practice, which include the use of technology and blended learning. Nnazor (2009) develops the concept further by describing the new practice by teachers as a shift to teaching with technology. For example, the participants' provision of additional classes to learn about the online tools and empowering the students to be in charge of their own learning of difficult concepts, revision and extension, illustrates the blended learning enhancements that were previously limited in the face-to-face environment. Teachers may therefore gradually enhance their teaching by progressively transitioning to teaching with technology.

6.2.2.3 Discussion of what blended learning transformed

Graham (2006) describes transforming blends as blends that generate activities that "were not practically possible without the technology" (p. 13) and result in a radical shift in the pedagogy. The participants were initially hesitant to describe their blending as transformational, however they revealed many changes they had made that would not have been possible without the technology. The development grants that had been influential for the participants were highly contested and required innovative practice, yet the participants were still doubtful in regarding their blended learning developments as transformative. The participants' shared tentative views of transformative blended learning focused on developing aspects of the LMS that made learning fun, appealing and student driven.

There is a growing literature on transformative teaching development (Chen, 2011; Cranton, 2011; Holden, 2010; Swanson, 2010), however I contend that transformation needs to be considered in relation to the teacher situated within a particular context. There is value in exploring the participants' early conceptions of transformative practice. It is also worthy to note that perhaps the participants were humble about the transformative nature of their work and had high standards for what they would consider as transformative. All of the participants worked closely with the staff development unit to extend the use of the LMS. Many of the participants had secured development grants to create innovative resources, which could by definition be viewed as examples of transformative practice.

The participants did acknowledge that they had started a change process which had impacted on the development of their pedagogical blended teaching practice. Changing their approach to giving resources and access to students that empowering the students to be in charge of their own learning, demonstrated a shift

in the participants' teaching style to an approach that focused on the student, which could be attributed to a shift towards developing a student centred pedagogy. This is supported by the definition by Sharpe, Benfield, and Francis (2006) of transformative practices as those that may "change how students study, interact and learn" (p. 24).

Initially the participants did not realise the significance of the changes they made. Enhancing the availability of resources was a starting point from which further changes to their teaching practice developed. These changes were greater than just the addition of the LMS, and some participants recognised that it had totally changed their course. The literature states that blended learning necessitates a total redesign of the course (Brunner, 2007; Littlejohn & Pegler, 2007). The participants however first required the interpretive flexibility and experimentation, before they could then redesign their course. It was almost like they were changing their course from the inside out, and that it was an organic process that needed to start gradually.

6.2.3 Strong and weak blends

Littlejohn and Pegler's (2007) concept of strong versus weak blends provide an alternative perspective on these findings. The teachers were transitioning to providing students with resources that they had not previously shared or not previously had available due to issues such as time constraints in the physical classroom and online access limitations. The teachers stated that in response to the students' requests for greater resources online, they actively increased not only the quantity of resources but also the quality and type of resources they provided online, providing an example of Littlejohn and Pegler's (2007) transition from a weak to a stronger blend.

The gradual process of transitioning to teaching in a blended format was an important aspect of this research study. Sharpe et al. (2006) surmise from numerous research studies that redesign becomes more difficult if it is conducted during the implementation rather than planned for in advance, yet they conceded that "an emphasis on design [first] is probably not the norm for either traditional or blended courses" (p. 25). However, I maintain that the order in which the development happened was vital. I suggest the same shift in realisation may not have been reached if the participants had not been able to first experience the dynamic nature and interpretive flexibility of experimenting with the LMS.

Autonomous control at a course level enabled the participants to fully explore the dynamic nature of course development (interpretive flexibility). It is worthwhile to contrast these findings with the literature about the entrenched culture of academia and challenges to implementing change (Bates & Sangra, 2011; Duderstadt et al., 2002; Trowler, 1998). The course level changes empowered the participants to choose the changes that they wanted to make, they did not seem to be limited by the culture or challenges because of the localised implementation.

Innovation that remains localised rather than becoming widespread throughout educational institutions has been the focus of recent research where the phenomenon has been referred to as "*islands of innovation*" (Avidov-Ungar, 2010, p. 259). The concern with "islands of innovation" is that such innovation remains localised at a course level and does reach the ideal widespread innovation across the institution. Leadership and blended learning have been connected in the literature (Garrison & Vaughn, 2008; Quinn, 2004), it is the nuance of positioning leadership at the course level that I would like to emphasise in relation to the participants ability to create stronger blends. When the participants were able to operate at a level where they had full control and leadership, they were able to make the changes that they wanted to. The challenge that this gives rise to will be discussed in the next RQ because many of the innovations remained at the course level and were not transferred to the wider environment.

6.2.4 Summary

The dynamic impact of introducing the LMS leading to change in the face-to-face classroom is what characterised the findings regarding how the teachers went about blending. Graham (2006) stated that blended learning can happen at different levels and this was occurring in this research study where participants were simultaneously blending across the three levels of enabling, enhancing and transforming. Through interpretive flexibility the participants took action on their thoughts and goals, which then led them to learn more and then experiment with incorporating the LMS. Experimentation was pivotal to this step at all three levels (enabling, enhancing, transforming) of blending, and represented in weak to strong blends. Interpretive flexibility allowed exploration of including the LMS, making the dynamic nature of this development process apparent. The participants perceived that the LMS would enable and enhance their teaching practice, and were starting to acknowledge a weak level of transformation. The participants were

empowered to make changes because the course was where they had the locus of control and could fully engage in interpretive flexibility through reactive changes in both of their teaching environments. The dynamic nature of the participants' experimentation with the LMS technology and how this led to changes in their face-to-face classroom teaching (and away from a focus on the LMS) was the surprising finding from this research study. Teachers may therefore benefit from reviewing the dynamic and iterative impact that blended learning may provide in all aspects of their teaching practice.

6.3 How do teachers create blended learning environments at campus-based universities?

The study illustrated the ways in which teachers had changed their practice. The developments they had made in applying the LMS are discussed next in relation to the last stages of the SCOT model (closure and stabilisation). Pinch and Bijker (1984) defined closure as a situation where interpretive flexibility ceases, and stabilisation as the stage where physical development of the artefact takes place. In this research study, the artefact was the LMS and the multiple ways in which this software could be used and planning for succession were the long term development processes that the participants illustrated. As discussed earlier, Bijker (1997) describes closure and stabilisation as two sides of the same coin in the SCOT model, making it logical to discuss these concepts together. Humphreys (2005) simplified the distinction between these concepts by stating that closure focuses on people, which in this research was the teachers (RSG) and stabilisation focuses on technology, which was the LMS (artefact).

The intangible nature of software use as development becomes apparent in the discussion of the final RQ, and the role of the teacher is central to this discussion. The participants showed an awareness of the LMS on two levels, the development of their own teaching practice and also the potential of a contribution to the wider institutional environment. The course level was where they experimented and worked as individuals who exhibited leadership and control, which was important across each stage of the SCOT model. At the environment level, they interacted with the institution/university structure that was broader than their course. Table 6.4 contains the overview of this section with closure and stabilisation displayed side by side, to visually represent Bijker's (1997) two sides of the same coin.

Table 6.4: RQ: How do teachers create blended learning environments at campus-based universities?

SCOT stage 3 Refining practice and SCOT stage 4 future direction	
Closure focused on: The RSG and their approach	Stabilisation focused on: The technology [LMS] development

6.3.1 Closure through acceptance of a blended teaching spaces as essential

Pinch and Bijker (1984) originally stated that observing closure can be done by paying attention to the tighter definition that the RSG uses to describe the artefact. An example of closure achieved through a more fixed definition of the LMS was evident in the way that the teachers (the RSG) stated how natural it was to be using the LMS now, and that they could not imagine teaching without it, indicating that the LMS had become taken for granted. Also the participants' references to "online" showed this was a well understood term and a highly utilised teaching space that had become a common view of the LMS. The way in which the technology provided a way of centrally locating resources is an example of Pinch and Bijker's 'solution' that the artefact provided. The clearer definition and centrality of the LMS signalled what Prell (2009) identified as closure across the two dimensions of creating a tighter definition of the LMS and positioning the LMS as a solution to a problem that has been solved. This interpretation provides a way to mitigate Russell's (1986) critique of closure being difficult to observe. Closure in this research study was evidenced by the participants' definition of the LMS as the foundation of a new online teaching space and the recognition of blended teaching spaces as essential. The refining of their current practice, reinforced the participants active role in constructing how they would incorporate the LMS.

The participants described their plans for using the LMS, the associated procedures and administrative tasks as well as LMS uptake by their wider team. These factors provide evidence of the LMS becoming a fixed aspect of their individual teaching practice (closure) together with the continual development that was required to maintain the use of the LMS (temporary closure). These descriptions may go some way towards "[taking] stock of what it is that teachers now do" (Selwyn, 2010), and illustrate the broader range of planning and procedures that teachers now need in order to become proficient in managing their teaching context. The use of the LMS had become integrated into the participants' practice, and they were focused on

putting systems in place and improving resources. Although the participants would continue work with the LMS, there was a goal of making the work more streamlined and less cumbersome. The aspect of refining their blended practice could be understood as one of the many ways that Kaleta et al. (2007) describe as the changing role of the teacher in relation to teaching with technology.

Constant renewal of the LMS was shown in the participants' talk of refining their practice and their incorporation of technology updates, which may be viewed as examples of Humphrey's (2005) temporary closure. While Bijker (1993) contended that once closure was reached the concept would seldom be reopened, in the context of applying the SCOT model to the use of software, temporary closure in relation to the way in which the software is used is a more appropriate concept. In this research study the blended learning space had become essential, displaying that the teachers had reached closure in their commitment to use of this space. The LMS is an example of software that Humphreys (2005) classifies as having "long-term processes of technological innovation and evolution" (p. 242). Viewing the act of closure as being open to redefinition within different contexts, is an ongoing process that becomes the focus in temporary closure. This supports Pinch and Bijker's (1986) view that closure simply becomes part of the development cycle. The value of temporary closure is further supported by Kerr (2004) who firmly states, "by its nature, technology changes constantly [and] technology in education is no different" (p. 113). One of the participants described their development of the LMS as being *in the kindergarten of blended learning*, further indicating a development process over time and characterised by temporary closure.

The participants applied many aspects of the LMS to their teaching practice. The participants had not reached closure on all aspects of the LMS however in my view, they had made significant changes in their approach and using the LMS had become integral to their teaching. The teachers had reached temporary closure in their continued commitment to updating and applying new features of the LMS indicating that they were applying Nnazor's (2009) concept of teaching with technology that is an acceptance of the long term development processes required when teaching with fast changing technology. Their approach demonstrated closure in the development of their preferred teaching environment and temporary closure in the commitment to the long term development processes the LMS required. The teachers could not imagine teaching without the LMS. As a result the teachers

developed a mature and sustained understanding of the purpose of the LMS and the impact it had on changing their approach to blended teaching with the LMS technology.

6.3.2 Stabilisation intended for future direction

In this research study stabilisation was considered on two levels: first at the course level and second with regard to the wider institutional environment. The participants view that their course with the LMS could continue without them, signalled that development had taken place, indicating achievement of Pinch and Bijker's (1984) concept of stabilisation. The participants developed a clear way of working with the LMS through their application of the software, which illustrated Rosen's (1993) view that stabilisation may be observed when the technology is perceived as essential and "taken for granted" (p. 483), a sentiment that the participants clearly expressed. Teachers thought that it would be difficult for others to pick up their course, and this indicated that although the LMS had reached a certain level of stabilisation, that stabilisation, like closure, happens in degrees (Pinch & Bijker, 1984). Although the use of the LMS had become a fixed aspect of the teachers' practice, they also perceived that there were improvements to be made. To this end they incorporated the LMS into their own teaching practice but had not developed the LMS for other teachers to use.

It is important to recognise the intangible nature of the LMS software. While the participants did reach stabilisation in their application of the LMS, Prell (2009) describes the development of software as a fluid process of stabilisation. This contrasts to the physical construction of hard technologies from Pinch and Bijker's (1984) early example of bicycles, and Bijker's (1997) review of bicycles, bakelites, and bulbs. Building on the connection between closure and stabilisation as two sides of the same coin, temporary closure is matched with flexibility of structure in relation to the "continuous evolution of technological innovations" (Humphreys, 2005, p. 243) and supports the idea of degrees of stabilisation. The impact of continual development was evident in the software updates the participants experienced. The complication of constant evolution meant that the participants could not see an end point where they could state the work was finished and done. The impact of continuous development is important to acknowledge in relation to Brown and Cornwall's (2000) concerns about "the bafflement of technology" (p. 3)

that has now become an accepted part of teaching. Together with needing to keep up with the changing technology, Thirunarayanan and Perez-Prado (2005) emphasise that teaching in the 21st century has created a need for a wide range of technology skills. Not only do teachers need to learn and apply the new technology, they must keep adapting to the changes that take place, because technology is not static and skills must be continually updated to keep pace with technology.

The second level of stabilisation is relevant to Bijker's (2010) more recent emphasis on the process of technology development. The participants expressed a contradiction in their desire for wider use of LMS developments across the institution, yet wanted to make their courses perfect before handing them on. I suggest that part of the reason the participants had difficulty in attaining this level of stabilisation with the LMS, was that the technology kept changing before they could finish their perfect course and they were deepening their understanding and becoming more ambitious in their use of the LMS. While the participants were convinced that their investment of time had paid dividends, even if they had underestimated how much work it would be, they did not think that other teachers should need to go through the same lengthy development process. The participants hoped that synergies could be gained from their work for future users of the LMS and wanted to share their experiences across the university. This view is supported in the research by Hallas (2005) and Moron-Garcia (2006) who recommend the sharing of exemplars within the institution, providing insight into how the LMS is currently used and how it could be applied by future users. Bates and Sangra (2011) also suggest that effectiveness is increased when localised projects are connected to the wider context and strategy of the institution. Cornford and Pollock (2002) call for visibility into how teachers create the blended environment, to which providing such exemplars could be one part of the solution.

The SCOT model highlights the complexity of the continuous process in developing blended learning. Controversially, the development cycle may fail to gain momentum if the perfect course is achieved, because this would illustrate that the LMS or the teacher had stagnated or may have chosen to focus on research rather than development. Perhaps an insight gained from developing the use of LMS is that there may need to be an acceptance of continual work cycles and the ability to share developments in mid stream. An institutional response to continual work cycles could be to build an acceptance of this into the development grants. Another

recommendation would be in addition to exemplars to provide a forum where enhancements to developments could be shared within the development grant process and to promote the development of research-based practice.

6.3.3 Summary

The participants were focused on passing on a finalised artefact rather than a descriptive exemplar of the process in which they engaged. Perhaps the potential for blended learning has not been reached because the participants were not ready to let go of their creations; they wanted to perfect their work first before handing it on. A focus on the process could entail the participants sharing of how they first learnt about and then explored the multiple possibilities of LMS, which they then refined through reaching closure and stabilisation. Providing ideas on how to navigate through a more streamlined process and any improvements they would suggest could be a more feasible approach than attempting to share a perfected, completed product, supported by Bijker's (2010) recent focus on processes of technology development. Further research is required using the SCOT model as a lens on a much larger sample, that may allow greater focus on the development of institution wide blended learning environments, thus realising the potential of blended learning.

6.4 SCOT reflection and review

The SCOT model adapted by Prell (2009) provided a rigorous concept for the analysis and discussion in this research study. In particular, Bijker's (2010) recent refinement of using SCOT as a tool for discovering the process of development was directly aligned and supportive of my interpretation of the SCOT model. Jump (2011) also concluded that there is a necessity to understand the processes involved in creating blended learning environments within the wider context of the institution. Supporting the use of SCOT as a tool to focus on the process of creating blended learning environments may assist in contributing to research focused on revealing the potential of blended learning.

Researchers have expanded on the foundation of the four stage model, to create new variations. Most notably Bijker (1994) extended the model with a further four

stages to enable research to include a focus on the issue of power relationships (which is also the model that Prell [2009] extends). Bruun and Hukkinen (2003) propose the combination of models: evolutionary economics (EE), SCOT and Actor Network Theory (ANT). Alternatively, Dayton (2006) explores the full cycle of development within a workgroup "as they collectively learn, analyse, adopt, and redefine a new information technology (IT) tool or system" (p. 355). In order to see these developments fully, Dayton combines SCOT with the adoption and diffusion theory (ADT, first put forward in 1962 by E. Rogers [2003]) and cultural–historical activity theory (CHAT, developed and discussed in relation to social construction by Engestrom, [2000]).

The combination of several theoretical models suggested by Bruun and Hukkinen (2003) and Dayton (2006) show the potential to build on SCOT based research. While there are merits to applying a broader focus and combining SCOT with other theoretical models, for this research, applying the original model provides a much tighter focus for a case study and limits the scope to a more manageable master's thesis. My research focused on the first four stages and remained in the interpretivist/constructivist paradigm. My rationale for limiting the model to the first four stages was to focus on the original essence of the SCOT model put forward by Pinch and Bijker (1984), so that the investigation of the impact of power and structure were not within the focus and scope of this project. Other researchers have also adapted the SCOT model, for example, Jump (2011) presented a reordered and compacted version of the SCOT model, comprising of interpretive flexibility, RSG, closure and stabilisation and the wider context. This research study was a single case study that applied SCOT directly to one RSG. There could be future benefit in developing this research study into a meta-analysis such as Jump (2011) conducted, however a wider selection of participants or multiple case studies would be required.

Prell's (2009) order of analysis that is situating the RSG first followed by interpretive flexibility, and discrete treatment of closure and stabilisation allowed for specific nuances to be revealed that may have been obscured if a different approach to using the SCOT model had been used. This research study was based on one RSG.

Limiting the RSG to a singular group may be different from other researchers' application of the SCOT model and could be considered a limitation of this research study. However, overall, my approach was compatible with the SCOT intentions, because the singular RSG was a group of participants from the case study site. Following the case study methodology, the scope of a master's thesis did not permit the inclusion of multiple RSGs. Initial analysis was conducted inductively at the individual participant level. Subsequently, to provide a greater level of abstraction and focus for this research study the SCOT model was applied deductively as a second level of analysis, thereby solidifying the use of a singular RSG into a meaningful unit of analysis for this research study. The shift from individual analysis of participants to viewing the participants as a group, further supported the research implementation phases presented by Prell (2009) in which the interpretive flexibility was then viewed after the RSG had been formed. Jump (2011) placed interpretive flexibility first, however this did not fit my research study. The design of this research could have been strengthened by an earlier application of the SCOT model to inform the interview questions.

6.5 Conclusion

This research study has provided in-depth insights into the ways in which teachers constructed their use of the LMS into a blended teaching practice, supporting the call by Bissell (2010), Edgerton (2004) and Winner (1993) for research into actual technology use. Edgerton (2010) recently refined this point calling for research that studies "technologies-in-use" (p. 688). This research study illustrated the malleability of an LMS as a form of technology development and did not support the views of technological determinism. The focus of the three RQs on the participants' process, approach and creation of a blended learning environment, may provide a contribution to much needed research into "the whole area of practical use of ICT-supported learning technologies" (Bissell, 2010, p. 539). The three major findings followed by a discussion of the implications are presented in the Conclusion Chapter with the significance, limitations and recommendations for future research to conclude this research study.

Chapter Seven: Conclusion

The aim of this research was to explore how teachers created blended learning within the environments of their own individual micro level course and at the wider institution macro level. The main findings and their implications are discussed first under the heading of the research questions. The significance of this research study is then presented with an acknowledgement of the limitations and recommendations for future research.

7.1 Summary of the main findings in this research study

This research study has focused on teachers and the new work they have engaged in as a result of incorporating blended learning into their teaching practices. Through the course of the research study and analysis, the research focus shifted from the application of the LMS to the shaping of the teachers' blended practice through the use of the LMS. The main findings are summarised under each of the research questions and are followed by discussion of their implications and provision of recommendations.

To provide an overview, the three major findings of this research study were that:

- A pattern emerged where the participants described their influences on choosing to incorporate the use of the LMS resulting in the teachers' actively shaping their blended practice.

- The addition of the LMS led to a dynamic impact on both the face-to-face and online environments, the former of which was unexpected.

- Constant renewal of technology may be better supported by a focus on sharing the process of blending (rather than the artefact), through the creation of rich descriptions on how to navigate pliant technologies implementation into teaching and institutional practice.

7.1.1 What influences teachers when engaging with the blended learning design process?

The first noteworthy finding identified the five influences displayed by participants who became involved in the blended learning course design process which were the potential, autonomy, personal commitment, institutional support and training. These three internal and two external influences enabled the teachers to take an active role in shaping their blended environment. The teachers shared the view that the LMS added value for teaching and learning, which they could apply and adapt to their individual teaching practice.

7.1.1.1 Implications of increasing teachers' involvement

Teachers' perspectives of the influences that emerged when engaging with the LMS raises issues of policy change. McShane (2004) argues that research into teachers' processes may assist in informing policy. The influences may be viewed as the things that teachers as users of technology found necessary. Greater support structures are required, to sustain the new and time consuming work that teachers are now engaging in, which Wiesenberg and Stacey (2009) suggest could be attained through policy shifts. A recommendation for the institutional perspective is that the five influences could be used to highlight potential areas for supporting policy shifts that Blight et al. (1999) and Samarawickrema (2009) recommend.

The passion that the participants described is not enough and cannot be constantly relied on if there is to be continuous development in the use of the LMS. Blight et al. (1999) suggest that in order for institution wide changes to be supported, policy is required. This research aims to highlight that some teachers were working despite the lack of support. A limited interpretation of support could be through the provision of faculty or institution templates however much greater support could be created through policy shifts. A recommendation would be for teachers to be aware of how policy at their institution may or may not support their blended learning endeavours.

Formal identification of change in roles attributing this work into job descriptions is now essential. In this research study, the LMS became taken for granted by the participants through their developed use of the technology. Caution must be used to ensure that the considerable work performed by teachers in creating blended learning environments does not become taken for granted. In the literature it has

been suggested repeatedly that the reward structure needs to be revised to include the new work teachers are now engaging in (Bates, 2000; Bates & Sangra, 2011). Recognition, remuneration and reward for the work involved that is within the scope of the role of the teacher are highly recommended. This research study highlights that some participants were working despite the lack of support, claiming they might not have done so had they realised the amount of work required when they first started to use the LMS. Part of the benefit gained by this insight into the actual practice, was that perhaps some aspects could be recognised and formally attributed to a role within the institution, as suggested by Samarawickrema (2009).

The support from the staff development unit and internal development grants were integral to the participants' shaping of their blended practice. One aspect of the individual development grants (as offered by the participants in this research study) was that their projects did not seem to have a finite end point. This was compounded by the fact that LMS is a fast changing technology, and does not become a fixed product so that universities should consider including a project lifecycle evaluation from an institutional level. The prospect now exists to create greater connections between development projects, to build cohesiveness at both a faculty and institutional level. Future potential could also be gained by drawing together future project teams based on the strengths from previous projects and strengthening the focus on process purported by Bijker (2010) with the application of the SCOT model.

7.1.2 How do teachers go about blending online and face-to-face teaching in their courses?

The surprising finding from this research study was the dynamic impact the LMS had on the participants' teaching practice in both environments (LMS online and face-to-face). Through interpretive flexibility the teachers had the autonomy to explore a range of ways in which to apply the LMS. My expectation was to find an increased focus on the technology or the tools. Instead a dynamic impact was observed that reinforced Moore's (2006) view of a mutually beneficial relationship between online and face-to-face teaching. The introduction of the LMS resulted in changes to all aspects of the teachers' practice. The dynamic impact also highlighted the iterative development process inherent in the development of a blended environment.

7.1.2.1 Implications resulting from the dynamic impact

Teachers may also benefit from the provision of holistic training that transcends the current provision of training to use new software to a way of preparing for and conceptualising the dynamic impact which may occur when integrating the LMS. The institution offers courses on technology tools, whereas the recommendation from this research study would be for institutions to develop courses that take a holistic view of blended teaching practice. A key aspect in new training situations would be to introduce the notion that the addition of LMS tools may lead to a total redesign of the course. Littlejohn and Pegler (2007) and Garrison and Vaughn (2008) recognise that teachers perceive or fear that a total redesign may involve significant work, yet research shows that incremental changes lead to the greater workload (Hofmann, 2006).

The potential of the addition of the LMS to have far reaching changes for teachers' practice could be foreshadowed as something that other teachers may also experience when engaging in this work. Although some research contends that incremental changes lead to greater work, it may also be a necessary part of engaging with the process for some teachers. Therefore situations that allow for a gradual redesign could be supportive to future users / future projects that focus on the development of blended learning. A focus on blended learning is quite different to the focus of adding on the LMS, it was the teachers' pedagogical approach that was affected. A recommendation would be to provide professional development for the creation of blended learning environments with a holistic focus on the pedagogical approach combined with a long term redesign processes.

7.1.3 How do teachers create blended learning environments at campus-based universities?

The third finding highlighted the continuous development cycle that is evident in the application of educational technology. The teachers' engaged in a process of constant renewal of their own teaching practice and reskilling to stay constant with technology advances. The potential to share the navigation process rather than a final product (artefact) suggested a shift from attempting to design a perfect course to a focus on the process of how teachers shape the pliant technology. The SCOT model provided a framework for focusing on the teachers' processes when using the LMS artefact and was supported by Bijker's (2010) recent focus on uncovering process through the application of SCOT. Pliant technologies are constantly

changing and being changed, therefore integration of the LMS was highly contextual to the course and the individual teachers' practice (Jump, 2011). Learning to teach in a blended environment is still in the early stages of development, necessitating a focus on long term processes to be anticipated.

7.1.3.1 Implications of constant renewal processes

The participants hoped that some leverage could be gained from their expertise and that benefits could be shared. Research recommends the sharing of exemplars (Hallas, 2005), and the institution does provide forums for sharing feedback on development grants. However, it is also stated in the research that the imminent transformation of education is yet to be attained. (Hofmann, 2006; Laurillard, 2008a; Selwyn, 2007). I suggest the institution could further lead development of the LMS by advocating the LMS as a malleable system that teachers may use to shape to suit their own practice and the specifics of their courses and create forums where the pliant nature of the LMS is prevalently discussed. Such discussions may also promote the idea that teachers' can maintain control and autonomy when developing blended practice.

The teachers' blended environments were highly contextual, which further complicated the ability to make them transferable. The way in which the teachers applied the LMS for their own blended teaching practice was highlighted through their closure and stabilisation, which remained at a course level. Extending their practice to the wider institutional environment was in their view, impeded by the iterative development of their blended product. This is problematic because technologies do not remain stagnant and digital technologies such as the LMS change rapidly. Sharpe et al. (2006) recognised highly contextual course specific implementations of blended learning as a response to course level issues, drawing attention to the fact that the course level is an important focal point when implementing blended learning.

While I applaud the desire of teachers trying to make the transition smoother for other teachers, I think there is a shift in practice that this research study supports. I recommend a shift in focus away from the individual teacher and their course to the institution environment and how to facilitate continual change. I propose that the SCOT framework could be used to provide insights into creating lasting change in blended learning. It is vital to focus more on the process rather than the product of

the blended learning environment. All four stages of the SCOT model were required to gain insight into the processes that the teachers' engaged in. A recommendation would be to ensure that there is a rich description of the process involved when blended learning initiatives are discussed. Rather than trying to facilitate the quick transfer of blended practice it is important that the details of the process are explored, perhaps through an application of the SCOT model. This study revealed that it is insufficient to focus on describing the development (stabilisation) of the LMS artefact in isolation. It appears that teachers go through the development of their blended practice individually; however the development time may be shortened if they were to have support in accessing similar work that had been completed previously on the LMS.

I maintain that teachers need to constantly make new journeys revisiting their development of blended learning and pedagogical processes. In essence the SCOT model could be used to provide a description of how teachers and universities might navigate the development of blended learning. Such navigation descriptions would support the continual development required when incorporating an LMS into blended teaching practice. Therefore I maintain that sharing *practice as navigation* holds greater feasibility than attempting to provide the perfect course.

7.2 Significance of the research study findings

The way in which teachers socially constructed their blended practice was the focal point of this research study. Research into ICT and blended learning has focused on students and I contend this focus has led to an imbalance in the literature, which is only recently starting to focus on the teacher in the corresponding student teacher learning equation (Agostinho, 2011; Bennett et al., 2011; Gerbic, 2011; Laurillard, 2008b). The role of the teacher in relation to their creation of blended learning environments has been emphasised in this research study. The further significance of this research study is next discussed.

This research study highlighted the application of the SCOT model as a tool to uncover the influences that were vital to teachers when engaging with blended learning. SCOT provides a way in which to examine the process of developing blended teaching practice by focusing on the iterative process rather than the directly on the blended product. This research study reminds us that while there is research into the use and effectiveness of blended learning (Bonk & Graham,

2006a; Picciano & Dziuban, 2007; Stacey & Gerbic, 2009) it is the focus on teachers and their processes which is at the core of developing the use of blended environments. This research study expanded the use of SCOT and explored the influences that were integral to the teachers forming an RSG. Most SCOT research takes the RSG for granted and does not focus on how the RSG is constituted. There are many ways in which this emphasis on the RSG could contribute research.

The focus in this research study shifted from the LMS to the dynamic impact that the addition of the LMS had on the face-to-face environment. Building on research that focuses on creating the best of both worlds (Gruenewald, 2003; Nielsen, 2008; Ward, 2004), this research contends that it is the dynamic interaction of these environments on each other that is significant. Instead of focusing on the online and face-to-face environments I suggest the importance lies in the impact each environment has on the other and how this drives development forward. Power (2008) suggested the need for investigation into how teachers plan for online teaching. An interesting way to extend Power's suggestion would be to investigate how online teaching may impact on face-to-face teaching, thereby taking a holistic view of the impact of blended teaching.

Insights into teachers' challenges in sharing blended developments and succession planning was gained in this research. The teachers revealed a desire to impart a perfect course (a fixed development of the LMS) yet there were constant modifications due to the changing nature of technology and specifically educational technology (Kerr, 2004), resulting in many innovations remaining at the course level as islands of innovation (Avidov-Ungar, 2010). The SCOT concepts of closure and stabilisation revealed a contradiction between the teachers' level of professional development and the development of the technology. In their professional development the concepts of being at the beginning of learning about blended teaching was likened to being in the 'kindergarten' of blended learning. This contrasted with the teachers' desire in to prepare for succession and develop the perfect course so that it could continue on without their input.

As a result of constant changes in educational technology I would like to suggest that creating a perfect course may be an unobtainable ideal and that developing ways of sharing the development process may provide a new way of creating knowledge and sharing practice across the blended learning field. Institutional

environmental challenges became apparent in relation to the sharing of blended practice, which were perhaps impacted by the lack of job description clarity and policy support.

7.3 Limitations of this research study

This case study research must be interpreted within the context that it was conducted: A single site research project with a small sample group of six teachers selected to represent a range of subject areas and teaching levels across one New Zealand tertiary institution. These teachers shared a conviction that the LMS had been a positive choice to support their teaching practice. One of the limitations of case study research is the lack of transferability (Merriam, 1998; Yin, 2009). However every reader is able to make their own decisions relating to the particulars presented in this case study (Cohen et al., 2000; Stake, 1995).

Prell's (2009) interpretation of the SCOT model put forward by Pinch and Bijker (1984) has been applied to this research study. There are a variety of ways in which the SCOT model could be applied to research. Power issues and additional theoretical models were not used to extend the original SCOT model. Winner (1993) cautions that it is important to consider whose ideas have not been represented, by the selection of the RSG. Therefore in this research study it is important to disclose that the views of teachers resistant to using the LMS due to a dislike, difficulties or bad experiences with technology were not considered.

Finally the scope of this research study needed to be contained, therefore aspects of the participants' adopter level, personal leadership, pedagogy or LMS evaluation were not the central focus of this research study. The participant demographics form (Appendix A) provided the potential to augment this research with E. Rogers (2003) adoption and diffusion theory and to explore adopter levels in relation to Elgort's (2005) chasm between adopter levels or Gartner's (2011) hype cycle. The connection between technology and leadership has not been explored to any great depth, it has only been briefly addressed. The kinds of pedagogy or LMS evaluation were also beyond the scope of this research study. The sentiment put forward by the participants that they were at the beginning of their own learning indicated to me that it may be premature to perform evaluation. I contend that there is still much to be learnt and shared about developing teaching practice prior to such evaluation.

7.4 Recommendations for future research

This thesis has reported on teachers' involvement in creating blended learning environments. During the course of this research decisions were made to maintain a strong focus on the case study site and the application of the SCOT model. Ideas for areas that could warrant future research that were not investigated during this research study are presented next.

7.4.1 Extend the scope of this research into a broader setting with multiple case study sites, RSGs, and/or an extended SCOT model.

This research study showed the potential of applying the SCOT model with one RSG to research blended learning within a single case study site. Research often raises more questions than it answers and extending the model of this research into a broader setting shows potential. Viewing technology as pliant was a pivotal aspect of this research study, future research could be formed within this paradigm from the foundation of viewing technology as malleable.

7.4.2 Directly investigate the dynamic impact between online and face-to-face settings.

This surprising finding from my research could provide a way of investigating synergies between learning environments. In this research study, dynamic impacts were discovered when exploring the processes that the teachers engaged in when adding the LMS to their teaching practice. Further dynamic impacts may be discovered between other aspects of teachers' practice, perhaps in relation to their professional leadership and blended learning. A recent call for papers stating that "there is currently no international scholarly journal which effectively covers the interaction between the fields of 'e-Learning' and that of 'Leadership'" ("British Journal of Educational Technology Homepage," 2011) emphasises this area for future research. Combining the dynamic impact that was observed in this research study with teachers' autonomy and professional leadership in blended learning could be a niche for further research.

7.4.3 Develop a model for navigating pliant technologies

Exploring how the process of creating blended learning can be shared would be an area for rich research and development. Agostinho (2011) and Bennett et al. (2011) call for a greater focus on the design process that teachers engage in when creating blended learning environments, suggesting that direct observation of their design

process could provide a richer understanding. Seeking to understand these phenomena in both the wider national and international contexts could provide a platform for research based on the meta-analysis of many different case studies or other research studies that could be combined for analysis. Recent conferences that focused on 'blended metrics' could form a baseline for such research and demonstrates recognition that further research is required into what is now currently taking place.

In closing, this research study used Garrison and Vaughn's (2008) concept of thoughtful fusion to define blended learning. Perhaps future research, training and support for blended learning could take a more holistic view of both teachers and the learning environment. I suggest this emphasis might be achieved by shifting the focus from "the thoughtful fusion of face-to-face and online learning experiences" (p. 5) to research that is focused on the dynamic practice of blended learning.

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Appendix A: Participant Demographic Form

How do teachers create blended learning environments at campus based universities?

Please provide some information about your teaching before we begin the interview.

1. *Date*

2. *Pseudonym*

3. *Number of semesters working in blended environments*

1 – 2 semesters	*3 – 4 Semesters*	*More than 4 Semesters*

4. *Discipline/Programme*

5. *Course level*

6. *Class size: Smallest blended class size _____ Largest blended class size _____*

7. *Technologies used* *LMS* *Other – please state:*

8. *Blend (circle your choice)* *Additional to face-to-face class component* *Class contact hours reduced from _____ to _____*

9. *Interaction and communication uses of technologies (circle or underline the ones you use)*

Discussion Boards	*Blogs*	*Quizzes*
Chat	*Wikis*	*Other – please describe:*
Email	*Announcements*	

10. *Informational Uses Technologies (circle or underline the ones you use)*

Lecture Notes / Handouts	*References*	*Examples*
Course materials	*Web links*	*Images*
Learning activities	*Video*	*Other – please describe:*
Tutorials	*Resources*	

11. *How would you describe your approach to using new technologies?(circle your choice)*

First in line -happy to do trial / testing OR Second in line – I'll wait for testing to finish	*When lots of people are starting to use it – I will join in*	*When most people have used it – then I will start. OR Last in line, would rather avoid new technologies!*