Innovation from a distance: a study of diffusion in a regional university

Valentine Albert Robert Hazelman
University of Wollongong

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Innovation from a distance: a study of diffusion in a regional university

A thesis submitted in fulfilment of the requirements for the award of the degree

Doctor of Philosophy

from

UNIVERSITY OF WOLLONGONG AUSTRALIA

by

Valentine Albert Robert Hazelman
BBus PGCert MEdTech, S. Qld

Faculty of Social Sciences
School of Education
2017
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Abstract

This study examined the diffusion of an innovation, a learning management system for distance and flexible learning (DFL) in a regional university – the University of the South Pacific (USP). It set out to address the following questions:

1. How does diffusion of an innovation occur in a regional university?
2. What elements of diffusion have significant influence?
   - What are the key processes in the diffusion of a learning management system?
   - What key stakeholders are involved in the diffusion of a learning management system?
3. What aspects of the regional setting impact diffusion?

Grounded in the work of Rogers (2003), diffusion is how an idea that is perceived as new by an individual, organisation or adopting unit is communicated through certain channels among members of a social system over a period of time. Understanding the nature of diffusion of innovations in the context of a social system with varying ICT infrastructures, challenging geography, diverse cultures, environmental and political settings presented a unique opportunity for inquiry. A pragmatic approach saw a primarily qualitative based case study involving interviews and questionnaires supported by document analysis over multiple sites.

This study showed that innovation for DFL, in this regional university was dynamic, both deliberate and unplanned. There was no clear formula for introducing innovations for learning and teaching in a broader institutional sense, nor was there an innovation plan. This impacted on the diffusion process, which was crucial to spreading awareness and use of the learning innovation. The central decision making unit of the university tended to be ‘originator’ and ‘communicator’ of an innovation. In this study, innovations such as the learning management system were the result of a single unit’s innovativeness. This unit was the early adopter of the innovation due to the innovations’ relevance to that unit. The decision to adopt for the entire University was made by the authoritative decision making unit.
Diffusion in this regional context was adversely affected by geography, infrastructure and resource differentials. It was not so much the type of innovation and the time it took for awareness and use in the region, but more the effectiveness of the individual campuses operating and driven by the central campus. This study also highlighted staff members’ level of awareness and use of innovations such as the learning management system was closely related to the nature of their work, despite the location and or the individual’s confidence of computer/technology use.

Further, this study found that centralized decision making regarding the innovation was not viewed favourably by the regional campuses, as communication from the central campus was viewed as monopolistic and lacking inclusivity. However, it appears that in light of the geographical characteristics of the university, key innovative decisions were best suited to authoritative decision-making processes.

As well, it was evident that the further geographical distance from the central campus, the slower the diffusion process. A general agreement was that the central campus was perceived as being better developed and more progressive in terms of infrastructure resulting in inequitable diffusion.

This study makes a contribution to diffusion research by addressing the gap in application of theory to underdeveloped regional (SIDS) contexts, while gaining a greater understanding of staff involvement in the process of diffusion. As well, the study provides a thorough account of the unique regional context while informing literature related to technology adoption, implementation and sustainability of learning innovations in dispersed learning environments.
Declaration

This thesis comprises my original work towards the Doctor of Philosophy in Education. Due acknowledgement has been made in the text to all other material used. This thesis is the result of my own investigation, except where otherwise stated. No part of this thesis has been used for the award of another degree. This thesis meets the University of Wollongong’s Human Ethics Research Committee (HREC) requirements for the conduct of research.

Candidate: Valentine A. R. Hazelman
Date: 28th August 2015
Acknowledgements

Thank you Lord for the life you blessed me with. I am fortunate to be able to undertake studies of this calibre. This undertaking required invaluable people and precious time, for which I am humbled and grateful.

To mum, dad, Felisha, Clifford, Christina and Shelton, thank you for your love and support. To Keiron, Kelenia, Gracelyn and Augustine, may your futures be bright and exciting.

To my supervisors, Professor Ian Brown and Dr. Sarah Howard, thank you for the critical voices I needed to complete this journey. This love-hate relationship was enlightening and worthwhile.

To family, thank you for the distractions. To friends, thank you for reminding me to take it easy. To my colleagues at the Centre for Flexible Learning at the University of the South Pacific, thank you for your helpfulness and heart.

To Dr. Jennifer Evans, Dr. Theresa Koroivulaono, Dr. Eileen Tuimalea’Il’ifano, Dr. Richard Wah, Dr. Kader Pramanik, Dr. Eci Nabalarua, Professor Susan Kelly, Dr. Desmond Amosa, and Tomasi Cabebula, thank you for being beacons of support and guidance throughout my career and life.

To aunty Melcy, Andrea and Ava, Fiona, Tully and Lulu, my family away from home, I am indebted to your hospitality and care. To my fellow hardworking HDR students (especially Tiffani, Karley and Sophie) and staff members in the School of Education at the University of Wollongong, thank you for keeping me sane and for entertaining and tolerating my mood swings.

Thank you to the Government and people of Australia for the opportunity of the prestigious Australian Leadership Award. Finally, to the many wonderful people who have guided and supported me along the way, “vinaka vaka levu”.

For Vanessa Helena Hazelman, always in my heart.
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CHAPTER 1 INTRODUCING THE STUDY

1.1 Introduction
Universities in under developed contexts are faced with challenges of maintaining adequate levels of service delivery. Challenges range from a diverse student and staff base to varying infrastructure and inadequate resourcing. Added to a geographically dispersed and diverse setting (Chand 2010, p. 2) the challenges become increasingly complex. A popular method for delivering learning and teaching to a dispersed region is distance and flexible learning (DFL). According to Bates (2005) it is a method of education where students can study in their own time, at the pace of their choice (home, work or learning centre), and without face-to-face contact with a teacher. Technology is a critical element of distance education. The flexibility in this method is built around the geographical, social and time constraints of individual learners, rather than those of an educational institution (p. 5). Increasingly, technology is being used to mediate issues of distance over dispersed settings. Where technology is concerned, institutions are driven to be innovative to address issues of access and equity regarding education.

This study investigated a regional university’s experiences with widespread use of a learning management system (LMS) by applying the diffusion of innovations theory (Rogers 2003). The aim of the study was to gain a fuller understanding of the process by which the learning management system passed from first-hand knowledge at the central level, to actual use at the regional level. A case study approach offered an opportunity to explore the situation in depth. This improved understanding will inform the implementation of innovations for DFL in underdeveloped regional institutional contexts. Further, an understanding of the involvement of key stakeholders in the process may lead to better informed technology adoption planning.

This chapter outlines the background to the investigation in terms of innovation and diffusion and the gap in the research. This is followed by the setting in which the study was conducted, the research strategy adopted, the purpose, research questions that guided the study and the significance and limitations of the study. The final section
provides an overview of the chapters in this thesis and commonly referenced definitions throughout the thesis.

1.2 Background to the study

Innovation means different things to different people. Most of the widely-used definitions of innovation focus on novelty and newness (Johannessen, Olsen & Lumpkin, 2001) implying some form of benefit to the organisation. Newness is also associated with change (Baregheh, Rowley & Sambrook, 2009). Damanpour (1996) explains,

“innovation is conceived as a means of changing an organisation, either as a response to changes in the external environment or as a pre-emptive action to influence the environment. Innovation here is broadly defined to encompass a range of types, including new product or service, new process technology, new organisation structure or administrative systems, or new plans or programs pertaining to organisation members” (p. 694).

Rogers, a preeminent researcher who published the landmark book *Diffusion of Innovations*, defines innovation as,

“an idea, practice, or object that is perceived as new by an individual or other unit of adoption. It matters little, so far as human behaviour is concerned, whether or not an idea is objectively new as measured by the lapse of time since its first use or discovery. The perceived newness of the idea for the individual determines his or her reaction to it. If the idea seems new to the individual, it is an innovation” (2003, p. 12).

Since his original concept of innovation in 1962, Rogers expanded the definition of innovation to include ‘practice or object’ in addition to idea, as well as ‘other unit of adoption’ in addition to an individual by the time of the third edition of his book in 1983. Subsequent editions (4th & 5th – 2003) as with the previous three have taken into consideration developments in the field and the exponential grown in diffusion scholarship and research that have required revisions to Rogers’ initial framework.
Grunwald (2002) states that Rogers’ theory of diffusion laid the foundation for the majority of the studies in relation to adoption of instructional technology. Rogers’ definition of innovation was followed by his primary theory of diffusion of innovations. Rogers (2003) and his seminal work on diffusion of innovations form the theoretical framework that underpins the study. Diffusion according to Rogers (2003) is, “the process by which an innovation is communicated through certain channels over time among the members of a social system” (p. 11).

The end goal of diffusion asserts adoption or rejection of an innovation. Rogers (2003) states, “insight into the innovation process in organisations can be gained from research on the diffusion and adoption of communication technologies such as personal computers and e-mail in companies. Communication technologies he adds, represent a very major change in human behaviour, and require a good deal of learning and time (p. 419).

Past studies in diffusion related to technology use have focused on one of two levels of inquiry, the individual level, for example Davis (1985), Mahajan (1985), Mitra, LaFrance and McCullough (2001), Venkatesh (2002), and the organisational level, for example Surry, Estminger and Haab (2005), Tanoglu and Basoglu (2006). Factors such as technology acceptance, perceived usefulness of technology, cognitive processes and social influence have influenced adoption at the individual level. At the organisational level, organisational change and adaptability, resourcing and infrastructure have been explained as key influences in adoption of new technology.

Other related studies in diffusion suggest that the focus of diffusion has been mostly on demographic and cultural diversity. Only a few studies have paid attention to aspects such as structural diversity, for example, organisational role, geographical location, functional assignments and business units (Cummings 2004, Majchrzak, Malhotra & John, 2005). Recently, a number of studies have suggested that much organisational friction stems from the geographical dispersion of the organisation and that communication and incentive problems increase with the distance between hierarchical levels (Alessandrini, Calcagnini & Zazzaro, 2008).
Chapter 1 Introducing the study

Through Rogers (2003) diffusion of innovations theory, this study sought to address the gap in the research by investigating technology diffusion at the regional level, more specifically the process of diffusion in a regional university. According to Rogers (2003) diffusion comprises the four main elements, innovation, communication channels, time and the social system. These elements are examined against the backdrop of the case university with regard to a learning management system.

1.3 The case university

The case university investigated was the University of the South Pacific (USP), a regional university owned and governed by twelve countries spread across a vast expanse of the Pacific Ocean encompassing volcanic islands and coral atolls. In recent conceptual work on small states, the classification of Small Island Developing States (SIDS) has emerged to refer to countries such as those that make up USP (Crossley & Sprague 2012, p. 26). While there is no formally agreed-upon definition of SIDS, UNESCO does maintain a list of 52 such states, which were officially recognised as a formalised group at a 1992 UN Conference on Environment and Development. This sub group of small states is not homogenous, though they face similar challenges related to sustainable development, including remoteness, susceptibility to natural disaster, and external shock vulnerability (Crossley & Sprague 2012, p. 27).

USP was established in 1968. The twelve countries represent three distinct cultural groups in Oceania. They are Melanesia, Micronesia and Polynesia. The twelve countries of USP are Fiji, Samoa, Cook Islands, Marshall Islands, Solomon Islands, Tonga, Niue, Nauru, Kiribati, Tokelau, Vanuatu and Tuvalu (USP, 2009). USP’s student base covers face to face as well as students studying through distance and flexible learning, scattered throughout these countries. Each member country has a main campus with smaller centres. Staff members are also dispersed throughout the USP region. The uniqueness of the case university context is supported by Sookram and Hogan (2012), who state that the University of the South Pacific is only one of two regional universities in the world, the other being the University of the West Indies. Sookram and Hogan (2012), remind us that as a developing country, Fiji may lack the
educational resources for the provision of educational access and ultimately improve the social conditions of the context.

The complexity of the diffusion of a technological innovation, in this case the introduction of a learning management system across 12 countries, cannot be overstated. For successful adoption to occur, a number of factors would need to be considered. The study highlighted factors that facilitated or impeded the diffusion process within the regional context.

1.4 Research strategy
The nature of this study suited a primarily qualitative approach with some quantitative data as a supporting mechanism. It was recognised early in the development of the research design that a qualitative study would provide the necessary data due to the low number of participants involved in the diffusion process. The overall case study based approach to inquiry follows a mixed method approach which allowed the researcher to undertake an appropriate examination of the setting in which the ‘how’ and ‘why’ questions related to a real-life context.

The investigation was set within the context of the University of the South Pacific in which members of staff from the regional campuses were either interviewed or administered a questionnaire. Interviews were conducted and questionnaires distributed once a pilot was run to adjust the suitability of the questions. Data collection was coordinated from the central campus in Fiji because it hosted the central campus of USP and is therefore influential.

The context of the case university was divided into two sub cases and two phases of data collection; the regional campuses (n=88) and the central campus (n=100). Phase 1 involved the development of the questionnaire and interviews with a pilot, with phase 2 conducting of interviews and distribution and collection of questionnaires. After the data collection was complete, interview transcriptions and questionnaire responses were collated, summarised, thematically coded and analysed, resulting in the identification of emergent themes.
1.5 Purpose of the study
The purpose of this study was to examine the nature of diffusion in a regional context (University of the South Pacific) in relation to a learning management system (Moodle). The complexity of wide spread use of a learning management system in a university setting with diverse characteristics provides a unique opportunity for exploration. The regional context of the university was small yet vast at the same time. To understand the diffusion within a regional context, a number of research questions were framed.

1.5.1 Research questions
In terms of the scope of the study, the research questions were:
1. How does diffusion of a learning management system occur in a regional university?
   - What are the key processes in the diffusion of a learning management system?
   - What key stakeholders are involved in the diffusion of a learning management system?
2. What elements of diffusion have significant influence?
3. What aspects of the regional setting impact on diffusion?

1.6 Theoretical framework
The theoretical framework for this study draws on Rogers’ (2003) diffusion of innovations theory where the adoption and diffusion of a new idea or product is considered in the context of a regional university in a developing context. The study uses the four main elements of the theory (innovation, communication channel, time and the social system) to explore the regional diffusion process. Subcategories within the theory relating to the characteristics of an innovation for instance, Relative Advantage, Compatibility, Complexity, Trialability and Observability, provided the researcher with a range of themes to draw on when examining the learning management system as the innovation for diffusion at USP. This framework enabled the researcher to explore the ‘why’ and at ‘what rate’ in addition to the ‘how’. The framework’s four elements provided clear and succinct categories allowing the
researcher to examine the entire diffusion process from multiple lenses and then organize or cluster the data for ease of analysis.

Diffusion theory has been applied to many research studies across a number of decades. Originally applied to the areas of sociology and anthropology, it is now being applied to market and behaviour studies (Lowrie, 1991). Robinson (2009) supports the importance of the use of Rogers’ framework stating over 6,000 research studies applying the theory where it has been successfully tested. Some of these studies were highlighted earlier in this chapter (refer to section 1.2). Rogers (2003) acknowledges the important contribution that diffusion research has made but also recognizes some of its shortcomings in terms of the absence of critical review across time. He draws the researcher’s attention to the fact that every field of scientific research makes certain simplifying assumptions about complex realities. He elaborates that such assumptions are built into the intellectual paradigm that guides the scientific field as an expected set of ‘intellectual blinders’ or a ‘trained incapacity’ and without it scientists cannot cope with the vast uncertainties of the research process in a chosen field of study. Research gradually puzzle-solves the complexities.

Rogers (2003) also reminds researchers that one of the most serious shortcomings of diffusion research is the pro-innovation bias. This includes where much of the diffusion research is funded by the change agents themselves, resulting in pro-innovation bias. That is, those who are seeking to promote the innovation. It is also the practice that evaluations generally occur with successful diffusions. Pro-innovation bias also manifests itself by the way the innovation for investigation is selected. Limitations of diffusion theory are addressed at length in the next chapter, section 2.6 although it was important to highlight pro-innovation bias here.

An important aspect of the study undertaken for this thesis is that while the researcher is connected and has a relationship with the area/institution being investigated it was chosen by the researcher because it was ‘intellectually interesting’ and the results obtained may influence or have impact on future policy development for this important area. The innovation was not chosen by the sponsor nor encouraged by the institution to determine successful results.
1.7 Significance of the study

This study makes a contribution to diffusion research by:

- addressing the gap in application of theory to underdeveloped regional contexts – Small Island Developing States (SIDS);
- seeking to understand more about staff involvement in the process of diffusion;
- informing Rogers’ diffusion of innovations theory through a cultural lens
- providing a thorough account of the context and its particulars so that researchers can make comparisons with their own findings;
- informing technology adoption, implementation and sustainability of learning innovations in dispersed learning environments; and
- adding to the literature in the area of diffusion of innovations in higher education.


Learning management systems have arguably been one of the more contentious issues in learning and teaching at USP in the last decade because of a presumed lack of clear direction on a single preferred LMS (Whelan & Bhartu, 2007). Distance and flexible learning is in a state of continuous flux as Information, Communication, Technologies (ICTs) develop and change how learning and teaching is distributed in an infrastructure challenged region. The case university however, acknowledges the vital role technology plays in this region. The Deputy Vice Chancellor of the case university stated that,
“the Pacific Islands simply cannot sit back and wait but must find ways to catch up. Or they will risk being left even further behind, perhaps by a minimum of 50 years, with their people perpetually ICT-illiterate and their economy restrained by a Third World straitjacket” (Williams, 2005).

The case university recognises the advantages that technology brings to its distance and flexible learning programmes. As a regional institution, USP also had to be cognisant of the fact that,

“member governments applying precious resources to a university thousands of miles away expected it to reach their communities, have a strong in-country presence and contribute to their ongoing development as newly independent states” (Mathewson & Va’a 1999, p. 279).

The learning management system is an important innovation for USP and the region.

1.8 Limitations of the study

The study focused on the role of USP staff members in the diffusion process. As such, gauging the diffusion process from the perspective of the students was beyond the scope of this study. USP’s internal processes are continuously evolving and key staff member’s availability was critical to the data collection phase. Access to key staff members who have left the services of USP was problematic due to situations such as retirement and relocation. There were also participants who were not at USP when the learning management system was implemented and who had limited knowledge on the subject. Issues of recall however are common for those who were present during implementation and this is often highlighted as a limitation of diffusion research.

In the context where the study was being undertaken, there was potential for it to be volatile in terms of country politics, evident from coups in Fiji (2000, 2006) where the main USP campus is located, and civil unrest in Tonga (2006) and Solomon Islands (2006, 2010). Demonstrated by Gold and Tuimalea’li’ifano’s (2001) example that USP’s decision to,
“jump right into large scale use of its newly inaugurated USPNet satellite communications system as a solution to reach out to students who hastily returned to their home countries due to the political events in Fiji in 2000”.

Unexpected events such as this had a bearing on the implementation of communication technologies at USP in that their introduction was quick and reactive in nature. Learning management systems, in their embryonic state at USP also had to be hastily implemented to facilitate the mass exodus of students from the main Fiji campus that ended up studying from their home countries until the political situation was resolved.

The limitations of Rogers’ (2003) theory to which this study relies are addressed in the next chapter. Rogers is clear that by no means did he, “seek only to synthesise the important findings from past research … but also strive to criticise his own work (and be criticised by others), and to lay out direction for the future that are different from the recent past.” (Rogers 1983, p. xv).

1.9 Structure of the thesis

Chapter 1 establishes the background to the study with the concept of innovation introduced as a prelude to diffusion. This is followed by the setting in which the study was conducted, the research strategy adopted, the purpose of the study, research questions that guided the inquiry, and the significance and limitations of the study.

Chapter 2 provides a review of the literature. An overview of the concept of innovation commences the chapter. This leads to the establishment of the theoretical framework by Rogers (2003) as well as supporting considerations in the context of a higher education setting and learning technology use. Relevant diffusion studies spanning the last decade address technology diffusion issues from the individual to the organisational level. An examination of the use of learning management systems in higher education rounds out the literature review.

Chapter 3 presents a profile of the case university. It provides a background by explaining the reasons for selecting the university. The concept of ‘regional’ is explored in order to define the university’s context. The case university is then
Chapter 1 Introducing the study

presented in terms of its purpose, geography, and governance and staffing structure. The context of its distance education agenda is explained, followed by a description of its main communication system, USPNet to support distance and flexible learning (DFL). Profiles of the cultural groups of the countries of USP are provided. Following this, pertinent socio-economic, environmental and political issues are discussed in relation to education and ICT development in the region.

Chapter 4 describes the case study based approach that forms the main method of inquiry. There are two phases to the research methodology. The primary data for this research was obtained from a combination of questionnaires and interviews administered to staff members, as well as strategic documents from the university. Staff members included regional campus directors and staff, teaching staff, heads of schools and keys support sections, and the senior management team.

Chapter 5 presents the first part of the findings, for the regional campuses, grouped according to the cultural regions of Melanesia, Micronesia and Polynesia.

Chapter 6 presents the second part of the findings at the USP central campus. The central campus is divided into three groups – teaching staff, heads of schools and key staff members in support sections, and the senior management team.

Chapter 7 provides a synthesis of the findings presented in Chapters 5 and 6 with consideration for the literature, case background and methodology.

Chapter 8 provides conclusions and implications for the study following a discussion of the emergent themes.

1.10 Definitions

The following terms are accepted and used throughout this study. While other definitions exist for the following terms, the definitions chosen contain common elements and are frequently used in current literature, pertaining to the theory of diffusion. Use of these sources relating to technology and distance learning are common definitions and frequently adopted by the case university in their publications.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diffusion</td>
<td>The process by which an innovation is communicated through certain channels over time among the members of a social system” (Rogers 2003, p. 11).</td>
</tr>
<tr>
<td>Distance education</td>
<td>A method of education where students can study in their own time, at the pace of their choice (home, work or learning centre), and without face-to-face contact with a teacher. Technology is a critical element of distance education (Bates 2005, p. 5).</td>
</tr>
<tr>
<td>Flexible learning</td>
<td>The provision of learning in a flexible manner, built around the geographical, social and time constraints of individual learners, rather than those of an educational institution (Bates 2005, p. 5).</td>
</tr>
<tr>
<td>Innovation</td>
<td>An idea, practice, or object that is perceived as new by an individual or other unit of adoption. It matters little, so far as human behaviour is concerned, whether or not an idea is objectively new as measured by the lapse of time since its first use or discovery. The perceived newness of the idea for the individual determines his or her reaction to it. If the idea seems new to the individual, it is an innovation (Rogers 2003, p. 12).</td>
</tr>
<tr>
<td>Learning management system</td>
<td>A suite of software tools that enable the management and facilitation of a range of learning and teaching activities and services. They are also commonly referred to as Course Management Systems (CMS), Virtual Learning Environments (VLE) and Online Learning Management Systems (Naidu 2006).</td>
</tr>
<tr>
<td>Learning technologies</td>
<td>Learning technology is the broad range of communication, information and related technologies that can be used to support learning, teaching, and assessment. (ALT 2016).</td>
</tr>
</tbody>
</table>
Regional – Relating to or characteristic of a region (Oxford English Dictionary 2008) with similar characteristics such a common human property (presence of people), functionality (organised around a focal point linked by transportation systems or communication systems) and ‘perceptualness’ (human feelings and attitudes about areas and is defined by people’s shared subjective images). These spatial units may be without precise borders or even commonly accepted regional characteristics and names. These types of regions are dynamic, changing as the physical and human properties of the Earth’s surface change, for example according to global climate change and economic globalisation (National Geographic 2013).
CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

This chapter advances the concepts introduced in Chapter 1 through a review of the literature and the research questions guiding the study. As stated in Chapter 1, the theoretical framework being applied to this study is the theory of diffusion of innovations as developed by Rogers (2003). Therefore the study needs to be informed by current literature relating to both diffusion and innovation.

Firstly, the concept of innovation is developed. This is followed by an overview of general diffusion theories. It is important to recognise that diffusion theories have a broad application and appeal across disciplines and to strengthen the study, literature has been drawn from areas such as education, management, economics, health and agriculture. At the general level, there are two types of diffusion theory identified for its relevance to this type of study. Secondly, the study’s theoretical framework is presented with contextual considerations to focus the study in a more cultural, geographic and higher education context. This study was undertaken in a unique context, that it, small island developing states (SIDS), specifically the University of the South Pacific. Literature relating to relevant diffusion studies spanning the last decade which address technology diffusion issues at both the organisational and individual level will be presented. An examination of literature relating to the use of learning management systems as innovations in higher education concludes the literature review.

The research design of this study examines the diffusion of a learning management system, specifically Moodle, as implemented by an organisation (University of the South Pacific). While limitations have been identified and will be discussed later in the literature review, Rogers’ theory of diffusion of innovations has been adopted as the theoretical framework for this study, as it has been commonly used for over five decades to clearly explain why adoption and diffusion has occurred in a particular context. Further, the following literature supports that Rogers’ theory has been used...
successfully across disciplines to affect adoption so that behavioural changes were brought about in a social system.

The following literature review is structured to provide relevant and recent research studies which relate specifically to the themes explored and required for this study. Initially, the broad concept of innovation is explained, followed by an in-depth review of the theories of diffusion in general and more specifically in an instructional setting. Basic notions of change in an organisational setting are outlined, leading into the seminal theory of Rogers’ diffusion of innovations.

Rogers’ theory is outlined in much detail as it forms the basis for both the theoretical framework and the research design. The four key elements of innovation, communication channel, time and the social systems are elaborated fully as these elements form the basis for the categorisation of data collection. The researcher, as with other researchers, recognises the limitations of Rogers’ theory, and a number of alternatives and criticisms are provided.

The uniqueness of this research study is its relationship to regional organisational diffusion set in a particular small island context, therefore broader contexts, such as inter-cultural communication, organisational infrastructure and geography are considered. The premise of this study is exploring an innovation which is specifically related to a learning management system (LMS) in Information Communication Technology (ICT) in higher education, therefore literature has been included which examines diffusion studies in ICT, innovation adoption of LMS’s at the organisational and individual level, including a brief introduction to e-Learning.

2.2 The concept of innovation

Literature related to innovation suggests that the term is perceived as central to achievement in the business climate of the 21st century in all sizes and forms of organisations (Hidalgo & Albors, 2008). Arguably as a concept, innovation had its beginnings in the discipline of economics. Joseph Schumpeter, an economist, provided one of the earliest known definitions of innovation, defining it as, “the introduction of new goods, new methods of production, the opening of new markets, the conquest of
new sources of supply and the carrying out of a new organisation of any industry” (Schumpeter, 1912, p. 66). According to Schumpeter (1912), there are five types of innovation, the introduction of a new product or a qualitative change to an existing product; process innovation new to an industry; the opening of a new market; the development of new sources of supply for raw materials or other inputs; and changes in industrial organisations (p. 66). Schumpeter (1939) also distinguishes between invention and innovation adding that invention “is an act of intellectual creativity” while innovation “is an economic decision – a firm adopting or applying an invention” (p. 87). The Oslo Manual developed by the OECD (1997, 2nd Edition) clarifies the definition of the first two categories of innovation by Schumpeter (1912) as follows: a technological product innovation can involve either a “new of improved product whose characteristics differ significantly from previous products” (p. 49). The characteristics may differ due to use of new technologies, knowledge or materials. A technological process innovation on the other hand is the adoption of “new or significantly improved production methods, including methods of product delivery” (p. 49). The Oslo Manual concludes that while innovation is problematic to define precisely, it is relatively easy to define and measure in terms of product and process innovation. According to M. Rogers (1998), as a guideline, survey researches must choose a relatively short definition and accept the fact that respondents will use varying interpretations. Any subsequent analysis of survey data should be aware of this fact.

2.3 Diffusion theories

According to Surry (2002) there is an extensive body of literature on the topic of adoption and diffusion of innovations. He adds that one of the most interesting aspects of the diffusion literature is that there is no single, unified, universally accepted theory of adoption and diffusion. Efficiently organising and discussing the various diffusion theories can be difficult as the literature consists of numerous, unrelated theories, each addressing a different aspect of the diffusion process or a different type of innovation or organisation (Surry 2002, p. 2). These theories tend to combine to create a meta-theory of diffusion. Surry and Farquhar (1997) divide diffusion theories into:
(i) General diffusion theories, applicable to a wide range of organisations, and
(ii) Instructional technology diffusion theories, applicable to innovations in instructional settings.

2.3.1 General diffusion theory
The researcher responsible for the most significant findings and compelling theories related to diffusion is Everett M. Rogers, stemming from his book *Diffusion of Innovations* from 1962 (Surry & Farquhar, 1997). Earlier studies however can also be identified. The Ryan and Gross study from 1943 on hybrid seed corn farming is often quoted as an originating study in diffusion from the field of rural sociology. Other researchers have conducted studies and developed theories related to diffusion of innovation such as Fliegel and Kivlin 1962 and Wenstein 1986. Rogers (2003) goes back further in time to trace the roots of diffusion in Europe. He quotes Tarde (1903) *The Laws of Imitation* as one of the grandfathers of the diffusion field. To Gabriel Tarde, the diffusion of innovations was a basic and fundamental explanation of human behavior change. Tarde (1969) states that, "invention and imitation are, as we know, the elementary social acts" (p. 178). However, an immediate follow-up by empirical studies of diffusion did not occur until 40 years later according to Rogers. The Ryan and Gross study followed Tarde. It appears the main contribution of the European diffusionists was in their calling the importance of diffusion to the attention of other social scientists (Kroeber 1937, p. 137-142).

2.3.2 Instructional diffusion theory
General diffusion theory has served as the basis for developing diffusion theories specific to the field of instructional technology (Surry & Farquhar, 1997). Surry and Farquhar (2002) group the application of diffusion theory to instructional (learning) technology (or IT-related diffusion research) into two major categories. They are Systematic change theories (macro theories) and Product utilisation theories (micro theories).

Macro theories focus on the reform and restructuring of educational institutions of which the goal is to develop theories of organisational change, where technology plays a major role. Micro theories on the other hand focus on increasing adoption and
utilisation of specific instructional products. The goal in this instance is to develop theories of technology adoption that will lead to a more widespread use of instructional innovations. Underlying these categories of theories lie two predominant philosophies of technology and technological change. One is ‘technological determinism’ and the other is ‘technological instrumentalism’. Technological determinists according to Chandler (1995) view technology as an autonomous force, beyond direct human control, and see technology as the prime cause of social change. The expansion of technology as such is discontinuous. Instrumentalists see social conditions and human aspiration as the primary cause of change. They see the growth of technology as an evolutionary process and not as a series of technological leaps (Levinson, 1996). Surry and Farquhar (1997) illustrate the theories, goals and philosophical views in Table 2-1 below.

**Table 2-1** Instructional diffusion theories showing goal and philosophical view  
(Surry & Farquhar 1997)

<table>
<thead>
<tr>
<th>P H I L O S O P H Y</th>
<th>Systematic Change (Macro)</th>
<th>Product Utilisation (Micro)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developer (Determinist)</td>
<td>Focus of the structure and establishment of an effective organisational framework.</td>
<td>Focus on process of designing, developing, and evaluating effective instructional products.</td>
</tr>
<tr>
<td>Adopter (Instrumentalist)</td>
<td>Focus on the social, political, and professional environment in specific organisations.</td>
<td>Focus on the needs and opinions of potential adopters and characteristics of the adoption site.</td>
</tr>
</tbody>
</table>

**2.4 The notion of change**

Garud and Van De Ven (2001) state that most organisational scholars would agree that change is a difference in form, quality, or state over time in an entity. They add that change in any entity manifests itself in differences on a set of dimensions across time and that much of the literature on organisational change focuses on the nature of these differences, what produced them and the consequences (p. 208). According to Ensminger, Surry, Porter and Wright (2004) Instructional Designers need to have an understanding of change theory in order to facilitate the successful implementation of
their products. Like Surry’s view on meta-theories of diffusion, Ensminger et al (2004) explain that change theory is not one universally acceptable theory, but a broad family of theories. Rogers is again referenced as a widely accepted model for change. Bates and Sangra (2011) state that universities and colleges are facing strong pressure for further change (p. 3). Technology, they add, is a key factor for bringing about such relevant and necessary change in higher education institutions. They contend that ICTs have a crucial role to play in such changes, but for technology to be used fully and effectively, major changes are needed in the prevailing culture of the academy and the way in which it is managed. In an increasingly knowledge-based economy, skills and competencies need to be constantly upgraded which is a reflection of the influence of ICTs in modern society, i.e. the means for creating, storing, analysing, transferring, reproducing, and transforming information (Bates & Sangra 2011, p. 11). Daniel (1999) claims that the modern university needs to balance three competing forces. These are access, quality and cost. Bates and Sangra (2011) see technology as a key factor in balancing these pressures. These views, balancing access, quality and cost in technology, are to be considered throughout the context of this study.

Change comes with potential risk as well, particularly to knowledge management. Knowledge management, according to O’Regan (2012), encompasses the ways in which information and the interpretation of information are captured and handled. It involves the ways an organisation’s employees individually and collectively learn, sort, analyse, understand, communicate, distribute, represent and use information to achieve organisational objectives (p. 19). The risk of institutional memory loss or institutional amnesia has to be considered in the context of diffusion for dispersed institutions if knowledge management systems are not properly managed. Information can at times be overwhelming for staff members and knowledge retention must be systematic for organisational continuity because of the dispersed setting.
2.5 Theoretical framework – Rogers’ diffusion of innovations

Rogers’ (2003) diffusion of innovations will be applied as the theoretical framework for the study. Rogers uses *innovation* and *technology* as synonyms (Orr 2003, p. 12). A technology he adds is a design for instrumental action that reduces the uncertainty in the cause-effect relationships involved in achieving a desired outcome. It usually has two components. The first is the hardware aspect consisting of a tool that embodies the technology as a material or physical object. The second is the software aspect, consisting of the information base for the tool (Orr 2003, p. 12). Rogers (2003) defines diffusion as,

“the process by which an innovation is communicated through certain channels over time among the members of a social system” (p. 11).

This definition can be broken down into four key elements.

2.5.1 Elements of diffusion

Diffusion theory has four elements. They are the innovation, communication channels, time and the social system (Rogers 2003, p.11).

2.5.1.1 Innovation

The first element Rogers (2003) explains is innovation which is, “an idea, practice, or object that is perceived as new by an individual or other unit of adoption” (p. 11).

*Newness*

Newness in an innovation need not just involve new knowledge. Someone may have known about an innovation for some time but not yet developed a favourable or unfavourable attitude toward it, nor have adopted or rejected it. Newness of an innovation may be expressed in terms of knowledge, persuasion, or a decision to adopt (p. 12). It should not be assumed that diffusion and adoption of all innovations are necessarily desirable.

Knowing of a technological innovation creates uncertainty about its consequences in the mind of potential adopters. According to Rogers (2003), the main questions an individual typically asks about a new idea include "What is the innovation?" "How does it work?" "Why does it work?" What are the innovation’s consequences?” and "What
Chapter 2 Literature review

will its advantages and disadvantages be in my situation?" Determining the boundaries around a technological innovation can be challenging, especially deciding where one innovation stops and another begins. Rogers (2003) states that, "if an innovation is defined as an idea that is perceived as new, the boundary question ought to be answered by the potential adopters who do the perceiving" (p. 14). He also explains that innovations should not necessarily be investigated independently from other innovations. In reality, the innovations diffusing at about the same time in a system are interdependent. He presses for scholarly attention to be paid to technology clusters, what he defines as, "consisting of one or more distinguishable elements of technology that are perceived as being closely interrelated” (p. 14).

Attributes of innovation

Rogers (2003) states that five attributes of innovation help to explain different rates of adoption. They are Relative advantage, Compatibility, Complexity, Trialability and Observability. The adopter categories play an important role towards the development of this study in relation to the methodology. For example, if the research can classify, after data collection, which members of the social system adopted the innovation at a particular rate, energy and resources can be focussed on either supporting or rewarding that particular group. Closer examination of the ‘laggards’ may determine various factors for that particular rate of adoption (or not) or for members where they could be identified as ‘innovators’ then particular aspects of their diffusion process could be examined to account for their success. The social system within a particular study could be examined to see whether they fit the bell curve so commonly found in other studies. This may be important when accounting for overall diffusion success or failure. These categories, which have been validated by numerous previous studies, provide a benchmark that a researcher can compare, contrast and understand the diffusion process more clearly.

(i) Relative Advantage

The first, Relative advantage is, “the degree to which an innovation is perceived as being better than the idea it supersedes” (Rogers 2003, p. 229). Casmar (2001) for example, states that when faculty members face new demands placed on them, they
will adopt technology because of its relevance. For example, secondary school teachers who see that technology has value in their instruction will use it (Parisot 1995, Spotts 1999, McKenzie 2001, Kent & Moore 2014).

(ii) Compatability
The second attribute, Compatibility is, “the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters (Rogers 2003, p. 240). McKenzie (2001) states that a lack of compatibility in IT with individuals needs may negatively affect the individual’s IT use. Pennings (2012) states an innovation that is more compatible with a person’s lifestyle and cognitive characteristics is more likely to be assimilated into an individual’s life. He refers to their needs, usage patterns and/or current value system that aligns with the innovation.

(iii) Complexity
The third attribute, Complexity is, “the degree to which an innovation is perceived as relatively difficult to understand and use” (Rogers 2003, p. 15). Parisot (1995), for example, explains that a technological innovation might confront faculty members with the challenge of changing their teaching methodology to integrate the technological innovation into their teaching which might have different levels of complexity. Martin (2003) adds that if hardware and software are user-friendly, then they might be adopted successfully for the delivery of course materials.

(iv) Trialability
The fourth attribute, Trialability is, “the degree to which an innovation may be experimented with on a limited basis” (Rogers 2003, p. 16). He adds that trialability is positively correlated with the rate of adoption, i.e. the more an innovation is tried, the faster its adoption is. Increased reinvention may also create faster adoption of the innovation (Rogers 2003, Sahin 2006).

(v) Observability
The fifth attribute, Observability is, “the degree to which the results of an innovation are visible to others” (Rogers 2003, p16). Parisot (1997), for example, found that role modelling (or peer observation) was a key motivational factor in the adoption and
diffusion of technology. Pennings (2012) reinforces Rogers (2003) that the easier it to see the advantages of an innovation, the faster it will diffuse throughout society.

Rogers (2003) explains that innovations offering more of the five attributes will be adopted faster than other innovations. Diffusion research by Bennett & Bennett 2003, Parisot 2007, Surendra 2001, have shown that the five attributes for example, influenced faculty members’ likelihood of adopting new technology into their teaching. Innovations that are perceived by individuals as having greater relative advantage, compatibility, trialability, and observability and less complexity will be adopted more rapidly than other innovations. Research indicates that these five qualities are the most important characteristics of innovations in explaining the rate of adoption. The first two attributes, relative advantage and compatibility, are particularly important in explaining an innovation’s rate of adoption (Rogers 2003, p. 17).

During the process of diffusion, an innovation is not necessarily unchanging. Rogers explains the concept of reinvention here. It is, “the degree to which an innovation is changed or modified by a user in the process of adoption and implementation” (Rogers 2003, p. 179). Adopting an innovation is not a passive process as adopters want to participate actively in customisation to fit their unique situation. An innovation diffuses more rapidly when it can be re-invented and that its adoption is more likely to be sustained.

In addition to the five perceived attributes of an innovation, such other variables as the type of innovation-decisions, the nature of communication channels diffusing the innovation at various states in the innovation-decision process, the nature of the social system in which the innovation is diffusing, and the extent of change agents’ promotion efforts in diffusing the innovation, affect an innovation’s rate of adoption (see Figure 2-1). I to IV provide a further breakdown of the key elements of diffusion.
2.5.1.2 Communication channels

The second element of diffusion is communication channels, “the means by which messages get from one individual to another” (Rogers 2003, p. 18). The nature of the information-exchange relationship between a pair of individuals determines the conditions under which a source will or will not transmit the innovation to the receiver, and the effect of the transfer (Rogers 2003, p. 18). Communication channels are made up of both mass media (radio, TV, etc.) and interpersonal communications (face to face exchanges); external communications influence early innovators or adopters, while interpersonal communications influence the speed and shape of the diffusion process over time. Communication is defined by Rogers (2003) as, “a process in which participants create and share information with one another in order to reach a mutual understanding” (p. 18). Rogers and Kincaid (1981) state communication as a two-way process of convergence, rather than as a one-way, linear act in which one individual seeks to transfer a message to another in order to achieve certain effects. Diffusion
according to Rogers’ (2003) definition is a special type of communication, in which the messages are about a new idea. This newness of the idea in the message content gives diffusion its special character. He states however that most individuals do not evaluate an innovation on the basis of scientific studies of its consequences. Instead most people depend mainly upon a subjective evaluation of an innovation that is conveyed to them from other individuals (near peers) like themselves who have already adopted the innovation - a social process of interpersonal communication relationships.

**Homophily and heterophily**

Rogers (2003) states that one of the most obvious and fundamental principles of human communication is that the exchange of messages most frequently occurs between a source and receiver who are alike, similar, *homophilous*. He defines *homophily* as, “the degree to which pairs of individuals who interact are similar with respect to certain attributes, such as beliefs, values, education, social status, etc.” (p. 305). More effective communication occurs when two or more individuals are homophilous. When they share common meanings and a mutual sub-cultural language, and are alike in personal and social characteristics, the communication of new ideas is likely to have greater effects in terms of knowledge gain, attitude formation and change, and overt behaviour change. When homophily present, communication is therefore likely to be rewarding to both participants.

*Heterophily* on the other hand is “the degree to which pairs of individuals who interact are different with respect to certain attributes.” (Rogers 2003, p. 306). While Lazarfeld and Merton (1954) conceptualised homophily, the concept may actually date back to Tarde when he stated, “Social relations ... are much closer between individuals who resemble each other in occupation and education”. One of the most distinctive problems in the diffusion of innovations is that the participants are usually quite heterophilous. The nature of diffusion demands that at least some degree of heterophily be present between the two participants in the communication process.
2.5.1.3 Time

The third element of diffusion is time which affects the diffusion process in three ways (Rogers 2003, p. 20). First, in the innovation-decision process which is the mental process where an individual passes from firsthand knowledge of an innovation through to forming an attitude towards it – accepting or rejecting it. Second, in the innovativeness of an individual or other unit of adoption; innovativeness is, “the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a social system” (Rogers 2003, p23). This affects the adopter categories, discussed later. Third, in an innovation’s rate of adoption in a system, usually measured as the numbers of the system that adopt the innovation in a given time period (Rogers 2003, p. 23).

Innovation-decision process

The time element of diffusion directly concerns the innovation-decision process. The perceived newness of an innovation and the uncertainty associated with this newness is a distinctive aspect of innovation-decision making. Rogers (2003) describes the innovation-decision process as, “an information-seeking and information-processing activity, where an individual is motivated to reduce uncertainty about the advantages and disadvantages of an innovation” (p. 168). Rogers (2003) explains uncertainty as the degree to which a number of alternatives are perceived with respect to the occurrence of an event and the relative probability of these alternatives (p. 6).

There are five stages of the innovation-decision process. Figure 2-2 illustrates this process with regard to the attributes of diffusion and ultimately how time as an element of diffusion has a bearing on the adoption or rejection of an innovation.
The length of time required to pass through the innovation-decision process is called the innovation-decision process. The first stage is knowledge, when a person becomes aware of an innovation and has some idea of how it functions. For example, Sprague et al (1999) state that the biggest barrier to faculty use of technology in teaching was that faculty lacked a vision of why or how to integrate technology in the classroom. Lack of knowledge of the innovation was evident here. The second stage is persuasion, when a person forms a favourable or unfavourable attitude toward the innovation. For example, Sherry (1997) stated that while information about a new innovation is usually available from outside experts and scientific evaluations, teachers usually seek it from trusted friends and colleagues whose subjective opinions of a new innovation are most convincing (p. 70). The third stage is decision, when a person engages in activities that lead to a choice to adopt or reject the innovation. While adoption refers to, “full use of an innovation as the best course of action available”, rejection means “not to adopt an innovation” (Rogers 2003, p. 177). Individuals continue to search for innovation evaluation information and messages through the decision stage (Sahin 2006). The fourth stage is implementation, when a person puts
an innovation into use. McGuire (1989) states that in addition to the innovation being put to regular use, additional information about the innovation is acquired with its continued use (p. 45). Reinvention usually happens at this stage. The final stage is confirmation, when a person evaluates the results of an innovation-decision already made. McGuire (1989) adds the following to this stage: recognition of the benefits of using the innovation, integration of the innovation into one’s ongoing routine, and promotion of the innovation to others (p. 45). Discontinuance (rejection) also occurs once an innovation has been previously adopted. It occurs because an individual becomes dissatisfied with an innovation or because the innovation is replaced with an improved idea.

Rogers (2003) notes that many innovation decisions however, are made by organisations and the individual in the organisation will have little or no say. When an innovation-decision is made by a system, rather than by an individual, the decision process is more complicated because a number of individuals are involved. The individuals in a social system do not all adopt an innovation at the same time. Some adopt earlier than others. Adoption tends to take place in an over-time sequence, so that individuals can be classified into adopter categories on the basis of when they first begin using an idea (Rogers 2003, p. 267).

**Adopter categories**

There are five adopter categories according to Rogers. The first category is called innovators. These are the risk-takers and pioneers who lead the way. They are able to adopt despite a high degree of uncertainty about the innovation at the time of adoption, and are willing to accept an occasional setback when a new idea proves unsuccessful. The second group is known as the early adopters. They climb aboard the train early and help spread the word about the innovation to others. The third group is the early majority. They are persuaded to adopt by the innovators and early adopters, and may deliberate for some time before completely adopting the new idea. Their innovation-decision period is relatively longer than that of the innovators and early adopters. The fourth group is the late majority. They approach innovation cautiously and wait to make sure that adoption is in their best interests. As a result,
they do not adopt until most others have done so. The fifth group is called the *laggards*. These are the individuals who are highly sceptical and resist adopting until absolutely necessary. Rogers (2003) expressed the categories as a bell shaped curve with approximate distributions assigned as shown in Figure 2.3 (p. 81). The vertical axis represents the adoption of innovation while the horizontal axis represents time. The adopter categories play an important role towards the development of this study in the methodology, i.e. where staff members may lie on the adoption curve.

**Figure 2-3** The adoption curve

*Rogers (2003)* expressed the categories as a bell shaped curve with approximate distributions assigned as shown in Figure 2.3 (p. 81). The vertical axis represents the adoption of innovation while the horizontal axis represents time. The adopter categories play an important role towards the development of this study in the methodology, i.e. where staff members may lie on the adoption curve.

**Figure 2-3** The adoption curve

**Rate of adoption**

The innovation-decision process ultimately affects the rate of adoption as illustrated in Figure 2.1. Rate of adoption according to Rogers (2003) is the relative speed with which an innovation is adopted by members of a social system and is generally measured as the number of individuals who adopt a new idea in a specific period (p. 81).
It is usually measured by the length of time required for a certain percentage of members of a system to adopt an innovation.

Most innovations tend to have an S-shaped rate of adoption when the number of individuals adopting a new idea is plotted on a cumulative frequency basis over time, according to Rogers. First, a few individuals adopt an innovation then the curve steadily climbs over time as more individuals adopt. Eventually it levels off as few individuals remain who have not yet adopted the innovation until the diffusion process is finished. Some innovations have a slower rate of adoption resulting in a gradual (lazy) slope. A steeper curve reflects a rapid diffusion. There can be differences in the rate of adoption for the same innovation in different social systems. The system in turn has a direct effect on diffusion through its norms and other system-level qualities, as well as an indirect influence through the behaviour of its individual members.

**2.5.1.4 Social system**

The fourth element of diffusion is the social system which is defined as, “a set of interrelated units that are engaged in joint problem-solving to accomplish a common goal” (Rogers 2003, p. 23).

*Structure*

The members or units of a social system may be individuals, informal groups, organisations, and/or subsystems. The social system constitutes a boundary within which an innovation diffuses. Structure exists in a social system because not all units are identical in behaviour. Rogers (2003) defines structure as, "patterned arrangements of the units in a system" (p. 24). He adds that structure gives regularity and stability to human behaviour in a system. It allows one to predict behaviour with some degree of accuracy, e.g. bureaucracy in a government organisation. It represents a type of information in that it decreases uncertainty. A well-developed social structure in a system consists of hierarchical positions and gives individuals in higher ranked positions the right to issue orders to individuals of lower rank. Orders are expected to be carried out.
Diffusion’s focus is on interpersonal communications within social systems over time as it relates to the spread of innovations (Gatignon & Robertson, 1985) and it emphasises that the norms and beliefs of the social system must be considered in any diffusion process of innovation (Gregor & Jones, 1999). A communication structure exists in a social system. Rogers explains this as differentiated elements that can be recognised in the patterned communication flows in a system (p. 24). A communication network therefore exists when interrelated individuals in a system are linked by patterned flows of information. Systems effects (influences on behaviour of members) and system norms (established behaviour of members) are a result of a system’s structure.

**Opinion leadership**

In the diffusion process, there are individuals that are able to influence other individuals’ attitudes or overt behaviour informally in a desired way with relative frequency. Rogers (2003) calls them 'opinion leaders' (p. 27). They can either lead innovation or lead opposition to it. Characteristics of these opinion leaders include more exposure to all forms of external communication, are of somewhat higher socioeconomic status, and tend to be more innovative. Another type of individual that can also influence others in a social system is called a change agent. According to Rogers, change agents usually seek to obtain the adoption of new ideas but may also attempt to slow down diffusion and prevent the adoption of undesirable innovations. Change agents tend to be the influencers of new technology use and faster (or slower) adoption in university contexts. They often use opinion leaders in a social system as their lieutenants of diffusion activities. They are professional, with university degrees in a technical field; possibly employing aides or semi-professionals (p. 28).

**Innovation decisions**

Innovations are often adopted by organisations through three main types of innovation-decisions: collective innovation decisions, authority innovation decisions and optional innovation decisions. The collective innovation decision occurs when the adoption of an innovation has been made by a consensus among the members of an organisation. The authority-innovation decision occurs when the adoption of an
innovation has been made by very few individuals with high positions of power within an organisation (Rogers 2003, p. 403). Unlike the optional innovation decision process (a third type of innovation decision), these innovation-decision processes only occur within an organisation or hierarchical group. Optional innovation decisions are choices to adopt or reject an innovation that are made by an individual independent of the decisions of other members of the system (Rogers 2003, p. 28). Collective and authority decisions are more common in organisations such as factories, schools and government. There is a fourth kind of innovation-decision which incorporates sequential combinations of two or more of the above types. This is called contingent innovation-decisions.

Within the innovation decision process in an organisation there are certain individuals termed "champions" who stand behind an innovation and break through any opposition that the innovation may have caused. According to Rogers (2003), innovations requiring an individual-optional innovation-decision are generally adopted more rapidly than when an innovation is adopted by an organisation. The more people involved in making an innovation-decision, the slower the rate of adoption. He also adds that a means of speeding the rate of adoption of an innovation is to attempt to alter the unit of decision so that fewer individuals are involved (p. 221). Change occurs to a social system or individual as a result of the adoption or rejection of an innovation. Rogers (2003) calls this the 'consequences of innovations'. He classifies consequences as:

1. Desirable vs. undesirable consequences, depending on whether the effects of an innovation in a social system are functional or dysfunctional.
2. Direct vs. indirect, depending on whether the changes to an individual or to a social system occur in immediate response to an innovation or as a second-order result of the direct consequences of an innovation.
3. Anticipated vs. unanticipated, depending on whether or not the changes are recognised and intended by the members of a social system.
The previous section explained Rogers’ (2003) diffusion of innovations in terms of the four main elements, Innovation, Communication channels, Time, and the Social System.

A theoretical framework has been developed for this study drawing on the earlier works of Rogers’ (1962) diffusion of innovations theory, as well as subsequent developments to the theory. Rogers’ (2003) key elements of the theory (innovation, communication channel, time and the social system) provides a rich framework with tangible structures to enable an exploration of a regional diffusion process.

The theory explains the how and why of diffusion and at what rate the diffusion process occurs. Rogers (2003) provides classifications or adopter categories for members involved in the innovation which enables an understanding of the complexity of the social system. The elements outlined by Rogers (2003) allow the researcher to clearly articulate the diffusion process, including the identification of the champions or the change agents involved. MacVaugh and Schiavone (2010) state that Rogers’ (2003) diffusion of innovations theory is a “useful systemic framework to describe either adoption or non-adoption of new technology” (p. 197).

### 2.6 Limitations of diffusion research

While Rogers’ (2003) diffusion of innovation theory has been recognised for its importance in understanding the process, some limitations have been raised. Interestingly, Rogers (2003) identifies four major shortcomings of diffusion research inherited from diffusion research ancestry over time and which are inappropriate for certain research tasks of today (p. 134). The first is pro-innovation bias, where the implication of most diffusion research is that an innovation should be diffused to and adopted by all members of a social system, that it should be diffused rapidly, and that the innovation should be neither re-invented nor rejected. Whenever the research of an innovation is produced by the same group that produced the innovation, the possibility for pro-innovation bias exists (Oren 2009). The second is individual-blame bias, the tendency to hold an individual responsible for his/her problems, rather the system of which the individual is a part. Third is recall problem, where respondents are asked to remember the time at which they adopted a new idea. This can lead to
inaccuracies. Fourth is equality, as socioeconomic gaps among members of a social system are often widened as a result of the spread of new ideas. There are various ways of overcoming these shortcomings as Rogers (2003) suggests, for instance, having a clear understanding of the innovation and the reasons for adoption. Further, making comparisons between similar groups of socioeconomic status and evaluating the social system as opposed to the individual can overcome these biases. Data gathering at multiple points in time is another way to overcome issues of recall. In other bodies of work, Rogers’ theory has also been criticised.

Bigum (2004) criticises the notion of pre-determined categories as proposed by Rogers. According to Bigum (2004), a large number of influences or factors should be taken into account. The reliance on categories of factors becomes “little more than an exercise in taxonomy” (p. 217). Clarke (1999) raises other issues in relation to its predictive ability. Clarke (1999) states that diffusion theory is “best as a descriptive tool, less strong in its explanatory power, and less useful still in predicting outcomes, and providing guidance as to how to accelerate the rate of adoption.” What is of interest to this study is that Clarke highlights that the elements identified by Rogers in the diffusion of innovations theory may be specific to the culture in which it was derived, that is North America in the 1950s and 1960s. Clarke (1999) does acknowledge that it provides “one valuable 'hook' on which research and practice can be hung.” This is something to be mindful of as USP encompasses several, very different cultural contexts (see Chapter 3) as well as this study’s time nested case.

Lyytinen and Damsgaard (2001) question many of the assumptions made by diffusion of innovation theory on examination of complex technologies in its ability to identify and measure distinct features such as those that affect adopters behaviour; recognition of the complexity of systems and the significance of how they can vary from one to another; the predictive power of the theory where results can be viewed as low or confounding; how choices or decisions are made; that diffusion does not necessarily diffuse in sequential stages. While recognising the considerable impact of the theory, Lyytinen and Damsgaard (2001) point out that at times it falls short of some theoretical constructs.
Rossiter (2006) reminds us that Rogers’ (2003) diffusion of innovation theory can at times have a “product centric view”, meaning when the innovation is seen as well-defined and bounded it assumes the surrounding system of environment is stable. This according to Rossiter, does not align with current views that the environments are constantly changing, evolving, and can be viewed as non-stable.

Waterman (2004) highlights another possible limitation in that Rogers assumes that each innovation is objectively good for everyone and does not consider the possibility that individuals could understand an innovation fully but choose not to accept it. Botha and Atkins (2005) in their research paper assessing five different theoretical frameworks to study the uptake of innovations, quote Wolfe (1994) stating that insufficient consideration is given to innovation characteristics and how these change over time. Kole (2000) raises another important limitation in the diffusion of innovations theory for the need to incorporate the context. According to Kole (2000) the diffusion of innovations theory focuses on individuals (the adopters) rather than the social system in which the diffusion takes place.

Limitations to the theory of innovation are recognised and identified as factors that may impact the research design. In fact, in Rogers later work (2003) he recognises the similarities between innovation and technology and acknowledges the uncertainty and complexity of the environment in which the innovation is diffused. Rogers (2003) also suggests that individual innovations are not independent from other innovations that have preceded it nor its influence after it.

2.7 Broader contextual considerations

The research study intends to employ the elements derived from Rogers’ diffusion of innovations theory. Aspects of communication, time and the social system will be observed through this unique cultural lens. This can be discussed through the work of Anthropologist Edward T. Hall which provides relevance in terms of the diverse regional characteristics of USP encompassing 12 cultures. Culture according to Hall (1976), “is not genetically inherited, and cannot exist on its own, but is always shared by members of a society” (p. 16). He put it simply as, “the link between human beings and the means they have to interacting with others (p. 188). Hofstede (1980) extends
this further as, “the collective programming of the mind which distinguishes the members of one group from another”, which is passed from generation to generation; it is changing all the time because each generation adds something of its own before passing it on (p. 21-23). UNESCO (2002) has defined culture as, "... the set of distinctive spiritual, material, intellectual, and emotional features of society or a social group, and that it encompasses, in addition to art and literature, lifestyles, ways of living together, value systems, traditions and beliefs” (UNESCO, 2002). Culture is a complex concept, and different definitions of culture reflect different theories for understanding, or criteria for valuing, human activity (Belshek 2010, p. 23-24).

This section explores intercultural communication, time and space in culture, organisational infrastructure in higher education and geography as potential factors affecting diffusion in this study.

### 2.7.1 Intercultural communication

Hall (1953), who founded the scholarly field of intercultural communication and who Rogers (2003) is heavily influenced by, states that language is the most technical of the message systems. It is used as a model for the analysis of the others. By ‘others’, he meant the ways in which people read meaning into what other people do. In his book, *The Silent Language*, he states that “we must learn to understand the “out-of-awareness” aspects of communication. We must never assume that we are fully aware of what we communicate to someone else. There exists in the world today tremendous distortions in meaning as people try to communicate with one another. The job of achieving understanding and insight into the mental processes of others is more serious than most of us care to admit” (Hall 1981, p. 28-9).

Hall (1981) states, “Culture is communication” (p. 97-8). Hall and Trager (1953) introduced a set of terms which apply to all types of communication, including language. The cover terms are used to designate the three principal elements of a message. These are: sets, isolates, and patterns. The sets (words) are what you perceive first, the isolates (sounds) are the components that make up the sets, while the patterns (syntax) are the way in which sets are strung together in order to give them meaning. Hall and Trager (1953) suggest that idea of looking at culture as
communication has been profitable in that it has raised problems which had not been thought of before and provided solutions which might not otherwise have been possible. The fruitfulness of the approach can be traced to the clear distinction which was made between the formal, informal, and the technical ways of learning, as well as the realization that culture can be analysed into set, isolates, and patterns (p. 102-3).

Learning styles and awareness may be considered in the way people of the Oceania region receive, understand and disseminate information, for example of an LMS. Formal learning according to Hall (1981) is a set of formal activities that are taught by precept and admonition. The adult mentor moulds the young according to patterns they have never questioned (p. 68). Informal learning is of a different character from either the technical or formal. The principal agent is a model used for imitation. Whole groups of related activities are learned at a time, in many cases without the knowledge that they are being learned at all or that there are patterns of rules governing them (p. 69). Technical learning on the other hand, is fairly one-way. It is usually transmitted in clear terms from the teacher to the student either orally or in writing. Often there is an analysis before an outline form is presented. Three types of awareness follow suit. Formal awareness, an approach to life that’s asks: “Is there any other way?” Formally aware people are more likely to be influenced by the past than they are by the present or future (Hall 1981, p. 72-3). Informal awareness is made up of behaviours which we once learned but which are now part of everyday life that they become automatic (p. 73). Then there is technical awareness which is characterised by the fact that it is fully conscious behaviour. It is very explicit and the fact that it can be written down and recorded and even taught at a distance differentiates it from the other two types. The very essence of the technical is that it is on the highest level of consciousness (p. 74).

Informal awareness for instance may be a type of communication that is culturally present in spreading information in the community particularly where technology and fast and frequent transport is lacking, a “coconut wireless” as it may. Coconut wireless (according to a Hawaiian definition) is a term to describe local word-of-mouth communication channels. The coconut wireless (may be commonly referred to as
“heard it through the grapevine”) spreads like a web across entire islands and many marvel at the speed at which information and gossip moves. On the coconut wireless, accuracy of information sometimes falls prey to the need for passing along a slightly "better" version of the story (Enlightened Science's LLC, 2012). Cass (1999) had an interesting observation about the continuing clash between the demands of traditional cultures (in the Pacific) and those of western news gathering in developing countries. He noted that western concepts of press freedom cannot be automatically transferred to the Pacific, and in certain circumstances they would be inappropriate. He argued that what was developing slowly in the Pacific was a bipolar approach to press freedom, where stories which do not appear in the mainstream, western-style media, were not suppressed but passed along by those traditional forms of communication sometimes called the “coconut wireless” (p. 55). While the coconut wireless often seems to be an important purveyor of news and comment, it can often accentuate rumours and half based stories (Haas 2008, p. 140).

2.7.2 Time and space in culture

In a developing South Pacific Island context, the scheduling of activities can be a less than punctual affair and often proudly exclaimed as the adage, ‘Pacific time’. Hall’s (1953) work presents an interesting dimension to this notion of time in the Pacific context. He parallels this with different cultures; what he states as monochronic and polychronic time. Monochronic time (M-time) or cultures ‘do one thing at a time’ as in North Europe for example. Appointments are taken more seriously, more tangible, “time well spent, seldom wasted”. It is not flexible in terms of accounting for life’s unpredictability’s. Monochronic time is arbitrary and imposed, that is, learned. Because it is so thoroughly learned and so thoroughly integrated into American culture for example, it is treated as though it were the only natural and logical way of organising life. Yet, it is not inherent in man’s biological rhythms or his creative drives, nor is it existential in nature (Hall 1953, p. 45-9). Polychronic time (P-time) on other hand is a ‘many things at a time system’ as in the Mediterranean model of involvement in several things at once, stresses involvement of people and completion of transactions rather than adherence to pre-set schedules. P-time is not as tangible. Theoretically, when considering social organisation, p-time systems should demand a
much greater centralization of control and be characterised by a rather shallow or
simple structure. This is because the leader deals continually with many people, most
of whom stay informed as to what is happening. Polychronic people are so deeply
immersed in each other’s business that they feel a compulsion to keep in touch (p. 45-9).
American, Canadian and Northern Europe are classified as monochronic cultures
while Latin America, the Arab part of the Middle East, or sub-Sahara Africa are
polychronic cultures.

‘Pacific time’ may be more indicative of polychronic than monochronic time. Notions
of this ‘polychronic time’ can be found in traditional aspects of planning, for example, a
general attitude of life among many Fijians is that life is to be lived and enjoyed now.
A person who worries about the future is said to be lomaocaoca (‘tomorrow will take
care of itself’). The immediate needs of the present must be attended to first; other
things for the morrow will be resolved as they occur. There is no need to panic or to
be upset if things did not happen the way one wanted. Things will sort themselves
out; what is really important is to be happy and contented now (Ravuvu 1983 p. 106).
Maroroya me qai kena na qele (‘To keep it only to feed the earth’) or Maroroya me qai
kena na baca (‘To keep it only to feed the worms’) are expressions conveying the idea
that keeping or accumulating things is pointless because one does not know what may
happen the next day; and one does not live long enough to use all they have
accumulated. The implication is that material possessions must be enjoyed and shared
with others while the going is good. What is the pleasure of hoarding? When one
dies, their possessions are left behind. If they are entombed, the worms would devour
them. Such an attitude minimises frustrations in many ways and eases the situations
in which anger may otherwise be generated. Too much striving without a break to
enjoy one’s effort with others is considered not only bad for one’s health, but morally
unacceptable. If one is not ambitious, does not strive, there is less chance of being
frustrated when one’s plans are affected by other people. Many still believe in
providence and that things are in adequate supply. “If you don’t get it today, you’ll get
it another day. If you can’t do it today, you’ll be able to do it another day. The best
way to get along is to take it easy, and not get too worried about what happens later.”
Aspects of space are a common consideration amongst Pacific Islanders in addition to time. People who know one another well and have common social status often place themselves close together. The exception will be those who have certain tabu or ‘avoidance relationships’ with one another. The degree of tabu (taboo) or avoidance one practices is determined by the type of kinship relationships one has with another person as socially defined by traditional custom (Ravuvu 1983, p.107). In some areas in Fiji, brothers who have reached adulthood and have their own families avoid casually talking or joking with one another. They may live together in the same house, but will avoid sitting or standing so close to one another that physical bodily contact may be enhanced. They may talk to each other, but only when it is essential to do so. On the other hand brothers and sisters who have reached adulthood and have got their own families, avoid talking directly to one another and keep themselves at a much greater distance than that between brothers. In some instances they are not expected to be together in that same house at the same time without a third person who often acts as an intermediary between the two.

The higher the chief’s status is, the greater the distance between him and the commoners whereas the distance between him and other minor chiefs is not as great as those between him and the people. Common people should place themselves at much greater distance from the high chief than from a small or minor chief. Inside a house, they should sit an appropriate distance from the man of status, facing him, but not beside or behind him. Only those of almost equal status with the chief should sit side by side with him or immediately behind (Ravuvu 1983, p.108). In the traditional village setting, men and women generally sit apart in informal and formal gatherings alike. Even the husband and the wife do not normally sit close together in theatres, restaurants, entertainment places and in other public gatherings. A woman may avoid sitting close to a man who she does not know unless shortage of space or of seats forces her to do so. Where this happens she could hardly talk to the man or even look at him directly in the face. Generally, in the urban centres, only men and women who know each other well and those who have intimate relationships with each other sit close together. Fijians often feel uncomfortable being too close to people whom they do not know, particularly if they are of the opposite sex (Ravuvu 1983, p.108). Similar
considerations hold true for Polynesian and Micronesian cultures as well as other cultures of Melanesia. Such cultural considerations are important in terms of other possible factors affecting diffusion.

Hall also provided complementary work to monochronic and polychronic time by way of explaining ‘high’ and ‘low context’ culture. Table 2-2 below shows the kinds of behaviour that is generally found in high and low context cultures within five categories: how people relate to each other, how they communicate with each other, how they treat space, how they treat time, and how they learn. In some cultures, people can be at one end of the spectrum or the other. They tend to fall somewhere in between and may have a combination of high and low context characteristics. With time and space in mind as cultural diversity is taken into consideration, an organisation’s culture is also impacted by the diversity of its staff and students, adhering to a certain context. This may present challenges in terms of communication and understanding. Application of Hall’s work in this area is still relevant in contemporary cultural studies (Cardon 2008) although it may be limited by its application to quantitative research (Dahl 2004, p. 12) in terms of a specific ranking along the HC-LC continuum.

Table 2-2 High and low context cultures

<table>
<thead>
<tr>
<th>High context (HC)</th>
<th>Low context (LC)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Association</strong></td>
<td><strong>Association</strong></td>
</tr>
<tr>
<td>• Relationships depend on trust, build up slowly, and are stable. One distinguishes between people inside and people outside one's circle.</td>
<td>• Relationships begin and end quickly. Many people can be inside one's circle; circle's boundary is not clear.</td>
</tr>
<tr>
<td>• How things get done depends on relationships with people and attention to group processes.</td>
<td>• Things get done by following procedures and paying attention to the goal.</td>
</tr>
<tr>
<td>• One's identity is rooted in groups (family, culture, work).</td>
<td>• One's identity is rooted in oneself and one's accomplishments.</td>
</tr>
<tr>
<td>• Social structure and authority are centralized; responsibility is at the top. Person at the top works for the good of the group.</td>
<td>• Social structure is decentralized; responsibility goes further down (is not concentrated at the top).</td>
</tr>
</tbody>
</table>
### Interaction
- High use of nonverbal elements; voice tone, facial expression, gestures, and eye movement carry significant parts of conversation.
- Verbal message is implicit; context (situation, people, and nonverbal elements) is more important than words.
- Verbal message is indirect; one talks around the point and embellishes it.
- Communication is seen as an art form—a way of engaging someone.
- Disagreement is personalized. One is sensitive to conflict expressed in another’s nonverbal communication. Conflict either must be solved before work can progress or must be avoided because it is personally threatening.

### Interaction
- Low use of nonverbal elements. Message is carried more by words than by nonverbal means.
- Verbal message is explicit. Context is less important than words.
- Verbal message is direct; one spells things out exactly.
- Communication is seen as a way of exchanging information, ideas, and opinions.
- Disagreement is depersonalized. One withdraws from conflict with another and gets on with the task. Focus is on rational solutions, not personal ones. One can be explicit about another’s bothersome behaviour.

### Learning
- Knowledge is embedded in the situation; things are connected, synthesized, and global. Multiple sources of information are used. Thinking is deductive, proceeds from general to specific.
- Learning occurs by first observing others as they model or demonstrate and then practicing.
- Groups are preferred for learning and problem solving.
- Accuracy is valued. How well something is learned is important.

### Learning
- Reality is fragmented and compartmentalized. One source of information is used to develop knowledge. Thinking is inductive, proceeds from specific to general. Focus is on detail.
- Learning occurs by following explicit directions and explanations of others.
- An individual orientation is preferred for learning and problem solving.
- Speed is valued. How efficiently something is learned is important.

### Territoriality
- Space is communal; people stand close to each other, share the same space.
- Everything has its own time. Time is not easily scheduled; needs of people may interfere with keeping to a set time. What is important is that the activity gets done.
- Change is slow. Things are rooted.

### Territoriality
- Space is compartmentalized and privately owned; privacy is important, so people are farther apart.
- Things are scheduled to be done at particular times, one thing at a time. What is important is that activity is done efficiently.
- Change is fast. One can make change and see immediate results.
in the past; slow to change, and stable.
- Time is a process; it belongs to others and to nature.
- Time is a commodity to be spent or saved. One’s time is one’s own.

(Source: The 1993 Annual: Developing Human Resources, Pfeiffer & Company, p. 131-139)

These broader considerations contextualize the study in terms of culture, time and space relative to Rogers’ (2003) theory. An organisation’s infrastructure in higher education as a means for transformation is also an important consideration, where new technology is concerned.

2.7.3 Organisational infrastructure in higher education

Ingerman (2001) states that there is a need to reconceptualise the notion of the institution of higher education as a destination for learning. The concept of infrastructure has changed to include the digital environment provided by the institution. The Internet has liberated both the learner and the faculty member from the confines of place. Instead of assuming, “If we build it, they will come,” or asking, “If we build it will they come?” we should be designing and building infrastructures such that we can say, “If we create the right learning environment, they will want to be part of it” (p. 8). Organisational infrastructures in this day and age however go beyond just physical structures moving into virtual spaces. Virtual spaces such as learning management systems for example are driven by technological applications. Bates and Sangra (2011) state that the scope and range of technology applications have widened considerably with the applications of technology to teaching and learning which has three implications.

1. A need for systematic and comprehensive training of instructors in teaching;
2. A need for professionally staffed units to support the use of learning technologies; and
3. A clear governance structure for technology that involves all key stakeholders, and includes teaching, research, and administrative applications as well as technology infrastructure (p. 128).

They add that the design, definition, implementation, maintenance, and communication of such a structure should be a prime responsibility of the executive
team. Contrary to this ideal scenario however, they found that too often they observed confusion over roles and responsibilities for decision making, with overlapping committee structures, or committees covering technical infrastructure but not learning technologies, recommendations by committees often ignored or not implemented by the senior administration, and issues allowed to rift until a crisis arose. A major limitation they saw as hindering progress is the industrial style organisational structure of universities and colleges and in particular the silos of academic, administrative, and technical support units. Technology management requires more flexibility and more efficient organisational arrangements. What this means for the study is due consideration for aspects of the changing university setting based on the introduction and use of new technologies for learning and teaching, such as infrastructure to support the introduction of an LMS.

Barone (2001) provided a useful set of conditions which can be applied to this study to better understand the diffusion process. The conditions can seek to understand and describe the interrelated, inclusive decision-making processes involving technological infrastructure (p. 45). In summary, the following 12 campus conditions for transformation will be useful in the development of the methods to examine the diffusion process in this study.

1. Choices – a strategic direction is identified and a path selected in order to provide clear sense of the institutional mission.
2. Commitment – resources are aligned and policy aligned to enable the institution to adjust its course and follow the selected path.
3. Courage – visible and focused leadership from the highest level of administration is provided.
4. Communication – a well-executed strategy for consultation and for dissemination of information builds a climate of trust with the inclusion of the entire campus community.
5. Cooperation – collaboration occurs across functions and throughout the levels and constituencies to achieve a consistent and integrated set of support services for learning and teaching.
6. Community – complementing the community of support nurtured through cross-functional collaboration with an equally cohesive community of faculty across disciplines; creating an engaged community of learners.

7. Curriculum – the curriculum is reconceptualised to reflect its distributed, interdisciplinary, and outcomes-oriented nature.

8. Consistency – reflecting institutional commitment to transformation through consistent action and acknowledging the importance of standards, both within the technology industry and the institution; aligning organisational rhetoric to support and reinforce transformative behaviour.

9. Capacity and competency – developing "the learning and teaching capacity of the institution to serve students achievement and outcomes" (CHA 2000, p. 3); using intelligent assessment to drive transformation by defining and evaluating institutional success in terms of student achievement and outcomes.

10. Complexity and confusion – overcoming the confusion associated with coping with transformation by adapting to the inherent complexity of the decision-making process and adopting more agile and responsive governance processes.

11. Culture and context – understanding the culture, values, and sensitivities of the campus climate.

12. Creativity – developing strategies and tactics that harmonize with the campus culture and context and recognising that ‘this’ is a creative, not a political process.

### 2.7.4 Geography and diffusion

It is generally agreed that geographical distance is a fundamental impediment to virtually all economic transactions. Diffusion with regard to geography tends to have more firm research roots in the Economics, Agriculture and Banking disciplines as the above examples show. However, similar contextual parallels could be drawn from them in terms of the case university’s staff member and campus distribution.

When exploring the spatial diffusion of technology, distance played an extremely important role in technology diffusion (Comin, Dmitriev and Rossi-Hansberg, 2012). Being far from technological leaders in a given technology slows down the diffusion of technology significantly. It was noted that with the introduction of new technology
(unlike goods or people), the importance of distance will be governed by the frequency of meetings between agents, as well as by how much more often they meet people that are closer to them. As more agents use a technology, the higher the chances of meeting them and therefore adopting it. Further, over time the importance of distance to the technological leader will diminish until everyone knows and uses the technology. Assuncao, Braganca and Hemeley (2013) found that (social) learning as a diffusion channel is affected by differences in the environment as new technologies need to be adapted to local conditions (p. 28). Perkins and Neumayer (2006) similarly state that future shifts in the geography of economic activity, inequality, and environmental pressure all significantly hinge on the extent to which different countries are able to rapidly exploit new technology (p. 36).

Baptista (2001) states that technological diffusion, like any other socio-economic phenomenon occurs simultaneously in time and space. This further lends itself to being truly geographic in scope. He adds that diffusion of new technological processes may occur faster in geographical areas where the density of sources of knowledge about such technologies is higher. New technological knowledge is said to be more easily transmitted by interpersonal contact than across great distances (Nelson & Winter 1982). Networking is also important between adopters and potential adopters in terms of reducing uncertainty about the innovation. Mark and Poltrock (2001) suggest that users at distant sites in an organisation have more challenges in adopting a technology compared to their colleagues at a main site. Critical factors that encourage adoption must exist at these sites, for example, technical support for isolated users, local support for each site. Social factors they state are also important in the adoption of innovations, such as communication, cultural influences and peer pressure which are different for remote users than for those who are at the same work site. Their study showed that potential users at a site with few users of technology have fewer opportunities to learn about it. An important aspect of their study showed that collaboration and an established communication network were key in learning about a new technology. Apparently the communication network across distance was sufficiently strong that people adopted the technology despite local adversities. Their examination of the diffusion process immediately after a new technology was
introduced compared to a period lapse from when it was introduced showed that the barriers to technology had differed in users’ opinions, owing to them being in a different stage of technology adoption. An example would be an indication of lack of support for the technology when it was first introduced; later on, barriers reflected limitations of the technology.

A number of studies have suggested that much organisational friction stems from the geographical dispersion of the organisation and that communication and incentive problems increased with the distance between hierarchical levels (Alessandrini, Calcagnini & Zazzaro, 2008). Alessandrini et al (2005) also explain the concept of ‘functional distance’, the distance between local branches and headquarters of their parent banks. Functional distance reflects different physical and cultural factors. It is reasonable to believe that the costs of monitoring loan officers per visit increased with geographical distance from the bank’s headquarters. Similarly, reliability of communication and trust between managers and loan officers at the parent bank decreased not only with the physical distance between the bank’s head office and the local branch but also with the socio-cultural distance between the geographical areas where the staff of the bank’s decisional centre and operational peripheries work and live (Ichnio & Maggi, 2000). deBlasio (2009) posits that the ‘death-of-distance’ prophecy as a result of internet diffusion in banking is far from realised. He states this because he found that eBanking was more frequent among urban consumers than non-urban consumers. Non-urban consumers rated personal acquaintance a more important factor than urban clients, suggesting a preference for face to face, person to person interaction than electronic. He also adds that innovations of all kinds tend to arise first and diffuse faster in larger cities, i.e. the likelihood of learning about a new technology is greater in larger cities (p. 126) than non-urban areas anyway. Geographic distance needs to be considered in this study due to USP’s dispersed setting.
2.7.5 Institutional memory

Of importance to this study is the role of the individual in the organisation. Gaining an understanding of the diffusion process from the viewpoint of the social system was imperative in the data collection. Therefore, acknowledgement of the knowledge held within this social system should be recognised. It should be noted that a prominent risk to knowledge management is the loss of institutional memory. Knowledge management according to O’Regan (2012) encompasses the ways in which information and the interpretation of information are captured and handled. It involves the ways an organisation’s employees individually and collectively learn, sort, analyse, understand, communicate, distribute, represent and use information to achieve organisational objectives (p. 19). With an institution as distributed as USP (see Chapter 3) and relatively large in size in comparison to other similar regional organisations, the risk of institutional memory loss or institutional amnesia has to be considered in the context of diffusion.

2.8 Diffusion studies in ICTs

Rogers (2003) states, “insight into the innovation process in organisations can be gained from research on the diffusion and adoption of communication technologies such as personal computers and e-mail in companies” (p. 419). He adds that, “these communication technologies represent a very major change in human behaviour, and require a good deal of learning, and time”. After an organisation decides to adopt technological innovation, the next process is to encourage its adoption at an individual level throughout the organisation (Peansupap & Walker, 2005).

Innovation diffusion theory can be applied to explain the nature of IT adoption (Mitropoulos & Tatum, 2000) and implementation (Fichman, 1992). The number of adopters increases as the technological innovation becomes fully diffused. There are several reasons a good understanding of technological diffusion is necessary to ensure successful technological innovation (Green & Hevner, 2000). First, the rate of effective adoption can be used as a proxy measure to reflect technology introduction success. Additionally, the diffusion process is complex and should also be understood so that
technological limitations and constraints on adopters in the organisation are well recognised (Senge, Roberts, Kleiner, Smith & Ross, 1999). Further, Holloway (1996) posits that studies in diffusion and adoption help to explain patterns in the use of technology in education.

2.8.1 Innovation adoption at the organisational level
This study recognises that organisations also adopt innovations. Rogers (2003) defines an organisation as a “stable system of individuals who work together to achieve common goals through a hierarchy of ranks and a division of labor” (p. 404). As Rogers (2003) states, an individual cannot adopt new ideas until the organisation has previously adopted it. The innovation investigated in this research study was initiated by the organisation prior to implementation.

Earlier innovation research according to Tanoglu and Basoglu (2006) suggests that many factors can influence the diffusion and infusion of a new information technology within an organisation. Unlike diffusion’s “spread” concept, infusion refers specifically to, "the degree of integration with existing business processes", i.e., the degree to which an organisation becomes dependent on IT to carry out its core tasks and manage its business (p. 1735). Mathiassen, Pries-Heje and Ngwenyama (2002) identified the influence of the organisational changes while implementing new information technologies or the diffusion of them. Lee and Lee (2000) found that an organisation’s adaptive capability concerning role and responsibility redistribution, the development of new types of required knowledge and the introduction of a different knowledge structure influenced an organisation’s ability to internalise these standardised processes into business routines.

Adoption decision making is usually more complex when taking place at an organisational than individual level (Higa, Shin & Au, 1997). In their comparative study of Telemedicine in two clinical units of a Hong Kong hospital, Higa et al (1997) found that investment requirements including both fixed and operating costs measured in monetary or other terms are an important innovation attribute and therefore need to be included in adoption decision making. When making adoption decisions, an organisation needs to straddle simultaneously innovation and organisation dimensions.
because the equality of technological superiority and fit with the adopting organisation is not automatically guaranteed. They suggested needs, structure, members' attitudes toward technology, and decision making practice to be important organisational characteristics of adoption decision making (p. 7-8). They found that an internal champion, convenient access, member involvement and rewards for system utilization be candidates for critical success factors for effective innovation diffusion in organisations (p. 8).

The RIPPLES model by Surry, Ensminger and Haab (2005) and influenced by Rogers (2003) emerged from inquiry into the integration of instructional technologies into universities and colleges highlighting the need to consider Resources, Infrastructure, People, Policies, Learning, Evaluation and Support (RIPPLES) in the adoption process (Tickle, Muldoon & Tennant, 2009). The four main applications of the model according to Surry et al. were:

1. Implementation Planning - determining an organisation's overall implementation readiness and identifying specific barriers or enablers to implementation.
2. Implementation Support - developing specific interventions that will facilitate the implementation of an innovation thereby reducing stress, and saving time and money.
3. Implementation Evaluation - understanding the reasons for a successful or unsuccessful implementation in order to better prepare for future implementations.
4. Research - developing better theories about why implementations succeed or fail and creating theory-based models for supporting implementation in a variety of organisations.

(https://sites.google.com/site/dansurry/ripples)

According to Benson and Palaskas (2006), the RIPPLES model “appeared to be most useful for post-adoption analysis of an institutional innovation, with the potential for pre-adoption guidance of future practice” (p. 551). Estminger and Surry (2008) suggest that if the success of an innovation is directly tied to its successful implementation, organisations must not only be aware of variables that facilitate implementation, but
need a means for determining which variables are most important to their organisation, given a specific innovation (2008, p. 612). Consideration of organisational adoption of innovations is a key aspect of this study.

2.8.2 Innovation adoption at the individual level
The diffusion of the innovation, the implementation of the learning management system for this study recognises the complexity of the process. As Rogers (2003) reminds us, “implementation typically involves a number of individuals, perhaps including both champions and opponents ... each of whom plays a role in the innovation decision” (p. 403). The following studies encompass much of what is presented in the theoretical framework for this study as it looks at various issues faced with the diffusion of technology at the individual level.

Igbara, Schiffman and Wicckowshi (1994) studied 471 managers in 54 companies across the United States and observed that computer anxiety was an important barrier to the adoption and use of the personal computer. In Heikkila’s (1995) study of employee’s use of a personal computer in a Finnish company found that a great deal of time and effort was required for an employee to learn how to use a personal computer once he or she adopted the technology. Much of this learning occurred on a day to day basis as an individual asked co-workers for help. It later took some months before the employee became proficient in terms of word processing and e-mail. Carter (1998) found that word processing and e-mail software were the most frequently used computer-based technologies in his study of what computer-based technologies were the most frequently used by faculty members. He further explored the factors that affected faculty attitudes towards the use of these technologies and found that support, resources and training were needed for effective use. Blankenship’s (1998) study found that attitude, support, access and age were statistically significant predictors of computer use in classroom instruction. A major finding of this study was that grade level and curriculum area must be considered for successful training.

Medlin (2000) examined selected factors that might influence a faculty member’s motivation and decision to adopt new electronic technologies in classroom instruction. He organised his findings into three groups.
1. Social factors – friends, mentors, peer support and students were found to be the significant predictors that may influence a faculty member’s decision to adopt electronic technologies in the classroom.

2. Organisational factors – physical resource support and mandates from the university.

3. Personal motivational factors – personal interest in instructional technology, personal interest in improving one’s teaching and personal interest in enhancing student learning were cited as personal motivational variables that might affect faculty members’ decision to adopt instructional technologies.

Resource support is a key factor in technology acceptance in universities. Bates (2000) stated that, “because of the central role that faculty member’s play in the work of the universities and colleges, any change, especially in core activities such as teaching and research, is completely dependent on their support” (p. 95). In order for large-scale technology adoption and diffusion to happen, it is critical to understand and bridge differentiated needs and expectations of faculty members who are open to, and those who are reluctant or resistant to IT adoption, and to determine if faculty characteristics contribute to the prediction of faculty adopter categories (Garofoli & Woodell, 2003).

Surendra’s (2001) study found that access in general and training in particular were found to be the best predictors in the diffusion process of web technology-based educational innovation. He also found that Rogers’ attributes of innovations were useful predictors of the adoption of innovation and that there was a relationship between computer knowledge and the adoption of innovation. His study involved predicting the acceptance of web technology by professors and administrators of a college. Isleem’s (2003) study examining the level of computer use for instructional purposes by technology education teachers in Ohio public schools discovered that technology education teachers used more mainstream computer applications than specialised computer applications. Furthermore, teachers’ perceived expertise, perceived access to computers, and perceived attitude towards computers were
significant predictors of the level of computer use. In his study, Isleem emphasised that providing training was a main strategy to increasing computer use.

These studies mainly focus on the adoption side of innovation from an individual’s behaviour and consistent with Davis’s (1985) Technology Acceptance Model (TAM) focusing on perceived ease of use and perceived usefulness as the major variables affecting an individual’s decision whether to accept or reject a new technology. On the other hand, these variables, together with intention to use and attitude towards use, are accepted as mediating variables which influence the adoption decision and which are influenced by the characteristics of the organisation, social environment, individual, and the technology itself (Tanoglu & Basoglu, 2006). Venkatesh, Morris, Davis and Davis (2003) Unified Theory of Acceptance and Use of Technology (UTAUT) holds that four key constructs (performance expectancy, effort expectancy, social influence, and facilitating conditions) were direct determinants of usage intention and behaviour. Gender, age, experience, and voluntariness of use were posited to mediate the impact of the four key constructs on usage intention and behaviour. Venkatesh and Davis (2000) further extended the TAM model to explain perceived usefulness and usage intentions in terms of social influence and cognitive instrumental processes (TAM2). Both social influence processes (subjective norm, voluntariness, and image) and cognitive instrumental processes (job relevance, output quality, result demonstrability, and perceived ease of use) significantly influenced user acceptance. These findings advanced theory and contributed to the foundation for future research aimed at improving our understanding of user adoption behaviour. Jebeile and Reeve (2003) stated that research on the adoption of innovations is concerned with an individual’s behaviour during the innovation diffusion process, as opposed to diffusion research per se, which focuses on the social system as a whole. Consequently, adoption can be viewed as a subset of the diffusion process, but one that takes place at the individual level rather than at the social group level.

Sookram and Hogan (2012) focus on a number of challenges in relation to the context where the diffusion takes place. A number of challenges, opportunities and benefits are highlighted which may impact on the success of personal and/or collective
diffusion. In a study undertaken by Sookram and Hogan (2012) comparisons were made about the only two regional universities in the world, the University of West Indies (UWI) and the University of the South Pacific (USP). Both universities have similar missions to increase the economic, social and political development through teaching, research and innovation.

Sookram and Hogan (2012) quotes the USP (2011) vision, mission and values statement the USP was in 2012 positioning itself to be a centre of excellence in the pursuit of knowledge and be active in social, economic and political development in the region. Sookram and Hogan’s (2012) study highlighted a number of specific challenges for regional universities including faculty, funding, the regions, competition, failure rates, culture, politics, quality assurance, technology, tuition, reluctance to change, workload and relevancy.

In relation to faculty attitudes, Sookram and Hogan (2012) identify that even though USP has a forty year history of distance learning, it will still take time and effort to change the attitudes and to develop the necessary skills required.

Recognition is made to the political volatility of the USP region, the Pacific economy and flow on effect of modest funding reductions on the USP operating costs. This effect of funding constraints then impacts on the maintenance of physical campuses operated by USP. Sookram and Hogan (2012) suggest a greater reliance on online offerings as an alternative. Alternatively, Kavaliku (2006) makes a strong case that the regional campuses would need to be retained for the survival of USP. A strong point made by Sookram and Hogan (2012) is that regional universities need to financially sustainable. Competition is an area, which cannot be dismissed lightly, as both USP and UWI both experienced increased competition from other universities, both local and international. Increased global pressure will be a challenge for regional universities.

While failure rates were highlighted by Sookram and Hogan (2012) as a challenge, it appears that there is evidence that this is a problem for UWI but not so much for USP. This can be attributed to the lower number of online offerings at this time by USP. Important cultural challenges have been highlighted as possible inhibiting factors
impacting on the success of education at USP. Interestingly, Sookram and Hogan (2012) identify a common cultural issue of ‘Fiji Time’ resulting in low motivation and poor time management. Another major challenge highlighted is the fact that students still perceive online instruction as inferior to face to face instruction.

Political unrest in the USP region has led to uncertainty, instability and a contributor to declining enrolments. The flow on effect of this political unrest has resulted, according to Sookram and Hogan (2012) to many foreign universities offering online courses.

Quality assurance procedures and policies is another area of consideration as a challenge for regional universities. Problems such as plagiarism and lack of assurance procedures may impact on online delivery at USP. Similar concerns can be seen at UWI and Sookram and Hogan (2012) propose a closer examination of the quality of the programs being proposed, as well as the development of procedures to quality assure these programs.

Sookram and Hogan (2012) specifically highlight the problems of technology at USP (not so much at UWI), in particular internet connectivity. Associated with the access of online delivery is the reluctance of staff to change to this style of delivery. In 2012 it was evident that the faculty at USP (according to Sookram and Hogan (2012), had little or no experience with blended or online delivery. Plans, policies and skill development in this area are required.

Finally, two areas which needs to be considered as challenges for regional universities is the (perceived) increased workload for online delivery and the relevancy of courses and offerings. This latter area relates closely to global offerings and the need to change delivery methods to suit the changing needs of students.

2.9 E-learning in higher education

At the most general level, ICTs, and actors, practices and processes which they support, appear to threaten almost all of the established certainties around which the university has been formed. New uncertainties in 2 arenas exist according to Cornford and Pollock (2003):
1. **Realm of knowledge** – new sites of knowledge have sprung up, nowhere more heavily than around the technologies. Universities now have to compete with corporate laboratories and global consultancies in the knowledge claims that they put forward – competitors who can claim greater performance value for their kind of knowledge. Further, the academy’s claim to indifference in the development of knowledge is no longer so widely accepted. The university’s structure of faculties and disciplines appears to get in the way of rather than sustain, ‘the new production of knowledge’.

2. **Realm of geography** – the online world is also seen as threatening another important point of reference for the university – its practical and conceptual geography. Here the boundaries that are seen as being destabilised are those of the campus, the region and nation (p. 112).

With the rapidly increasing sophistication, and decreasing cost of virtual courses, the dominance provided by geography has disappeared. With increasing numbers of ‘on-campus’ students enrolling in their institution’s virtual courses on the Internet, the move towards courses offered by other institutions is only a ‘mouse click’ away. This is true whether the, “other institution is located in Djibouti or is part of a multi-campus systems such as in California or New York (Abeles 1999, p. 10)”. If information technologies, through the processes of globalization and post-modernisation, are seen as part of the ‘problem space’ within which the university is struggling, they also figure in most maps of the ‘solution space’ (Conford & Pollock 2003, p. 3). The relationship between technologies and universities ought to focus on how they mutually shape each other. To do so, it is argued that a deeper understanding may come from examining three key areas: Information, Technology and Organisational change (p. 108).

For the contemporary university and its future trajectories one feature is common; that information communication technologies, and above all the Internet, are a significant element of the current condition (Noam, 1995). This apparent agreement about the significance of the digital technologies for the university according to Cornford and Pollock (2003) masks a much wider set of arguments about why they are so important. The new technologies appear variously as the principal threat to the
future of the university, as its potential saviour and, increasingly frequently, as both at the same time. If the university is to survive in a wired and networked world, then it must move online and embrace e-learning. The university is variously described as a ‘ruined institution’ (Readings, 1996), reduced to pursuit of a hollow and illusory ‘excellence’; it is an ‘attenuated’ institution struggling to deal with an ‘age of supercomplexity’ (Barnett, 2000); it is perhaps even a ‘dinosaur’ (Noam, 1995) in a new networked environment which favours other, more recently evolved and more agile creatures.

E-learning has been part of the teaching and learning lexicon of universities for over a decade and the promises of e-learning have been a ubiquitous feature of higher education initiatives (Edwards, Watson, Farrell & Nash, 2007). Salmon (2005) suggests there is considerable research evidence that most higher education institutions are not engaging with a high percentage of students and staff in e-learning. Salmon (2005) states that “research is currently not providing answers to this problem and more models are needed to demonstrate the transferability and scalability of e-learning.” (p. 208).

Nicols (2008) reminds us that the ultimate aim of e-learning diffusion is to “achieve an implementation of e-learning that is suitable for and sustainable within a given institutional context” (p. 599). He identifies a number of factors resulting from numerous studies which applies to diffusion of e-learning in higher education (Gunn & Panko 1998, Lynch 2002, Salmon 2005). Factors included time commitment and workload issues, poor leadership, information technologies self-efficacy, lack of effective staff development and implementation timing (p. 599). In the study undertaken by Nicols (2008) a number of areas were deemed important for the diffusion of e-learning such as, centres of power were significant (e.g. offices which made budgetary decisions); strategic ownership and acceptance for eLearning; and institutions readiness; alignment of policy and systems; professional development and dynamics of change were different from institutions.

E-learning more often is facilitated through learning management systems.
2.9.1 Learning management systems

Learning management systems are a suite of software tools that enable the management and facilitation of a range of learning and teaching activities and services (Naidu 2006). Learning Management Systems (LMS) [also termed Course Management Systems, Virtual Learning Environments and Online Learning Management Systems] have significantly enhanced learning capabilities within educational institutions (universities, schools, training providers etc.) as well as within individual organisations (government departments, businesses etc.). Learning Management Systems are available in two broad categories; Open Source and free, and Propriety – paid for (Eckstein 2011). Reasons for the adoption of LMS’s are fairly common and range from increasing efficiencies and reducing physical space to improving quality and access in learning and teaching, and addressing competitive pressure (Gillani 2000, Brown 2001).

In terms of LMS use in the global higher education context, adoption has been swift (Coates, James & Baldwin 2005, p. 21). Oblinger and Kidwell (2000) comment on the almost herd-like mentality underpinning the attraction of universities to online teaching. Universities are encouraging or requiring each subject to have some kind of web presence (Coates, James & Baldwin 2005, p. 25). There has been a remarkable level of adoption of LMS’s at Australian universities for example (Smissen & Sims, 2002). A survey of adoption trends conducted in 2002 in 39 Australian universities by Smissen and Sims (2002) showed commercial LMS’s such as Blackboard/WebCT being predominantly used. Results from the same evaluation indicated no obvious patterns of brand selection in terms of university characteristics such as size, type, history or discipline focus.

The Observatory on Borderless Higher Education (OBHE, 2002) showed that the Blackboard/WebCT LMS dominated international markets. In Australia, the United Kingdom and Canada, over 70% of institutions hold licenses for at least one of these products. In South Africa, Finland, the Netherlands and the USA, between 55% and 62% of institutions use WebCT or Blackboard. Open source systems too have matured and developed as commercial options did. Moodle for example has over 56,000
registered sites in over 200 countries with over 19 million user enrolments (Moodle.org, 2011). In 2008, the Open University of the UK rolled out Moodle to its 180,000 students and 7,000 tutors (Sclater 2008, p. 11).

Data over the past decade has demonstrated the higher level of adoption of learning management systems at the organisational level. Research studies have attempted to understand how and why these LMS’s have been diffused. Kilmon and Fagan (2007) explored the adoption of course management software (CMS) among a nursing programme to better understand the consequences that result from particular adoption decisions. Using a case study approach, the researchers used a component of diffusion of innovations theory as a framework to understand both the decisions and consequences. The study concluded that it was difficult to separate desirable and undesirable consequences resulting from the innovation of CMS adoption, which was consistent with Rogers’ theory of diffusion of innovations.

Recent data by Hill (2012, 2014) on continuing trends of LMS adoption point to a change in strategy by institutions in terms of more “homegrown systems” in light of MOOCs and the acquisition of support providers of open course systems by major commercial players despite a drop in market share. In an update to the Smissen and Sims (2002) study on LMS adoption by Australian universities, the picture shows a marked increase in open source LMS use. According to Hill (2014), 51% (20) of Australian universities use Blackboard as their enterprise LMS, while 41% (16) use Moodle and 8% (3) use Desire2Learn. There was further indication that some departments used another LMS within universities. Hill (2014) does caution however that while this data remains to be verified independently, it is open to other mechanisms to provide some level of verification to make this data robust in the long run. Nevertheless, it does provide a useful position of where LMS adoption is currently situated relative to USP. Universities continue to ponder the issues of customizability, flexibility and control showing that the choice of LMS may not necessarily be about cost and ease of use but driven by a priority to manage course content and knowledge (Chesher & Howard, 2011).
2.10 Summary

As the study primarily examined the diffusion of an innovation, related and appropriate literature outlining issues specifically related to technology use have been included. In this chapter, firstly a definition of innovation was presented. This was followed by an overview of general diffusion theories. Diffusion theories have a broad application and appeal across disciplines. As the diffusion to be examined in this study applies to a regional context, there are two types of diffusion theory distinguished for its relevance – general and instructional. The study’s theoretical framework chosen draws heavily on the work of Rogers (2003). Therefore, literature was included which explained Rogers’ framework and was presented with supporting considerations to focus the study in a more cultural, geographical and higher education context. The literature presented supports the notion that Rogers (2003) theory of diffusion laid the foundation for many studies relating to the adoption of instructional technology. Relevant diffusion studies chosen, spanning the last decade address primarily technology diffusion issues both at the organisational and individual level which are required for this inquiry.

Literature demonstrated that adoption decision-making at the organisational level appears more complex than at the individual level. The study intended to gain an understanding of the organisation and it’s decision-making process, while also understanding the role of the individual in the success or failure of the innovation diffusion. As the study examined in depth the four broad elements of innovation, communication channel, time and social system, relevant and current research studies examining these areas have been included. The study to be undertaken is unique as it examines relationships specifically to regional organisational diffusion, therefore broader concepts such as cultural communication, organisational infrastructure and geography needed consideration. Research studies, which have recently examined these concepts and contexts, have also been included. An examination of the use of learning management systems as an offshoot of e-learning in higher education and the regional context completed the relevant literature review.

Chapter 3 provides a background to the case university.
CHAPTER 3 BACKGROUND TO THE CASE UNIVERSITY

3.1 Introduction

This chapter provides a background to the case university by explaining the reasons for its selection. The concept of ‘regional’ is explored in order to define a parameter for the study that is culturally diverse. The case university is then presented in terms of its purpose, governance and staffing structure. Profiles of the cultural groups of the countries of USP are provided in relation to the campuses. The context of its distance education agenda is explained next, followed by a discussion of communication issues related to maintaining effective distance education and a description of its main communication system to support distance and flexible learning (DFL), USPNet. Following this, pertinent socio-economic, environmental and political issues are discussed in relation to education and ICT development in the region. These areas illustrate the diverse issues and challenges faced that may impact the diffusion of technological innovations at the regional level. A local context for the learning management system concludes the chapter.

The case university is the University of the South Pacific (USP). USP was chosen for the following reasons. First, it is one of only two universities’ in the world that is truly regional by its structure, governance and location; the other being the University of the West Indies [UWI] serving 17 member countries (UWI 2016). Sookram and Hogan (2012) explain that the combined service areas of USP and UWI include nearly 35% of the Earth’s surface (p. 51). The USP website recognises the role of the university as a regional university by promoting the institution with the phrase, “premier institution of higher learning for the Pacific region, uniquely placed in a region of extraordinary physical, social and economic diversity ... The multi-cultural nature of the staff and student body give USP an exceptional character.” (USP, 2013) This is a unique opportunity for study. Second, the researcher is familiar with USP as he has worked at the university for over ten years in the area of distance and flexible learning (DFL) and has over that time developed a keen interest in how a university of this nature innovates in terms of learning and teaching for DFL. Third, dispersing the use of learning technologies have proved to be challenging in terms of the university’s diverse
characteristics and unique challenges. Fourth, selecting a university like USP allows for exploration of contexts beyond the main campus and provides an alternative approach to the otherwise Fiji-centric focus common to general studies about the case university. Fifth, the university is unique in terms of its cultural makeup of second, third or even fourth language English speakers with thousands of dialects. Communication presents a challenging scenario in terms of disseminating the awareness and use of a new technology.

3.2 A definition of ‘regional’

According to the Oxford English Dictionary (2008), ‘Regional’ is defined as, “relating to or characteristic of a region.” This definition is simple but broad. The field of geography places much emphasis on defining a region further in an attempt to understand the origins and functions of an area as pursued by the discipline. National Geographic (2013) explains that,

“A region has characteristics that give it cohesiveness and distinctiveness and sets it apart from other regions. The boundaries and characteristics of a region are derived from a set of criteria that organizes Earth’s complex surface on the basis of the presence or absence of selected physical and human characteristics. Regions can vary in scale from local to global; overlap or be mutually exclusive; be nested into a hierarchy (e.g., counties, states, countries); and exhaustively partition the entire world or capture only selected portions of it”.

In this regard, geographers recognise three types of regions. The first being the formal region characterised by a common human property, such as the presence of people who share a language, nationality, or culture; or it is characterised by a common physical property, such as the presence of a type of climate, landform, or vegetation. The second is the functional region. It is organised around a focal point, with surrounding areas linked by transportation systems or communication systems, or other associations such as manufacturing and retail trading. The third type is the perceptual region, based on human feelings and attitudes about areas and is defined by people’s shared subjective images (National Geographic, 2013). These spatial units may be without precise borders or even commonly accepted regional characteristics.
and names. These types of regions are dynamic, changing as the physical and human properties of the Earth’s surface change, for example according to global climate change and economic globalisation.

The use of the term regional in the developing South Pacific context incorporates elements of the above and focuses on countries in the same vicinity with similar states of development. Progress on the economic front is similar in terms of their reliance on aid and imports. They share similar education systems with small populations and small land masses. This is consistent with what agencies in the region such as the Secretariat of the Pacific Community (SPC) and the Pacific Islands Forum Secretariat considers their development priorities and targeted areas for enhancement. An example of this is the ‘Pacific Plan’, discussed in 3.8. The developing South Pacific countries are the focal point of literature on regional development. In the context of development, *regionalism* is also used to refer to a geographical proximity, or to economic flows and coordination, or to political-military relations (Haggard, 1997).

According to Sanga (2011), regionalism is a common strategy for service delivery in the Pacific. He adds that in more recent times, Island churches, Pacific governments, metropolitan governments, international agencies, multilateral institutions, companies, sporting bodies, professional consortia and networks have used (or are using) regional partnerships on the grounds that it is deemed to be an effective and efficient way of dealing with common issues beyond national capabilities (p. 7). Chand (2010) adds that a shared ocean and colonial past have been prominent aspects of regionalism in the Pacific Islands, as has the desire to exploit the benefits of economies of scale.

The term South Pacific however, does not clearly demarcate the countries of the *regional university* for this study. South Pacific as a region also includes the countries of Australia and New Zealand which are seen to be more developed when compared to other countries in the region. Therefore, in the context of a developing status, New Zealand and Australia are excluded from this definition. In addition, not all of the USP member countries are located in the South Pacific in its strictest geographical sense. The Marshall Islands for instance are located in what is considered to be the Northern
A narrower focus on the cultural groupings or sub regions of Oceania is needed.

According to Howe (2008) the sub regions of Oceania are classified as Micronesia, to the west of the Pacific Ocean, Polynesia, spread over the central and southern Pacific Ocean, and Melanesia, extending from the western end of the Pacific Ocean to the Arafura Sea, and eastward to Fiji or the region comprises most of the islands immediately north and northeast of Australia (See Figure 3-1). Micronesia comes from the Greek word *mikros* (small), thus, the “small islands”. Polynesia comes from the Greek words *poly* (many) and *nesos* (islands). Melanesia gets its name from the Greek word *melas* (black), probably for the dark appearance of its inhabitants as seen by the early European navigators (Stanley, 1999). Pawley (2007) states that this division, based on 19th century perceptions of racial and cultural groupings is unsatisfactory especially because ‘Melanesia’ is not a coherent entity of the same order as the other two, but it remains a standard frame of reference.

**Figure 3-1** Map of the country classifications of Micronesia, Melanesia and Polynesia

In terms of regional development and higher education, Arbo and Benneworth (2007) posit that the literature on higher education institutions and their role in regional development seems to be centred on four basic themes. These are:

1. The notion of centrality of a university;
2. Its meaning and purpose;
3. Its mission and operation; and
4. Its innovation agenda and new modes of governance.

He adds that in many developing countries, the role of community outreach is a central task and is often integrated into the research and teaching functions of the institution compared to developed countries where it was seen as an added task.

Tuimaleali’ifano (1996, p. 26) states that the idea of a regional university in the South Pacific was based largely on two arguments provided by Morris (1966, p. 20). Sir Charles Morris oversaw the initial mission (with the assistance of the British, New Zealand and Australian governments) to establish a regional university in the South Pacific that became the University of the South Pacific. Firstly, among the countries of the South Pacific region, “general situations bear sufficient similarities to allow some degree of common consideration.” Secondly, the fact of smallness in size of many countries of the region meant that only through joint regional effort and meeting educational and training needs of these countries would such a venture become economically viable. Morris (1996) and Alexander (1967), in arguing for the creation of the University of the South Pacific, recognised that the differences prevailing among the countries of the South Pacific would give rise to unique educational and training challenges for the university. The Morris (1966) Report of the Higher Education Mission to the South Pacific indicated several diverse features of the South Pacific region that would influence the kind of university to be established. He emphasised the geographical variations of the region comprising “several territories, which are themselves divided into further separated geographical entities ... with ... people living under differing political systems and with different social environments ...” (p. 20). The USP region thus is defined by the institution and its member countries and their dynamic formal, functional and perceptual characteristics.
3.3 Cultural diversity

According to Corcoran and Koshy (2010), the cultural diversity of the islands is globally significant and includes many of the most intact cultural systems that have not succumbed to Western consumerist ideology. They add that the predominant values are trust, deep respect for elders, creativity, restraint, reciprocity, compassion, awareness of interdependence with the environment, and an abiding faith in God. There is a deep spirit of heritage that includes intense consciousness of land and sea. In Fiji for instance, it is called vanua. It includes the heavens, Earth, and the underworld or afterlife. Vanua means everything on land and in land – beaches, waterways, oceans, mountains, forests, and all creatures (Nabobo-Baba, 2006). Land has social, physical, and spiritual significance. Land is a source of life and death. Often, death is associated with misuses of land, so one learns to respect it early in life and to know it as the foundation of education and sustainability. This harmonious coexistence has been the basis for survival of traditional cultures for over three millennia (Corcoran & Koshy, 2010). Caston (1993) affirms the “fierceness of each island country to protect its own national identity and treasures the full regalia of sovereignty”. Despite the cultural classifications of the Pacific Islands it must be acknowledged that there is significant linguistic and cultural diversity within each of the countries. Some of these differences are obvious, for example the Samoan language and any of the more than 100 languages of Melanesian Vanuatu, let alone the Hindi of Fiji. More on this is discussed in 3.5.1 below. Some are more subtle and yet significant in the organisation of education, for example very different attitudes toward traditional authority between Eastern Polynesians in the Cook Islands and Polynesians from farther west in Tonga (Caston, 1993). With this cultural diversity in mind, the case university is explained in the next section followed by a profile of the USP region that further illustrates this region’s diversity.

3.4 The University of the South Pacific (USP)

Over its forty year history, the University of the South Pacific (USP) has seen itself as playing an important role in the delivery of higher education to the peoples of the South Pacific region (USP, 2012). This view stems from its uniqueness as a truly regional university and in its use of technology to deliver education to a geographically
and culturally diverse region. In 1967 representatives of governments of the region, the United Kingdom and New Zealand met in Suva, Fiji to discuss a proposal to establish the University of the South Pacific (USP). This followed on from the Morris report discussed in 3.2. The proposal was approved and USP commenced operations in 1968 with its first campus located in Suva, Fiji. Its objectives were:

“the maintenance, advancement and dissemination of knowledge by teaching, consultancy and research and otherwise, and the provision at appropriate levels of education and training responsive to the well-being and needs of the communities of the South Pacific” (USP, 2009).

USP is a public university co-owned by 12 Pacific Island countries (see Figure 3-2). They are the Cook Islands, Fiji, Kiribati, the Marshall Islands, Nauru, Niue, Samoa, the Solomon Islands, Tokelau, Tonga, Tuvalu and Vanuatu. Its member countries are small island states, the smallest being Tokelau and the largest Fiji (USP, 2012). The total population is about 1.3 million. The University of the South Pacific region spreads across 33 million square kilometres of ocean. USP has around 19,000 students and employs around 1,500 staff members (USP Official Statistics, 2010). Most of its key infrastructures and human resources are based at the main campus in Suva, Fiji.

**3.4.1 USP’s governance structure**

USP is governed by its own Council, which includes representatives of the twelve member country governments, academic staff, students, community and business leaders, the Pacific Islands Forum Secretariat, Secretariat of the Pacific Community, the American Council of Education, the Privy Council, Australia and New Zealand (USP, 2004).

The Senate is the academic authority of the University, responsible for matters such as teaching and research. The Council and the Senate are served by committees working in such areas as Finance, Human Resource Management and Academic Planning.
Other committees deal with special projects and the day-to-day work of the University. The ceremonial head of the University is the Chancellor. USP's Chancellors have been drawn from the leaders of the University's member governments and include Prime Ministers, Presidents and Heads of State. This role rotates on a regular basis. The Pro Chancellor is Chair of Council and the executive head of the University is the Vice-Chancellor (USP, 2004). The Vice-Chancellor (VC) is assisted by two Deputy Vice-Chancellors, the DVC Learning, Teaching and Student Services and the DVC Administration and Regional Campuses. There are two Pro-Vice Chancellors, the PVC Research and International and PVC Planning and Quality. The Executive Director of Finance (EDOF) is concerned with managing the university's finances while the university's human resources are managed by the Executive Director of Human Resources (EDHR). The Senior Management Team (SMT) comprises the VC, DVC's, PVC's, EDOF, EDHR and the Deans of the three Faculties (Business and Economics [FBE], Arts, Law and Education [FALE], Science, Technology and Environment [FSTE]) (USP, 2012). The governance structure changes with time in response to national, regional, and global ideas, systems and concepts.
3.4.2 USP’s staffing structure

There are three categories of staff at USP (USP, 2013). Firstly, there are senior staff members or Academic (teaching staff) and Comparable (non-teaching staff). Secondly, there are Intermediate and Junior staff members which make up the majority of the staff population at USP, for example, clerical, secretarial staff. Thirdly, there are Permanent Hourly Paid Staff which include, for example, maintenance and security staff. Within these three categories are corresponding salary scales, conditions and entitlements. Rates may vary depending on the USP member country in terms of currency and employment conditions and are adjusted from time to time based on cost of living adjustments.

3.5 Profile of the USP region

Previously stated, the USP region represents the cultural groupings of Melanesia, Micronesia and Polynesia. The following section provides a profile of these distinct groups in relation to the campuses based there.

3.5.1 Campuses in Melanesia

The regional campuses in Melanesia are located in the Solomon Islands, Vanuatu and Fiji.

Fiji is the largest of the three in terms of population with an estimated (July 2012) 890,057 people. It has a land mass of 18,274 sq. km (CIA World Fact book, 2012). The Solomon Islands follow with an estimated population of 584,578 (July 2012) and a land mass of 28,896 sq. km. Vanuatu has an estimated population of 256,155 and a landmass of 12,189 sq. km (CIA World Fact book, 2012). These countries also have smaller establishments called centres. They have 1-3 staff members looking after students that cannot get ready access to the main campus which is normally situated on the largest of the islands in each country. They have been set up through memoranda of understanding (MOUs) and partnerships with local provincial government councils. The policy enhances the partnership between the government and the USP in the provision of education to remote students in remote places (Napwatt, 2008).
In Vanuatu, the main campus called Emalus Campus is located in Port Vila, the capital. The Emalus campus was established in 1981 (Van Trease, 2010). The School of Law and the Pacific Languages Unit under the Faculty of Arts, Law and Education are based at Emalus. Equivalent full time students in 2011 were 991 (USP Official Statistics, 2011). The centres in Vanuatu are in Tafea, Santo, Penama and Malampa. The Solomon Islands main campus is located in its capital, Honiara. It has smaller centres in Gizo, Auki, Lata and Mokolo which are mostly based on the larger outer islands and provinces. The main campus had around 1,044 equivalent full time students (EFTS) as of 2011 (USP Official Statistics, 2011).

Fiji has three campuses with small centres also scattered around the country. The centres are activated when students are enrolled from remote locations. Primary and secondary schools in the area are often used as centres as with some of the other larger USP countries. The central campus, Laucala, is situated in Suva on the main island of Vitilevu. It had around 7,422 students (USP Official Statistics, 2011). The USP Lautoka campus on the Western side of Vitilevu and the Labasa campus on the Northern part of the second largest island Vanualevu are the other two main campuses in Fiji. The Lautoka campus was established in 1996 and has around 500 full time students while the Labasa campus was established in 2000 and has around 300 students (USP Official Statistics, 2011). The campuses in Melanesia represent the largest combined number of enrolments for USP in the region.

3.5.2 Campuses in Micronesia

Campuses in Micronesia represent the smallest number of enrolments for USP in the region, as well as total combined land area. The regional campuses in Micronesia are located in Nauru, Kiribati and the Marshall Islands.

Nauru has an estimated population (July 2013) of 9,434 (CIA World Fact book, 2013) and it is 21 sq. km in land size. The USP campus there was officially opened in October 1987 (USP, 2013). The campus is located in the Aiwo district. There isn’t an official capital for Nauru but the government offices are located in the Yaren district. As of 2011, there were 17 EFTS based at the campus (USP Official Statistics, 2011). The Kiribati campus officially became a campus in 2006. Prior to that, it had been
operating as a centre since 1976 out of a government secondary school, before moving to its present location in 1978 (USP, 2013). The campus is located on the main island of Tarawa, also the capital of Kiribati (formerly the Gilbert Islands). As of 2011, campus enrolments were around 400 students (USP Official Statistics, 2011). The total land area is 811 sq. km with an estimated population (July 2013) of 103,248. The Marshall Islands campus is located in Majuro, the capital with an estimated population (July 2013) of 69,747 and a land area of 181 sq. km. The campus was formally established in 1993 and it became the major distance education provider for the next two decades (ICDE, 2011). Campus enrolments as of 2011 were around 73 (USP Official Statistics, 2011).

3.5.3 Campuses in Polynesia

The regional campuses in Polynesia are located in the Cook Islands, Samoa, Tokelau, Niue, Tuvalu and Tonga.

The Cook Islands, named after Captain Cook, is a self-governed country in free association with New Zealand. With an estimated population (July 2013) of 10,477, it has a total land area of 236 sq. km (CIA World Fact book, 2013). USP Cook Islands campus was established at an old hospital building in Rarotonga, the capital, in July 1975. From there, the Campus moved to its current location and was officially opened in July 1979 (USP, 2013). The campus had around 61 students as of 2011 (USP Official Statistics, 2011).

Samoa is the largest of the USP countries in Polynesia in terms of land area and population. It is 2,831 sq. km in total area with an estimated population (July 2013) of 195,476 (CIA World Fact book, 2013). The main campus in Samoa, called the Alafua campus was formally established in 1997 and is located on the island of Upolu close to the capital Apia. This is where the School of Agriculture and Food Technology (SAFT) under the Faculty of Business and Economics (FBE) is based. The centre supporting distance learners that had been in existence since 1976 was eventually relocated to the Alafua campus in 1998 (USP, 2013). There is also a centre located on the other main island of Savai’i. Enrolments as of 2011 were 226 EFTS (USP official Statistics, 2011).
With an area of 12 sq. km and an estimated population (July 2013) of 1,353, Tokelau is the smallest of the six USP countries in Polynesia and in the USP region in terms of land size. It is located near Samoa and is considered a territory of New Zealand (CIA World Fact book, 2013), unlike the free association status with New Zealand that the Cook Islands have. Tokelau consists of three atolls, each of them having its own administrative centre with leadership shared from atoll to atoll on a yearly basis. The USP campus is located on the northern most atoll of Atafu. One of the last campuses to open in the region, there were 41 campus enrolments in 2011 (USP Official Statistics, 2011). Like the Cook Islands, Niue 'the rock of Polynesia' with an estimated population (July 2013) of 1,229 and a land area of 260 sq. km is a self-governed country in free association with New Zealand. A USP centre opened in 1972 on the island before being relocated to an improved facility in 2000 (USP, 2013) and subsequent upgrade to a campus. An estimated enrolment of EFTS was 15 in 2011 (USP Official Statistics, 2011). Tuvalu, formerly part of the Gilbert (Kiribati) and Ellice Island colony, has a total land area of 26 sq. km and an estimated population (July 2013) of around 10,698 (CIA World Fact book, 2013). The USP campus in Tuvalu was established in the late 1980’s. As of 2011, there were around 81 enrolments (USP Official Statistics, 2011).

The USP Tonga campus was first set up in 1971 in an old hospital in Nuku’alofa, the capital of Tonga on the island of Tongatapu. In 1987 it was re-located to its present site, 7km from Nuku’alofa. An estimated 397 students were enrolled at the campus in 2011 (USP Official Statistics, 2011). There are USP centres located in the Ha’apai and Vava’u group of islands north of the main island where the capital is situated. Tonga, 'the friendly islands' remains the only monarchy in the South Pacific with an estimated population (July 2013) of 106,322 (CIA World Fact book, 2013). It has a total land area of 747 sq. km.
3.6 Distance education at USP

Tuimaleali’ifano (1996) states that a significant consequence of general regional diversity, and of the distance location of the university for many potential students of the region, was that only a small and select number of sponsored students, mainly young school leavers, would be able to receive education at the university. An alternative mode of teaching would have to be in place for a vast number of adults across all socio-economic levels. The fact that most of the teaching activities would be concentrated in one country catering only to a select group would do little to enhance its role as a regional university and ultimately, “meeting the needs of the peoples of the region” (p. 29). In 1970 USP began to offer distance courses in addition to its on campus program delivery. The initiative began in a limited way, focusing primarily on courses for the Diploma in Education taken by in-service teachers in a number of USP member countries. One of the initial demands was the need to provide training to primary and junior secondary school teachers in the region who were not in a position to attend the on-campus programme (Mathewson & Va'a, 1999). By 2011 over half of its 700 or so courses were offered through DFL with around 9,000 students enrolled in the DFL mode (USP Official Statistics, 2011). This was a testament to the steady growth of the university in terms of its presence via the regional campuses, greater availability of DFL courses and the enhancement of infrastructure and overall development which USP has managed to cope with despite various ongoing challenges illustrated in the next sections.

Distance and Flexible Learning (DFL) is facilitated by the Centre for Flexible Learning (CFL). CFL is the arm that plans, develops, and executes an extensive range of professional learning materials for students of the University, promotes professional staff development and research in all areas related to achieving an excellent quality of learning and teaching (USP, 2010). CFL has undergone various restructures and name changes to align with its evolving priorities and the changing landscape of the university as whole. This is also in light of improvements to ICT infrastructure at the university. The Programme Design and Development Unit (PDD) in CFL, formerly the Distance Education Unit (DEU) consists of a qualified team of Learning Designers, Education Technologists, Electronic Publishers and multimedia professionals and
content specialists who are faculty based. They work as teams to develop courses for
the DFL mode and recently have broadened its focus to face to face students as well
with online learning support.

DFL courses at USP use a range of media including print materials, a learning
management system, video/ audio conferencing and CDs/DVDs. Overall, USP has four
formal modes of study, of which DFL materials form an integral part. These are Face to
face, print, blended and online. There may be overlapping features across the four
different modes. For example, a face-to-face course may also have selected online and
multimedia components. Similarly, print and blended courses may also have some
face-to-face tutorials, either delivered by tutors or lecturers at the regional campuses
or through audio and video conferences. Furthermore, there may also be selected
online and multimedia components. DFL students may also be enrolled in more than

3.6.1 Communication issues in distance education at USP

Communication is vital at the various levels of the distance education process (Wah,
1994). He add that, “communication is more often than not, linked to various
technologies. USP’s distance education programme depends on communication for its
success and survival” (p. 2). With cultural and language dissimilarities amongst some
of the USP region’s diverse characteristics, there are transportational and
telecommunication problems encountered that are expensive to solve. Getting the
message from sender to final destination, on time and then getting a confirmation that
it was received is challenging.

The dynamics of intercultural communication (Dodd 1998, Samovar, Porter and
McDaniel, 2004) also come into play especially as heterophilous and homophilous (see
Rogers’ theory) characteristics may affect the timeliness of communication. Wah
(1994) suggested a point of debate in the language of communication at USP. The
official language or language of instruction of USP is English; which is the second
language of the majority of students and staff members. Lynch and Mugler (1999)
explain that the use of English as an official medium of instruction is the result of
various factors, for instance as the language inherited from the colonial past (along
with French in Vanuatu for example). The colonial language according to them survived Independence both by force of habit and because it enjoyed advantages in the formal education system, itself a foreign institution introduced by Western powers. The major factor however was that South Pacific languages were not written until European contact and many, in Melanesia, still are not. English provided an easy, single answer to educational planners. The status of English as an "international" language, itself a product of colonialism, contributes to its acceptability in education as in other official domains; and the necessity for or desire of many students to undertake tertiary education in some country other than their own (either within or outside the South Pacific) reinforces this (Lynch & Mugler, 1999).

Although English is used as a lingua franca (bridge, trade or vehicular language) in the South Pacific, this is more the case at regional than at national level. In the countries of Polynesia, nearly everyone speaks the national language, and English is used as a lingua franca only with foreigners (Lynch & Mugler, 1999). In most countries of the region, English is used much less than its status as official language may suggest. Even in government offices, for example, the indigenous language or languages – including Pidgin in Melanesia – often dominate in verbal interaction about day to day work. Indigenous languages are also used for many "high" traditional – and some non-traditional – functions, and they dominate in daily interaction outside of work. This is also similar for Melanesia and Polynesia. Regional campuses have used the local language as the medium of communication on administrative and academic matters in-country (Wah, 1994). Wah questioned whether teaching and/ administration should be done in the local languages instead of English.

### 3.6.2 USPNet

In terms of a formal communication system for USP, the provision of DFL is supported by educational technology and communications through USPNet (see Figure 3-3), a telecommunications system owned and operated by the University. It has grown and developed over the years, largely with overseas aid assistance (Asian Development Bank, 2008). The system was enhanced substantially in 2000 and again in 2006 moving to a new satellite providing a greater bandwidth and an IP base for all
communications. Each campus has teleconferencing facilities, computer and Internet access and telephony. In 2010-11 another enhancement was made to USPNet, yet again changing its satellite to provide even faster internet access to the campuses under Japanese aid – the ICT for Human Development and Human Security Project 2010-13 (Vanualailai 2010, USP 2013).

**Figure 3-3** USPNet satellite system

USPNet under the JICA technical cooperation project implemented further enhancements by 2012-13 in select USP campuses. This was the KU-band deployment providing a low cost solution for the expansion of USPNet throughout the region. This network, when operational allowed the USP Centres located further away from their main campuses to enhance their ICT capabilities for distance learning (Pramanik, 2012). Additionally, the main USP campus in Fiji has better internet connectivity compared to the regional campuses due to its partnership with the Australian Academic and Research Network (AARNET, 2005).
3.7 Socio-economic, environmental and political issues

Resources vary from country to country in the USP region but all are challenged by development issues such as poverty, good governance, environmental degradation (and adverse effects of climate change), harsh climatic conditions, gender equality and unsatisfactory health status (Evans & Hazelman 2006, Sharma 2008). Furthermore, migration brain drain affects regional capacity building on top of these issues. The population of some of the island countries continues to drop, for example Niue with substantial emigration to New Zealand. Aid, e.g. approximately AUD129.3 million in 2016-17 from Australia given to SIDS (DFAT, 2016) remains an essential part of development because of the small size of the islands, and limited production base, resulting in the relative weakness of most economies in the region. Agriculture, fishing and tourism are major industries. USP countries have an average Gross Domestic Product (GDP) of approximately USD4,392. In comparison, neighbouring Australia is approximately USD46,400 and New Zealand is USD35,200 (CIA World Fact book, 2015).

The islands have used their Pacific regional forums to try to make their voice heard on the world stage. Environmental concerns related to the increased exploitation of natural resources are also an issue. Nauru is one such example where years of non-renewable and unsustainable phosphate mining practices has resulted in what has been described as a “barren, jagged wasteland” (The Economist, 2001). In other countries, the adverse effects of climate change have signalled their impending demise in as little time as the next 50 to 60 years (Marks, 2008). President Anote Tong of Kiribati said that communities had been resettled and crops destroyed by sea water in some parts of the country (AFP, 2008). Reports of king tides of up to 2.8 metres in height have ravaged areas of a country that has a highest point of around 3 metres. This was an unheard of phenomenon. Relocation plans are now underway with the current government launching an Education for Migration programme, aimed at up-skilling its population to make them more attractive as migrants (Chapman, 2012).

The region is not without its share of political issues. Hassall (2012) explains that a significant feature of the Pacific Islands context is the extent of political conflict, which
has affected the role and functioning of several parliaments. Fiji has been impacted by four coups since 1987; violence erupted in Vanuatu at the time of independence and recurs periodically when groups vent their frustration at some aspect of government policy; Solomon Islands and Tonga are also reconstructing systems of governance following periods of violence. In the case of Solomon Islands, five years of interisland conflict (1998–2003) prompted the creation of RAMSI (Regional Assistance Mission to the Solomon Islands), whilst in Tonga, a steady rise in tension around expectations for democratic reform resulted in the destruction of much of Nuku’alofa in 2006. They are well-used to the revolving door of local politics. Nauru for example has had more than 36 changes of government since independence in 1968 (Mercer, 2010). These socio-economic, environmental and political issues are areas to be mindful of through the passage of this study.

3.8 Higher education in the USP region
Thaman and Thaman (2009) have written, “in the case of most Pacific Island nations, education for sustainable development is rooted within Pacific cultures, languages and knowledge systems that have helped Pacific peoples to live sustainably for centuries” (p. 64). There have been many approaches to meeting the needs of higher education in small island states, according to Baba (1997). He explains four approaches: the development of regional institutions such as USP, the use of national institutions in-country (e.g. National University of Samoa, Fiji National University), metropolitan institutions where students are awarded scholarships to study abroad, for example, in Australia or New Zealand, and the use of distance education (p. 5). The challenges of globalisation have impacted on the shape and mode of operations of tertiary education systems in developing countries. The World Bank (2002) reported these challenges as the need to expand tertiary education in a sustainable way; inequalities of access and outcomes for some groups of students; problems of educational quality and relevance; and rigid governance structures and management practices.

Thaman (2007) describes higher education in the USP region as being, “highly selective and elitist”. She estimates less than 5% of high school leavers in most USP member countries go to university. This trend appears to be changing however as an increasing
number of school leavers are gradually meeting the admission requirements to USP.
Regional governments are making concerted efforts such as ‘The Pacific Plan’. The
Pacific Plan was initiated following the Pacific Islands Forum (PIF) in 2004. The leaders
then came up with the vision for the region as one of “peace, harmony, security, and
economic prosperity, so that all of its people can lead free and worthwhile lives” whilst
the region is respected for “the quality of its governance, sustainable management of
its resources, full observance of democratic values, and for its defence and promotion
of human rights.” (Pacific Islands Forum Leaders Vision, 2004). The above was to be
realised through “sustainable development predicated on economic growth” (Chand,
2013). According to Thaman (2007) USP, as the largest regional organisation in
Oceania, and an active member of the Pacific Plan Task Force, USP has a leading role in
areas of human resource development; governance; sport; information and
communication technologies; and education for sustainable development.

3.9 ICT challenges in the USP region
ICT development in the USP region may arguably be slower than that of the western
world, owing to the varying stages of development illustrated earlier in this chapter.
While some countries have support and leadership from their governments, others
face the limitations of telecommunication monopolies, a severe lack of infrastructure
and resources, and real resistance to the rapid development and use of ICT as being
elitist, divisive and undesirable (Williams, 2005). Telecommunications development
and provision is inconsistent and often expensive. Cave (2012) however, posits that
the Pacific Islands region in general is in the midst of an ICT revolution. She states that
approximately 60% of Pacific Islanders now have access to a mobile phone and the
figure continues to rise. Furthermore they are playing a role in influencing change and
emphasising transparency. One major driver of this massive increase in mobile phone
usage has been telecommunications deregulation and reform. This began in 2003 in
Tonga and over subsequent years occurred across most countries in the region. Some
of these reforms were supported by development partners including the International
Despite this push to open up telecommunications markets, monopolies can still be
found in Kiribati, Marshall Islands and the Cook Islands (Cave, 2012). On top of this,
infrastructure is still underdeveloped in most of these countries beyond just the provision of mobile telephony. ICT is having a revolutionary effect on school practices, government and public sector policies, and commercial and economic capacity building opportunities (Whelan, 2007). In a survey of 60 experts across the Pacific on the current status and trends on educational ICT, respondents described the top three ICT challenges in their countries as finance, skills and access to infrastructure. Other challenges included low awareness about the benefits of ICT equipment, low connectivity speeds and inadequate networks, difficulties in maintaining and repairing broken equipment, lack of trust and suspiciousness about ICT and a lack of integration of ICT into the curriculum or the presence of an out-dated curriculum. USP has made an effort to update its ICT curriculum in light of this, particularly with new courses and programmes implemented in its Computing Science and Information Systems degree programmes (Pramanik, 2012). In spite of this, questions arise as to whether ICT literacy needs be addressed at the pre-tertiary level, although perhaps beyond the scope of USP.

3.10 Learning management systems at USP

The complexity of diffusing learning management systems in an undeveloped context as the University of the South Pacific (USP) has not been explored in depth, especially in terms of a developing (SIDS) regional perspective. The notion of ‘structural diversity’ explained in 2.7.4 is noteworthy here. Despite its more applied use in the banking industry, it has relevance to the way USP is dispersed and the continuous challenges that arise between regional campuses and the central campus headquarters in geographical and socio-cultural terms. Tuimalealii’ifano (1993) for instance drew attention to the ‘ad hoc’ and ‘reactive’ nature of the USP satellite tutorial support programme and the need for ‘research and user training’ to direct the technology ‘more realistically towards the diversity of students of the USP region’ (p. 291). Studies at USP focusing on regional diffusion appear limited. A scan of available local literature in the last decade skirt around diffusion and instead focuses on either implementation issues of technological innovations at USP (see Gold & Tuimalealii’ifano 2001, Gold et al 2002, Evans 2002, Moala 2002, Wah & Tuisawau 2002, Hunter & Austin 2004, Dewiyanti 2006, Evans 2006, Sharma 2008, Bakalevu & Narayan 2010) or the potential
of technologies (Wah 1997, Prasad 2009) for learning and teaching at USP. Learning management systems have arguably been one of the more contentious issues in learning and teaching at USP in the last decade. Whelan and Bhartu (2007) observe that different institutions have approached LMS deployment and integration differently. Some researchers take a pedagogical-theoretical perspective. For example, Papastergiou (2006) discusses and evaluates LMS usage from a social constructivist framework, emphasising the increase in workload on faculty and the limitations in terms of assessment and collaboration. Ulmer and Leech (2005) showed how to address university policy, federal guidelines, end user requirements, and technical potential within a single LMS solution. McPherson and Nunes (2006) argue that if LMS implementation is to be successful, the university, “must manage the change process by proposing and agreeing to goals through consensual debate, supporting strategies appropriately and then realising these through common commitment” (p. 1). USP grappled with deploying a single enterprise wide LMS. USP was maintaining three different web-based LMSs [WebCT, Edison & Moodle] at the same time; something that was perceived as illogical and as having a negative impact on the overall effectiveness of teaching and learning, particularly to students in the distance and flexible learning mode (Whelan & Bhartu 2007, p. 1054). After nearly ten years and an LMS evaluation (Hunter & Hazelman, 2005), Moodle came out as USP’s favoured LMS. Whelan and Bhartu (2007) aptly described the case of USP with regard to the learning management system, i.e. “deployment of an LMS takes place across one institution but in a dozen very different contexts” (p. 1055)

3.11 Summary

In this chapter a background to the case university was presented in the context of its regional characteristics and challenges. They illustrate a diverse range of issues that are socio-economic, environmental, cultural and political in nature. These may impact education and ICT development as foundations for innovation and diffusion at the regional and organisational level, and it is this diffusion that this study seeks to explore in such as disparate and diverse place.

In the next chapter, the methodology for the study is presented.
4.1 Introduction

This chapter explains the methodology for the study. It begins with the philosophical underpinnings, followed by the method and design to be used. Rogers’ (2003) Diffusion of Innovations theory, discussed in Chapter 2 forms the theoretical framework with a case study approach. While this is primarily qualitative research, a mixed methods design is used, with the prominent part of the data being qualitative, supported by quantitative data.

Rogers (2003) notes that innovation diffusion research methodologies also stemmed from the Education research tradition. Rogers (2003) traces the ancestry of nine main research traditions in Table 4-1 below to better understand the history of diffusion research. His lists nine because they represented the relatively greatest number of empirical diffusion publications at the time. Of particular note are the research methodologies by discipline. While this study is embedded in the education research tradition, it has methodologies stemming from other traditions as well. This reflects a diverse application of diffusion theory.

Anderson and Arsenault (1998) explain that, “research in education is a disciplined attempt to address questions or solve problems through the collection and analysis of primary data for the purpose of description, explanation, generalization and prediction” (p. 4). They view educational research as primary problem solving as opposed to testing of hypothesis and that, “the researcher should be unbiased and strive for objectivity (p. 5). Furthermore they add that, “the researcher acts in the belief that the laws of nature can be understood and ultimately controlled to at least some degree. In essence, “educational research is the systematic process of discovering how and why educational settings behave as they do” (p. 4-5).
Table 4-1 Nine research traditions (Rogers, 2003)

<table>
<thead>
<tr>
<th>Diffusion research tradition*</th>
<th>Estimated percentage of all diffusion publications</th>
<th>Typical innovations studied</th>
<th>Method of data gathering and analysis</th>
<th>Main unit of analysis</th>
<th>Major types of findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anthropology</td>
<td>4%</td>
<td>Technological ideas (steel axe, horse, water boiling)</td>
<td>Participant and non-participant observation and case studies</td>
<td>Tribes or peasant villages</td>
<td>Consequences of innovations; relative success of change agents</td>
</tr>
<tr>
<td>Early sociology</td>
<td>-</td>
<td>City manager, government, postage stamps, ham radios</td>
<td>Data from secondary sources and statistical analysis</td>
<td>Communities or individuals</td>
<td>S-shaped adopter distribution; characteristics of adopter categories</td>
</tr>
<tr>
<td>Rural sociology</td>
<td>20%</td>
<td>Agricultural ideas (weed sprays, hybrid seed, fertilizers)</td>
<td>Survey interviews and statistical analysis</td>
<td>Individual farmers in rural communities</td>
<td>S-shaped adopter distribution; characteristics of adopter categories; perceived attributes of innovations and their rate of adoption; communication channels by stages in the innovation-decision process; characteristics of opinion leaders</td>
</tr>
<tr>
<td>Education</td>
<td>8%</td>
<td>Teaching/learning innovations (kindergartens, modern math, programmed instruction, team teaching)</td>
<td>Mailed questionnaires, survey interviews, and statistical analysis</td>
<td>School systems, teachers, or administrators</td>
<td>S-shaped adopter distribution; characteristics of adopter categories</td>
</tr>
<tr>
<td>Public health and medical sociology</td>
<td>10%</td>
<td>Medical and health ideas (drugs, vaccinations, family-planning methods, AIDS prevention)</td>
<td>Survey interviews and statistical analysis</td>
<td>Individuals or organisations such as hospitals and health departments</td>
<td>Opinion leadership in diffusion; characteristics of adopter categories; communication channels by stages of the innovation decision process</td>
</tr>
</tbody>
</table>
**Chapter 4 Methodology**

<table>
<thead>
<tr>
<th>Traditional Research Areas</th>
<th>Percentage</th>
<th>Data Collection Techniques</th>
<th>User Categories</th>
<th>Methodological Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>15%</td>
<td>News events, technological innovations, new communication technologies</td>
<td>Survey interviews and statistical analysis</td>
<td>Communication channels by stages in the innovation decisions process; characteristics of adopter categories, and of opinion leaders; diffusion networks</td>
</tr>
<tr>
<td>Marketing and management</td>
<td>16%</td>
<td>New products (a coffee brand, the touch-tone telephone, clothing fashions; new communication technologies)</td>
<td>Survey interviews and statistical analysis; field experiments</td>
<td>Individual consumers; Characteristics of adopter categories, opinion leadership in diffusion</td>
</tr>
<tr>
<td>Geography</td>
<td>4%</td>
<td>Technological innovations</td>
<td>Secondary records and statistical analysis, maps</td>
<td>Individuals and organisations; Role of spatial distance in diffusion</td>
</tr>
<tr>
<td>General sociology**</td>
<td>9%</td>
<td>A wide variety of ideas</td>
<td>Survey interviews and statistical analysis</td>
<td>Individuals, other units; Characteristics of adopter categories</td>
</tr>
<tr>
<td>Other traditions</td>
<td>14%</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*The exact number of major research traditions is arbitrary. Rogers chose these because they represent the relatively greatest number of empirical diffusion publications (an exception is the early sociology tradition, which is included because of its influence on certain of the other traditions that developed later).**

**Includes general economics, public administration and political science, agricultural economics, psychology, industrial engineering, statistics, and others/unknown.
4.1.1 The researcher in context
The philosophical level of a research method relates to its assumptions based on the most general features of the world, encompassing such aspects as the mind, matter, reality, reason, truth, nature of knowledge, and proofs for knowledge (Hughes, 1994). The researcher’s experience, understanding of philosophy and personal beliefs may also have some bearing on the method adopted (Denzin & Lincoln, 1994). The researcher for this study is a business graduate who, over the course of a ten year career, transitioned into the area of higher education, specifically instructional design for distance and flexible education, where technology has been the main focus.

A consideration for this study is the role of the researcher as an “insider” (Robson, 2002). That is, where the study is undertaken in the researcher’s work setting. Kvale (1995) suggests that a researcher may no longer be objective. On the other hand Tierney (1994) argues that insider research could increase validity due to familiarity. A researcher must acknowledge that it is important to be objective when interpreting data and making sense of the context of the research. In this research study, it is important to note that the researcher is intimately involved with the respondents and the context as a staff member of the institution being investigated. It is paramount to acknowledge as a researcher that it would be impossible to be unbiased when interpreting or analysing the data gathered. This interpretive study called for analysis, combining both qualitative and quantitative data sources. Sense making in this type of study included both rationalising and interpretive approaches. Lather (1990, p. 319) reminds us that "objectivity means being aware and honest about how one’s own beliefs, values, and biases affect the research process." This research study openly states the relationship of the researcher with the respondents and context and where possible, by using multiple data sets (questionnaire, interviews and documents) to cross validate findings, reduce the personal values and biases of the researcher from the analysis. Triangulation is undertaken in Chapters 5 and 6 to limit this bias.

4.2 Research philosophy
Holden and Lynch (2004) state that as a researcher reviews the philosophical literature, they quickly appreciate that choosing a research methodology, i.e. the “how
and what of research”, involves something much deeper than practicalities – it necessitates a philosophical solution to “why research?” Easterby-Smith, Thorpe and Lowe (1997) identify three reasons why the exploration of philosophy may be significant with particular reference to research methodology:

- Firstly, it can help the researcher to refine and specify the research methods to be used in a study, that is, to clarify the overall research strategy to be used. This would include the type of evidence gathered and its origin, the way in which such evidence is interpreted, and how it helps to answer the research questions posed.

- Secondly, knowledge of research philosophy will enable and assist the researcher to evaluate different methodologies and methods and avoid inappropriate use and unnecessary work by identifying the limitations of particular approaches at an early stage.

- Thirdly, it may help the researcher to be creative and innovative in either selection or adaptation of methods that were previously outside his or her experience.

According to Clarke (2000), research methods can be described, considered and classified at different levels, the most basic of which is the philosophical level. The methodological distinctions most commonly used focus on the differences between quantitative research, which is generally associated with the philosophical traditions of positivism, and qualitative research, most commonly allied with post-positivist philosophy (Polit, Beck & Hungler, 2001).

Considering a research philosophy for the study places the researcher in a position to apply an appropriate methodology, which is a pragmatic approach.

**4.2.1 A pragmatic approach**

At its core, this study seeks to examine the processes in diffusion. As such a “one size fits all approach” such as deploying a purely qualitative or purely quantitative approach is limiting. In this instance, research is often multi-purpose and a “what works” tactic will allow the researcher to address questions that do not sit comfortably within a wholly quantitative or qualitative approach to design (Armitage, 2007). Ideas
provided by Cherryholmes (1992) and Murphy (1990) support the direction that this study takes, for example:

- “Individual researchers have a freedom of choice. They are “free” to choose the methods, techniques, and procedures of research that best meet their needs and purposes” (p. 11).
- “Pragmatists do not see the world as an absolute unity. In a similar way, mixed methods researchers look to many approaches to collecting and analysing data rather than subscribing to only one way” (p. 11).

In line with this study is the pragmatist’s notion that:

- “Research always occurs in social, historical, political, and other contexts” (Gall, Borg & Gall 2003).

The main idea of philosophical pragmatism is that ideas and practices should be judged in terms of their usefulness, workability, and practicality and that these are the criteria of their truth, rightness and value (Reason, 2003). Reason (2003) also states it is a perspective that stresses the priority of action over principles. Creswell (2007) states that there are many forms of pragmatism but individuals holding this view focus on outcomes of the research – the actions, situations, and consequences of inquiry – rather than previous conditions as in positivism (p. 22). Pragmatists link the choice of approach directly to the purpose and the nature of the research questions posed (Creswell, 2003). The use of flexible and multiple methods is desirable as a way of studying a small sample in depth over time that can establish warranted assertibility as opposed to absolute truth. The researcher interacts with those being researched, and findings are the outcome of this interactive process with a focus on meaning and understanding the situation or phenomenon under examination (Crossan, 2003).

The personal research philosophy adopted by the researcher for this study was a pragmatic approach. The researcher was cognizant that there were many ways to interpret the world and that no single point of view can ever give the entire picture and that multiple realities exist (Saunders, Lewis, & Thornhill, 2012). The study undertaken combined both the positivist and interpretivism approach. That is, quantitative in terms of questionnaires and qualitative in relation to interviews.
undertaken. The study required the researcher to collect multiple data sets for analysis interpretation based on a clear research question, triangulating the data collected and analysed. The study required collection of multiple perceptions from respondents from across multiple locations; therefore the integration of more than one research strategy was required. In keeping with a pragmatic approach, both inductive and deductive reasoning were required and as the researcher was familiar with the context and area under study, the analysis will not be free from bias.

4.3 Research methodology
The study took place within the context of a regional university. The timeframe of the case was approximately 10 years, which was when the university first introduced learning management systems. The learning management system as the innovation was then examined in terms of diffusion. The IT related circumstance was just one of the many possible facets surrounding the learning management system in the case university, lending itself appropriately to the case study approach.

4.3.1 Case study
Stake (2005) states, “case study research is more a choice of what is to be studied than a methodology.” Case study is the most widely used qualitative research method in information systems research and is well suited to understanding the interactions between information (IT)-related innovations and organisational context (Orlikowski & Baroudi, 1991). The data collected from documents, interviews and questionnaires allow for an account of retrospective events from various sources over time.

According to Myer (2004) qualitative data adds a dimension to research in terms of better accounting for the dimension of time by treating it in a continuous fashion as well as discovering important new exploratory variables that had not been considered in the study (p. 68).

Stenhouse (1979) supports the use of case study methodology, claiming its credibility as a positive research method by highlighting the strengths of its ‘descriptive representation of practice (p. 10). Tight (2017) states that the possible reasons for using case study methodology in combined research designs is that it combines the strength of the design while enhancing the rigour, reliability, validity and
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generalizability (or trustworthiness, credibility, transferability and confirmability) of
the research. Sandelowski (1993) states when a researcher relates to issues of validity
in a qualitative study they should not be addressed as notions of truth or value, but
instead to be viewed in terms of trustworthiness. Sandelowski (1993) rejects the
concept of reliability as a useful measure of quality and instead relies on validity or
trustworthiness. The research study therefore does not seek truth nor value in the
data collected but instead will rely mostly on a qualitative methodology,
understanding the practices presented, the data collected and the voice of the
respondents, therefore trustworthy. This is demonstrated in Chapters 5 and 6.

Case study is conducted in a naturalistic setting, with extensive use of narrative data
from interviews, transcripts and notes to create rich narrations of perceptions,
attitudes, reactions, relations and environments (Luo 2011, p. 8). Creswell (2007)
describes it as a type of design in qualitative research, or an object of study, as well as
a product of the inquiry (p. 73). He states that qualitative research seeks to
understand a complex social problem in its natural setting. Case studies, based on its
purpose, are categorized into three types (Yin 2003, p. 5-10):

1. Explanatory – seeking to define how and or why an experience took place with
   the purpose to suggest “clues to possible cause-and-effect relationships”.
2. Exploratory – to explore situations in which the intervention being evaluated
   has no clear, single set of outcomes.
3. Descriptive – used to develop a document that fully illuminates the intricacies
   of an experience, presenting answers to a series of questions based on
descriptive theories.

This study generally takes an explanatory and descriptive approach.

4.3.2 Retrospective study

The learning management system has been implemented in the case university which
makes a dimension of this study retrospective. Flick (2009) states that design
questions in relation to retrospective research involve the selection of informants who
will be meaningful for the process to be investigated. He adds that they also involve
defining appropriate groups for comparison, justifying the boundaries of the time to be
investigated, checking the research question, deciding which sources and documents should be used in addition to interviews (p. 136). Another issue to think through here is how to consider the influences of present views on the perception and evaluation of earlier experiences (Flick 2009, p. 136). The researcher considers this retrospective aspect through the data collection and analysis phase, for instance the types of documents that were selected and analysed, and the overall time nested context stated in 4.3.

4.3.3 Limitations of case study
According to Luo (2011), case study as a qualitative method is not without limitations. Common critiques include lack of reliability and validity, inability to generalize, and uncontrolled bias and subjectives. He argues that these critiques may be problematic because they are raised based on quantitative standards. Flick (2009) explains that a danger in any retrospective research is that the current situation (in which an event is recounted) influences overlaps with the earlier situation (which is recounted) or influences any assessment of past events (p. 136). Other critiques of case study include the tendency to be susceptible to producing too much detailed data that can bog researchers and readers down and in the process lose focus of the key issues in research. Hodkinson and Hodkinson (2001) point to the complexity examined in a case which makes it difficult to represent simply; as there are often several different ways to present the same set of issues, with only subtle difference in approach and emphasis, which makes the findings of case study difficult to summarize. Case study is also seen as cost-ineffective since collecting in-depth data can be expensive and time-consuming (Luo, 2011).

To counter the limitations of this case study approach, the researcher set parameters in the survey and interviews to address specific areas of the diffusion study that needed to be addressed. This would reduce excessive detail from participants while still allowing for added dimensions to the study that the researcher did not anticipate. Issues of reliability and validity are addressed in section 4.4.3 below. The researcher was also mindful in the analysis of the data in terms of categorising data sets so that summarising the case findings was clear.
4.4 Research design

Swanborn (2010) states that the usual sources of data for case studies are field documents, interviews with key persons or informants, interviews with ‘members’, and observation (p. 73). He refers predominantly to the case studies of organisations which is relevant to this study. This study deploys a mixed methods design. The greater part of the data is qualitative, derived from an examination of relevant documents, interviews and open ended questions on a questionnaire. Quantitative data is used as a supporting mechanism for triangulation, as well as informing the use and awareness of the learning management system with regard to the case university.

4.4.1 Structure of the study

The study is divided into two phases. Phase 1 consists of document analysis, interviews with gatekeepers and the development of the questionnaire and interview proper, informed by the theoretical framework. Document analysis extends to phase 2 as a means of supporting the findings. A pilot concludes phase 1. Phase 2 follows with the questionnaire and interviews as illustrated in figure 4-1 below.

Figure 4-1 Structure of the study

CASE
University of the South Pacific

LMS diffusion

Phase 1:
- Develop questionnaire/ interview questions
- Contact participants about the research
- Pilot

Method:
- Identify/interview gatekeepers
- Document search/ analysis

Phase 2:
Regional level
13 campuses
(n=88 staff)

Organisational level
Central campus
(n=100 staff)

Method:
- Interview
- Questionnaire
- Document analysis

Analysis:
- Summarise interviews/ questionnaire responses
- Compare categories
- Triangulate interview/ questionnaire results and document analysis
4.4.2 Purposive sample

Samples for qualitative studies are generally much smaller than those used in quantitative studies (Mason, 2010). Reasons given for this by Ritchie, Lewis and Elam (2003) include the rarity of importance placed on frequencies, as one occurrence of the data is potentially as useful as many in understanding the process behind a topic. The focus tends to be concerned with finding meaning and not making generalized hypothesis statements (Crouch & Mckenzie, 1967). There is a point of diminishing returns to a qualitative sample, i.e. as the study goes on more data does not necessarily lead to more information. Ritchie et al (2003) elaborates that one occurrence of a piece of data, or a code, is all that is necessary to ensure that it becomes part of the analysis framework.

This study targeted staff members at the case university from two of the three classifications of staff members at the university. Stated in Chapter 2, staff members are classified as Academic and Comparable (A&C) and Intermediate and Junior (I&J) (USP, 2012). The third classification, Permanent and Hourly Paid (P&HP) were excluded from the study as they were not relevant, i.e. the P&HP staff were involved in general maintenance and security work, unrelated to the study. They did not use the learning management system. It was the intention of the researcher that involvement of staff from the two classifications would allow for greater depth of response, especially as ‘awareness’ had to occur across the organisation where relevant. Overall this reflected small participatory numbers in terms of a sample.
Staff members were placed in two categories. The first category was staff members located at the regional campuses. The campuses are classified as small, medium or large sized campuses, averaging between 50 to over 800 students (USP Official Statistics, 2011). The second category was staff members located at the central campus, which was further divided into three groups – Teaching staff (TS), Heads of schools and support sections (HOSS), and the Senior management team (SMT). This division allowed for a coherent flow in the analysis in terms of hierarchy and decision making responsibilities. The anticipated number of responses were, $n=88$ for regional campuses, and $n=100$ for the central campus, based on estimated eligible staff numbers provided by USP’s Human Resources Office.

### 4.4.3 Validity and reliability

According to Patton (2002) validity and reliability are two factors which any qualitative researcher should be concerned about while designing a study, analysing results and judging the quality of the study. While establishing good quality studies through reliability and validity in qualitative research, Seale (1999) states that the “trustworthiness of a research report lies at the heart of issues conventionally
discussed as validity and reliability” (p. 266). Patton (2002) with regards to the researcher’s ability and skill in any qualitative research also states that reliability is a consequence of the validity in a study. Creswell and Miller (2000) suggest that the validity is affected by the researcher’s perception of validity in the study and his/her choice of paradigm assumption. As a result, many researchers have developed their own concepts of validity and have often generated or adopted what they consider to be more appropriate terms, such as, quality, rigor and trustworthiness (Davies & Dodd 2002; Lincoln & Guba 1985; Seale 1999; Stenbacka 2001).

The researcher was part of the case university as an employee and was mindful of objectivity when conducting the research. In terms of the interviews, standardised protocol was followed (see 4.7.1). Member checking was undertaken by requiring interviewees to read their own interview transcripts and allowing them to comment and make amendments where they saw fit or so that the researcher could seek clarification. In terms of the questionnaire, a pilot was conducted to gauge the suitability of the questions as well as the clarity of questioning to remove ambiguity. In some cases, participants were interviewed instead of attempting the questionnaire. Documents seen to be relevant to the study were verified according to set criteria (see 4.6.3). The data analysis level was scrutinized to avoid bias, especially where pre conceived beliefs of the researcher may adversely affect the findings.

In the next section, the phases of the study are described.

4.5 Phase 1
The researcher was based at the central campus in Fiji for the duration of the data collection. This was the most optimum location for access to data as well as being the central hub for communications with the regional campuses. While acquainted with some of the staff members at the case university, the researcher had not made contact with them in the past year since commencing research. The researcher began a series of plenary activities. Potential key informants (‘gatekeepers’) of the case university were identified through the Research Office, the Council and Central Committee Secretariat (CCCS) and the Central Records and Archives Unit (CRAU). This was made informally once the researcher re-immersed himself into the context and interacted
with colleagues to discuss his research with them. Ethics was finalised in the process along with construction of the questionnaire and interview tools informed by a document analysis and the theoretical framework for the study. This is explained in the following sections.

4.5.1 Gatekeepers
Allen (1966) states that these gatekeepers are people of very high information potential; they are highly regarded in the organisation and maintain informal contact with many colleagues in other organisations. Allen talks about ‘technological gatekeepers’ in the discipline of management. In this study, two prominent staff members were identified as potential ‘gatekeepers’ of information. They have 20-30 years of experience between them at the case university. Both were interviewed using an unstructured format. They were explained the research background in an email prior to the meeting. The researcher’s questions focused on:

i. What official documents would be appropriate to the research,

ii. What the greater university processes were in terms of formulation of its strategic plan,

iii. The history of the previous administrations and the significant changes in the university that have impacted upon the direction of the university in the last ten years,

iv. Whether innovation as a theme has been a key element of development at the university.

4.5.2 Ethics
Following approval of the researcher’s proposal, the ethics process commenced. This required submission of the ‘Application for approval to undertake research involving human participants’ form (see Appendix A, B & C) to the University of Wollongong/South Eastern Sydney & Illawarra Area Health Service Human Research Ethics Committee. The form was submitted on 2nd of November 2011. The committee returned an initial review response on 4th November 2011. The researcher submitted a response to the committee with the areas needing amendments on 12th December
2011. The Ethics application was finally approved on 15th December 2011. Subsequent renewals were approved on 15th December 2012 and 15th December 2013.

In essence, ethical considerations were addressed in both phases of the research. Participants were informed that involvement in the study was purely voluntary, they could withdraw from the study at any time which included withdrawal of their questionnaire or interview data. All participants received full disclosure of the research intent through the Participant Information. All considerations were taken to avoid inflicting any harm upon participants. Participants were given the contact details of both University Research and Ethics Committees. Participants did not report harm at any stage of the research project. All necessary steps were taken to preserve participants’ confidentiality and anonymity. Participants had full disclosure regarding anonymity and confidentiality relating to these processes. Participants and other identifiable names were changed in all data reporting. The researcher contacted participants directly or through their supervisors where appropriate. The research data was stored on two (primary and backup) portable hard drives secured in the researcher’s office.

4.5.3 Document analysis
Document analysis is an important research tool in its own right and is an invaluable part of most schemes of triangulation (Wesley 2010). Official documents are intended to be read as objective statements of fact but they are themselves socially produced (Heffernan, 2012). This tool was particularly important to the research as a form of triangulating responses from participants as well as to possibly ‘fill in the gaps’ where participants recall or recounting past events related to the LMS was vague or needed supporting documentation.

The quality of the documents were assessed on the following four criteria by Scott. These criteria are sufficient to analyse the documents and guide qualitative research studies (1990, p. 6).

i. Authenticity – document is genuine and of unquestionable origin.
ii. Credibility – evidence is free from error and distortion.
iii. Representativeness – evidence typical of its kind.
iv. Meaning – evidence is clear and comprehensible.

Wesley (2010) also provides a useful guideline for the conduct of qualitative analysis which may ensure the trustworthiness of the document analysis. These are:

i. Triangulation – this may take several forms. One is “quantising”, i.e. buttressing any subjective, qualitative interpretations of the latent elements of a text with more objective, quantitative analyses of its manifest content (Hesse-Biber & Levy 2006, p. 326-330). References from the existence of a particular theme in a set of documents may benefit from an indication of how many times a particular set of keywords appeared in the texts. A second form is “member checking” where (if possible) the authors of the document may be relied on to verify the authenticity of their written findings as well as to see if one’s interpretations match their original motives of intent.

ii. Intense exposure and thick description – this requires an immersion into the texts to produce a detailed account of findings. Some refer to this as “soaking and poking” where document analysts “marinate” in their data until “saturation point”, i.e. no new, alternative interpretations appear to emerge.

iii. Audit trails and discrepant evidence – practitioners not only need to keep an account of their findings but also the process by which they reached their conclusions (Platt 1981, p. 31). This entails creating an “audit trail” and reporting any discrepant evidence that may challenge their interpretations (Altheide 1996, p. 25-33). Therefore they must keep detailed accounts of their progress throughout the data gathering, analysis and reporting stages.

The following documents were identified by the gatekeepers as potentially relevant for the study.

1. USP Strategic Plan – active from 1998 to present (four thus far, with a new Strategic Plan to be launched in 2013).
   a. University Grants Committee (UGC) Report – the basis from which the university’s Strategic Plan takes shape. These have been active since Strategic Plans came into existence pre 1998.
b. USP Triennial Submission – report (outcomes) of the UGC that feed into the Strategic Plan.

2. USP Annual Plan – the most recent document from the university to outline its goals and objectives for the coming year. Active since 2010.

3. USP Annual Report – documenting the achievements of the university for the year.
   a. CFL Annual Report – documenting the achievements of CFL for the year and which now feeds into the USP Annual Report. USP has now consolidated its annual reporting into one document.
   b. ITS Annual Report – similar purpose to the CFDL Annual Report which is now also consolidated into the USP Annual Report.

4. USP Strategic Achievements – initially a document to report on outputs from the strategic plan but has since been discontinued.

5. USP Council Induction Kit – for newly elected USP Council members explaining the organisation, its governance structure, standing orders, charter and official publications.


Further documents identified by the researcher from a search of the university library catalogue point to academic papers presented at conferences or published in journals. With the exception of the following paper, the others cover broader issues of eLearning and Technology use at the case university. They are covered in the literature reviews.

7. ‘Factors in the deployment of a learning management system at the University of the South Pacific’ by Whelan and Bhartu (2007).

Documents recommended by the gatekeepers and retrieved by the researcher were mainly available in hard copy with recent publications available in softcopy, ranging from PDF to WORD formats. Where hardcopies were available (library and departments), these were in bounded form, photocopied or printed from soft copy files (with permission from the USP website). Most, if not all of these documents were
available for public access. The documents gathered are of a technical nature although non-technical literature such as internal correspondences and unpublished documents are acknowledged as being valuable to developing meaning and understanding to the researcher. Instances where the phrases ‘learning management system’, ‘Moodle’ and ‘Innovation’ were mentioned in the documents were noted.

4.5.4 Questionnaire development

A questionnaire consisting of 30 questions (see Appendix D) was developed as the preferred tool because of the flexibility with which the participants (see Appendix E) could respond in terms of a time frame, e.g. participants may have been on leave or out of their own country. Travel was not possible to the regional locations where the participants were based due to issues of finance. However, the researcher had visited four of the 13 regional locations during his tenure at the university. A questionnaire also made it possible for the participants and researcher to extend the anonymity within which it was administered.

Based on the research questions, document analysis and theoretical framework, the questionnaire was formulated into six sections. These were:

1. Demographics – these included the participant’s highest level of qualification and discipline, campus location and years of service at the case university.
2. Computer use – to establish a baseline amongst participants in terms of computer use, i.e. common computer tasks related to the use of the Microsoft Office suite, email and Internet are listed and participants are asked to rate their confidence at these tasks. An adapted scale from Compeau and Higgins (1995) Computer Self-Efficacy measure is used here.
3. USP and Communication – to gauge participant’s awareness of the institutions’ strategic plan and its functions; as well as preference for receiving news and general information about the institution and new technology\(^1\).
4. Information technology (IT) and Moodle – to gauge participant’s perception of their IT facilities, awareness of learning management systems, Moodle and its functions to support distance and flexible learning at their campuses.

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\(^1\) Technology refers to software or hardware in ICT terms.

In the areas concerning Rogers’ (2003) diffusion of innovations theory, questions were contextualized in order for the participants to better understand them and relate it to their own experiences. Table 4-2 illustrates this. Supporting questions about level of awareness of campus changes (activities) helped put their responses to Rogers’ (2003) elements of innovation in context as a means of triangulating responses to the other questions. Additionally they serve as a means to extrapolating attitudes to possible adoption of learning innovations in general.

6. The USP region – this gauges participants knowledge about the other regional campuses and their perceptions toward their uptake of new technology compared to other campuses. The participants are also asked to identify overall challenges they faced when using new technology at their campuses. They are then given the opportunity to comment on aspects of technological innovations for learning, teaching and distance and flexible learning at the USP.
Table 4.2: Contextualised questions based on Rogers’ (2003) diffusion of innovations

<table>
<thead>
<tr>
<th>Rogers’ (2003) diffusion of innovations</th>
<th>Questionnaire</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a. Elements of diffusion</strong></td>
<td>Please indicate your level of agreement with when new technology is introduced at your campus. This is rated on a 5 point scale: Strongly agree, Agree, Disagree, Strongly disagree, I don’t know</td>
</tr>
<tr>
<td>i. Innovation</td>
<td>Information provided about the new technology makes it easy to understand.</td>
</tr>
<tr>
<td>ii. Communication channels</td>
<td>Communication about the technology is effective.</td>
</tr>
<tr>
<td>iii. Time</td>
<td>Staff members at my campus take up the new technology quickly.</td>
</tr>
<tr>
<td>iv. Social system</td>
<td>My campus has sufficient resources to support the new technology.</td>
</tr>
<tr>
<td><strong>b. Attributes of innovation</strong></td>
<td>Rank the following in order of importance in terms of how you think a new technology may gain wide acceptance at your campus. 1 for least important to 5 for most important</td>
</tr>
<tr>
<td>i. Relative advantage</td>
<td>The technology is better than a previous technology it replaces.</td>
</tr>
<tr>
<td>ii. Compatibility</td>
<td>The technology is suitable for my work.</td>
</tr>
<tr>
<td>iii. Complexity</td>
<td>The technology is easy to understand.</td>
</tr>
<tr>
<td>iv. Trialability</td>
<td>The technology can be tested first.</td>
</tr>
<tr>
<td>v. Observability</td>
<td>The effects of the technology can easily be seen by others.</td>
</tr>
<tr>
<td><strong>c. Adopter categories</strong></td>
<td>Which ONE of the following statements best describes you in terms of new technology use?</td>
</tr>
<tr>
<td>i. Innovators</td>
<td>I will use new technology easily.</td>
</tr>
<tr>
<td>ii. Early majority</td>
<td>I will use new technology once I see a few people use it first.</td>
</tr>
<tr>
<td>iii. Late majority</td>
<td>I will use new technology only after I am persuaded.</td>
</tr>
<tr>
<td>iv. Trialability</td>
<td>I will use new technology after many people have used it.</td>
</tr>
<tr>
<td>v. Laggards</td>
<td>I won’t use new technology easily.</td>
</tr>
</tbody>
</table>

4.5.5 Pilot

The questionnaire was piloted on staff members (n=10) of the Centre for Flexible Learning (CFL). Staff members encompassed both categories of USP – Intermediate and Junior (I&J) and Academic and Comparable (A&C), representative of the type of participant to complete the questionnaire in the actual sample. This group was well versed with educational technology use as they administered the learning management system and other learning systems related to learning and teaching at
USP. Revisions to the questionnaire focused on rewording of some of the questions which were deemed complex or open to misinterpretation. The phrase ‘IT’ required further clarification. In some instances, examples were added to place the question in a finite context e.g. ‘New Technology’ followed by ‘Software or hardware’. In other instances, questions were reordered to improve the sequence of questions and make the sections more coherent. This was also discussed with the researcher’s supervisors as a means of verifying that the questions being asked were universally sound and to be understood exactly as they were phrased.

4.6 Phase 2
The revised questionnaire following the pilot was then administered to participants using Survey Monkey2 (see Appendix F & G) in three stages. It was first administered to the regional campuses, then to the heads of departments and support sections, and finally teaching staff. Survey Monkey was appropriate for administering the questionnaire because it was a robust, intuitive and widely used online survey tool capable of generating quantitative data reports. Further, the researcher was familiar with the use of Survey Monkey.

4.6.1 Interview
The interview (see Appendix H) was developed from the questionnaire, in a condensed version. It was a semi structured interview of about 20-30 minutes in duration although some of the interviews continued for up to 45 minutes to an hour. The interview sought to cover aspects of the diffusion process at the senior management and decision making levels where participants were accessible to the researcher. Kvale (1996) states that a qualitative research interview seeks to cover both a factual and a meaning level, though it is usually more difficult to interview on a meaning level. Interviews are particularly useful for getting the story behind a participant’s experiences. The interviewer can pursue in-depth information around the topic. The interviews as with the document analysis helped triangulate responses from the questionnaire and enhanced description of processes.

2 An online survey tool, http://www.surveymonkey.net/mp/aboutus/
**4.7 Data collection**

The collection of research data took place over a period of six months. The first phase took three months to complete while the second phase a further three months. Despite follow-up phone calls and emails, lack of timeliness of responses was the main issue among participants due to factors such as the period within which the questionnaire was administered, geographical and time differences and the availability of participants. Participants that did not complete the questionnaire indicated that they were busy with aspects of work at their campuses, e.g. student enrolments for the new semester, while others declined to participate in the study as it was voluntary. There were unforeseen circumstances such as the passing of the King of Tonga (George Tupou V) resulting in a nationwide period of mourning, therefore cultural considerations had to be made in terms of finding the appropriate time to send reminders about the questionnaire. There was an instance where a participant contacted the researcher because they could not maintain a consistent Internet connection to Survey Monkey to complete the questionnaire. They were eventually sent an email of the questionnaire which they filled and returned to the researcher by post. Despite the confidentiality and anonymity clauses stated in the questionnaire, one participant requested further assurance of the process of de-identification because her job was unique at the case university and could easily be identified. The researcher contacted her with further assurance of the generalizability with which statements would be made pertaining to the responses. Additionally, responses were given coded names in terms of quoted responses (see Appendix I, J, K & L) de-identifying them in the process.

**4.7.1 Data collection overview**

Data was collected from three sources (Interviews, questionnaire, documents). 51 questionnaires out of a possible 88 were collected from three regions, Melanesia (24), Micronesia (13) and Polynesia (14) representing a 58% response rate. 52 questionnaires out of possible 100 were collected from the central campus representing a 52% response rate. 20 interviews were conducted (3 Campus Directors from the regional campuses, 9 support service managers [3 ITS, 4 CFL and 2 former CFL], 6 senior management team [VC, 2 DVCs and 3 Deans] and 2 Heads of schools). Three main documents formed the basis for the final analysis (USP Strategic Plan 2013-
In terms of challenges faced in the data collection, five participants had difficulty with
the following question (see table below) which was not anticipated from the pilot. They indicated to the researcher that they would have preferred for example, to rank all five attributes of the innovation with a 5, i.e. all being ‘most important’. Alternatively, they would have liked to rank 2 attributes with the same value of importance. The questionnaire did not allow them to assign multiple attributes with the same value of importance. Overall however, the ranking method worked in light of the simple scalar multiplication method (row multiplied by column) used to produce the aggregate rank from most to least important for each campus. Unlike the questionnaire, the interview questions did not meet with any prominent ambiguity. Where participants required further elaboration, they simply asked to elaborate, give examples or repeat the question.

<table>
<thead>
<tr>
<th>1 Most important</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 Least important</th>
</tr>
</thead>
<tbody>
<tr>
<td>The technology is better than a previous technology it replaces.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The technology is suitable for my work.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The technology is easy to understand.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The technology can be tested first.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The effects of the technology can easily be seen by others.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.8 Data analysis strategy

Data analysis in qualitative research consists of preparing and organizing the data for analysis, then reducing the data into themes through a process of coding and condensing the codes, and finally representing the data in figures, tables, or a
discussion (Creswell 2007, p. 148). Stake (2005) advocate’s four forms of data analysis and interpretation in case study research. These are:

i. Categorical aggregation – seeking a collection of instances from the data, hoping that the issue-relevant meanings will emerge.

ii. Direct interpretation – looking at a single instance and drawing meaning from it without looking for multiple instances.

iii. Pattern establishment – looking for a correspondence between two or more categories.

iv. Naturalistic generalizations – making generalizations that people can learn from the case either for themselves or to apply to a population of cases (p. 163).

Creswell (2007) adds a fifth form of data analysis,

v. Case description – a detailed view of aspects of the case, the “facts”.

General analysis strategies advanced by Yin (2003), Huberman and Miles (1994) and Wolcott (1994) also speak to similar techniques as Stake and Creswell. Yin posits ‘modes of analyses’, i.e. pattern matching, explanation building and cross-case synthesis. Miles and Huberman (1994) explore representational techniques when presenting data while Wolcott (1994) discusses the importance of forming a description from the data, as well as relating the description to the literature.

The researcher acknowledges that while there are other data analysis strategies available, a combination of various techniques suggested by Huberman and Miles (1994), Wolcott (1994), Yin (2003), Stake (2005) and Creswell (2007) were applied for the case study based approach carried out in this research. As data was being collected from a variety of sources and using a number of methods, the appropriate data analysis strategy was adopted accordingly.

At the end of the data collection period, the researcher analysed the data through Survey Monkey and Nvivo 9. The responses from the questionnaire through Survey Monkey were collated. The Interviews were coded in Nvivo 9 supported by relevantly selected literature from the strategic documents for the university. Survey Monkey

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provided summary responses to the quantifiable questions. The qualitative responses (to the open ended questions) were then transferred to Nvivo for coding. Open coding was deployed at the first level followed by thematic coding from the theoretical framework. Consideration was taken for responses in the open coding process that did not fit directly into the theoretical framework but nevertheless provided insight into other possible themes from the study. The two subcases - regional campuses and central campus are then compared to assess similarities and dissimilarities in the responses. Swanborn (2010) explains this as a technique to reach case-transcending conclusions after the collection of data (p. 125). The findings were then assessed against the literature review and background to the study to inform the emergent themes.

4.9 Organisation of findings
For reporting purposes, the findings will be organised in two parts, Part 1 the regional campuses and Part 2 the central campus. The central campus (based in Suva, the capital of Fiji and classified under Melanesia) is treated separately due to its large size and main administrative position relative to the regional campuses (see Figure 4-2). It is also classified as non-regional by the university. Each findings section begins with demographic information followed by a presentation of the findings based on the theoretical framework.

4.10 Summary
This chapter explained the methodology for the study. A pragmatic research philosophy is deployed with the background of the researcher in mind, the research traditions from the theoretical framework and what he sees as the most appropriate method for the study. The study uses a case study based mixed methods design with primarily qualitative data. The ethics process for the study was described and involved approval from the case university as well as the researcher’s university.

The study methodology was structured in two phases.

The first was the development of the questionnaire and interview instruments informed by strategic documents and informal interviews with gatekeepers. The
questionnaire was then piloted on a sample of participants similar to that of the target audience at the case university.

The second phase was administering of the questionnaire and interviews. Validity and reliability were observed by means of four criteria for documents analysis, member checking for the interviews and a pilot for the questionnaire. Survey Monkey and Nvivo was used to administer, collate and analyse the data.

The next chapter presents the first part of the findings for the study.
CHAPTER 5 FINDINGS PART 1 – THE REGIONAL CAMPUSES

5.1 Introduction

This chapter reports on the outcomes of the data-gathering process. Flick (2009) explains that the data produced as a result of this process are substituted for the studied (psychological or social) relations in order that the next stages of the research process, i.e. interpretation and generalization, may be conducted (p. 166). The findings are presented in two parts. They are as follows:

Part 1 – The regional campuses (presented in the three cultural groups)
  – Melanesia (Vanuatu, Solomon Islands, Fiji [Labasa & Lautoka])
  – Polynesia (Samoa, Cook Islands, Tonga, Tuvalu, Tokelau, Niue)
  – Micronesia (Marshall Islands, Kiribati, Nauru)

Part 2 – The central campus (Fiji [Suva] presented in three groups)
  – Teaching staff
  – Heads of schools and support sections
  – Senior Management team

The findings for the central campus are presented in Chapter 6.

Each section begins with a description of the participants’ profile, followed by the findings. The findings are presented in text and numeric form. Numeric responses are presented in tables. Open ended questions from the questionnaire and the interviews are explained and supported by quotations. This qualitative aspect of the data used a simple coding method as presented and explained in Appendix L to de-identify respondents and differentiate between interview data and responses to the open ended questions. Where appropriate, key documents that were evaluated and triangulated as relevant to the study were incorporated into the findings throughout Chapter 5 and 6. Of the preliminary documents identified in Chapter 4, two of the seven had direct relevance to the study – the Strategic Plan and paper by Whelan and Bhartu (2007). The quotations are verbatim; therefore some may not appear grammatically sound. This may be due to factors such as native language interference, i.e. English being the respondents second, third and fourth language. This interference
is defined as the automatic transfer, due to habit, of the surface structure of the first language onto the surface of the target language (Dulay, Burt & Krashan 1982, Bhela 1999). However, the integrity of the text is intact.

5.2 The regional campuses

5.2.1 Participants’ profile

This section explains the profile of the participants in terms of level of education, years of service at their campus, and years of service at the university overall. This is followed by the type of work they are involved in at their campus and their confidence in computer use along with their preference for method of learning new technology.

There are relatively small numbers of staff based at these campuses. For the regional campuses, interviews were aimed at the campus directors due to their larger scope of responsibilities of running the campus. Despite the same amount of time given (4-8 weeks) to complete the questionnaire, response rates varied from campus to campus (Chart 5-1). The voluntary nature of the questionnaire may be a factor in non-participation of some staff members. Availability of campus directors for interviews was irregular and those that were interviewed happened to be visiting the central campus at the time of data collection. Other campus directors that responded opted to complete the online questionnaire. Participants had a formal qualification, ranging from Certificate to Doctorate level. Their qualifications represented a diverse range of disciplines which may indicate the type of work they were involved in at their campus. Years of service at their campus varied, from less than a year to more than 20 years. When comparing this with years of service at overall at the university, there wasn’t much intercampus movement in terms of service. The participants generally reflected the organisational structure of the campus. Each campus has a similar organisational structure encompassing the three broad categories of staff. This is in accordance with the university’s overall staffing structure explained in Chapter 3. To give an idea of the organisational structure of the regional campuses, a Campus Director manages their own campus with one to two lecturers or tutors assisting with learning and teaching responsibilities. They are classified as Academic and comparable (A&C) staff. Then there are Intermediate and Junior (I&J) staff members who perform the day-to-day
administrative duties at the campus. Duties include clerical, financial and IT related tasks. Student academic services and course materials distribution are also included in this category. There are more staff members classified as I&J compared to A&C at these campuses which is a general reflection of the ratio of I&J to A&C staff members for the whole university.

A breakdown of the responses from the campuses is as follows.

**Responses from campuses in Melanesia**

24 staff members returned responses to the questionnaire with one Campus Director interviewed for a total of 25 responses (Table 5-1).

<table>
<thead>
<tr>
<th>Campus</th>
<th>Staff count</th>
<th>Response</th>
<th>Response rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solomon Islands</td>
<td>15</td>
<td>10</td>
<td>67%</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>20</td>
<td>6</td>
<td>30%</td>
</tr>
<tr>
<td>Fiji – Lautoka</td>
<td>10</td>
<td>4</td>
<td>40%</td>
</tr>
<tr>
<td>Fiji – Labasa</td>
<td>9</td>
<td>5</td>
<td>56%</td>
</tr>
</tbody>
</table>

**Responses from campuses in Micronesia**

13 staff members returned responses to the questionnaire with one Campus Director interviewed for a total of 14 responses (Table 5-2).

<table>
<thead>
<tr>
<th>Campus</th>
<th>Staff count</th>
<th>Response</th>
<th>Response rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nauru</td>
<td>6</td>
<td>6</td>
<td>100%</td>
</tr>
<tr>
<td>Kiribati</td>
<td>5</td>
<td>2</td>
<td>40%</td>
</tr>
<tr>
<td>Marshall Islands</td>
<td>7</td>
<td>6</td>
<td>86%</td>
</tr>
</tbody>
</table>
Responses from campuses in Polynesia

14 staff members returned responses to the questionnaire with one Campus Director interviewed for a total of 15 (Table 5-3).

**Table 5-3 Responses by campuses in Polynesia**

<table>
<thead>
<tr>
<th>Campus</th>
<th>Staff count</th>
<th>Response</th>
<th>Response rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cook Islands</td>
<td>2</td>
<td>2</td>
<td>100%</td>
</tr>
<tr>
<td>Samoa</td>
<td>5</td>
<td>3</td>
<td>60%</td>
</tr>
<tr>
<td>Tokelau</td>
<td>2</td>
<td>2</td>
<td>100%</td>
</tr>
<tr>
<td>Niue</td>
<td>3</td>
<td>2</td>
<td>67%</td>
</tr>
<tr>
<td>Tuvalu</td>
<td>5</td>
<td>2</td>
<td>40%</td>
</tr>
<tr>
<td>Tonga</td>
<td>10</td>
<td>4</td>
<td>40%</td>
</tr>
</tbody>
</table>

Overall responses by cultural group are shown in Chart 5-1. Responses from the larger campuses in Melanesia were not as favourable as the small to medium sized campuses in Micronesia and Polynesia. Response rate was rounded off to the nearest percentage. A factor for the level of some staff members in Melanesia non-participation could be attributed to the voluntary nature of the questionnaire. It is unclear why the participants from Micronesia provided a higher response rate.

![Chart 5-1 Overall response rate at regional campuses](chart.png)
Level of education for campuses in Melanesia

The common disciplines representing their qualifications (Table 5-4) are Business (with specializations in Management), Secretarial Studies, Office Administration, Computing Science and Information Systems, and Law.

Table 5-4 Level of qualification for campuses in Melanesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Cert</th>
<th>Dip</th>
<th>Degree (Bachelors)</th>
<th>PG Cert</th>
<th>PG Dip</th>
<th>Masters</th>
<th>PhD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solomon Islands</td>
<td>3/9 (33%)</td>
<td>-</td>
<td>3/9 (33%)</td>
<td>-</td>
<td>2/9 (22%)</td>
<td>-</td>
<td>1/9 (11%)</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1/6 (16.6%)</td>
<td>1/6 (16.6%)</td>
<td>1/6 (16.6%)</td>
<td>3/6 (50.2%)</td>
</tr>
<tr>
<td>Fiji – Lautoka</td>
<td>-</td>
<td>2/4 (50%)</td>
<td>1/4 (25%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1/4 (25%)</td>
</tr>
<tr>
<td>Fiji – Labasa</td>
<td>-</td>
<td>3/5 (60%)</td>
<td>2/5 (40%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Level of qualification for campuses in Micronesia

The disciplines representing their qualifications (Table 5-5) were Business, Computing Science and Information Systems, Education and Social Sciences. Secretarial and Vocational (Continuing and Community Education) studies were also prevalent.

Table 5-5 Level of qualification for campuses in Micronesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Cert</th>
<th>Dip</th>
<th>Degree (Bachelors)</th>
<th>PG Cert</th>
<th>PG Dip</th>
<th>Masters</th>
<th>PhD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nauru</td>
<td>2/6 (33.6%)</td>
<td>1/6 (16.6%)</td>
<td>1/6 (16.6%)</td>
<td>-</td>
<td>1/6 (16.6%)</td>
<td>1/6 (16.6%)</td>
<td>-</td>
</tr>
<tr>
<td>Kiribati</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>-</td>
<td>1/2 (50%)</td>
</tr>
<tr>
<td>Marshall Islands</td>
<td>2/6 (33.6%)</td>
<td>1/6 (16.6%)</td>
<td>1/6 (16.6%)</td>
<td>-</td>
<td>-</td>
<td>1/6 (16.6%)</td>
<td>1/6 (16.6%)</td>
</tr>
</tbody>
</table>
Educational qualifications in relation to the type of work at campuses in Micronesia varied and appeared context specific, for example the Marshall Islands campus had a dedicated number of staff members administering its Continuing and Community Education (CCE) outreach programme to the local community. According to the campus website:

“The courses are developed to improve skills that are most needed in the community, such as literacy and numeracy and the teaching of traditional Marshallese weaving.” (USP Marshall Islands Campus 2011)

Dedicated positions appeared to vary from campus to campus based on the local demand of courses.

**Level of qualifications for campuses in Polynesia**

The range of disciplines reflecting their qualifications (Table 5-6) included Education, Business and Social Sciences, followed by Information Systems, Applied Sciences, Secretarial, Library Studies and Veterinary Science. The main campus in Samoa is home to the School of Agriculture and Food Technology for the university.

**Table 5-6 Level of qualification for campuses in Polynesia**

<table>
<thead>
<tr>
<th>Campus</th>
<th>Cert</th>
<th>Dip</th>
<th>Degree (Bachelors)</th>
<th>PG Cert</th>
<th>PG Dip</th>
<th>Masters</th>
<th>PhD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cook Islands</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>-</td>
</tr>
<tr>
<td>Samoa</td>
<td>-</td>
<td>-</td>
<td>2/3 (66.6%)</td>
<td>-</td>
<td>-</td>
<td>1/3 (33.4%)</td>
<td>-</td>
</tr>
<tr>
<td>Tokelau</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>-</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Niue</td>
<td>-</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tuvalu</td>
<td>-</td>
<td>-</td>
<td>2/2 (100%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tonga</td>
<td>2/3 (66.6%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1/3 (33.4%)</td>
</tr>
</tbody>
</table>
Overall level of qualifications by cultural group is shown in Chart 5-2. Despite the varied qualifications at the regional campuses, staff members were generally qualified according to the requirements of their roles at the campuses. It appears Melanesia had slightly higher qualifications with five PhD’s and six Bachelor degrees; this would be expected as it represented the highest concentration of campus teaching staff, as well as some of the largest campuses (by staff and student size) in the USP region.

![Chart 5-2 Overall level of qualification at regional campuses](image)

**Years of service at campuses in Melanesia**

The majority of staff members had worked at their campus for up to 10 years with nine in the 1-5 years category and seven in 6-10 years category. Three staff members had worked at their campus for less than a year and five having worked there for over 10 years (Table 5-7). When compared to overall years of service at USP (Table 5-8), minimal staff movement between campuses was evident. Instances of this occurred for five staff members in the 1-5 years category, three staff members in the 6-10 years category and two staff members in the 16-20 years category.

While the questionnaire did not ask for reasons of campus change, the staff member that was interviewed indicated his relocation was due to promotion. He had relocated from the central campus in Fiji to the Solomon Islands campus.
Table 5-7 Years of service at campuses in Melanesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Years</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Less than 1 year</td>
<td>1-5 years</td>
<td>6-10 years</td>
<td>11-15 years</td>
<td>16-20 years</td>
<td>More than 20 years</td>
</tr>
<tr>
<td>Solomon Islands</td>
<td>1/9 (11.33%)</td>
<td>4/9 (44%)</td>
<td>2/9 (22.01%)</td>
<td>1/9 (11.33%)</td>
<td>1/9 (11.33%)</td>
<td>-</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>-</td>
<td>4/6 (66.66%)</td>
<td>-</td>
<td>1/6 (16.67%)</td>
<td>-</td>
<td>1/6 (16.67%)</td>
</tr>
<tr>
<td>Fiji – Lautoka</td>
<td>1/4 (25%)</td>
<td>1/4 (25%)</td>
<td>1/4 (25%)</td>
<td>1/4 (25%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Fiji – Labasa</td>
<td>1/5 (20%)</td>
<td>-</td>
<td>4/5 (80%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 5-8 Years of service at USP at campuses in Melanesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Years</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Less than 1 year</td>
<td>1-5 years</td>
<td>6-10 years</td>
<td>11-15 years</td>
<td>16-20 years</td>
<td>More than 20 years</td>
</tr>
<tr>
<td>Solomon Islands</td>
<td>1/9 (11.33%)</td>
<td>-</td>
<td>5/9 (55.33%)</td>
<td>1/9 (11.33%)</td>
<td>2/9 (22.01%)</td>
<td>-</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>-</td>
<td>3/6 (50.02%)</td>
<td>-</td>
<td>1/6 (16.66%)</td>
<td>1/6 (16.66%)</td>
<td>1/6 (16.66%)</td>
</tr>
<tr>
<td>Fiji – Lautoka</td>
<td>1/4 (25%)</td>
<td>1/4 (25%)</td>
<td>1/4 (25%)</td>
<td>1/4 (25%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Fiji – Labasa</td>
<td>1/5 (20%)</td>
<td>-</td>
<td>4/5 (80%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Years of service at campuses in Micronesia

The majority of staff members (seven) had worked at their campus between 1-5 years. Four staff members had worked at their campus between 6-10 years with one staff member having worked there for 11-15 years and another for less than a year (Table 5-9). When compared to overall years of service at USP (Table 5-10), inter campus movement was limited to one staff member from the Kiribati campus. Similar to the Campus Director in Melanesia, they too relocated because of promotion.
### Table 5-9 Years of service at campuses in Micronesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Less than 1 year</th>
<th>1-5 years</th>
<th>6-10 years</th>
<th>11-15 years</th>
<th>16-20 years</th>
<th>More than 20 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nauru</td>
<td>1/6 (16.67%)</td>
<td>3/6 (50%)</td>
<td>2/6 (33.33%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Kiribati</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Marshall Islands</td>
<td>-</td>
<td>3/6 (50%)</td>
<td>3/6 (50%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Table 5-10 Years of service at USP at campuses in Micronesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Less than 1 year</th>
<th>1-5 years</th>
<th>6-10 years</th>
<th>11-15 years</th>
<th>16-20 years</th>
<th>More than 20 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nauru</td>
<td>1/6 (16.67%)</td>
<td>3/6 (50%)</td>
<td>2/6 (33.33%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Kiribati</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Marshall Islands</td>
<td>-</td>
<td>3/6 (50%)</td>
<td>3/6 (50%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Years of service at campuses in Polynesia

Six staff members had worked at their campus between 1-5 years, followed by two each from 6-10 years, 16-20 years and more than 20 years. There was a single indication of a staff member having worked at their campus for less than a year and 11-15 years (Table 5-11). In comparison to years of service at USP (Table 5-12), most of the staff members had only worked at their campus with the exception of one staff member who had worked for over 20 years at the central campus before moving to another campus location. This was due to a change in job that resulted in a move back to her main country of citizenship.
### Table 5-11 Years of service at campuses in Polynesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Campus</th>
<th>Years</th>
<th>Less than 1 year</th>
<th>1-5 years</th>
<th>6-10 years</th>
<th>11-15 years</th>
<th>16-20 years</th>
<th>More than 20 years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cook Islands</td>
<td>-</td>
<td>1/2  (50%)</td>
<td>-</td>
<td>1/2  (50%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Samoa</td>
<td>-</td>
<td>2/3  (66.67%)</td>
<td>1/3 (33.33%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Tokelau</td>
<td>-</td>
<td>2/2  (100%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Niue</td>
<td>-</td>
<td>-</td>
<td>1/2  (50%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1/2  (50%)</td>
<td></td>
</tr>
<tr>
<td>Tuvalu</td>
<td>1/2  (50%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1/2  (50%)</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Tonga</td>
<td>-</td>
<td>1/3  (33.3%)</td>
<td>-</td>
<td>-</td>
<td>1/3  (33.3%)</td>
<td>1/3  (33.3%)</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

### Table 5-12 Years of service at USP at campuses in Polynesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Years</th>
<th>Less than 1 year</th>
<th>1-5 years</th>
<th>6-10 years</th>
<th>11-15 years</th>
<th>16-20 years</th>
<th>More than 20 years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cook Islands</td>
<td>-</td>
<td>1/2  (50%)</td>
<td>-</td>
<td>1/2  (50%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Samoa</td>
<td>-</td>
<td>1/3  (33.3%)</td>
<td>1/3 (33.3%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1/3  (33.3%)</td>
</tr>
<tr>
<td>Tokelau</td>
<td>-</td>
<td>2/2  (100%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Niue</td>
<td>-</td>
<td>-</td>
<td>1/2  (50%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1/2  (50%)</td>
</tr>
<tr>
<td>Tuvalu</td>
<td>1/2  (50%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1/2  (50%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tonga</td>
<td>-</td>
<td>1/3  (33.3%)</td>
<td>-</td>
<td>-</td>
<td>1/3  (33.3%)</td>
<td>1/3  (33.3%)</td>
<td>-</td>
</tr>
</tbody>
</table>

Overall years of service at campuses by cultural group is shown in Chart 5-3. The majority of staff members (68%) had years of service between 1-10 years at the
regional campuses. When compared with overall years of service at USP by cultural group (Chart 5-4) there appeared to be inter-campus movement mainly among campuses in Melanesia. Inter-campus movement among campuses in Micronesia and Polynesia were minimal.
Position at campuses in Melanesia

Staff member employment positions are as follows (Table 5-13). There was an equal amount of responses for A&C and I&J staff members. The position of Learning Designer is unique to Vanuatu which is a position usually based at the central campus in Fiji as part of the Course Design and Development Team in the Centre for Flexible Learning. One position of Instructional Designer was transferred to Vanuatu in 2007 to assist with the transfer of online Law courses from Edison to Moodle and further convert more Law courses to the online mode of delivery (Internal correspondence, 2007). The Law School at the time was the only School to have the majority of their Law programme available online at the time.

<table>
<thead>
<tr>
<th>Campus</th>
<th>Position</th>
<th>Academic &amp; Comparable category</th>
<th>Intermediate &amp; Junior category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Campus Director</td>
<td>Lecturer</td>
<td>Tutor</td>
</tr>
<tr>
<td>Solomon Islands</td>
<td>1/9 (11.11%)</td>
<td>1/9 (11.11%)</td>
<td>-</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>1/6 (16.66%)</td>
<td>3/6 (50.02%)</td>
<td>1/6 (16.66%)</td>
</tr>
<tr>
<td>Fiji – Lautoka</td>
<td>1/4 (25%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Fiji – Labasa</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Position at campuses in Micronesia

Staff members at the campuses in Micronesia also represented an even response rate between A&C and I&J staff (Table 5-14). The small numbers of staff reflected the generally small size of the campuses which for example, showed the lack of presence of a lecturer or more tutors.

Table 5-14 Position at campuses in Micronesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Position Academic &amp; Comparable category</th>
<th>Position Intermediate &amp; Junior category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Campus Director</td>
<td>Lecturer</td>
</tr>
<tr>
<td>Nauru</td>
<td>1/6 (16.67%)</td>
<td>-</td>
</tr>
<tr>
<td>Kiribati</td>
<td>1/2 (50%)</td>
<td>-</td>
</tr>
<tr>
<td>Marshall Islands</td>
<td>1/6 (16.67%)</td>
<td>-</td>
</tr>
</tbody>
</table>
Position at campuses in Polynesia

Staff member’s positions at the campuses in Polynesia are represented in Table 5-15 below. For some of these campuses, there tended to be staff who assumed dual roles. For example, the Librarian at the Niue Campus was also the Campus Director due to a freeze in the Director’s position due to “low enrolment numbers” (Ne_1). Another staff member, from the Samoa Campus was Coordinator of Continuing Education programme but also acted as Campus Director from time to time (Sm_1). This was not isolated to the senior positions as junior members also experienced this, for example an IT Assistant was also a part time Tutor at the Tuvalu Campus.

Table 5-15 Position at campuses in Polynesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Position</th>
<th>Academic &amp; Comparable category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Campus Director</td>
<td>Lecturer</td>
</tr>
<tr>
<td>Cook Islands</td>
<td>1/2 (50%)</td>
<td>-</td>
</tr>
<tr>
<td>Samoa</td>
<td>-</td>
<td>1/3 (33.33%)</td>
</tr>
<tr>
<td>Tokelau</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Niue</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tuvalu</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tonga</td>
<td>1/3 (33.33%)</td>
<td>-</td>
</tr>
</tbody>
</table>
Computer use at campuses in Melanesia

Gauging the confidence of staff members undertaking standard computer tasks may provide a baseline indication of how staff members may use or accept technology.

Participants generally considered themselves ‘Totally confident’ at computer use (Table 5-16). They were more confident with the basic tasks of computer use when compared to the level of confidence for intermediate tasks. This included for example 23 staff members indicating ‘totally confident’ sending an email with an attachment (basic), as opposed to 14 who were ‘totally confident’ with appending an email signature to an outgoing email (intermediate). This is consistent for the rest of the tasks with the exception of searching the internet and downloading images from websites.

In terms of internet use at work each day, excluding email activity, staff members indicated generally spending between 1-2 hours daily. In order of time most spent on using the internet, 12 staff members indicated 1-2 hours, four indicated more than 6 hours, four indicated 3-4 hours and three spent less than an hour using the internet each day. It was interesting to note that 17 staff members used some form of social networking sites such as LinkedIn and Facebook which would give an indication of the extent of their internet use.

<table>
<thead>
<tr>
<th>Campus</th>
<th>IT Assistant</th>
<th>Library Assistant</th>
<th>Science Lab Assistant</th>
<th>Admin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cook Islands</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1/2 (50%)</td>
</tr>
<tr>
<td>Samoa</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tokelau</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Niue</td>
<td>1/2 (50%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tuvalu</td>
<td>1/2 (50%)</td>
<td>-</td>
<td>-</td>
<td>1/2 (50%)</td>
</tr>
<tr>
<td>Tonga</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2/3 (66.67%)</td>
</tr>
</tbody>
</table>

Chapter 5 Findings part 1 – the regional campuses
### Table 5-16 Level of confidence at computer use at campuses in Melanesia

Rate your level of confidence for the following tasks.

<table>
<thead>
<tr>
<th>Task</th>
<th>Not at all confident</th>
<th>Moderately confident</th>
<th>Totally confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can send an email with an attachment</td>
<td>-</td>
<td>2/25 (8%)</td>
<td>23/25 (92%)</td>
</tr>
<tr>
<td>I am able to create an email signature for my outgoing emails</td>
<td>5/23 (22%)</td>
<td>4/23 (17%)</td>
<td>14/23 (61%)</td>
</tr>
<tr>
<td>I can create a word document and format it</td>
<td>1/24 (4%)</td>
<td>1/24 (4%)</td>
<td>22/24 (92%)</td>
</tr>
<tr>
<td>I can insert, edit and format tables in a word document</td>
<td>2/24 (8%)</td>
<td>1/24 (4%)</td>
<td>21/24 (88%)</td>
</tr>
<tr>
<td>I am able to insert data in a spreadsheet</td>
<td>1/24 (4%)</td>
<td>6/24 (25%)</td>
<td>17/24 (71%)</td>
</tr>
<tr>
<td>I can create charts and graphs in a PowerPoint presentation</td>
<td>2/24 (8%)</td>
<td>7/24 (29%)</td>
<td>15/24 (63%)</td>
</tr>
<tr>
<td>I can insert text and images in a PowerPoint presentation</td>
<td>3/24 (13%)</td>
<td>6/24 (24%)</td>
<td>15/24 (63%)</td>
</tr>
<tr>
<td>I can insert audio and video in a PowerPoint presentation</td>
<td>9/14 (37%)</td>
<td>3/24 (13%)</td>
<td>12/24 (50%)</td>
</tr>
<tr>
<td>I am able to search for information using the Internet</td>
<td>-</td>
<td>6/24 (24%)</td>
<td>18/24 (76%)</td>
</tr>
<tr>
<td>I can download images from websites</td>
<td>1/23 (4%)</td>
<td>4/23 (17%)</td>
<td>18/23 (79%)</td>
</tr>
</tbody>
</table>
Computer use at campuses in Micronesia

Staff members at campuses in Micronesia generally considered themselves ‘Totally confident’ at the computer tasks (Table 5-17). Confidence at the basic tasks was generally higher than that of the intermediate computer tasks.

For the Nauru campus, confidence levels were more varied in comparison to the other campuses despite a majority indicating ‘Totally confident’. A few staff members from that campus indicated ‘Not at all confident’ with intermediate tasks such as creating email signatures and adding audio and video elements in a PowerPoint presentation. This was mainly among Intermediate and Junior staff members.

In terms of internet use at work each day, excluding email activity, staff members indicated generally spending between 3-4 hours daily. In order of time most spent using the internet, five staff members indicated 3-4 hours, three indicated less than 1 hour, two indicated 4-5 hours, two indicated more than 6 hours and one indicated 1-2 hours using the internet each day at work. In terms of using social networking sites, eleven staff members indicated using them while two staff members indicated not using any form of social networking.
Table 5-17 Level of confidence at computer use at campuses in Micronesia

<table>
<thead>
<tr>
<th>Task</th>
<th>Not at all confident</th>
<th>Moderately confident</th>
<th>Totally confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can send an email with an attachment</td>
<td>-</td>
<td>2/13 (15%)</td>
<td>11/13 (85%)</td>
</tr>
<tr>
<td>I am able to create an email signature for my outgoing emails</td>
<td>3/13 (23%)</td>
<td>1/13 (8%)</td>
<td>9/13 (69%)</td>
</tr>
<tr>
<td>I can create a word document and format it</td>
<td>-</td>
<td>2/13 (15%)</td>
<td>11/13 (85%)</td>
</tr>
<tr>
<td>I can insert, edit and format tables in a word document</td>
<td>1/13 (7.5%)</td>
<td>1/13 (7.5%)</td>
<td>11/13 (85%)</td>
</tr>
<tr>
<td>I am able to insert data in a spreadsheet</td>
<td>1/13 (7.5%)</td>
<td>1/13 (7.5%)</td>
<td>11/13 (85%)</td>
</tr>
<tr>
<td>I can create charts and graphs in a PowerPoint presentation</td>
<td>2/13 (15.5%)</td>
<td>2/13 (15.5%)</td>
<td>9/13 (69%)</td>
</tr>
<tr>
<td>I can insert text and images in a PowerPoint presentation</td>
<td>1/13 (8%)</td>
<td>2/13 (15%)</td>
<td>10/13 (77%)</td>
</tr>
<tr>
<td>I can insert audio and video in a PowerPoint presentation</td>
<td>3/13 (23%)</td>
<td>4/13 (31%)</td>
<td>6/13 (46%)</td>
</tr>
<tr>
<td>I am able to search for information using the Internet</td>
<td>-</td>
<td>2/13 (15%)</td>
<td>11/13 (85%)</td>
</tr>
<tr>
<td>I can download images from websites</td>
<td>-</td>
<td>3/13 (23%)</td>
<td>10/13 (77%)</td>
</tr>
</tbody>
</table>
Computer use at campuses in Polynesia

Staff members generally considered themselves ‘Totally confident’ at the computer tasks (Table 5-18) particularly with basic email use and Internet search where indications of ‘Totally confident’ were unanimous. Similar to Melanesia and Micronesia, staff members were generally more confident with tasks that were considered basic than those intermediate, for example sending an email with an attachment compared to inserting audio and video into a PowerPoint presentation. More varying levels of confidence were noted for PowerPoint tasks which may be an indication that staff members did not regularly use PowerPoint in their work compared to software such as email, word processing and spreadsheet software.

Internet usage varied in terms of hours spent using it each day at work with four staff members using it for more than 6 hours, followed by four staff members using it for 3-4 hours and three using it for less than an hour. Two staff members used the internet for 1-2 hours with one using it for around 4-5 hours each day at work. Social networking was used by nine members of staff as opposed to five who did not.
Chapter 5 Findings part 1 – the regional campuses

### Table 5-18 Level of confidence at computer use at campuses in Polynesia

<table>
<thead>
<tr>
<th>Rate your level of confidence for the following tasks.</th>
<th>Not at all confident</th>
<th>Moderately confident</th>
<th>Totally confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can send an email with an attachment</td>
<td>-</td>
<td>-</td>
<td>13/13 (100%)</td>
</tr>
<tr>
<td>I am able to create an email signature for my outgoing emails</td>
<td>2/14 (14%)</td>
<td>1/14 (7%)</td>
<td>11/14 (79%)</td>
</tr>
<tr>
<td>I can create a word document and format it</td>
<td>-</td>
<td>1/14 (7%)</td>
<td>13/14 (93%)</td>
</tr>
<tr>
<td>I can insert, edit and format tables in a word document</td>
<td>-</td>
<td>2/14 (14%)</td>
<td>12/14 (86%)</td>
</tr>
<tr>
<td>I am able to insert data in a spreadsheet</td>
<td>-</td>
<td>4/14 (29%)</td>
<td>10/14 (71%)</td>
</tr>
<tr>
<td>I can create charts and graphs in a spreadsheet</td>
<td>2/14 (14%)</td>
<td>4/14 (29%)</td>
<td>8/14 (57%)</td>
</tr>
<tr>
<td>I can insert text and images in a PowerPoint presentation</td>
<td>2/14 (14%)</td>
<td>4/14 (29%)</td>
<td>8/14 (57%)</td>
</tr>
<tr>
<td>I can insert audio and video in a PowerPoint presentation</td>
<td>3/14 (21%)</td>
<td>4/14 (29%)</td>
<td>7/14 (50%)</td>
</tr>
<tr>
<td>I am able to search for information using the Internet</td>
<td>-</td>
<td>-</td>
<td>14/14 (100%)</td>
</tr>
<tr>
<td>I can download images from websites</td>
<td>-</td>
<td>1/14 (7%)</td>
<td>13/14 (93%)</td>
</tr>
</tbody>
</table>

When comparing the level of confidence of computer use across the regional campuses, generally, when taking the number of respondents into account, the confidence levels are fairly even. This would be consistent with the level of training, qualifications each campus exhibits.
Preference for method of learning new technology by campuses in Melanesia

Preference for a particular method for learning new technology may provide an indication of how staff members respond to new technology use (Table 5-19). In terms of preference for how they would like to learn a new technology, seven staff members generally preferred to ‘read the instructional manual’ while five preferred to ‘play around with it’. This was followed by three who preferred to ‘search for internet resources’ which may suggest that staff members may not be reliant on assistance from others. Four indicated ‘attending a workshop’ and three indicated ‘learning from a friend or colleague’ in contrast to those who were self-reliant.

Table 5-19 Preference for method of learning new technology at campuses in Melanesia

<table>
<thead>
<tr>
<th>Method</th>
<th>How do you normally prefer to learn to use a new technology?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Solomon Islands</td>
</tr>
<tr>
<td>Read instructional manual</td>
<td>4/8 (50%)</td>
</tr>
<tr>
<td>Attend a workshop</td>
<td>-</td>
</tr>
<tr>
<td>From a colleague or friend</td>
<td>1/8 (12%)</td>
</tr>
<tr>
<td>Search internet for resources</td>
<td>-</td>
</tr>
<tr>
<td>Play around with it</td>
<td>3/8 (38%)</td>
</tr>
<tr>
<td>Listen to or watch instructional video</td>
<td>-</td>
</tr>
</tbody>
</table>

Preference for method of learning new technology by campuses in Micronesia

For campuses in Micronesia, six staff members generally preferred the more informal methods such as ‘playing around with it’, two learning from a colleague or friend and one ‘searching the internet for resources’. This is in contrast to two who preferred ‘attending a workshop’ and one ‘reading the instructional manual’ (Table 5-20).
Table 5-20 Preference for method of learning new technology at campuses in Micronesia

<table>
<thead>
<tr>
<th>Method</th>
<th>Nauru</th>
<th>Kiribati</th>
<th>Marshall Islands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read instructional manual</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>-</td>
</tr>
<tr>
<td>Attend a workshop</td>
<td>2/5 (40%)</td>
<td>1/2 (50%)</td>
<td>-</td>
</tr>
<tr>
<td>From a colleague or friend</td>
<td>1/5 (20%)</td>
<td>-</td>
<td>1/6 (16.67%)</td>
</tr>
<tr>
<td>Search internet for resources</td>
<td>1/5 (20%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Play around with it</td>
<td>1/5 (20%)</td>
<td>-</td>
<td>5/6 (83.33%)</td>
</tr>
<tr>
<td>Listen to or watch instructional video</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Preference for method of learning new technology by campuses in Polynesia

For campuses in Polynesia, six staff members preferred assistive methods as ‘attending workshop’ (four) and ‘asking a friend or colleague’ (two). Five staff members preferred the self-help oriented methods such as ‘reading an instructional manual’ (two), ‘playing around with it’ (two) and ‘searching the internet for resources’ (one), as table 5-21 illustrates.
Table 5-21 Preference for method of learning new technology at campuses in Polynesia

<table>
<thead>
<tr>
<th>Method</th>
<th>Cook Islands</th>
<th>Samoa</th>
<th>Tokelau</th>
<th>Niue</th>
<th>Tuvalu</th>
<th>Tonga</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read instructional manual</td>
<td>-</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>-</td>
<td>-</td>
<td>1/2 (50%)</td>
</tr>
<tr>
<td>Attend a workshop</td>
<td>1/2 (50%)</td>
<td>2/2 (100%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1/2 (50%)</td>
</tr>
<tr>
<td>From a colleague or friend</td>
<td>-</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>1/1 (100%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Search internet for resources</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>-</td>
</tr>
<tr>
<td>Play around with it</td>
<td>1/2 (50%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>-</td>
</tr>
<tr>
<td>Listen to or watch instructional video</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Overall, popular methods for learning new technology (Chart 5-5) among campuses in Melanesia were ‘read instructional manual’ and ‘play around with it’. Similarly for campuses in Micronesia, ‘play around with it’ was the most popular. In Polynesia, ‘attend a workshop’ was favoured in terms of method for learning new technology. It is unclear why there was a variation in preference as each campus would be afforded similar learning opportunities for new technologies.

Chart 5-5 Preference for method of learning new technology at regional campuses
5.2.2 The elements of diffusion

The findings in this section are presented according to Rogers’ (2003) elements of diffusion as explained in Chapter 2. The elements of diffusion are the innovation, communication channels, time and the social system. They are explored through staff members’ awareness of the university’s operations in the context of their own campuses. It looks specifically at the respondents understanding of the university in terms of the learning management system as an innovation for distance and flexible learning, strategic directions, communication mediums, technological capabilities and regional consciousness.

5.2.2.1 The innovation

The innovation identified for this study is a learning management system, Moodle. Staff members were asked about their previous general experience using learning management systems. Then they were asked specifically about their awareness of Moodle and what they recognized to be its main functionality in terms of distance and flexible learning at the university. Staff members were then asked to rank the attributes of new technology according to how they perceived it gaining wide acceptance at their campus.

Prior use of learning management systems and awareness of Moodle at campuses in Melanesia

Of the 23 participants, seventeen staff members indicated ‘Yes’ that they had previously used a learning management system. Generally, prior use of learning management systems by staff members were in the capacity of a ‘student’ as they may have used it when enrolled as students at other tertiary institutions or at USP. Other roles, in which they had used a learning management system, though to a lesser extent, had been as a ‘teacher’, ‘guest’ or ‘programmer’ or a combination of roles. The staff members were then asked about their awareness of Moodle. They were all aware of the existence of Moodle at their campus, as well as its functionality for distance and flexible learning. They generally described it as a tool for delivering courses and information online and interaction between students and lecturers over distance,
“I think it is a learning tool basically if not all most of your course materials is on it, also you have the opportunity to link with others in terms of chat. It is also like a classroom where students can be anywhere but still in the same classroom as everyone else.” (Si_1)

“Moodle assists students get notes, assignment dates, tutorials and information regarding their unit and is a great help for DFL students as they can get updates via moodle and don’t have to be at campus.” (Lba_2)

“Very handy tool for communicating with other students using the forum discussions. Also keeps us informed with any news and information given by the course coordinators and is also a very useful guide for our weekly progress with the lectures, notes and tutorials.” (Ltk_1)

“It is the major VLE for all courses offered in DFL mode at USP; it is a communication platform as well as an information medium (course materials) plus a grading platform. Now with inclusion of Turnitin on Moodle it is also a support in marking assignments.” (Em_6)

In addition to explaining the function of Moodle, staff members from each campus also commented on challenges faced with using Moodle, such as lack of computers and disruptions to consistent network connectivity to Moodle. The respondents highlighted issues with Moodle such as technical issues of connectivity and geographical issues of access. While Moodle is available widely, actual access to a computer and ultimately the internet appears to be a challenge. However, staff members may have raised these issues upon hearing student concerns.

“Provide extra information and resources from the Course Coordinators but our problem is students could not access this regularly due to interruptions in the connections as well as not enough computers”. (Em_2)

“Student have to travel to the Labasa campus or the Savusavu centre to gain access.” (Lba_1)

Prior use of learning management systems and awareness of Moodle at campuses in Micronesia

In terms of having used learning management systems previously, 11 staff members indicated ‘Yes’ and three indicated ‘No’. The majority mainly used learning management systems as students. Other roles of prior use were as teacher (two) and guest (two). The staff members were then asked about their awareness of Moodle. With the exception of a single member of staff from Nauru campus, the rest indicated
'Yes’ they were aware of Moodle at their campus. For those who were aware of Moodle at their campus, they described it as a tool for delivering courses and information online as well as its functionality. Seven of the 11 staff members returned responses to the question with the exception of the Kiribati campus that did not.

“Naming a few: Discussion forum, assignments submission, course announcements”. (Mi_1)

“Moodle is used for lecturer and student, student to student chats so to actively communicate, ask questions, notes posted up by the lecturer for students”. (Nu_5)

“As a student I will need to participate in Moodle, ask questions and share ideas with others. Myself and the lecturer can use forums, chats and emails to discuss ideas, learn from others views. You can debate on issues, give feedback or with as a group. Assignments can be posted on Moodle”. (Nu_2)

Prior use of learning management systems and awareness of Moodle at campuses in Polynesia

12 members of staff indicated having previously used a learning management system with one staff member who had not. The majority mainly had used learning managements systems as students. To a lesser extent, staff members had also used it as guest or as teachers. With the exception of a staff member from the Samoa campus, staff members were generally aware of Moodle at their campus. Most staff members described the use of Moodle for distance and flexible learning at USP in terms of its functions or as a tool for delivering courses and information online with the exception of one staff member who commented on its usefulness. All 12 staff members who were aware of Moodle provided responses such as,

“Provides students with course content and information. Enables communication between students and their lecturer. Can also provide mini tests or quizzes for students to test their knowledge.” (Sm_1)

“It is a learning management system used by students and lecturers to access information on the courses, submit assignments, chat and share ideas with the course lecturer and other students in the course.” (Tg_1)

“To support students learning with document support, interactive chat and email, submission of assignments,” (Ci_2)

“Used to post course details online so that students can have access to it.” (Ne_1)
“Allowing for discussions to be held via the forums and distributing electronic course materials in an organized manner. In essence, bringing (most of) the classroom to the web where it can be easily accessed by all students with internet access.” (Tv_1)

“Just as for on-campus learning – tutorials, past assessment tasks, announcements from course coordinators, various posts by students all over the regional campuses, are some of the things accessible on moodle by DFL students.” (Tk_2)

From the questionnaire quantitative responses and the open ended qualitative responses, it is evident that the majority of respondents from the regional campuses had prior use of learning management systems. Also, the respondents demonstrated a sound understanding of the role of the learning management system Moodle, highlighting features such as chat and discussion forums, course content and information and submission of assignments. On the whole, the results demonstrate a high level of awareness by the respondents.

*Attributes of innovation for campuses in Melanesia*

In terms of general technology use, overall, ‘suitability of the technology to their work’ (Compatibility – 55) was considered most important by respondents in Melanesia, followed by ‘the technology being better than a previous technology it replaced’ (Relative advantage – 30) and ‘how easy it was to understand’ (Complexity – 24). ‘The technology can be tested’ (Trialability – 15) and ‘the effects of the technology easily being seen by others’ (Observability – 16) were considered less important (Table 5-22). The order of most important to least important attribute was determined by using a scalar matrix multiplication method, whereby the number of responses to each attribute (row) was multiplied by their corresponding value of importance (column). For example five staff members (row) indicated the attribute ‘Relative advantage’ as ‘most important’ which had a value of five (column) and a score of 25. The highest score (product) for each attribute was then ranked according to the corresponding level of importance.
### Table 5-22 Attributes of innovation for campuses in Melanesia

<table>
<thead>
<tr>
<th>Attribute</th>
<th>1 Least important</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 Most important</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>The technology is better than a previous technology it replaces (Relative advantage)</td>
<td>6 (6)*</td>
<td>1 (2)</td>
<td>2 (6)</td>
<td>3 (12)</td>
<td>6 (30)</td>
<td>2</td>
</tr>
<tr>
<td>The technology is suitable for my work (Compatibility)</td>
<td>1 (1)</td>
<td>0 (0)</td>
<td>4 (12)</td>
<td>5 (20)</td>
<td>11 (55)</td>
<td>1</td>
</tr>
<tr>
<td>The technology is easy to understand (Complexity)</td>
<td>2 (2)</td>
<td>3 (6)</td>
<td>6 (18)</td>
<td>6 (24)</td>
<td>2 (10)</td>
<td>3</td>
</tr>
<tr>
<td>The technology can be tested first (Trialability)</td>
<td>4 (4)</td>
<td>6 (12)</td>
<td>5 (15)</td>
<td>1 (4)</td>
<td>2 (10)</td>
<td>4</td>
</tr>
<tr>
<td>The effects of the technology can easily be seen by others (Observability)</td>
<td>5 (5)</td>
<td>8 (16)</td>
<td>2 (6)</td>
<td>3 (12)</td>
<td>0 (0)</td>
<td>5</td>
</tr>
</tbody>
</table>

*Product of row by column in parenthesis

### Attributes of innovation for campuses in Micronesia

In terms of general technology use, respondents from Micronesia indicated that ‘The technology being better than a previous technology it replaced’ (Relative advantage – 30) and ‘suitability of the technology to their work’ (Compatibility – 20) were considered most important, followed by ‘how easy it was to understand’ (Complexity – 18). ‘The technology can be tested’ (Trialability – 12) and ‘the effects of the technology easily being seen by others’ (Observability – 5) were considered least important (Table 5-23).
Table 5-23 Attributes of innovation for campuses in Micronesia

<table>
<thead>
<tr>
<th>Attribute</th>
<th>1 Least important</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 Most important</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>The technology is better than a previous technology it replaces (Relative advantage)</td>
<td>0 (0)</td>
<td>2 (4)</td>
<td>1 (3)</td>
<td>1 (4)</td>
<td>6 (30)</td>
<td>1</td>
</tr>
<tr>
<td>The technology is suitable for my work (Compatibility)</td>
<td>1 (1)</td>
<td>2 (4)</td>
<td>2 (6)</td>
<td>3 (12)</td>
<td>4 (20)</td>
<td>2</td>
</tr>
<tr>
<td>The technology is easy to understand (Complexity)</td>
<td>1 (1)</td>
<td>1 (2)</td>
<td>6 (18)</td>
<td>1 (4)</td>
<td>0 (0)</td>
<td>3</td>
</tr>
<tr>
<td>The technology can be tested first (Trialability)</td>
<td>1 (1)</td>
<td>3 (6)</td>
<td>0 (0)</td>
<td>3 (12)</td>
<td>1 (5)</td>
<td>4</td>
</tr>
<tr>
<td>The effects of the technology can easily be seen by others (Observability)</td>
<td>5 (5)</td>
<td>2 (4)</td>
<td>1 (3)</td>
<td>1 (4)</td>
<td>1 (5)</td>
<td>5</td>
</tr>
</tbody>
</table>

*Product of row by column in parenthesis

Attributes of innovation for campuses in Polynesia

In terms of general technology use, overall, ‘suitability of the technology to their work’ (Compatibility – 20) and ‘the technology being better than a previous technology it replaced’ (Relative advantage – 15) were considered most important by respondents in Polynesia, followed closely by ‘how easy it was to understand’ (Complexity – 15). ‘The technology can be tested’ (Trialability – 8) and ‘the effects of the technology easily being seen by others’ (Observability – 7) were considered least important (Table 5-24).
Table 5-24 Attributes of innovation for campuses in Polynesia

<table>
<thead>
<tr>
<th>Attribute</th>
<th>1 (Least important)</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 (Most important)</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>The technology is better than a previous technology it replaces</td>
<td>0 (0)</td>
<td>2 (4)</td>
<td>4 (12)</td>
<td>2 (8)</td>
<td>3 (15)</td>
<td>2</td>
</tr>
<tr>
<td>(Relative advantage)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The technology is suitable for my work (Compatibility)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>3 (9)</td>
<td>4 (16)</td>
<td>4 (20)</td>
<td>1</td>
</tr>
<tr>
<td>The technology is easy to understand (Complexity)</td>
<td>0 (0)</td>
<td>3 (6)</td>
<td>2 (6)</td>
<td>2 (8)</td>
<td>3 (15)</td>
<td>3</td>
</tr>
<tr>
<td>The technology can be tested first (Trialability)</td>
<td>2 (2)</td>
<td>4 (8)</td>
<td>1 (3)</td>
<td>2 (8)</td>
<td>1 (5)</td>
<td>4</td>
</tr>
<tr>
<td>The effects of the technology can easily be seen by others</td>
<td>7 (7)</td>
<td>1 (2)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>1 (5)</td>
<td>5</td>
</tr>
<tr>
<td>(Observability)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Product of row by column in parenthesis

Both Melanesia and Polynesia believed that overall, the suitability of the technology to their work was the most important, while Micronesia indicated that technology being better than the previous technology it replaced was the most important. From the data, it is difficult to determine why these differences occurred.

5.2.2.2 Communication channels

In terms of the second element of diffusion, ‘communication channel’, staff members were asked how they first found out about Moodle. Then they were asked about their preference for a communication medium, the effectiveness with which communication occurred and the understandability of communication at their campuses. The university has several formal ways of disseminating information to students and staff members through electronic or hardcopy means. In addition there is word of mouth as a communication medium, i.e. though meetings, workshops and seminars.
First awareness of Moodle via communication channels at campuses in Melanesia

In Melanesia, staff members reported becoming aware of Moodle through a variety of communication channels (Table 5-25).

Table 5-25 Awareness of Moodle via communication channel at campuses in Melanesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Communication medium</th>
<th>USP website</th>
<th>USP beat</th>
<th>Staff/students email</th>
<th>Word of mouth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solomon Islands</td>
<td>1/9 (12%)</td>
<td>-</td>
<td>4/9 (44%)</td>
<td>4/9 (44%)</td>
<td></td>
</tr>
<tr>
<td>Vanuatu</td>
<td>-</td>
<td>-</td>
<td>3/6 (50%)</td>
<td>3/6 (50%)</td>
<td></td>
</tr>
<tr>
<td>Fiji – Lautoka</td>
<td>2/4 (50%)</td>
<td>-</td>
<td>1/4 (25%)</td>
<td>1/4 (25%)</td>
<td></td>
</tr>
<tr>
<td>Fiji – Labasa</td>
<td>3/5 (60%)</td>
<td>-</td>
<td>2/5 (40%)</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

10 staff members first became aware of Moodle via the all staff and students email, followed by seven through word of mouth. Six staff members found out about Moodle through the university website. There was no indication of awareness of Moodle through the USP Beat, the university’s official hardcopy news bulletin.

First awareness of Moodle via communication channels at campuses in Micronesia

Staff members in Micronesia reported becoming aware of Moodle through a variety of communication channels (Table 5-26). Six staff members first became aware of Moodle via the all staff and students email, and five through word of mouth. There was no indication of awareness of Moodle through the USP beat, the institutions hardcopy newsletter.
Table 5-26 Awareness of Moodle via communication channel at campuses in Micronesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Communication medium</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>USP website</td>
<td>USP beat</td>
<td>Staff/students email</td>
<td>Word of mouth</td>
</tr>
<tr>
<td>Nauru</td>
<td>-</td>
<td>-</td>
<td>1/5 (20%)</td>
<td>4/5 (80%)</td>
</tr>
<tr>
<td>Kiribati</td>
<td>-</td>
<td>-</td>
<td>2/2 (100%)</td>
<td>-</td>
</tr>
<tr>
<td>Marshall Islands</td>
<td>2/6 (40%)</td>
<td>-</td>
<td>3/6 (50%)</td>
<td>1/6 (10%)</td>
</tr>
</tbody>
</table>

First awareness of Moodle via communication channels at campuses in Polynesia

Four staff members reported becoming aware of Moodle mainly through the general ‘all staff and students email’ circulation with one member staff finding out about Moodle through an email from the Moodle Admin team at CFL (Table 5-27) in Polynesia. The two indications of ‘word of mouth’ were via the Campus Directors Forum and one staff member learning of Moodle through the ‘USP website’. However, one campus did not respond to the question. Like the other campuses, awareness appears to be mainly through electronic means. Again, like the other campuses, there was no indication of awareness of Moodle through the institution’s hardcopy newsletter, the USP beat.
Table 5-27 Awareness of Moodle via communication channel at campuses in Polynesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Communication medium</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>USP website</td>
</tr>
<tr>
<td>Cook Islands</td>
<td>-</td>
</tr>
<tr>
<td>Samoa</td>
<td>-</td>
</tr>
<tr>
<td>Tokelau</td>
<td>-</td>
</tr>
<tr>
<td>Niue</td>
<td>1/1 (100%)</td>
</tr>
<tr>
<td>Tuvalu</td>
<td>-</td>
</tr>
<tr>
<td>Tonga</td>
<td>-</td>
</tr>
</tbody>
</table>

The majority of regional staff members confirm overall awareness of Moodle through email followed by word of mouth and to a lesser extent the USP website (Chart 5-6). These findings are consistent with the channels of communication used at the time.
Preference of communication medium at campuses in Melanesia

Staff members were asked how they preferred to receive news and information about the university using the same communication options previously stated (Table 5-28).

Table 5-28 Preference of communication medium at campuses in Melanesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Communication medium</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>USP website</td>
</tr>
<tr>
<td>Solomon Islands</td>
<td>1/8 (12%)</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>1/6 (16.5%)</td>
</tr>
<tr>
<td>Fiji – Lautoka</td>
<td>2/4 (50%)</td>
</tr>
<tr>
<td>Fiji – Labasa</td>
<td>-</td>
</tr>
</tbody>
</table>

In Melanesia responses were similar to how they first found out about Moodle. They preferred email over the other mediums. The website was also a preferred medium though to a lesser extent. The lone preference for word of mouth was through a workshop. There was no preference indicated for the USP beat (the official hardcopy newsletter of the university).

Preference of communication medium at campuses in Micronesia

Staff members generally preferred email over the other mediums (Table 5-29) with an exception each for the website and word of mouth in Micronesia. Again, there was no preference for the hard copy medium.
Table 5-29 Preference of communication medium at campuses in Micronesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Communication medium</th>
<th>USP website</th>
<th>USP beat</th>
<th>Staff/students email</th>
<th>Word of mouth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nauru</td>
<td>-</td>
<td>-</td>
<td></td>
<td>6/6 (100%)</td>
<td>-</td>
</tr>
<tr>
<td>Kiribati</td>
<td>-</td>
<td>-</td>
<td></td>
<td>2/2 (100%)</td>
<td>-</td>
</tr>
<tr>
<td>Marshall Islands</td>
<td>1/5 (20%)</td>
<td>-</td>
<td></td>
<td>3/5 (60%)</td>
<td>1/5 (20%)</td>
</tr>
</tbody>
</table>

Preference of communication medium at campuses in Polynesia

Eight staff members generally preferred email over other mediums (Table 5-30) in Polynesia. Four members of staff preferred the university website. With the exception of one staff member indicating a preference for the ‘USP beat’, there was no preference for ‘Word of mouth’. Preference overall was directed towards electronic mediums.

Table 5-30 Preference of communication medium at campuses in Polynesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Communication medium</th>
<th>USP website</th>
<th>USP beat</th>
<th>Staff/students email</th>
<th>Word of mouth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cook Islands</td>
<td>-</td>
<td>1/2 (50%)</td>
<td></td>
<td>1/2 (50%)</td>
<td>-</td>
</tr>
<tr>
<td>Samoa</td>
<td>-</td>
<td>-</td>
<td></td>
<td>2/2 (100%)</td>
<td>-</td>
</tr>
<tr>
<td>Tokelau</td>
<td>1/2 (50%)</td>
<td>-</td>
<td></td>
<td>1/2 (50%)</td>
<td>-</td>
</tr>
<tr>
<td>Niue</td>
<td>1/2 (50%)</td>
<td>-</td>
<td></td>
<td>1/2 (50%)</td>
<td>-</td>
</tr>
<tr>
<td>Tuvalu</td>
<td>1/2 (50%)</td>
<td>-</td>
<td></td>
<td>1/2 (50%)</td>
<td>-</td>
</tr>
<tr>
<td>Tonga</td>
<td>1/3 (33.33%)</td>
<td>-</td>
<td></td>
<td>2/3 (66.67%)</td>
<td>-</td>
</tr>
</tbody>
</table>
Email, followed by the USP website were the preferred communication media of choice (Chart 5-7) for staff in the region overall. As this was the usual form of communication at the time, it is not surprising that the regional campuses would prefer this communication medium.

Effectiveness and understandability of communication at campuses in Melanesia

When questioned about the effectiveness and understandability of communication, responses from Melanesia were generally positive responses about the effectiveness of communication at their campus with eight indicating ‘strongly agree’ or ‘agree’ (Table 5-31). Four members of staff from three campuses however ‘disagreed’ or ‘strongly disagreed’ and felt that communication was not effective.
Table 5-31 Effectiveness of communication at campuses in Melanesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Communication about the new technology is effective</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly agree</td>
</tr>
<tr>
<td>Solomon Islands</td>
<td>4/8 (50%)</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>1/6 (16.66%)</td>
</tr>
<tr>
<td>Fiji – Lautoka</td>
<td>1/4 (25%)</td>
</tr>
<tr>
<td>Fiji – Labasa</td>
<td>2/4 (50%)</td>
</tr>
</tbody>
</table>

Staff members from Melanesia were then asked about whether they thought the information provided about the new technology made it easy to understand (Table 5-32).

Table 5-32 Understandability of communication at campuses in Melanesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Information provided about the new technology makes it easy to understand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly agree</td>
</tr>
<tr>
<td>Solomon Islands</td>
<td>2/8 (25%)</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>-</td>
</tr>
<tr>
<td>Fiji – Lautoka</td>
<td>1/4 (25%)</td>
</tr>
<tr>
<td>Fiji – Labasa</td>
<td>-</td>
</tr>
</tbody>
</table>

While not as agreeable as effectiveness of communication, staff members generally ‘agree’ that the information provided about the new technology was easy to understand, with five who disagreed and thought it was not easy to understand.
Effectiveness and understandability of communication at campuses in Micronesia

In Micronesia, staff members were generally positive about the effectiveness of communication at their campus with three indicating ‘strongly agree’ and seven indicating ‘agree’ (Table 5-33). Three members of staff from two campuses however ‘disagreed’ or ‘strongly disagreed’ and felt that communication was not effective.

Table 5-33 Effectiveness of communication at campuses in Micronesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Communication about the new technology is effective</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly agree</td>
</tr>
<tr>
<td>Nauru</td>
<td>1/5 (20%)</td>
</tr>
<tr>
<td>Kiribati</td>
<td>1/2 (100%)</td>
</tr>
<tr>
<td>Marshall Islands</td>
<td>1/6 (16.67%)</td>
</tr>
</tbody>
</table>

Staff members from Micronesia were positive about the understandability of communication regarding new technology with five indicating ‘strongly agree’ or ‘agree’ (Table 5-34). There were two disagreements although their reasons were unclear. However, a staff member who ‘strongly disagreed’ about the effectiveness of communication was also disagreeable about understandability of communication at their campus. Overall, staff members in Micronesia may appear to be more agreeable with the way information was presented to them as opposed to timeliness of communication.
Table 5-34 Understandability of communication at campuses in Micronesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Information provided about the new technology makes it easy to understand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly agree</td>
</tr>
<tr>
<td>Nauru</td>
<td>2/5 (40%)</td>
</tr>
<tr>
<td>Kiribati</td>
<td>1/2 (50%)</td>
</tr>
<tr>
<td>Marshall Islands</td>
<td>2/6 (33.33%)</td>
</tr>
</tbody>
</table>

Effectiveness and understandability of communication at campuses in Polynesia

Seven members of staff in Polynesia were positive about the effectiveness of communication at their campus when a new technology was introduced with five indicating ‘disagree’ or ‘strongly disagree’ (Table 5-35). Of the five campuses, three campuses had both positive and negative responses to effectiveness of communication. The three campuses represented small, medium and large sized campuses so there may not be any indication that these polarized views are size related.

Table 5-35 Effectiveness of communication at campuses in Polynesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Communication about the new technology is effective</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly agree</td>
</tr>
<tr>
<td>Cook Islands</td>
<td>1/2 (50%)</td>
</tr>
<tr>
<td>Samoa</td>
<td>-</td>
</tr>
<tr>
<td>Tokelau</td>
<td>-</td>
</tr>
<tr>
<td>Niue</td>
<td>-</td>
</tr>
<tr>
<td>Tuvalu</td>
<td>1/2 (50%)</td>
</tr>
<tr>
<td>Tonga</td>
<td>1/3 (33.33%)</td>
</tr>
</tbody>
</table>
In contrast to the effectiveness of communication about a new technology, staff members were more positive about the information provided about the new technology in Polynesia (Table 5-36). Of the twelve staff members who responded to the question, four indicated ‘agree’, three indicated ‘strongly agree’ while four indicated ‘disagree’.

Table 5-36 Understandability of communication at campuses in Polynesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Information provided about the new technology makes it easy to understand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly agree</td>
</tr>
<tr>
<td>Cook Islands</td>
<td>1/2 (50%)</td>
</tr>
<tr>
<td>Samoa</td>
<td>-</td>
</tr>
<tr>
<td>Tokelau</td>
<td>1/2 (50%)</td>
</tr>
<tr>
<td>Niue</td>
<td>-</td>
</tr>
<tr>
<td>Tuvalu</td>
<td>-</td>
</tr>
<tr>
<td>Tonga</td>
<td>1/3 (33.33%)</td>
</tr>
</tbody>
</table>

Overall, the regional campuses were agreeable that communication regarding a new technology was effective (Chart 5-8). Similarly there was general agreement that information regarding the new technology was understandable across the regional campuses (Chart 5-9).
5.2.2.3 Time

Staff members across all areas were asked to assess how early they would use new technology in terms of Rogers’ adopter categories. Then they were asked to assess how quickly staff members at their campuses took to using new technology and whether their campus would take up new technology faster than other campuses.
Personal use of new technologies by staff members at campuses in Melanesia

In Melanesia 17 staff members indicated that they generally would ‘use a new technology easily’ with four ‘using the new technology after seeing a few people use it first’ and one staff member who ‘won’t use new technology easily’ (Table 5-37).

Table 5-37 Personal use of new technologies at campuses in Melanesia

<table>
<thead>
<tr>
<th>Category</th>
<th>Solomon Islands</th>
<th>Vanuatu</th>
<th>Fiji – Lautoka</th>
<th>Fiji – Labasa</th>
</tr>
</thead>
<tbody>
<tr>
<td>I will use new technology easily</td>
<td>5/8 (62.5%)</td>
<td>5/6 (83.33%)</td>
<td>3/4 (75%)</td>
<td>4/4 (100%)</td>
</tr>
<tr>
<td>I will use new technology once I see a few people use it first</td>
<td>3/8 (37.5%)</td>
<td>-</td>
<td>1/4 (25%)</td>
<td>-</td>
</tr>
<tr>
<td>I will use new technology only after I am persuaded</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>I will use new technology after many have used it</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>I won’t use new technology easily</td>
<td>-</td>
<td>1/6 (16.67%)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Personal use of new technologies by staff members at campuses in Micronesia

Six staff members from Micronesia were confident that they ‘will use new technology easily’ with five whom ‘will use new technology after being persuaded’ (Table 5-38). The campus director shared similar views with how her staff members’ assessed themselves, attributable to being “young and enthusiastic” (Mi_1) and would use new technology easily.
Table 5-38 Personal use of new technologies at campuses in Micronesia

<table>
<thead>
<tr>
<th>Category</th>
<th>Nauru</th>
<th>Kiribati</th>
<th>Marshall Islands</th>
</tr>
</thead>
<tbody>
<tr>
<td>I will use new technology easily</td>
<td>1/5 (20%)</td>
<td>1/2 (50%)</td>
<td>4/6 (66.66%)</td>
</tr>
<tr>
<td>I will use new technology once I see a few people use it first</td>
<td>2/5 (40%)</td>
<td>1/2 (50%)</td>
<td>2/6 (33.34%)</td>
</tr>
<tr>
<td>I will use new technology only after I am persuaded</td>
<td>1/5 (20%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>I won’t use new technology easily</td>
<td>1/5 (20%)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*Personal use of new technologies by staff members at campuses in Polynesia*

10 staff members from Micronesia indicated that they were confident that they will use new technology easily while two staff members either had to be convinced after many people have used it or not using new technology easily (Table 5-39).
### Table 5-39 Personal use of new technologies at campuses in Polynesia

<table>
<thead>
<tr>
<th>Category</th>
<th>Cook Islands</th>
<th>Samoa</th>
<th>Tokelau</th>
<th>Niue</th>
<th>Tuvalu</th>
<th>Tonga</th>
</tr>
</thead>
<tbody>
<tr>
<td>I will use new technology easily</td>
<td>2/2 (100%)</td>
<td>2/2</td>
<td>2/2</td>
<td>1/1</td>
<td>1/2</td>
<td>2/3</td>
</tr>
<tr>
<td>I will use new technology once I see a few people use it first</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>I will use new technology only after I am persuaded</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1/2</td>
<td>-</td>
</tr>
<tr>
<td>I will use new technology after many have used it</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>I won’t use new technology easily</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1/3</td>
</tr>
</tbody>
</table>

Regional campuses generally considered themselves at the higher end of the innovation adoption scale (early adopters) in terms using personal use of new technology (Chart 5-10). There were very few laggards evident in terms of not easily using new technology. These are significant results for this particular study as confidence in new technology use would ultimately impact innovation adoption. These findings are important for small island developing states to ensure that those key stakeholders involved in technology innovation need to be competent in their own use of technology.
Overall, the respondents from Melanesia were generally positive that new technology uptake at their campus was quick with 11 indicating ‘agree’ and three who ‘strongly agree’ (Table 5-40). Indications of disagreement however represented all four campuses in Melanesia which may suggest that not all staff members were in agreement about quick uptake of technology and that some saw uptake by staff members as slow.

**Table 5-40 Staff uptake of new technology at campuses in Melanesia**

<table>
<thead>
<tr>
<th>Campus</th>
<th>Staff members at my campus take up new technology quickly</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly agree</td>
</tr>
<tr>
<td>Solomon Islands</td>
<td>1/8 (12.5%)</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>1/6 (16.67%)</td>
</tr>
<tr>
<td>Fiji – Lautoka</td>
<td>-</td>
</tr>
<tr>
<td>Fiji – Labasa</td>
<td>1/4 (25%)</td>
</tr>
</tbody>
</table>
Uptake of new technology at campuses in Melanesia compared to other campuses

When comparing themselves to other campuses, 11 staff members from Melanesia were confident that their campus would use new technology faster. Seven staff members indicated ‘don’t know’ while two indicated ‘no’ (Table 5-41). The Campus Director was optimistic of his campus because of his interest in technology. In Rogers’ (2003) terms, he may be considered a ‘champion’ in driving the use of new technology at his campus. He was aware of developments at the central campus that could be workable at his own campus. He had worked for over ten years at the central campus.

“I am pretty sure it will be much quicker or the same as other campuses. As for me as the manager of the campus I am interested in using technology. We can push to start online registration for us. That would reduce a lot of manual inputting. I think based on technology it is based on what Laucala (central campus) provides for us.” (Si_1)

The online registration system to which he refers may be seen as an innovation to his campus as it is new and has never been used before there. He may have observed its use at the central campus from which he felt that it could be applied to his own campus. This may also be an indication that not all innovations of this type were implemented across the university.

Geographic proximity was a reason given for using technology faster. In this case, the campus is located on the same island as the central campus and approximately 116 kilometres apart by road. This may suggest a more timely response to new technology at their campus.

“Because we are nearer to Laucala campus and have previously been privileged to get new software and hardware before other regional campuses.” (Ltk_4)

Another reason given for taking up technology faster may be because of the staff member’s competence at the use of technologies. The fact that they were using technologies for learning and teaching may suggest that they would use technology faster. The staff member (Instructional Designer) is based at the regional campus that houses the Law School and the Pacific Language Unit. This campus as previously stated had most of its courses online. Like the Campus Director above, he had worked longer
at the central campus so had a basis for comparison. His work primarily involves working with teaching faculty to develop DFL courses in Moodle and use other learning technologies to support DFL teaching.

“Staff from the School of Law and the Pacific Languages Unit are already teaching online and are generally open to the use of new technologies.” (Em_1)

While closeness of proximity to the central campus was a reason for fast take up of technology, it was also a reason for not being faster than other campuses particularly when the campus was further away from the central campus. A lack of infrastructure at the campus, lack of support staff and issues with trying to keep up with their current resources were reasons given for not taking up technology faster. Those that indicated that they did not know indicated having not been to the other campus or simply were not aware about them.

### Table 5-41 Uptake of new technology at campuses in Melanesia compared to other campuses

<table>
<thead>
<tr>
<th>Campus</th>
<th>My campus takes up new technology faster than other campuses</th>
<th>No</th>
<th>I don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes (percentage)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solomon Islands</td>
<td>5/7 (71.43%)</td>
<td></td>
<td>2/7 (28.57%)</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>2/5 (40%)</td>
<td>1/5 (20%)</td>
<td>2/5 (40%)</td>
</tr>
<tr>
<td>Fiji – Lautoka</td>
<td>1/4 (25%)</td>
<td>1/4 (25%)</td>
<td>2/4 (50%)</td>
</tr>
<tr>
<td>Fiji – Labasa</td>
<td>3/4 (75%)</td>
<td></td>
<td>1/4 (25%)</td>
</tr>
</tbody>
</table>

**Staff uptake of new technology at campuses in Micronesia**

Overall, responses were fairly even with seven in Micronesia indicating ‘strongly agree’ and ‘agree’ that staff members at their campus took up technology quickly (Table 5-42). In contrast, six respondents indicated ‘disagree’ and ‘strongly disagree’.

The Campus Director felt that her staff members took to using new technology quickly because of their young age – the fact that they were presently studying at the university as well as her input into their development and observing their potential.
“I’ve had some very good people to work with. I think they are (innovative). They are young. They newly graduate from USP but they are studying at the same time, so that helps. I trained them all on the job. As for ***** I took him because he was a student and he was always in the lab. I saw that he could do things. (Mi_D)
Staff members who were confident based their reasons on aspects of their campus development and observations of their own staff members. However, they did not elaborate fully on their reasons, for example

“Student priority for ICT related courses increases.” (Kb_1)

“The number of students enrolled has increased…” (Mi_1)

“Staff are fast learners.” (Mi_2)

Some highlighted their reasons as the possibility of unfamiliarity with technology and the other campuses or were simply unsure.

“Staff tend to be slow in their acceptance of new technology” (Kb_2)

“Not familiar with new technology.” (Nu_3)

“Personally I feel I don’t have time to stop and learn of how to use a new programme and just get frustrated learning as I go. This is probably why I prefer to attend a short workshop training use of the newly introduced software. Our campus is quite small compared to others and so I don’t know we’ll be using a new technology better than the other campuses.” (Nu_4)

Staff uptake of new technology at campuses in Polynesia

Indications from staff members in Polynesia were slightly more positive with five who ‘agree’ and two who ‘strongly agree’, compared to five who ‘disagree’ (Table 5-44). Reasons for disagreement were not provided although overall responses when compared to effectiveness of communication and understandability of communication about a new technology were fairly consistent from campus to campus.
Table 5-44 Staff uptake of new technology at campuses in Polynesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Staff members at my campus take up new technology quickly</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly agree</td>
<td>Agree</td>
<td>Disagree</td>
<td>Strongly disagree</td>
</tr>
<tr>
<td>Cook Islands</td>
<td>1/2 (50%)</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>-</td>
</tr>
<tr>
<td>Samoa</td>
<td>-</td>
<td>-</td>
<td>2/2 (100%)</td>
<td>-</td>
</tr>
<tr>
<td>Tokelau</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>1/2 (50%)</td>
<td>-</td>
</tr>
<tr>
<td>Niue</td>
<td>1/1 (100%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tuvalu</td>
<td>-</td>
<td>2/3 (66.66%)</td>
<td>1/3 (33.34%)</td>
<td>-</td>
</tr>
<tr>
<td>Tonga</td>
<td>-</td>
<td>2/2 (100%)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Uptake of new technology at campuses in Polynesia compared to other campuses

When comparing themselves to other campuses in Polynesia (Table 5-45), seven staff members indicated ‘don’t know’. Three staff members indicated ‘no’ with one staff member indicated ‘yes’ that their campus would take up technology faster.

Table 5-45 Uptake of new technology at campuses in Polynesia compared to other campuses

<table>
<thead>
<tr>
<th>Campus</th>
<th>My campus takes up new technology faster than other campuses</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>I don’t know</td>
<td></td>
</tr>
<tr>
<td>Cook Islands</td>
<td>-</td>
<td>-</td>
<td>2/2 (100%)</td>
<td></td>
</tr>
<tr>
<td>Samoa</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>1/2 (50%)</td>
<td></td>
</tr>
<tr>
<td>Tokelau</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>1/2 (50%)</td>
<td></td>
</tr>
<tr>
<td>Niue</td>
<td>-</td>
<td>1/1 (100%)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Tuvalu</td>
<td>-</td>
<td>-</td>
<td>1/1 (100%)</td>
<td></td>
</tr>
<tr>
<td>Tonga</td>
<td>1/3 (33.33%)</td>
<td>-</td>
<td>2/3 (66.67%)</td>
<td></td>
</tr>
</tbody>
</table>
Reasons for staff members being unsure of their campus’s capability in comparison to the other campuses varied, for instance in regards to campus leadership,

“It will depend on Campus Director buy in. If he does then we will definitely use it faster.” (Ci_1)

In regards to lack of physical contact geographically,

“I have not physically visited the other regional campuses, but I have met with most of the regional campuses IT staff – probably not the best people to represent the majority of their campus’ staff in terms of IT expertise.” (Tu_1)

In regards to capability of staff,

“I think the two IT boys can answer this question as they are communicating with ITS in Fiji.” (Tg_2)

“Not quite certain about IT knowledge in terms of people with the know-how of IT in other campuses.” (Sm_1)

Other reasons for being unsure of the campus’s capability included a lack of “direct information.” (Ci_2). While this response was not elaborated upon, it may suggest a limited availability of information regarding each campus’s technological capabilities.

Another reason provided was lack of experience (Tk_2).

For staff members who did not think that their campus would use new technology faster than other campuses, reasons provided were,

“Because our centre hasn’t had any upgrading work done on all our computers.” (Tk_1)

“Staff at **** may be resistant to change with regard to technology as there is little support or training available locally. Skills in using new technologies (for example even upgrades to Microsoft Software) have to be self-taught which is difficult for staff who may have a low level of understanding to begin with. Staff will therefore err on the side of sticking with what they know. Staff at **** are always very busy juggling the many tasks involved in operating the campus, they therefore do not have spare time to read manuals and teach themselves how to use new technologies. They always ask for face to face training to help them get up to speed quickly. IT infrastructure at **** also struggles at times which means adopting new technologies that may otherwise aid work and processes, is not possible (i.e. Skype, for communication with the main campus and regional colleagues, does not work on our internet connection). Student services are always the priority therefore IT infrastructure and resources go first to serving these needs, at times leaving little resourcing or support left for other things.” (Sm_2)
“We are small so are often last for anything!” (Ne_1)

The sole response in the affirmative, i.e. confidence that their campus took up technology faster than other campuses did elaborate on their response but was of the opinion that their campus was up to par with some of the other more developed campuses. However, the origin of this personal ranking is undeterminable and speculation could only be made in terms of campus size, technology use and other informal indicators compared with the central campus.

“**** campus is always on the top 3 when new things diffuse from Laucala campus.” (Tg_3)

Overall, regional campuses were agreeable about their own staff taking up new technology swiftly (Chart 5-11). In comparison to whether they thought the same for other campuses, most staff did not know or did not think technology uptake was quicker at other campuses compared to theirs (Chart 5-12).
5.2.2.4 The social system

This section presents staff members’ awareness of the strategic plan; how they assessed developments at their campus and the quality of IT facilities as far as supporting students adequately. They were also asked about their knowledge of the other regional campuses as well as challenges they experienced when using new technology at their campus.

**Awareness of the strategic plan at campuses in Melanesia**

17 staff members at the four campuses in Melanesia generally indicated that they were aware of the university’s strategic plan although three of the four campuses had a few staff members (six) who were not aware (Table 5-46).
Table 5-46 Awareness of strategic plan at campuses in Melanesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Are you aware of the Strategic plan for USP?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Solomon Islands</td>
<td>5/8 (62.5%)</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>6/6 (100%)</td>
</tr>
<tr>
<td>Fiji – Lautoka</td>
<td>3/4 (75%)</td>
</tr>
<tr>
<td>Fiji – Labasa</td>
<td>3/5 (60%)</td>
</tr>
</tbody>
</table>

Reasons for not being aware of the strategic plan from respondents in Melanesia were not provided. Those who were aware of the plan explained its function in terms of its general purpose or the actual details of the plan. There were instances where some staff members indicated being aware of the plan but not necessarily its function.

“Points out what the organisation wants to achieve and how it is going to achieve this.” (Si_3)

“To give the members of an organisation a vision and goals/targets for the future and the strategies for achieving these goals.” (Em_1)

“Research, Graduate Affairs and Innovation.” (Si_6)

“A focus on recovery and consolidation informs the new Strategic Plan because of the vastly changed circumstances in which the university is currently operating.” (Lba_3)

“Emphasis on academic excellence, emphasis on cultural interaction, infrastructure and human resource building etc.” (Ltk_1)

The Campus Director articulated the transference of the strategic plan into his own campus plan to contextualize it on the ground.

“Basically it is a road map to get us where we want to go. In fact, actually what I have done when USP Strategic Plan came out, I took all the priorities and then basically looked at what need to do in the centre in order to achieve in things that we focus on the strategic plan.” (Si_1)
Chapter 5 Findings part 1 – the regional campuses

 Awareness of the strategic plan at campuses in Micronesia

Nine staff members at the three campuses in Micronesia indicated that they were aware of the strategic plan while five indicated they were not (Table 5-47).

Table 5-47 Awareness of strategic plan at campuses in Micronesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nauru</td>
<td>4/6 (66.66%)</td>
<td>2/6 (33.34%)</td>
</tr>
<tr>
<td>Kiribati</td>
<td>2/2 (100%)</td>
<td>-</td>
</tr>
<tr>
<td>Marshall Islands</td>
<td>3/6 (50%)</td>
<td>3/6 (50%)</td>
</tr>
</tbody>
</table>

Reasons for not being aware of the strategic plan were not provided by respondents in Micronesia. Staff members who were aware of the strategic plan explained its purpose in terms of the specific areas covered by the plan.

“A guide for employees, administrators, decision makers to follow.” (Mi_2)

“Road map for development within a given period.” (Kb_2)

“It’s the USP 3-year plan for improvement in its services to its students and stakeholders.” (Nu_2)

 Awareness of the strategic plan at campuses in Polynesia

In Polynesia, staff members at the six campuses were generally aware of the university’s strategic plan with 10 indicating ‘yes’ and three indicating ‘no’ (Table 5-48).
Table 5.48 Awareness of strategic plan at campuses in Polynesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Are you aware of the Strategic plan for USP?</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Cook Islands</td>
<td>2/2 (100%)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Samoa</td>
<td>1/2 (50%)</td>
<td>1/2 (50%)</td>
<td></td>
</tr>
<tr>
<td>Tokelau</td>
<td>2/2 (100%)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Niue</td>
<td>1/2 (50%)</td>
<td>1/2 (50%)</td>
<td></td>
</tr>
<tr>
<td>Tuvalu</td>
<td>1/2 (50%)</td>
<td>1/2 (50%)</td>
<td></td>
</tr>
<tr>
<td>Tonga</td>
<td>3/3 (100%)</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Reasons for not being aware of the strategic plan from respondents in Polynesia were not provided. For the majority of staff members who were aware of the plan, possible explanations included,

“Strategies for the future of the USP regional university under the Pacific Forum umbrella. The main function is communication using the full capacity of ICT for most of the functions of distance education, distance administration and financial management. ICT as a bridge for timely deliverance and receipt of information to the USP region countries and others.” (Ne_1)

‘To coordinate resources towards strategic goals/vision.” (Ci_1)

“Provides strategic directions and goals for our workplan and campus activities.’ (Tg_1)

“It is to ensure that a corporation has a vision and all the activities and resources are aligned to the strategic plan to ensure success.” (Tk_2)

“Set the direction for the university in the upcoming years focusing on areas important in the current market.” (Sm_1)
Overall, regional campuses were generally aware of the university’s strategic plan (Chart 5-13). The findings indicated some variance despite receiving similar levels of communication. It is unclear why this variance occurred. Possible issues, raised in interview responses highlighted the possibility that there was a misunderstanding that the strategic plan was in fact a campus plan.

**Developments at campuses in Melanesia**

The developments illustrated in Table 5-49 are common to the campuses and to the institution as a whole. Staff members in Melanesia were asked how regularly these developments occurred at their particular campus.
Table 5-49 Developments at campuses in Melanesia

<table>
<thead>
<tr>
<th></th>
<th>Very often</th>
<th>Often</th>
<th>Sometimes</th>
<th>Never</th>
<th>I don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make improvements to work processes</td>
<td>2/21 (9.52%)</td>
<td>9/21 (42.85%)</td>
<td>7/21 (33.33%)</td>
<td>2/21 (9.52%)</td>
<td>1/21 (4.78%)</td>
</tr>
<tr>
<td>Acquire new computers</td>
<td>1/22 (4.54%)</td>
<td>10/22 (45.46%)</td>
<td>8/22 (36.37%)</td>
<td>1/22 (4.54%)</td>
<td>2/22 (9.09%)</td>
</tr>
<tr>
<td>Employ additional staff</td>
<td>-</td>
<td>6/21 (28.57%)</td>
<td>14/21 (66.66%)</td>
<td>1/21 (4.776%)</td>
<td>-</td>
</tr>
<tr>
<td>Upgrade office equipment</td>
<td>1/22 (4.55%)</td>
<td>6/22 (27.27%)</td>
<td>11/22 (50%)</td>
<td>2/22 (9.09%)</td>
<td>2/22 (9.09%)</td>
</tr>
<tr>
<td>Improve building facilities</td>
<td>1/22 (4.55%)</td>
<td>5/22 (22.73%)</td>
<td>10/22 (45.46%)</td>
<td>3/22 (13.63%)</td>
<td>3/22 (13.63%)</td>
</tr>
<tr>
<td>Upgrade software programmes</td>
<td>3/22 (13.63%)</td>
<td>9/22 (40.92%)</td>
<td>6/22 (27.27%)</td>
<td>2/22 (9.09%)</td>
<td>2/22 (9.09%)</td>
</tr>
</tbody>
</table>

There was a general consensus that developments at the campus in Melanesia occurred ‘sometimes’ or ‘often’. This was evident for ‘improvements to work processes’ which occurred more often at three of the four campuses. Acquisition of computers, upgrades to office equipment and software programmes were more frequent than improvements to building facilities. Some of the properties that the campuses occupied may have little capacity to expand for various reasons. From the interview with the Campus Director, there were political issues raised which impacted the decision to find an adequate site to house a new campus.

“To go into the new campus is basically I think it’s political, basically the person who is the minister of education at the moment ... he has different interests. So he is more interested in new (university) and at the same time he had people wrapped their heads around him so he wanted to satisfy them.” (Si_D)

In terms of employment of additional staff, this ‘sometimes’ occurred. With the size of these small regional campuses, staff numbers are relatively small so from time to time casual and temporary staff members are employed to assist at peak periods.

Developments at campuses in Micronesia

Staff members in Micronesia generally indicated ‘sometimes’ in terms of the regularity of developments that occurred at their campuses. This was evident for ‘employment
of additional staff, improvements to building facilities, acquisition of computers, and upgrading of office equipment. Some members of staff were also in agreement that changes ‘often’ occurred at the campus, especially with regard to improvements to work processes and upgrading of software programmes. There were an uncertain few who were not aware of these developments (Table 5-50). The Campus Directors for two of the three campuses thought that most of the changes ‘often’ occurred. It also happens that the two director’s campuses are part of planned expansions in terms of buildings and facilities. According to one director,

“It’s in the works with Japan and if it comes along I want it to be an eLearning campus….. and in terms of accommodating all the ergonomic issues.” (Mi_D)

One campus was allocated new computers for which there was no space to house them properly so the Campus Director had to divert them to a partner institution to be utilised by other students (Mi_D).

**Table 5-50 Developments at campuses in Micronesia**

<table>
<thead>
<tr>
<th>Development</th>
<th>Very often</th>
<th>Often</th>
<th>Sometimes</th>
<th>Never</th>
<th>I don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make improvements to work processes</td>
<td>2/13 (15.38%)</td>
<td>5/13 (38.46%)</td>
<td>3/13 (23.07%)</td>
<td>-</td>
<td>3/13 (23.07%)</td>
</tr>
<tr>
<td>Acquire new computers</td>
<td>1/13 (7.70%)</td>
<td>3/13 (23.07%)</td>
<td>8/13 (61.53%)</td>
<td>1/13 (7.70%)</td>
<td>-</td>
</tr>
<tr>
<td>Employ additional staff</td>
<td>-</td>
<td>-</td>
<td>10/12 (83.33%)</td>
<td>2/2 (16.67%)</td>
<td>-</td>
</tr>
<tr>
<td>Upgrade office equipment</td>
<td>-</td>
<td>5/13 (38.46%)</td>
<td>6/13 (46.14%)</td>
<td>1/13 (7.70%)</td>
<td>1/13 (7.70%)</td>
</tr>
<tr>
<td>Improve building facilities</td>
<td>-</td>
<td>2/13 (15.38%)</td>
<td>10/13 (76.92%)</td>
<td>-</td>
<td>1/13 (7.70%)</td>
</tr>
<tr>
<td>Upgrade software programmes</td>
<td>1/13 (7.70%)</td>
<td>5/13 (38.46%)</td>
<td>4/13 (33.77%)</td>
<td>-</td>
<td>3/13 (23.07%)</td>
</tr>
</tbody>
</table>

**Developments at campuses in Polynesia**

Staff members in Polynesia generally indicated ‘sometimes’ in terms of the regularity of developments that occurred at their campuses (Table 5-51). Three out of the six campuses also indicated that acquisition of new computers, upgrade of office
equipment and upgrade of software programmes ‘often’ occurred. While most staff members had an awareness of the developments occurring at their campus, there were a few staff members across the six campuses that indicated ‘don’t know’.

**Table 5-51 Developments at campuses in Polynesia**

<table>
<thead>
<tr>
<th></th>
<th>Very often</th>
<th>Often</th>
<th>Sometimes</th>
<th>Never</th>
<th>I don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make improvements to work</td>
<td>-</td>
<td>1/12 (8.33%)</td>
<td>10/12</td>
<td>-</td>
<td>1/12 (8.33%)</td>
</tr>
<tr>
<td>processes</td>
<td></td>
<td></td>
<td>(83.34%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acquire new computers</td>
<td>-</td>
<td>3/12 (25%)</td>
<td>8/12</td>
<td>-</td>
<td>1/12 (8.33%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(66.67%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employ additional staff</td>
<td>1/12 (8.33%)</td>
<td>-</td>
<td>7/12</td>
<td>2/12</td>
<td>2/12 (16.66%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(58.34%)</td>
<td>1/12</td>
<td></td>
</tr>
<tr>
<td>Upgrade office equipment</td>
<td>-</td>
<td>4/12 (33.34%)</td>
<td>6/12</td>
<td>1/12</td>
<td>1/12 (8.33%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(50%)</td>
<td>1/12</td>
<td></td>
</tr>
<tr>
<td>Improve building facilities</td>
<td>-</td>
<td>2/12 (16.67%)</td>
<td>8/12</td>
<td>1/12</td>
<td>1/12 (8.33%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(66.67%)</td>
<td>1/12</td>
<td></td>
</tr>
<tr>
<td>Upgrade software programmes</td>
<td>-</td>
<td>3/12 (25%)</td>
<td>7/12</td>
<td>1/12</td>
<td>1/12 (8.33%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(58.34%)</td>
<td>1/12</td>
<td></td>
</tr>
</tbody>
</table>

The Regional campuses generally agreed that developments on campuses sometimes occurred. Areas such as improvements to work, acquisition of computers, employment of staff, upgrades to office equipment and improvements to building facilities did not occur often, but sometimes.

**Quality of IT facilities and adequacy of resources to support new technology at campuses in Melanesia**

In terms of the quality of the IT facilities serving students adequately, staff members at three of the four campuses in Melanesia generally rated the facilities ‘Good’ or ‘Fair’. Staff members at the Vanuatu campus however, generally rated their IT facilities ‘Poor’ or ‘Very poor’ (see Table 5-52).
Table 5-52 Quality of IT facilities at campuses in Melanesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Very poor</th>
<th>Poor</th>
<th>Fair</th>
<th>Good</th>
<th>Very good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solomon Islands</td>
<td></td>
<td>2/8 (25%)</td>
<td>2/8 (25%)</td>
<td>4/8 (50%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>3/6 (50%)</td>
<td>2/6 (33.33%)</td>
<td>1/6 (16.67%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Fiji – Lautoka</td>
<td></td>
<td>-</td>
<td>-</td>
<td>2/4 (50%)</td>
<td>2/4 (50%)</td>
<td>-</td>
</tr>
<tr>
<td>Fiji – Labasa</td>
<td></td>
<td>-</td>
<td>-</td>
<td>1/5 (20%)</td>
<td>3/5 (60%)</td>
<td>1/5 (20%)</td>
</tr>
</tbody>
</table>

Responses in Melanesia were fairly consistent with their indications of lack of frequent changes to their campus above. The Fiji campuses rated positively overall. ‘Poor’ or ‘Fair’ ratings given by staff members of the Solomon Islands campus may be a result of the limited computer facilities for students. According to the Campus Director, the campus is overcrowded and as a result there are not enough computers to go around for the entire student population. Despite this, the director rated the IT facilities at the campus as ‘Good’ and indicated moves for improvements to the campus such as the impending relocation to a larger site, new initiatives that include wireless connections so that students are able to go online using their own laptops without being restricted to a physical lab space, and KU Band satellite deployment to enhance USPNet’s connectivity at the campus.

Staff members from the Fiji based campuses generally agreed that their campus had sufficient resources to support new technology which was consistent with their having adequate IT facilities, and regular improvements to campus processes (Table 5-53). There was a general indication of insufficient resources for the other three Melanesian campuses. Their reasons are articulated further when asked what challenges they faced when using new technology.
Table 5-53 Adequacy of resources to support new technology at campuses in Melanesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solomon Islands</td>
<td>1/8 (12.5%)</td>
<td>3/8 (37.5%)</td>
<td>4/8 (50%)</td>
<td>-</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>-</td>
<td>2/6 (33.33%)</td>
<td>-</td>
<td>4/6 (66.67%)</td>
</tr>
<tr>
<td>Fiji – Lautoka</td>
<td>-</td>
<td>3/4 (75%)</td>
<td>-</td>
<td>1/4 (25%)</td>
</tr>
<tr>
<td>Fiji – Labasa</td>
<td>1/4 (25%)</td>
<td>2/4 (50%)</td>
<td>1/4 (25%)</td>
<td>-</td>
</tr>
</tbody>
</table>

Quality of IT facilities and adequacy of resources to support new technology at campuses in Micronesia

Seven staff members at campuses in Micronesia rated their facilities ‘Fair’. Two of the three campuses also had ‘good’, ‘very good’ or ‘excellent’ ratings which may indicate a general satisfaction amongst staff about the quality of their IT facilities. The lone exception was the Kiribati Campus that had one ‘poor’ rating (Table 5-54).

Table 5-54 Quality of IT facilities at campus at campuses in Micronesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Very poor</th>
<th>Poor</th>
<th>Fair</th>
<th>Good</th>
<th>Very good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nauru</td>
<td>-</td>
<td>-</td>
<td>4/6 (66.66%)</td>
<td>1/6 (16.67%)</td>
<td>1/6 (16.67%)</td>
<td>-</td>
</tr>
<tr>
<td>Kiribati</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Marshall Islands</td>
<td>-</td>
<td>-</td>
<td>3/6 (50%)</td>
<td>2/6 (33.33%)</td>
<td>-</td>
<td>1/6 (16.67%)</td>
</tr>
</tbody>
</table>

In contrast to the quality of IT facilities above, staff members in Micronesia were fairly divided on whether they thought their campus had sufficient resources to support new technology (see Table 5-55). Seven staff members ‘agree’ or ‘strongly agree’ that resources were sufficient while six ‘disagree’ or ‘strongly disagree’.
Table 5-55 Adequacy of resources to support new technology at campuses in Micronesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nauru</td>
<td>-</td>
<td>2/5</td>
<td>3/5</td>
<td>-</td>
</tr>
<tr>
<td>Kiribati</td>
<td>1/2 (50%)</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>-</td>
</tr>
<tr>
<td>Marshall Islands</td>
<td>1/6 (16.66%)</td>
<td>3/6 (50.02%)</td>
<td>1/6 (16.66%)</td>
<td>1/6 (16.66%)</td>
</tr>
</tbody>
</table>

Quality of IT facilities and adequacy of resources to support new technology at campuses in Polynesia

Five staff members at campuses in Polynesia generally rated their facilities ‘Fair’. Three staff members indicated ‘Good’ and two, ‘Very good’ (see Table 5-56).

Table 5-56 Quality of IT facilities at campus in Polynesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Very poor</th>
<th>Poor</th>
<th>Fair</th>
<th>Good</th>
<th>Very good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cook Islands</td>
<td>-</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>1/2 (50%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Samoa</td>
<td>-</td>
<td>-</td>
<td>2/2 (100%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tokelau</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>1/2 (50%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Niue</td>
<td>-</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>1/2 (50%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tuvalu</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>1/2 (50%)</td>
<td>-</td>
</tr>
<tr>
<td>Tonga</td>
<td>-</td>
<td>2/3 (66.67%)</td>
<td>-</td>
<td>-</td>
<td>1/3 (33.33%)</td>
<td>-</td>
</tr>
</tbody>
</table>

While this may be an indication of overall satisfaction of their IT facilities, two campuses (one large – Tonga and one small – Tuvalu) however indicated ‘Poor’. The larger campuses may have issues with the adequate number of computers to cater to its large enrolment of students although the Campus Director indicated that the quality of IT facilities was ‘Very good’. This contrast appears to be present for three of the six campuses in Polynesia where the Campus Director rated more positively than their staff members.
Indications regarding the adequacy of resources to support new technology (Table 5-57) were fairly even in Polynesia with six staff members indicating ‘Agree’ (five), ‘Strongly agree’ (one) and six indicating ‘Disagree’.

**Table 5-57 Adequacy of resources to support new technology at campuses in Polynesia**

<table>
<thead>
<tr>
<th>Campus</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cook Islands</td>
<td>1/2 (50%)</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>-</td>
</tr>
<tr>
<td>Samoa</td>
<td>-</td>
<td>-</td>
<td>2/2 (100%)</td>
<td>-</td>
</tr>
<tr>
<td>Tokelau</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>1/2 (50%)</td>
<td>-</td>
</tr>
<tr>
<td>Niue</td>
<td>-</td>
<td>1/1 (100%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tuvalu</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>1/2 (50%)</td>
<td>-</td>
</tr>
<tr>
<td>Tonga</td>
<td>-</td>
<td>2/3 (66.66%)</td>
<td>1/3 (33.33%)</td>
<td>-</td>
</tr>
</tbody>
</table>

Overall assessment of the quality of IT facilities at the regional campuses were generally ‘Fair’ or ‘Good’ (Chart 5-14). This may suggest that the quality of IT facilities could be improved especially as there was a strong sentiment that there were inadequate resources to support new technology (Chart 5-15).
Knowledge of other regional campuses by staff members at campuses in Melanesia

When asked about their knowledge of the other campuses, respondents from Melanesia generally indicated having ‘Some knowledge’ or knew ‘Very little’ (Table 5-58). Of note are two staff members who were ‘very knowledgeable’ and had been at the university for many years in various roles and locations, including the central campus.

Table 5-58 Knowledge of other campuses by staff members at campuses in Melanesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Do not know anything</th>
<th>Know very little</th>
<th>Have some knowledge</th>
<th>Very knowledgeable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solomon Islands</td>
<td>-</td>
<td>3/7 (42.85%)</td>
<td>3/7 (42.85%)</td>
<td>1/7 (14.30%)</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>-</td>
<td>1/6 (16.67%)</td>
<td>4/6 (66.66%)</td>
<td>1/6 (16.67%)</td>
</tr>
<tr>
<td>Fiji – Lautoka</td>
<td>-</td>
<td>2/4 (50%)</td>
<td>1/4 (25%)</td>
<td>1/4 (25%)</td>
</tr>
<tr>
<td>Fiji – Labasa</td>
<td>-</td>
<td>-</td>
<td>4/4 (100%)</td>
<td>-</td>
</tr>
</tbody>
</table>

Knowledge of other regional campuses by staff members at campuses in Micronesia

Six staff members from Micronesia indicated ‘having some knowledge’ while five knew ‘very little’ (Table 5-59). The Campus Director had reservations about the depth to
which she knew about the other campuses, and felt that there was very little interaction across campuses and this occurred, “only when we come together for these meetings.” (Mi_D) The director was referring to the annual Regional Campus Director’s Forum (RCDF) where all the Campus Directors converged at the central university to discuss and address campus issues with the faculties and support sections. Additionally, the Campus Director felt that there was “little cross fertilization of ideas.” (Mi_D) There was also an indication that Campus Directors tended to form cliques usually based on common interests.

Table 5-59 Knowledge of other campuses by staff members at campuses in Micronesia

<table>
<thead>
<tr>
<th>Campus</th>
<th>Do not know anything</th>
<th>Know very little</th>
<th>Have some knowledge</th>
<th>Very knowledgeable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nauru</td>
<td>-</td>
<td>2/5 (40%)</td>
<td>3/5 (60%)</td>
<td>-</td>
</tr>
<tr>
<td>Kiribati</td>
<td>-</td>
<td>1/2 (50%)</td>
<td>-</td>
<td>1/2 (50%)</td>
</tr>
<tr>
<td>Marshall Islands</td>
<td>-</td>
<td>2/5 (40%)</td>
<td>3/5 (60%)</td>
<td>-</td>
</tr>
</tbody>
</table>

Knowledge of other regional campuses by staff members at campuses in Polynesia

Six staff members from campuses in Polynesia indicated ‘have some knowledge’, with four who ‘know very little’ and one who was ‘very knowledgeable’ about other campuses in the region (Table 5-60).
Staff members at the regional campuses (Chart 5-16) have ‘very little’ to ‘some knowledge’ in general of other campuses. This confirms earlier indications of being unsure of issues such as the rate of technology uptake at other campuses. When correlating responses, it was evident that those that responded ‘very knowledgeable’ were staff members that had moved across the USP region or may have served at USP for longer periods. None of the respondents from across the regional campuses indicated ‘Do not know anything’, suggesting a certain degree of knowledge of other campuses.

![Chart 5-16 Overall knowledge of other campuses by staff members at regional campuses](image-url)
Additional qualitative responses from the questionnaire

Respondents were given the opportunity to provide open ended qualitative responses on the questionnaire that addressed challenges of using new technology and thoughts on technological innovation at USP.

Challenges of using new technology

On the challenges of using new technology at their campuses, comments provided by staff members from Melanesia included,

“Biggest challenge is the resources and infrastructure for supporting these new technologies. Moodle is currently suffering because of connectivity issues and lack of computers and labs.” (Em_1)

“Knowledge about its (technology) usage, computers outdated, disruptions in connections, insufficient computers.” (Em_2)

“Not knowing how to go about using software/technology as we may need training.” (Lba_2)

“It is important that technology is serviced by our people who do maintenance either staff or companies. No use bringing this technology and our people there cannot service it.” (Si_1)

The campus itself was also identified as a challenge in terms of lack of support and processes, comments included areas such as,

“The lack of formal process for introducing new technology into an IT environment is one of the biggest challenges.” (Lba_4)

“IT staff are good for support systems, but usually unable to provide any support for applications (Word, Excel, Outlook) beyond what I already know as a power user. The administration (incl. Finance and IT) are usually painfully slow and unresponsive in actually obtaining and installing new hardware. When problems occur with hardware, there is inadequate appreciation of the effects of downtimes for academic staff.” (Em4)

“Testing phase and teaching it to staff.” (Ltk_3)

“The main challenge is that we do not get many opportunities to have a say in acquisition of new technology and the few request that staff have put in have been either disregarded in the past or staff were told that it is “impossible to get” for XY reason.” (Em_6)
Staff members from campuses in Micronesia indicated further challenges, similar but indicative to their region, such as,

“Connectivity to Suva.” (Kb_1)

“Slow connection.” (Mi_3)

In particular in terms of time and staff capability, campuses at Nauru and Kirabati stated,

“I don’t have time to stop and learn of how to use a new programme.” (Nu_4)

“Slowness of staff to adapt to new learning technology, capability of staff to use new technology.” (Kb_2)

“Need to familiarise with new technology by training.” (Nu_3)

In terms of changes to technology, generally the view was expressed that,

“Sometimes new features are added while old features are either gone or stored somewhere else, this can be frustrating.” (Nu_2)

“ITS should not try out a new software during the start of the semester – it sometimes does not work and students suffer as a result.” (Nu_5)

Issues raised by staff members from Polynesia could be expressed in terms of technology and infrastructure, training and support, as well as general issues such as time and geographical remoteness.

“IT support locally (IT do not have the time or the training they need to be able to support others). IT infrastructure – network and internet/ intranet... if the infrastructure is already struggling then it is difficult to look at adding more pressure to this.” (Sm_2)

“When there is a problem with the software and our 2 IT people cannot solve but we have to contact directly with the consultant.” (Tg_3)

“The lack of expertise to have the patience to go through explaining how the new technology can be best used.” (Sm_1)

“Training and user information. Also a lack of communication and support.” (Ci_2)

“Support is not usually readily available to really know.” (Tk_2)
“The only challenge that I always face is the speed of the computer that I am currently using. I think I need a latest version as the computer I am using now was from 2003.” (Tg_2)

In terms of time when questioned about challenges of new technology,

“Giving enough time to learn this new technology.” (Tg_1)

“Finding time to familiarise myself with it.” (Ci_2)

In terms of remoteness,

“The remoteness of our centre makes it difficult for our centre to be informed of new relevant technology that other USP campuses have been using for some time.” (Tk_1)

On closer examination of the issues raised by the regional campuses, it is evident that while some similarities are apparent, each campus focuses on different issues. Melanesia raised issues relating to resources, infrastructure, outdated hardware which were not highlighted by the other two campuses. Common to all regional campuses were the challenges of maintenance and staff support. Another important issue which was unique to Micronesia and Polynesia was the issue of connectivity and slow connections. Polynesia also raised an individual issue relating to the need for outside support not available in their location.

Technological innovation at USP

When staff members in Melanesia were asked to provide further comments on technological innovations by the university, they expressed both confidence and ambivalence. Some saw it as “useful to the institution as it would enhance learning, teaching and DFL” (S1_4). It was also seen as “necessary because of the wide spread geographic locations” (Lba_2). It also “enhanced the “university’s reputation” (Lba_1). However, the innovation needed to be “workable” (Si_3) and “relevant” (Ltk_1). “Connectivity” (Si_7) was again a reason for ambivalence as existing technology tended to work inconsistently.

“... at Solomon Islands campus the internet connections goes down, wireless not working during day time due to large number of students are connected.” (Si_7)
“Excessive centralization of IT systems makes IT operations very cumbersome and unnecessarily time consuming.” (Em5)

“To have a successful teaching/learning for DFL students through the use of new technology etc., we need to have updated and sufficient computers for our students. Additionally the links/bandwidth needs to be able to accommodate many users. At the moment, we don’t have enough computer teaching labs for our DFL students.” (Em_3)

“Need to be effective given the geographical spread of USP…” (Si_6)

“A more open ear for the needs and requirements of the regional campuses would be a step into the right directions,” (Em_6)

As far as general comments about technological innovations at the university were concerned, staff members in Micronesia shared similar sentiments as when they were asked to comment on the challenges of using new technology at their campus. Connectivity again arose as an issue especially as a staff members stated,

“So many users using the Internet affects our daily lives – that we usually experienced a slow connection of the Internet.” (Mi_1)

Other times, it was matter of infrastructure within the campus as well as beyond the control of the campus. This was evident for one campus in particular.

“Service is sometimes good, but due to power failure, this sometimes causes problems in the regional campus.” (Nu_1)

“Problem is no generator at the campus. Due to regular outages on island this will certainly cause technology problems to the equipments. Internet is slow and disconnected at times.” (Nu_2)

“... often there’s power outage on the island which affects our students use of computer lab including live satellite tutorials. Really I think we need to start with dealing with small problems before introducing technological innovations as it be a waste of USP money and its quite embarrassing as well for staff.” (Nu_3)

Finally, the issue of support was identified as crucial to the university.

“Technology must be well supported by the university to make student’s life/learning experience easier.” (Kb_1)

Staff members at campuses in Polynesia commented critically about issues of access, equity, connectivity and resources.
“I do not consider my campus to be innovative when it comes to the technology; we rely too much on Suva. We don’t have too much say in the purchase of software and hardware. I know very little about the other campuses as I only know their Campus Directors and CCE (Continuing and Community Education) managers through meetings that have attended together. I believe that our students are at a disadvantage because of the following: 1. The move to online learning without the investment of new PCs and the relevant software that some of the Law and IS (Information Systems) courses need. 2. When new courses that require technology are introduced (e.g. UU100) there was no investment in PCs etc. 3. At the beginning of the year we were asked for a readiness for semester 1 report. In this report I put in the needs for computers in our three centres. Today we have not received our PC and N-computing allocation for 21012.” (Tg_1)

“Our centre currently is not connected through USP’s internet connection but through our island’s local internet provider. As a result, our centre cannot broadcast or accommodate USP’s satellite tutorial service, as it only needs to be functioned through USP’s internet system. So USP should kindly consider installing its internet facilities in all its centres, regardless of remoteness of location and associated costs.” (Tk_1)

“These innovations end at the regional campus but need to be expanded to outer islands and sub centres – otherwise we are running a two tier system to the disadvantage of many.” (Ci_1)

“There is definitely a need for more resources, upgraded software and more computers, we are working on outdated PCs as a matter of fact.” (Sm_1)

Despite the above comments, there were staff members who were optimistic about the university’s developments and the possibilities that innovation had for the university.

“To me, it is helping students especially from regional campuses as we need more help apart from the course materials and textbooks used.” (Tg_2)

“USP is leading the Pacific in terms of innovative use of technology, but all campuses must get an equal share.” (Ne_1)

“There is a huge development of technology operated at the campus today in comparison to the last 10 years, for example, before students can rely on the print mode of study plus attending satellite tutorials whereas today, courses are offered through varieties mode of study such as online, Moodle, videoconference and so forth.” (Tg_3)

There was also a reluctance to comment because of a lack of experience.

“I think I would be able to provide a better informed answer given more years of experience and especially observation of transition to new technology in my campus.” (Tu_1)
On closer examination of the qualitative findings provided, it was evident that the issues related to innovation highlighted by the three campuses, generally overlapped. The one issue raised by all regional campuses was connectivity, the amount of users and the impact of consistent electricity supply. It is interesting to note that many of the respondents from Polynesia believed there was a lack of innovation at their campus. Another factor expressed strongly by Polynesia was an equity issue where the reliance on the campus was too heavy, resulting in a two tier system.

5.3 Summary

This chapter presented the findings for the regional campuses distributed by the three cultural classifications of Melanesia, Micronesia and Polynesia. The participants’ profiles were presented, followed by findings based on the theoretical framework for the study.

The second part of the findings which is based on the central campus is presented in the next chapter.
CHAPTER 6 FINDINGS PART 2 – THE CENTRAL CAMPUS

6.1 Introduction

Chapter 5 presented the findings for the regional campuses. This chapter presents the second part of the findings which looks at the central campus. The central campus is located in Suva, the capital of Fiji. Stated in Chapter 3, it is considered the administrative hub for the University of the South Pacific. The findings in this chapter are divided into three groups. The first group represents teaching staff (TS). The second group represents heads of schools and support sections (HOSS) and the third represents senior management team (SMT). This division allows a coherent flow in the analysis in terms of organisational hierarchy and decision making responsibilities. All participants are based at the central campus. Where appropriate, a short commentary with preliminary findings between the regional campuses and the central campus will be discussed. The final two chapters of this thesis will provide a more sophisticated analysis of the data.

The findings in this chapter follow the same organisation as the previous chapter but with variations reflecting the collection of data. Teaching staff were administered the online questionnaire, while Heads of schools and support sections completed the questionnaire or were interviewed. The senior management team were all interviewed, following a truncated format due to time constraints.

Earlier in the study, it was determined that the most relevant documents for analysis were the Strategic Plan and the paper by Whelan and Bhartu (2007) – Chapter 4 & 5. A further document was identified during the interview phase with Senior Management Team (SMT). This was a paper by Schutz et al on Free Open Source Software (FOSS). It is referred to later in this chapter, Figure 6.1.

6.2 Group 1: Teaching staff

The responses from teaching staff members at the central campus are presented in this section. It begins with a description of the participants’ profile, followed by findings based on the theoretical framework for the study.
6.2.1 Participants’ profile

This section explains the profile of the participants in terms of the responses to the questionnaire/interview which looked at the level of education of staff members and their years of service at the university. This is followed by a measure of confidence in basic computer use with their preference for method of learning a new technology. 29 members of teaching staff at the central campus returned responses to the questionnaire. Teaching staff represented the academic and comparable (A&C) or senior staff category at USP. Staff members generally had a formal qualification at a postgraduate level. This is indicative of the minimum requirements for academic teaching positions set by the university. 17 had a Master’s degree; seven had a Post Graduate Diploma; and five had a PhD. The disciplines covered by their qualifications represented the three faculties at the university with 13 from the Faculty of Business (FBE), five from the Faculty of Arts, Law and Education (FALE) and four from the Faculty of Science, Technology and Environment (FSTE). Staff members that responded had spent between 6-10 years (13) and 1-5 years (12) at the university, with four being with the university for over 10 years.

Computer use

Staff members generally considered themselves ‘Totally confident’ at the computer tasks (Table 6-1) particularly with basic uses of email, internet, WORD and PowerPoint. Tasks such as adding signatures to emails, editing and formatting tables, and inserting audio and video elements to PowerPoint presentations recorded varying levels of confidence which may indicate the complex tasks were more challenging to perform. In terms of hours spent using the Internet at work each day, 10 indicated 1-2 hours, nine spent 3-4 hours, five spent more than 6 hours, four spent 4-5 hours and one staff member indicating less than an hour.
### Table 6-1 Level of confidence at computer use

Rate your level of confidence for the following tasks.

<table>
<thead>
<tr>
<th>Task</th>
<th>Not at all confident</th>
<th>Moderately confident</th>
<th>Totally confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can send an email with an attachment</td>
<td>-</td>
<td>1/29 (3.45%)</td>
<td>28/29 (96.55%)</td>
</tr>
<tr>
<td>I am able to create an email signature for my outgoing emails</td>
<td>4/29 (13.79%)</td>
<td>3/29 (10.35%)</td>
<td>22/29 (75.86%)</td>
</tr>
<tr>
<td>I can create a word document and format it</td>
<td>-</td>
<td>3/29 (10.35%)</td>
<td>26/29 (89.65%)</td>
</tr>
<tr>
<td>I can insert, edit and format tables in a word document</td>
<td>2/29 (6.9%)</td>
<td>2/29 (6.9%)</td>
<td>25/29 (86.20%)</td>
</tr>
<tr>
<td>I am able to insert data in a spreadsheet</td>
<td>1/29 (3.45%)</td>
<td>3/29 (10.35%)</td>
<td>25/29 (86.20%)</td>
</tr>
<tr>
<td>I can create charts and graphs in a spreadsheet</td>
<td>2/29 (6.9%)</td>
<td>3/29 (10.35%)</td>
<td>24/29 (82.75%)</td>
</tr>
<tr>
<td>I can insert text and images in a PowerPoint presentation</td>
<td>-</td>
<td>3/29 (10.35%)</td>
<td>26/29 (89.65%)</td>
</tr>
<tr>
<td>I can insert audio and video in a PowerPoint presentation</td>
<td>4/29 (13.79%)</td>
<td>8/29 (27.59%)</td>
<td>17/29 (58.62%)</td>
</tr>
<tr>
<td>I am able to search for information using the Internet</td>
<td>-</td>
<td>2/29 (6.9%)</td>
<td>27/29 (93.10%)</td>
</tr>
<tr>
<td>I can download images from websites</td>
<td>-</td>
<td>4/29 (13.80%)</td>
<td>25/29 (86.20%)</td>
</tr>
</tbody>
</table>

The level of confidence of computer use among Teaching Staff at the central campus was similar but slightly higher (Totally confident: 58 – 96%) than that of the regional campuses. On examination of the demographic information, this would be expected as the qualifications and experience would be broader.
Preference for method of learning new technology
Preference for how they preferred to learn to use a new technology varied, with 11 respondents indicating ‘workshop’, seven who preferred to ‘play around with it’, and three who would ‘listen to or watch an instructional video’. Two staff members preferred to ‘search for internet resources’ and a staff member each who would ‘read the instructional manual’ or ‘learn from a friend or colleague’.

6.2.2 The elements of diffusion
This section represents responses from teaching staff in relation to the four elements of diffusion proposed by Rogers (2003). The four elements are the innovation, the communication channel, time and the social system.

6.2.2.1 The innovation
Firstly, staff members were asked about their previous experience with learning management systems to provide an indication of prior awareness. Secondly they were asked about Moodle and what they recognized to be its main function for distance and flexible learning. Following this, they were asked to rank the attributes of innovation to indicate what they saw as being the most important attribute for successful adoption.

Prior use of learning management systems and awareness of Moodle
With regard to having used a learning management system previously, 26 staff members indicated they had used a system while three had not. Those that had used a learning management system did so mostly in the role of ‘teacher’ (25). Of the 25, 12 members of staff had also used a learning management in the role of ‘student’ with three who had done so in multiple roles (‘student’, ‘teacher’ and ‘developer/programmer’). All staff members indicated they were aware of Moodle at their campus. When asked how Moodle was used for distance and learning at the university, staff members described some of its uses, firstly as a tool,

“Discussions and for submitting assignments.” (Ts_5)

“As a tool to deliver learning materials to all DFL (and F2F) students. Also, a number of online activities, such as online quizzes, guided discussion forums, are used to engage the students. Moodle is becoming like a virtual classroom.” (Ts_3)
“To upload lecture notes, tutorial questions, any important notices that students need to be informed off.” (Ts_21)

Secondly, in terms of purpose,

“To connect DFL students to F2F students and the course coordinator.” (Ts_2)

“As a means to transmit knowledge to distance learners.” (Ts_6)

“It provides a vital interactive link between lecturers and students, and amongst student’s themselves.” (Ts_17)

“A tool to support learning through the DFL mode.” (Ts_24)

“USP courses are taught on Moodle, everything is uploaded (course contents, instructions, schedules, assessment information, etc.) for students to access, and read, do assignments and submit on Moodle. Teachers mark student work and send comments to students. Forums are provided for student discussions, queries and notifications from staff.” (Ts_14)

Thirdly, in terms of performance and capability,

“Excellent.” (Ts_18)

“I think it is an extremely useful tool. I’m not too sure about other course coordinators but depend a lot on Moodle and I feel that its assist in ensuring that DFL students are able to access similar resources as F2F students. Also I find that it encourages DFL and F2F students to collaborate and assist each other’s learning.” (Ts_19)

“Poorly.” (Ts_22)

“Currently, to deliver course materials (assessments, notes, lectures, guides, etc) in electronic form. There is very little attempt to use the technology (Moodle) to actually engage the students’ and maximise the benefits of learning. Providing a link to a set or notes is not the point/ core of this technology. There numerous applications available that can be used to create more interactive and effective learning materials.” (Ts_4)

“It is quite good. As students in the regional centres are on par in terms of accessing to lecture notes, notices and relevant academic information with the F2F students in Laucala.” (Ts_11)

It is evident that the majority of respondents from the central campus had similar experiences as the regional campuses in relation to the prior use of learning management systems. Respondents from all campuses demonstrated a sound understanding of the role of the learning management system Moodle.
Attributes of innovation

In terms of general technology use, Teaching staff were asked to rank the attributes of innovation in terms of what they saw as most important to least important (Table 6-2). Defined by Rogers, the attributes of innovation are Relative advantage, Compatibility, Complexity, Trialability and Observability. Using scalar matrix multiplication, the attributes were ranked in order of importance from 1 – Most important, to 5 – Least important.

Table 6-2 Attributes of innovation

<table>
<thead>
<tr>
<th>Attribute</th>
<th>1 Least important</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 Most important</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>The technology is better than a previous technology it replaces (Relative advantage)</td>
<td>7 (7)*</td>
<td>0 (0)</td>
<td>6 (18)</td>
<td>5 (20)</td>
<td>7 (35)</td>
<td>2</td>
</tr>
<tr>
<td>The technology is suitable for my work (Compatibility)</td>
<td>0 (0)</td>
<td>2 (4)</td>
<td>2 (6)</td>
<td>9 (36)</td>
<td>12 (60)</td>
<td>1</td>
</tr>
<tr>
<td>The technology is easy to understand (Complexity)</td>
<td>2 (2)</td>
<td>2 (4)</td>
<td>9 (27)</td>
<td>9 (36)</td>
<td>3 (15)</td>
<td>3</td>
</tr>
<tr>
<td>The technology can be tested first (Trialability)</td>
<td>6 (6)</td>
<td>12 (24)</td>
<td>3 (9)</td>
<td>1 (4)</td>
<td>3 (15)</td>
<td>4</td>
</tr>
<tr>
<td>The effects of the technology can easily be seen by others (Observability)</td>
<td>10 (10)</td>
<td>9 (18)</td>
<td>5 (15)</td>
<td>1 (4)</td>
<td>0 (0)</td>
<td>5</td>
</tr>
</tbody>
</table>

*Product of row by column in parenthesis

From the table, ‘suitability of the technology for my work’ (Compatibility – 60) was considered most important, followed by ‘the technology being better than a previous technology it replaces’ (Relative advantage – 35), then ‘the technology is easy to understand’ (Complexity – 36). ‘The technology can be tested first’ (Trialability – 24) and ‘the effects of the technology can easily be seen by others’ (Observability – 18) were considered least important.

Respondents from the central campus considered suitability of the technology to their work was the most important. This is consistent with responses from the campuses Melanesia and Polynesia. Alternatively, Micronesia indicated that technology being better than the previous technology it replaced was the most important.
6.2.2.2 Communication channels

The second element of diffusion is the communication channel. To understand how communication worked at the university, staff members were asked how they became aware of Moodle in terms of the common mediums of communication at the university. They were asked about their preference of medium for communication about new technology. Following this they were asked about the effectiveness of communication and understandability of communication when a new technology was introduced at their campus.

First awareness of Moodle via communication channels

Staff members generally first became aware of Moodle through two mediums, ‘word of mouth’ (15) and ‘All staff & students email’ (14) at USP. Word of mouth included staff members hearing about Moodle from colleagues within and outside of the department. Other means of awareness were through formal Moodle workshops organised by the Centre for Flexible Learning. There was no indication that the ‘USP website’ and the university newsletter ‘USP Beat’ provided any awareness.

Preference of communication medium

In contrast to how they first became aware of Moodle, teaching staff overwhelmingly preferred to receive news and general information about USP through the ‘All staff & students email’ (24) system. There was no preference for the university newsletter while four staff members preferred the ‘USP website’ and one who preferred via ‘word of mouth’.

Effectiveness and understandability of communication at campus

In terms of whether they thought communication in general was effective at their campus when a new technology was introduced, 17 indicated ‘agree’ and three indicated ‘strongly agree’. Four staff members however indicated ‘disagree’ with one indicating ‘strongly disagree’. In contrast, staff members were less positive about the information provided about the new technology. Of the 29 staff members who responded, 11 indicated ‘agree’ and two indicated ‘strongly agree’ while seven staff
members indicated ‘disagree’ and two ‘strongly disagree’. Three staff members indicated ‘don’t know’.

The regional campuses and central campus confirmed their overall first awareness of Moodle was through email and the preference was to receive communication via email. The majority of regional staff members and central campus teaching staff agreed that the communication was effective at their campus and understandable when a new technology was introduced.

### 6.2.2.3 Time

Teaching staff were asked to assess how early they would use new technology in terms of Rogers’ (2003) adopter categories which are Innovators, Early Adopters, Early Majority, Late Majority and Laggards. Then they were asked to assess how quickly staff members at their campus took to using new technology, and how they assessed the pace at which their own campus took up technology in relation to other campuses.

#### Personal use of new technologies

In terms of personal use of new technologies, they were asked to identify which adopter category according to Rogers best described them. Staff members (14) were confident that they ‘will use new technology easily’, while seven ‘will use a new technology after seeing a few people use it first’. In contrast, one staff member needed to be persuaded to use new technology while two staff members ‘will use new technology after many people have used it’ and one who would not use new technology easily.

#### Staff uptake of new technology and uptake of new technology when compared to other campuses

Respondents generally felt staff members at their campus did not take up new technology fast enough with 14 that indicated ‘disagree’ and one, ‘strongly disagree’. This was in contrast to four who indicated ‘agree’ and one, ‘strongly agree’. Five staff members indicated ‘I don’t know’. Reasons for disagreement were not provided although when compared to whether they thought their campus would use technology faster than other regional campuses, 21 indicated ‘Yes’, two indicated ‘No’ and two
indicated ‘I don’t know’. Reasons provided for the affirmative suggest adequacy of resources and ideal location.

“There are more resources at Laucala, people are more used to new developments here.” (Ts_1)

“I have issues with getting the software correctly setup in the region. I believe this has to do with the level of IT support that regional IT are getting.” (Ts_4)

“I do-not know why there isn’t a collaborative approach to introducing this technologies across all regional campuses at the same time. Training, guides, instructional videos/websites all should be deployed at the same time.” (Ts_5)

“Connectivity issues at regional campuses are worse than those here at Laucala.” (Ts_7)

“I am based at Laucala which is likely to have less infrastructure problems.” (Ts_10)

“It’s the main headquarter and centre for everything, it has the best of all facilities and technology.” (Ts_12)

“Laucala is the main campus and USP will most likely test things out first in Laucala before rolling it out to other regional campuses.” (Ts_13)

“The technical resources are readily available at my center compared to regions as technicians there need to update themselves first before disseminating and diffusing the transfer of knowledge.” (Ts_20)

“Laucala campus is where new developments (new technology) are introduced, trialed before they are taken to other campuses, assuming that is the case.” (Ts_24)

When asked to identify which adopter category best described them, Teaching staff at the central campus generally considered themselves at the higher end of the innovation adoption scale (early adopters) in terms using personal use of new technology. There were very few laggards evident in terms of not easily using new technology which was also similar to the regional campuses responses. In terms of staff uptake of new technology at the central campus, teaching staff reinforced the views of the regional campuses that the central campus was faster because of better resourcing, facilities and support.
6.2.2.4 The social system

To address the fourth element of diffusion, the social system, this section explores staff members’ awareness of the strategic plan; how they assessed developments at their campus and the quality of IT facilities as far as supporting students adequately. They were also asked about their knowledge of the other regional campuses as well as challenges they experienced when using new technology at their campus. Finally, they were asked about their thoughts regarding technological innovation at USP.

Awareness of the strategic plan

All staff members at the central campus indicated being aware of the university’s strategic plan. They were able to articulate its main function, generally as a guiding document for the university.

“To make the university a better quality institute based on the needs of the region.” (Ts_1)

“Generally, an effort to convert the university to coincide with international standards. Making processes more efficient, effective, and productive with a hope to sustain it.” (Ts_5)

“To target a holistic development of its students, as effective members of homes, societies, nations, world.” (Ts_9)

“Set goals for university staff in terms of accomplishments for the set period.” (Ts_11)

“To outline future directions and aims of the university.” (Ts_14)

“To me, the main function of USP’s strategic plan is to clearly set our goals and directions that USP aims to achieve and broadly state how it intends to fulfil these goals.” (Ts_17)

There appeared to be cynicism in a few responses, for example,

“To appease and satisfy Donors and member governments. Give an outward show that USP is doing a GREAT job.” (Ts_3)

“Show all the staff the general direction of research and education of the USP. Of course, it is required to show the top management is doing something useful.” (Ts_19)
Developments at campus

Staff members were asked about the regularity at which changes occurred at their campus (Table 6-3). Staff members generally indicated ‘sometimes’ in terms of frequency of changes that occurred at the campus; more so with employment of additional staff (76%), acquisition of new computers (72%) and improvements to building facilities (68%). Overall, this may indicate that staff members are generally aware of changes taking place in their departmental/sectional level.

<table>
<thead>
<tr>
<th>Campus</th>
<th>Very often</th>
<th>Often</th>
<th>Sometimes</th>
<th>Never</th>
<th>I don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make improvements to work processes</td>
<td>3/25 (12%)</td>
<td>8/25 (32%)</td>
<td>12/25 (48%)</td>
<td>-</td>
<td>2/25 (8%)</td>
</tr>
<tr>
<td>Acquire new computers</td>
<td>1/25 (4%)</td>
<td>3/25 (12%)</td>
<td>18/25 (72%)</td>
<td>-</td>
<td>3/25 (12%)</td>
</tr>
<tr>
<td>Employ additional staff</td>
<td>1/25 (4%)</td>
<td>-</td>
<td>19/25 (76%)</td>
<td>3/25 (12%)</td>
<td>2/25 (8%)</td>
</tr>
<tr>
<td>Upgrade office equipment</td>
<td>1/25 (4%)</td>
<td>2/25 (8%)</td>
<td>15/25 (60%)</td>
<td>4/25 (16%)</td>
<td>3/25 (12%)</td>
</tr>
<tr>
<td>Improve building facilities</td>
<td>1/25 (4%)</td>
<td>-</td>
<td>17/25 (68%)</td>
<td>4/25 (16%)</td>
<td>3/25 (12%)</td>
</tr>
<tr>
<td>Upgrade software programmes</td>
<td>1/25 (4%)</td>
<td>4/25 (16%)</td>
<td>13/25 (52%)</td>
<td>4/25 (16%)</td>
<td>3/25 (12%)</td>
</tr>
</tbody>
</table>

Quality of IT facilities and adequacy of resources to support new technology at campus

Staff members were asked to rate the quality of the IT facilities at their campus in terms of serving students adequately. They generally rated the IT facilities positively with 10 indicating ‘Good’, 10 ‘Very good’, and one ‘Excellent’. On the other hand, five rated the IT facilities ‘Fair’, two ‘Poor’ and one ‘Very poor’. When staff members were asked whether their campus had adequate resources to support new technology, their indications were also positive, with 14 indicating ‘Agree’ and two ‘Strongly agree’. In contrast, four staff members indicated ‘Disagree’, one ‘Strongly disagree’ and four indicating ‘I don’t know’.

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Knowledge of other regional campuses

Staff members were asked to assess their general knowledge of other regional USP campuses. 17 staff members indicated having ‘some knowledge’ with two who were ‘Very knowledgeable’, five who knew ‘Very little’ and one who did not know anything about the other regional campuses. This was consistent with the fact that the majority of staff members (23) had visited one other campus in the region. In fact 15 of the 23 staff members had been to two or more campuses in the region which would account for how they were able to assess the differences in facilities between the regional campuses and their own. Teaching staff were generally expected to facilitate teaching at the any of the regional campuses from time to time. This included flexi-schools, operating outside of the normal semesters.

Challenges of using new technology

Indications by staff members of the challenges of using new technology may be categorised according to the following: Information Technology (IT), resources, time and the technology itself. With regard to IT, they indicated connectivity issues, restrictions placed by the Information Technology Services (ITS) department on aspects of computer use and a perceived difference in priorities by ITS. It was interesting to note that there was a perceived sense of preference when it came to ITS support priorities. While this was isolated to one teaching staff member’s view, it pointed to processes that perhaps required improvement, further evidenced under resource challenges.

“Internet connection is still slow at times...” (Ts_12)
“Low internet bandwidth and connectivity.” (Ts_23)
“Just the restrictions that IT place on users – internet quotas, restricted access, etc.” (Ts_3)
“Support is only provided based on the ranking system of importance from ITS. If it affects an individual then response within the same day is wishful thinking.” (Ts_5)

A lack of resources from the point of view of the regional students was expressed by staff. This was either related to human resources or physical equipment. In terms of human resources, there was a perceived lack of adequate knowledge and technical
staff in the regional campuses to assist students. In some cases, a perceived inconsistency in technical support despite the presence of qualified staff.

“It is not well supported in the region so does not reach my DFL students.” (Ts_10)

“Power cuts.” (Ts_9)

“IT bookings are regularly overlooked or forgotten because of the shortage of human resources. This is a glaring lack.” (Ts_17)

With regard to time, staff members found it challenging to find time to use new technology, especially with their main work commitments. The timing of technology workshops were not ideal although when they managed to attend these workshops, it was expected that they quickly adjust to the new technology. There was also a lapse of practical knowledge between learning how to use the technology from the workshop and then putting it to use some time later when the need arose.

“I use it, then it may be months again before I use and then I have forgotten...” (Ts_1)

“Getting and organising training sessions for all the people that will be using the new technology to be trained may be a challenge.” (Ts_21)

“Finding the time to play and learn new things from the software or hardware.” (Ts_13)

“Not enough time to learn deeply.” (Ts_15)

The technology was seen as a challenge in itself particularly with how staff members felt towards it, such as the motivation to use it, the lack of support for it and resistance to it.

“The older academic staff are not familiar with new technologies and worse, show little willingness to learn. This hinders the university’s efforts to maximise the benefit of online technologies available to us today.” (Ts_17)

“Grasping certain aspects of the technology can be frustrating.” (Ts_8)

“Very little follow-up guidance on new software (e.g. Moodle). Manuals provided are too brief and do not encourage use of a lot of the characteristics of the software.” (Ts_22)

“Some staff resist new changes. Often it becomes difficult to implement new technologies across the board as some staff will not cooperate. This affects the use of a new technology fully.” (Ts_25)

“Fear of trying out new things in case in doesn’t work for you.” (Ts_13)
Technological innovations at USP

When asked to comment on aspects of innovation at the university, staff members who responded emphasised the need to get the basics right first, improve the way new technology is introduced and create better awareness and understanding of innovation.

In terms of getting the basics right according to the respondents, the existing facilities needed to be improved, procedures need to be updated and reflective practice should be encouraged to reconcile past experiences with current practices in terms of technology use.

“What get the basics right first! Any students do not use the library now because of the promise of e-learning etc... Knowledge is not just acquitted by memorisation etc., it is absorbed from reading many different articles/books etc. Students are lacking an appreciation of this nowadays...” (Ts_1)

“There is still a lot of improvement needed to be done. Particularly in lecture rooms and tutorial rooms. Currently only the lecture rooms are fully equipped but would wanted to see some of the tutorial rooms well equipped as well. To do away from chalk and white boards and use more overheads projections etc.” (Ts_11)

“USP has to ensure that innovation is not made mandatory for courses if all students do not have access. E.g. Mandatory University courses which are online, but not all students have access to Moodle. Online tests etc.” (Ts_10)

“While being innovative is good, it is also important that USP takes time to reflect and take stock of the lessons learned from its innovations rather than ‘rushing’ to implement these. Involvement and engagement of many staff and the region are key so that any innovation is owned by all.” (Ts_24)

With regard to the introduction of new technology and innovation, there needed to be proper awareness and understanding as well as a cohesive approach to planning.

“I feel there need to constant workshops, user friendly manuals (for both beginners and advanced users), and full-time trainers who can assist in developing the relevant expertise. Otherwise there is no point in investing so much in software/hardware that no one really uses.” (Ts_22)

“Before an innovation takes place, awareness is paramount. There should also be constant support given, for example in the form of workshops or consultations with the experts on particular topics.” (Ts_6)

“All innovations are good, but needs to ensure everyone is trained on the use of
“it and not just the big boys and girls or certain people...” (Ts_12)

“USP is innovative but at times innovation creates more work.” (Ts_14)

There was also enthusiasm expressed by staff on the possibilities of what innovation could do for them and the university.

“It’s exciting being part of USP and being part of “cutting edge innovations” in the Pacific.” (Ts_16)

6.3 Group 2: Heads of schools and support sections

In this section, responses from Heads of Schools (HOSS) and key senior staff members from support sections are presented. It begins with a description of the participants’ profile, followed by findings based on the theoretical framework for the study.

6.3.1 Participants’ profile

23 staff members at the central campus returned responses to the questionnaire while nine staff members were interviewed for a total of 32. Responses from the nine staff members are categorized within the areas of Roger’s elements of diffusion and aspects of technological innovation for distance and flexible learning at USP.

Staff members represented the academic and comparable (A&C) or senior staff category at USP (HR Office 2013). Heads of Schools for instance are classified as academics while staff members of Support Sections are classified as comparable. Staff members generally had a formal qualification at a graduate level. Nine had a Master’s degree, six had a PhD, four had a Post Graduate Diploma, two had Post Graduate Certificate and one had a post doctorate. The disciplines covered by the qualifications of the Heads of Schools represented the three faculties at the university – the Faculty of Business (FBE), the Faculty of Arts, Law and Education (FALE) and the Faculty of Science, Technology and Environment (FSTE). The qualifications of staff from the support sections varied and did not necessarily apply to the area in which they worked. Nine staff members had spent between 6-10 years at the university; six had worked at
USP for more than 20 years, four between 11-15 years, two from 16-20 years and two from 1-5 years. Heads of Schools had worked considerably longer at USP which may reflect their current roles.

Computer use
All respondents considered themselves ‘Totally confident’ at computer use (Table 6-4). This was particularly evident for the basic computer tasks (ranging from 85 – 100%). There were varying levels of confidence for the more complex tasks of manipulating spread-sheets and inserting multimedia elements into PowerPoint presentations (47 – 76%).

Hours spent using the Internet at work each day varied. Five staff members spent 4-5 hours; another five spent 1-2 hours, four spent more than 6 hours and another four spent 3-4 hours with three spending less than an hour. 17 staff members indicated using social networking sites while four who did not.

Preference for method of learning new technology
In terms of how they would like to learn to use new technology, eight staff members indicated their preference for ‘attending a workshop’, seven would ‘play around with it’, four would ‘learn from a friend or colleague’, and one would use ‘internet resources’.
<table>
<thead>
<tr>
<th></th>
<th>Not at all confident</th>
<th>Moderately confident</th>
<th>Totally confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can send an email with an attachment</td>
<td>-</td>
<td>-</td>
<td>21/21 (100%)</td>
</tr>
<tr>
<td>I am able to create an email signature for my outgoing emails</td>
<td>-</td>
<td>1/21 (4.76%)</td>
<td>20/21 (95.24%)</td>
</tr>
<tr>
<td>I can create a word document and format it</td>
<td>-</td>
<td>3/21 (14.29%)</td>
<td>18/21 (85.71%)</td>
</tr>
<tr>
<td>I can insert, edit and format tables in a word document</td>
<td>-</td>
<td>2/21 (9.52%)</td>
<td>19/21 (90.48%)</td>
</tr>
<tr>
<td>I am able to insert data in a spreadsheet</td>
<td>1/21 (4.76%)</td>
<td>4/21 (19.05%)</td>
<td>16/21 (76.19%)</td>
</tr>
<tr>
<td>I can create charts and graphs in a spreadsheet</td>
<td>3/21 (14.29%)</td>
<td>5/21 (23.81%)</td>
<td>13/21 (61.90%)</td>
</tr>
<tr>
<td>I can insert text and images in a PowerPoint presentation</td>
<td>-</td>
<td>2/21 (9.52%)</td>
<td>19/21 (90.48%)</td>
</tr>
<tr>
<td>I can insert audio and video in a PowerPoint presentation</td>
<td>3/21 (14.29%)</td>
<td>8/21 (38.09%)</td>
<td>10/21 (47.62%)</td>
</tr>
<tr>
<td>I am able to search for information using the Internet</td>
<td>-</td>
<td>2/21 (9.52%)</td>
<td>19/21 (90.48%)</td>
</tr>
<tr>
<td>I can download images from websites</td>
<td>1/21 (4.76%)</td>
<td>2/21 (9.53%)</td>
<td>18/21 (85.71%)</td>
</tr>
</tbody>
</table>
6.3.2 The elements of diffusion

Rogers’ (2003) elements of diffusion are the innovation, the communication channel, time and the social system.

6.3.2.1 The innovation

Staff members were asked about their previous use of learning management systems and their awareness of Moodle at the university. Then they were asked to rank the attributes of innovation to indicate what they saw as being the most important attribute to successful adoption.

Prior use of learning management systems and awareness of Moodle

With regard to having used a learning management system, 17 staff members indicated ‘Yes’ while four indicated ‘No’. Two staff members did not respond. For those who indicated ‘Yes’, prior use was mainly in the form of a teacher and student role or both, which in some cases included a guest role. The role of developer/programmer was to a lesser extent. All staff members who responded were aware of Moodle at their campus. When asked how Moodle was used for distance and learning at the university, staff members described it mainly in terms of its functionality. Few provided evaluative comments such as,

“It promotes e-learning and encourages students to participate in forums regardless of their location as long as they have access to internet they can access moodle!” (Hos_5)

“It supports courses through staff and student interaction and student and student interaction online tutorials and the provision of information amongst course coordinators/tutor and students.” (Hos_7)

“I use it to inform students about the course generally – assignments, weekly topics, new ideas, updates, etc. Also for discussion forums – I pose questions every week to generate discussions. Students use the page to interact with me and with each other.” (Hos_10)

“It is a medium through which learning instructions are issues to students; it is also a medium through which students communicate with each other as well as with their tutors/lecturers course coordinators.’ (Hos_19)
The responses above generally indicated that staff members had used learning management systems prior, and were aware of Moodle and its uses for distance and flexible learning, though their working knowledge of Moodle varied in terms of functionality.

Attributes of innovation

In terms of general technology use, ‘The technology being better than a previous technology it replaced’ (Relative advantage – 40) was ranked as most important, followed by ‘Suitability of the technology to their work’ (Compatibility – 32), then the ‘technology can be tested first’ (Trialability – 20/10). The ‘technology is easy to understand’ (Complexity – 20/5) and ‘the effects of the technology can easily be seen by others’ (Observability – 20/4) followed (Table 6-5). Use of technology for this group may be dependent on whether it was better than its predecessor. It may be ideal however if they had prior experience of using the previous technology as well.

Table 6-5 Attributes of innovation

<table>
<thead>
<tr>
<th>Attribute</th>
<th>1 Least important</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 Most important</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>The technology is better than a previous technology it replaces (Relative advantage)</td>
<td>3 (3)*</td>
<td>4 (8)</td>
<td>2 (6)</td>
<td>4 (16)</td>
<td>8 (40)</td>
<td>1</td>
</tr>
<tr>
<td>The technology is suitable for my work (Compatibility)</td>
<td>0 (0)</td>
<td>2 (4)</td>
<td>8 (24)</td>
<td>8 (32)</td>
<td>3 (15)</td>
<td>2</td>
</tr>
<tr>
<td>The technology is easy to understand (Complexity)</td>
<td>4 (4)</td>
<td>4 (8)</td>
<td>5 (15)</td>
<td>5 (20)</td>
<td>3 (15)</td>
<td>4</td>
</tr>
<tr>
<td>The technology can be tested first (Trialability)</td>
<td>5 (5)</td>
<td>10 (20)</td>
<td>2 (6)</td>
<td>1 (4)</td>
<td>3 (15)</td>
<td>3</td>
</tr>
<tr>
<td>The effects of the technology can easily be seen by others (Observability)</td>
<td>9 (9)</td>
<td>1 (2)</td>
<td>4 (12)</td>
<td>3 (12)</td>
<td>4 (20)</td>
<td>5</td>
</tr>
</tbody>
</table>

*Product of row by column in parenthesis
6.3.2.2 Communication channels

Staff members were asked how they became aware of Moodle in terms of the common mediums of communication at the university. Then they were asked about their preference of medium for communication. Following this they were asked about the effectiveness of communication and understandability of communication when a new technology was introduced at their campus.

First awareness of Moodle via communication channel
Staff members indicated generally first becoming aware of Moodle through word of mouth (13). USP all staff & students email (three) and the USP website (two) were also indicated. There was no indication for the university’s official newsletter, the USP Beat.

Preference of communication medium
In contrast to how they first became aware of Moodle, staff members preferred to receive news and general information about USP through the all staff & students email (19) with one staff member preferring the USP website. No preference was given for the university’s official newsletter.

Effectiveness and understandability of communication at campus
In terms of whether they thought communication in general was effective at their campus when a new technology was introduced, 11 staff members indicated ‘agree’ and four ‘strongly agree’. In contrast, four indicated ‘disagree’, one ‘strongly disagree’ and two indicated ‘don’t know’. On whether they thought the information provided about the new technology was understandable, nine indicated ‘agree’ and five ‘strongly agree’, with six indicating ‘disagree’ and one ‘don’t know’.

6.3.2.3 Time

This section looks at staff member’s assessment of how early they would use technology. Then they were asked to assess how quickly staff members at their campus took to using new technology, and how they assessed the speed at which their own campus took up technology in relation to other campuses.
Personal use of new technologies

In terms of personal use of new technologies, they were asked to identify which adopter category according to Rogers best described them. Staff members (14) were confident that they would ‘use new technology easily’. Four staff members would ‘use new technology after being persuaded’, with two who would ‘use new technology once they saw a few people use it first’.

Staff uptake of new technology and uptake of new technology when compared to other campuses

Indications by staff members were fairly even with regard to the speed at which they felt staff members took up new technology at their campus. Eight indicated ‘disagree’ and one ‘strongly disagree’. On the other hand, seven indicated ‘agree’ and two ‘strongly agree’. However, when they were asked if their campus would use technology faster than other regional campuses, 20 indicated ‘yes’ which may suggest that despite the polarised views of technology uptake at their own campus, the pace was still better than that of the regional campuses. Reasons provided by staff members indicated that technical support and technology was better than any other regional campus. This may be due to its centrality and the fact that it was the centre of operations as the following suggests,

‘Laucala campus has the advantage in human resources and infrastructure to be able to do the above (use technology faster) effectively.” (Ts_1)

“There is more support (it’s not perfect, but there is some assistance). IT support at some regional campuses is very limited, which limits introduction and uptake of technology. Also things are very centralised, so that poor connections mean access is often very slow and this frustrates regional staff. As I do have quite a lot of contact with staff on other campuses, I know this is an issue even in campuses which I have not visited, such as Alafua, Vanuatu, Marshall Islands, Nauru etc. As well as an issue for staff, this also impacts significantly on students, who rarely receive any training in the technology, often do not receive passwords promptly, which means they cannot access SOLS, Moodle etc, and they often get no help when computers are malfunctioning. They often email me instead. Assistance is particularly limited on weekends and evenings.” (Ts_2)

“Laucala being the main campus and home to the ICT Centre; should be taking the lead role in exploring, testing, using and disseminating information on new technology.” (Ts_5)
“I work in Laucala – the bandwidth is best here; the IT support is here and everything gets attended to faster here than at the campuses.” (Ts_10)

“Often its takes a while before new technologies diffuse to other campuses, often those campuses are also not well supplied with new technology, which means set-backs for new technologies (i.e. in many of the campuses bandwidth is very poor, so new technologies that require good internet connection don’t make it.” (Ts_16)

“Staff are usually better informed in my campus than in others.” (Ts_21)

“One is leadership in different campuses probably they are not promoting it that much. We cannot be in all campuses as it has become expensive. There are some leaders in the campuses that have taken this on board. They have built their own structures and support to students which I think is more acceptable. Some of them think that whoever section leading this will have everything done.” (Lst_1)

6.3.2.4 The social system

Staff members’ were asked about their awareness of the strategic plan, how they assessed the developments at their campus and the quality of IT facilities as far as supporting students adequately. They were also asked about their knowledge of the other regional campuses as well as challenges they experienced when using new technology at their campus. Finally, they were asked about their thoughts on technological innovation at USP.

Awareness of the strategic plan

All staff members at the campus were aware of the university’s strategic plan. Generally, they were able to articulate the function of the strategic plan in terms of the university’s goals and direction.

“A guideline and pathway for USP to ensure its Vision, Mission, Values and Objectives are maintained and fulfilled.” (Hos_4)
“To direct the University's development in a constructive and holistic manner through the provision of tertiary education and research in response to the needs of the people and countries of the Region in the global context of the 21st century.” (Hos_7)

“It sets out the University's comprehensive plans for expanding its vision for the region and the education in the foreseeable future. It forecasts possibilities and keep the union between university team and the governments, stakeholders, development partners etc.” (Hos_10)

"To establish a sustainable future for the University and to strengthen its role as the premier institution in the Pacific that engages regionally and with Pacific communities to create more sustainable economies, environments, and social development appropriate to the changing region we occupy (VC’s Foreword, USP Strategic Plan 2010 - 2012: 3)” (Hos_12)

“To ensure that our programmes of study & courses are comparable, or better, at international level, and at the same time feasible for our institution. To also produce the best graduates.” (Ts_18)

**Developments at campus**

Staff members generally indicated ‘sometimes’, although ‘improvements to work processes’ were seen to be occurring more frequently with 10 (47.62%) indicating ‘often’. ‘Upgrade to office equipment’ (14 – 66.66%), ‘improve building facilities’ (14 – 66.66%) and ‘employment of additional staff’ (14 – 71.42%) was seen as sometimes changing (Table 6-6).

<table>
<thead>
<tr>
<th></th>
<th>Very often</th>
<th>Often</th>
<th>Sometimes</th>
<th>Never</th>
<th>I don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make improvements to work processes</td>
<td>3/21 (14.29%)</td>
<td>10/21 (47.62%)</td>
<td>6/21 (28.57%)</td>
<td>2/21 (9.52%)</td>
<td>-</td>
</tr>
<tr>
<td>Acquire new computers</td>
<td>2/21 (9.52%)</td>
<td>7/21 (33.34%)</td>
<td>12/21 (57.14%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Employ additional staff</td>
<td>-</td>
<td>-</td>
<td>15/21 (71.42%)</td>
<td>3/21 (14.29%)</td>
<td>3/21 (14.29%)</td>
</tr>
<tr>
<td>Upgrade office equipment</td>
<td>-</td>
<td>6/21 (28.57%)</td>
<td>14/21 (66.66%)</td>
<td>-</td>
<td>1/21 (4.77%)</td>
</tr>
<tr>
<td>Improve building facilities</td>
<td>-</td>
<td>2/21 (9.52%)</td>
<td>14/21 (66.66%)</td>
<td>4/21 (19.05%)</td>
<td>1/21 (4.77%)</td>
</tr>
<tr>
<td>Upgrade software programmes</td>
<td>2/21 (9.52%)</td>
<td>7/21 (33.33%)</td>
<td>11/21 (52.38%)</td>
<td>-</td>
<td>1/21 (4.77%)</td>
</tr>
</tbody>
</table>

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Quality of IT facilities and adequacy of resources to support new technology at campus

Staff members were asked to rate the quality of the IT facilities at their campus in terms of serving students adequately. They generally rated the IT facilities ‘Very good’ (10), with two rating it ‘Excellent’ and five ‘Good’. Four staff members rated it ‘Fair’. Staff members were fairly positive about the adequacy of resources at their campus to support new technology, with ten indicating ‘Agree’ or ‘Strongly Agree’. However, eight staff members indicated ‘disagree’ and one ‘strongly disagree’, despite earlier sentiments that their campus was at an advantage in terms of resources compared to the regional campuses.

Knowledge of other regional campuses

Staff members were asked about their general knowledge of other regional USP campuses. Fifteen indicated ‘have some knowledge’, with five who were ‘very knowledgeable’ and one who ‘knew very little’. With the exception of three staff members, 18 had visited at least one regional campus. 15 of the 18 staff members had been to three or more regional campuses. This may account for their level of knowledge of the other campuses in terms of assessing the differences in campus facilities.

Challenges of using new technology

Indications by staff members of the challenges of using new technology may be categorised according to the following: IT resources and support, staff attitudes, and time. Deficiencies in IT were indicated as the most common challenge, particularly where computers, internet connectivity and proper and adequate IT skills were concerned. These sentiments were often expressed in terms of the regional campuses and not necessarily their own. For instance,

“Delays in answering of queries regarding problems encountered during use of the software or hardware. At times when I am visiting the region, connection is very slow.” (Hos_1)

“The major challenge I have faced so far is in the area of knowledge support; i.e. the lack of it. For example, most IT staff recruited are very well versed with Windows based applications which is good. However a good number of applications available through open-source (which is the direction the USP is
enhancing) are Linux based. Teaching in IT has moved from these traditional platforms to the more fluid Windows based ones. If we are going to encourage the use of open-source software’s, then we should build our capacity with traditional platforms like Linux.” (Hos_5)

“The glitches from power surges, blackouts etc. are too frequent and frustrating; Losing data; sometimes the IT assistance is slow to arrive and computers are not replaced often enough. I still have many questions about Moodle.” (Hos_10)

“Internet access in different countries; overbearing costs.” (Hos_14)

“Low bandwidth (internet) lack of expertise of IT professionals.” (Hos_16)  
“Training and support.” (Hos_17)

“... limited access to support material. Support staff who are not familiar with the software/hardware, or ignore emails requesting help. No training, or one size fits all training which does not consider level of expertise. Training often takes little account of other demands of faculty, so we cannot attend, and sessions are not recorded or repeated.” (Hos_2pt2)

“That it is not compatible with current programs available and other equipment (printer) in the office.” (Hos_18)

With regard to staff attitudes, a reluctance to use technology was expressed,

“Staff not wanting to adopt new tech into their TLPs” (Hos_8)

“Management conservative thinking and attitude, too cautious to take risk to make changes and explore new methods.” (Hos_4)

“... with change especially at USP there is always resist so trying to get people to use new technology is always a challenge due to the resistance that people have for anything new that could possibly take them out of their comfort zones.” (Hos_3)

With respect to time, staff members expressed challenges in finding time to learn new technologies.

“Usually it is time to familiarise myself with the new.” (Hos_15)

“Find time to really play around with all of the features.” (Hos_20)

“Lack of time to learn it properly...” (Hos_21)
The “challenge of change” (Its_1) was also expressed especially as it was up to the individual to accept new technology or stay in their comfort zone. A lack of “awareness sessions” (Its_2) in regards to change and its benefits was also expressed as a challenge. There also had to be a systematic approach to awareness as “practical hands-on sessions on effective use” should follow. (Its_2)

**Technological innovations at USP**

When asked to comment on aspects of innovation at the university, staff members who responded reiterated technology issues as well as a need to address basic challenges first. Other responses provided examples of innovations that they had encountered or worked on at the university.

“As USP does not have unlimited funds, it would be better to prioritise key technologies and get these right, rather than spreading themselves too widely. Improving service and support for students should be the focus, but there is a growing divide between wealthier urban students and their technology needs, forgetting the limitations for poorer urban and rural students. This is evident in moves to fully online courses which do not seem to be offered in another format for those students with limited access to technology and connectivity.” (Hos_2)

“A real lack of infrastructure & relevant staffing makes it difficult for training in new technology to be carried out efficiently and effective across the entire university. This is why USP cannot call itself an innovative university.” (Ts_21)

“I know that sometimes USP is trying to compete with those universities out there in the world, outside of USP and they want to make sure that they are on par or the same technology but I wonder if it thinks about the appropriateness of that is suitable to the rest of the other campuses. USP assesses and evaluates innovation and finds out whether it is best to go into it or not.” (Cfl_1)

“The USP must ensure sustainability of its innovations through HR, Financial and Technical support. Innovations must always be aligned to the strategic plan. Personal interests must not override the strategic plan.” (Hos_7)

“Innovation is associated with ‘rareness’ and comes with a lot of creativity, flexibility, risk and originality. To foster innovation in the USP region, you need to be confident to use and build on the capacity of pacific islanders themselves. The technology is only here to facilitate the sharing if this ‘rare find, to those who wish or need to know.” (Hos_5)
“Innovation is fine but we need to attend first to basic challenges in teaching and research and we are not doing so. Our students are encouraged to use Moodle and certainly can use Facebook and Twitter but most cannot write or speak English to an adequate standard, and attempts to increase enrolments and reduce failure rates can be achieved only through reducing standards.” (Hos_13)

“In terms of innovation – I think - there are a lot of opportunities to work with the campuses not only just the delivery of the materials but monitoring, getting feedback, training. If we can come up with a whole innovative package which uses the online environment plus maybe on the phone or a trip at some stage. All those things we should be delivering some kind of innovations to advance the quality of the stuff we are putting out. Make some dents on the world stage because this is a very unique environment; the USP learning & teaching environment in terms of what we need to do to get our students to learn. If we can come up with something probably based on online portals with offline activities and put it up on the world stage and say there is a really good example of practice happening in USP.” (Cfl_2)

The work of a former Head of School who has since passed away is noted here. In an aid sponsored paper on Free and Open Source Software (FOSS) by Schutz, Khan and Chand (2005), he explained the beginnings of a course management system at USP. This system has since been phased out but of note (Figure 6-1) is the process by which the innovation process began.
Figure 6-1: Excerpt from FOSS by Schutz, Khan and Chand (2005)

The School decided to come up with an online education delivery platform for the University of the South Pacific’s School of Law in November 2001. The brief was to put something together using only open source software. Up until this point, the School had been publishing a limited range of supplementary materials in a couple of courses, using MS FrontPage and IIS. Some discussion forums were offered, but a lack of security resulted in too many inappropriate postings and they had to be taken offline. There was also a concern that the unprotected course materials may be poached by other institutions if not protected. Thus the initial requirements were fairly modest – a simple content management system which non-technical users would be comfortable with, discussion forums and an easy to administer user-level security system.

After much web crawling and test drives, Zope + CMF 1.1 was chosen. The range of add-on products looked promising. This was pre-Epoz & Kupu, but StructuredText promised a simple way for people to publish content without learning HTML. Local roles seemed a good way to manage course-level access. The separation of content, presentation and business logic also seemed like a good idea. Despite having never seen Zope or Python before, we were able to get a prototype up and running within a week. By February 2002, we had Version One, offering online courses in 2 subjects using a fairly standard CMF Default site, with the following couple of non-CMF products hacked into the site as well:

- ‘Squishdot’ for discussion forums
- ‘Exam’ for online tests

Of course much of the success of the project from this point onwards was due to the strong commitment of the Law School staff to learning the new system and using it to its full potential. Comprehensive lecture notes and readings were made available on the site, online tests were written for each week’s content area, and the discussion forums were regularly patrolled by teaching staff. This level of commitment made the eaSOL system into a dynamic learning environment which students were happy to use.

Incremental improvements took place over the next 12 months as we climbed the undeniably steep Zope learning curve, and new products were released. For example:
the Squishdot product was replaced by a version of CMFForum, hacked to remove Plone dependencies; when Epoz was released, it was integrated into the CMFDefault edit templates; presentation templates were overhauled in 2003 to give the site a distinctive look and feel; as CMFDefault developed, Page Templates came to replace DTML. Many site components had to be converted as a result; in order to integrate PloneChat into the site, a number of Plone tools were added to the site and PloneChat was hacked to work with CMFDefault’s main_template.pt; some of the navigation elements, such as batch navigation, were imported from Plone to improve usability; the LTOmlinesTest product began development in late 2003, in order to replace the non-CMF Exam product with a CMF-style product. This would remove any need for teaching staff to use the ZMI; the LTAssignmentBox product was developed to make the submission of assignments by online students more efficient.

At the same time, students who had used the system in some units were putting pressure on teaching staff to increase the number of courses available in the system. By February 2003, about 15 courses had been earmarked to use eaSOL. A new online-student mode of enrolment had been pushed through with its own fee structure to support the new remote mode of study. Prior to this system being offered, students from around the South Pacific had to move to Vanuatu to complete their studies in face-to-face mode. By Semester 1, 2004, all 40+ courses of the undergraduate LLB program were offered in online mode.

By early 2004, it was apparent from the continued pace of improvement of Plone, and the eaSOL site’s increasing reliance on Plone tools and code, that a migration to Plone was in order. The migration to Plone 2.0.4 was finally done in November 2004, involving over 250Mb of course content. The LTOmlinesTest and LTAssignmentBox products were rewritten for Plone, and the hacked version of PloneChat was replaced with an unmodified PloneChat2.

In order to cater for increased demand, the site now runs on a 4-box ZEO cluster. The School of Pacific Languages, and the Early Education department have recently begun using the eaSOL system for their own courses.

Of course, the improvement process never ends. We are now considering replacing CMFForum with CMFBoard; adding PowerPoint-style presentations based on Andy Mackay’s implementation of Eric Meyer’s S5; more improvements for LTOmlinesTest; a mail-in content product, similar to the Moblog feature of CoreBlog and more.
6.4 Group 3: Senior management team

In this section, the findings from the senior management team (SMT) are presented. It begins with a description of the participants’ profile, followed by findings based on the theoretical framework for the study.

6.4.1 Participants’ profile

In terms of participation, six of the nine members of the SMT were interviewed. This included the Vice Chancellor, the two Deputy Vice Chancellors and the three faculty Deans. The Executive Director of Finance, Pro Vice Chancellor of Planning and Quality, and the Pro Vice Chancellor of Research and International were unavailable during the data collection period. SMT are classified as academic and comparable (A&C) or senior staff category at USP (HR Office 2013). The SMT members who were interviewed had a minimum PhD qualification, with three being Professors. Five of the six SMT members had worked for the university for over twenty years while the remaining member had been with USP for less than three years. The SMT members that had been at USP for a longer period of time generally started from junior academic roles. With the exception of one member, none of the other SMT members had qualifications or vast experiences working with learning technologies for distance education. Work related to learning technologies appeared later in their careers as they assumed senior management roles at the university. For the single SMT member who was qualified in the area of ICT, career progression had occurred with ICT being a constant fixture in their work. They generally considered themselves computer literate with confidence at standard computer use.

6.4.2 The elements of diffusion

The elements of diffusion are the innovation, the communication channel, time and the social system. The views of the SMT in this section are expressed in a truncated manner while maintaining the same nuances from the previous two groups. For instance where previous sections were specific to each of the four elements due to large numbers, the SMT commented broadly about the elements of diffusion.
6.4.2.1 The innovation

The SMT members were asked about their previous experience with learning management systems and then were asked about their experience with Moodle and its functionality for distance and flexible learning. SMT members had prior knowledge of learning management systems in the higher education context though only one of them had actual practical experience at using it in terms of teaching. For SMT members who had been with USP longer, they were aware of the previous learning management systems in use prior to Moodle such as WebCT and eaSOL (Edison). These SMT members were involved in the historical development of learning management systems at the university leading up to Moodle at various points in time. For instance,

“We made a switch to ***** because at that time it was coming in and online courses were new so people were raising questions but School of ***** had already done it in 2006 because that was the restructure.” (Smt_1)

Generally, they were able to articulate what Moodle was for in terms of learning and teaching at USP, with observations about its current use, potential and its shortcomings. These shortcomings however were more to do with the philosophical underpinnings of Moodle use, i.e. online learning and whether it was feasible for a region as USP, particularly as language barriers and resource constraints were an issue. For example,

“USP wants to move to fully online (Moodle) and mobile learning by ******, if you don’t have the structure/back up or resources it is not cheap. I think there is a debate about economics of online learning... One of the variables you need to look at it especially for those campuses especially Solomon Islands you talking about online learning; students learning to use Moodle there when there is hardly any infrastructure; students don’t have places to sit properly.” (Smt_3)
“To me that is a problem because entirely online requires a very high level of language facility in the language of the course... USP is English as a foreign language institution... Almost everyone here English is a foreign language which is not a second language or third and fourth. It’s foreign. That means that they are learning it out of the context of their family home, people on the bus. There is not much practice of it aside from the academic use of it. Which means that to impose the entirely online on top of that – this is why I can’t even have this discussion. People who are working in a foreign language need more F2F support and they need a community of interest around the language...” (Smt_6)

This view is an interesting one in terms of trying to get the basics right before delving into extensive online learning and teaching that may be pedagogically unsound due to language issues.

6.4.2.2 Communication channel

While the SMT believed that communication was crucial at the university, they were generally unanimous about the ineffectiveness of communication at the university. Email may be the more effective way to disseminate information but the timeliness, consistency and execution was lacking. For instance, the Deans expressed similar concerns about inconsistencies with the way their Heads of schools communicated to their staff members. As one Dean expressed,

“I think we’ve got a major problem. It has to happen in schools – I find that none of my HOS sending out any general emails about certain things that are important and that is a problem. Some staff are complaining that there are too much information coming from the Dean’s office so there is the chance for overload as some people will not read it. The HOS haven’t been trained that this is a major part of their job.” (Smt_2)

Another Dean expressed similar sentiments and took further steps to remedy this situation,

“I found that sometimes HODs don’t communicate. When I came back from the ***** campus I found that they do not meet. I had to interview staff individually so I have decided that they must have 2 board meeting and 1 informal meeting. I meet every fortnight with my HOS... The HOS have to communicate but when I find that they are not communicating, I ask the ***** to circulate some of the issues I have sent to the HOSs to everybody. Communication is very important and communicating the information is very important too.” (Smt_1)
SMT members attributed the ineffectiveness of communication to there being no formal communication strategy at the university amongst,

“For a start, we don’t have a communication strategy... For my sections I have asked them to do their own; how they communicate with staff. When I return from SMT I send to them what had happened. We can’t continue to do that. We must have very clear strategies. When we were in ***** it was heartbreaking to hear that the ***** has not even met with the academic staff or all the staff.” (Smt_4)

For the following Dean, centralisation of operations appeared to be hampering effective communication. A state of email fatigue may have started to set in amidst the inherent appearance of “lack of teeth” in terms of policies and process flows that should command prompt adherence.

“One of the reasons why it’s happens is because you are centralizing everything. You think that a message on all staff/students policy would be adhered to. That policy will have to be supervised adhered to at the local level so you can’t direct policies from there. The chain that I was talking about, it has to flow. As a dean my job is to make sure that people in the faculty follow the policies but also equally important is that I should be able to make decision then people will believe that the policy is effective. But if they believe that this guy has no power eventually the decision will be made up there. They wouldn’t worry about the policies here. In economics we always talk about policy paralysis; you keep making policies and it doesn’t have that kind of impact that you expect and when you don’t have that kind of impact you think of another policy. You think of changing it, modifying it and you carry on until you are drowned with policies – that is what we call policy paralysis.” (Smt_3)

Another SMT member offered the following solution,

“Communication is not effective. When I am travelling now I am thinking what I can say; so I send something out whether it is about communication or be nice to people. What I said was that every project should have a communication project; every senior staff must have a communication strategy practice in their portfolios; each Dean must have a communication strategic plan for the HOS and staff; each HOS should have a communication channel and then there should be a communication strategy to everybody. The same applies to ***** and everybody; they need to communicate; we don’t; and if we don’t communicate then people speculate and other people feel the vacuum of information not really pushing the direction it should really go.” (Smt_5)
Other forms of communication such as the faculty forums and the use of REACT to regularly touch base with Heads of schools based at other regional campuses was suggested to enhance communication at the university. These communication deficiencies however, may not be limited to Heads of schools and support sections and the way information trickled down from SMT. There may still need to be improvements in inter faculty communication and not just intra faculty if the following comment is anything to go by. The Dean was commenting on a lack of consultation inter faculty, for example,

“... in ICT in education, (there is a) thinking (that it’s) always the School of ***** so we are kind of working in isolation (almost) ... apparently a framework for ICT in education had (been) developed by USP and approved by the Foreign Minister of Education. I don’t know anything about it neither is my colleagues.” (Smt_2)

6.4.2.3 Time

The aspect of time in the diffusion of an innovation relates to the innovation-decision process and ultimately the rate of adoption. With regard to the initial use of Moodle or LMS’s at the university, initial decisions may have been made by individual section and then endorsed by SMT once formal processes and recommendations were provided. Further, progression in terms of innovation decision processes involved an evaluation of mature learning management systems available at the time as Whelan and Bhartu (2007) explained. They recounted the process by explaining that,

“The main reasons why the University considered Moodle to be the best candidate were based on its pedagogical fitness for the University’s course delivery purposes, the extensive adoption of the platform by educational institutions around the world, and the overall usability, reliability and functionality of the platform.” (p. 1055)

As far as SMT was concerned there may be a concerted effort (and expectation) on the particular department, in this case the Centre for Flexible learning, to be innovative. This was especially true when the university was considering changing learning management platforms. As one SMT member puts it,

“It was for CFL to make it happen; how they did it didn’t matter.” (Smt_2)

However the events leading up to the adoption of Moodle as the sole learning management of the university appear to be fragmented and this also reflected the
innovation decisions as far as learning management systems were concerned at the time. Whelan and Bhartu (2007) state,

“The University hosted three different online Learning Management Systems (LMS): a customised Plone-based content management system that served the Faculty of Arts and Law, called EDISON; the commercial WebCT system that hosted courses in education and other fields; and the open source Moodle system that served the school of computing and information sciences.” (p. 1054)

An SMT member recollected events leading to the adoption of Moodle and notes an air of politics in the way decisions were made about preferred learning management systems. EDISON was developed in her faculty while CFL administered WebCT and another faculty was in the early stages of exploring Moodle. Whelan and Bhartu (2007) explain that EDISON was first developed at a regional campus. The Head of School at the time was also the Dean of the Faculty which may have made it easier to implement EDISON in the faculty in terms of authoritative decision making. The present Dean explains,

“... I was actually involved in WebCT (...) and we spend hours chatting with the students. EASOL then EDISON was there but too many politics. There was the lady that was pushing Moodle from CFL... The first Dean wanted all the staff to be trained in EDISON so I had to organise. Then discussions on Moodle came on. Finally the committee said that Moodle was a platform that was easier and cheaper... That’s what we were looking for – open source because EDISON only one was doing that. When Moodle came it was at a critical time when the university was part of this world move to try and offer flexible learning and accessibility and the use of open source. That’s where I became involved. ”
(Smt_1)

Despite the issues leading up to the adoption of Moodle, it has been assessed as one of the more successful innovations by the institution. As an SMT member explains,

“Moodle – I think is one of our successful innovations so far. Whoever decided made a good choice. You look around the world Moodle is now the platform plus it is open source which aligns with what we are supposed to do. Secondly, it has now increasing its practitioners; the risk is if I am making a contribution largely in terms of wanting timeline adoption and avoiding a very superficial application.”
(Smt_5)

University Senate handed down policy for full university-wide implementation of Moodle from 2007 onwards. The visit by the Moodle creator, Martin Dougiamas in 2010 may have represented a positive turning point for USP’s perception about Moodle and perhaps learning management systems.
“Martin’s visit last year was a major transformation to many people.” (Smt_2)

Now with the current version of Moodle (2.0) there appears to be a single coordinated effort to progress its use as opposed to previously when three learning management systems were in place and run by three different sections. The move to Moodle has also informed the strategic plan as explored in the next section.

6.4.2.4 The social system

This section looks at the function of the central campus in terms of how SMT viewed the strategic plan in terms of technology, the regional campuses and issues with technology use, and organisational and technological issues of innovation at the university. The SMT members appear to articulate the strategic plan in terms of a “bigger picture” context, maybe due in part to being initiators of the plan from which dissemination down the organisation took place. As one SMT member puts it,

“The strategic plan is actually what we’ve worked through. What we want to make sure is that the university takes off from there. The key element from the plan is transforming USP from a good university to being an excellent university.” (Sm_5)

Technology as a prioritised area in the strategic plan only came into prominence in the USP Strategic Plan 2010-12, especially where Moodle was concerned – Objective 3, point 3.5 (p. 13). At least by this iteration of the plan, there was a more tangible statement. This followed on the heels of the university wide adoption of Moodle as its sole learning management system. Earlier plans skirted around the idea of ICTs for education without specific mention for particular learning innovations such as learning management systems. Efforts to emphasise the importance of ICTs has seen its prominence as a new priority area (Priority Area 4: Information and Communication Technologies) in the latest plan (USP Strategic Plan 2013-18, p. 25). The previous plan (2010-12) had six priority areas. The new plan (2013-18) has seven. An indication of the beginnings of ICT as a new prioritised area may be evident from discussions surrounding the development of the plan, particularly from a historical point of view. For instance, the following Dean explained,
“The new strategic plan that we are developing – one of the areas is leveraging ICT. SMT & ITS met and I said our history shows in the last 40yrs with print, Laucala was wonderful with F2F then we discussed how we would do with the region so we decided to do print; my personal view when I looked at the data for the last 40 years is that we did that like almost as an afterthought; we never really supported this to the level that we support Laucala; end result every year every course has a big difference in pass rates.” (Smt_2)

DFL at USP has been synonymous with ICT use in terms of reaching regional students unable to attend face to face classes at the central campus.

SMT members provided their assessment of the regional campuses. The prominent issues raised included student learning in terms of Internet connectivity, campus facilities, campus leadership, and ICT issues overall that have set the regional campuses apart from the central campus. As one SMT member puts it,

“My biggest concern for this actually is the regional campuses. Not so much students as data shows that students prefer it but accessibility although yesterday the consultant from ITS claimed that the bandwidth is a non-issue. We know that regardless of all of these improvements particularly the online courses these days, Laucala campus students really enjoy but still in the region may still have some limited access.” (Smt_2)

In terms of IT infrastructure, some campus had more issues than others. For instance, the Solomon Islands campus was seen as needing a lot more support than other campuses because of slow connectivity to the Internet, space issues in light of increasing student enrolments, and a lack of IT staff. This was consistent with what the regional campuses expressed. In terms of limited bandwidth and lack of expertise,

“Solomons got issues that one of the biggest problems is that they have to go out to Australia and then come back through to the Southern Cross to get internet access. That is not easy as it is coming through the intranet and bandwidth is small and cater for the numbers ... We had appointed one of their local staff but the biggest problem – I think – is that they don’t have the IT support to support so many student that we have.” (Smt_2)

Until recently, plans for expanding the Solomon Islands campus were under threat due to land issues beyond the university’s control. While USP is owned by the twelve member countries, the jurisdiction itself is under the Ministries of Education for each member country as an SMT member points out,

“In all the countries, we (USP) come under the Ministry of Education.’ (Smt_4)
Solomon’s issue of lack of campus space is not isolated though as it is being prioritised along with other campuses who have similar concerns. Member governments have promised USP land on which to expand,

“The campuses that are priority are Kiribati, Solomons, Marshalls and Tonga … They (member governments) promised us land; Kiribati government promised us land; Solomons also though the land was too small for that fast growing campus so we were offered another piece to look at … Until we get that land, we can’t build. The land is not our responsibility, it’s the country. Tonga has given us 15 acres. Tonga needs to expand and we have given the go ahead.” (Smt_4)

Regional campus leadership arose as a key issue in terms of how progressive the campuses were. SMT members who had been with USP longer had visited most, if not all of the regional campuses and may have experienced changes as campus leadership changed over the years. Their assessment of the campus directors was generally positive, especially in terms of how they coped with limited resources and ongoing challenges of space and infrastructure. For example,

“I visited the **** campus last month and I was highly impressed with them. Firstly, it is a lovely campus; secondly, for e.g., they have this problem with access to Laucala but they don’t have enough computers but that is not a problem so virtually 90% of the students bring in their laptops and the Campus Directors say that they can manage with 10 computers because they got wireless (now) so they just hook on their laptops and do their work.” (Smt_2)

There was also an expectation of Campus Director’s as university representatives in their own countries. They needed to have good relations with government. One SMT member explained that while leadership was important, a key aspect was,

“The Campus Director’s relationship with government, especially the Ministry of Education.” (Smt_1)

Where there was less confidence expressed in a Campus Director’s leadership, it related to them not being as proactive as others. Again, other factors may have played a part in them being less progressive relative to other regional campuses.

“As a campus director I think **** is not as proactive as ***** could be or it could be because of the large numbers (of students in relation to space issues at the campus).” (Smt_4)

It was not all about the Campus Director’s leadership however, as comments were made about campus staff in general,
“A lot of the campuses we think that the staff don’t want to think for themselves and they are happy of what is being told… communication is one thing. There is not enough of it for them to get to know what Laucala wants and say to Laucala what they want.” (Smt_2)

The consistent issue across all regional campuses appears to be IT. The regional campuses may still be lagging behind the central campus at Laucala. SMT members generally agree that USP as a whole has good IT infrastructure. As two SMT members put it,

“I don’t see that as a big problem because apparently we have the basics of everything.” (Smt5)

“My personal view, USP’s IT infrastructure is actually pretty good.” (Smt_2)

It is when connectivity is compared between the regional campuses and the central campus that disparities become apparent, for instance,

“When we went there to the ***** campus we noticed that computers are still working but the internet access was so slow.” (Smt_4)

SMT offered solutions to address these IT issues which were on-going and to some extent reactive. An SMT member suggested a “site mirror” concept (Smt_2) where duplicated servers were located in each of the regional campuses to allow for efficient access to online services such as Moodle. A more recent option was the use of the KU band satellite system (refer to Chapter 3) to enhance connectivity in some of the regional campuses (Smt_4). There was reservation expressed about the lack of technical expertise at the higher level of IT management at the university along with suggestions to continue to up-skill IT staff.

“... I don’t think we have the technical expertise or the wish on certain people to actually do it (maximise IT capabilities) ... but we do not have a good driver in the driving seat. We need to build the capacity of our people to be able to build the technology as it is.”(Smt_2)

Furthermore, the SMT members who closely worked with IT management expressed similar sentiments about a perceived “silo mentality” that existed.

“ITS have been thinking in a silo.” (Smt_4)

“The way people think at USP; it needs a major shift from the current things that people have, i.e. people work in a silo...” (Smt_2)
General staff development was an issue raised in terms of progressing innovation. Younger members of staff for one needed to be considered in the management psyche,

“The university if shaped in changing the younger generation but unfortunately most people at the university are not so young by the time they get selected. What we have to do is to figure out how to make sure that young people can input into your thinking.” (Smt_5)

Performance management was raised as an issue that impinged on effective dissemination and use of technological innovations.

“One of the systems that we don’t use very well at all is performance management. We don’t require staff to get up to speed to practice those skills and to be assessed at the time of staff review. Unless you get TA to a Professor to be up to date with their skills and therefore, you have to require it from their HOS, Deans so if you don’t make it somebody’s job it won’t happen. It’s very simple and this is a very old fashion technique of getting people to do stuff. You train, develop, acquire them to do it, address their concerns, have individualised tutoring staff on it if you need to because they come out from a deeply resistant or even some kind of disability/visual but you working to make sure that, that person is able to understand that this part of their job and in the same way that they must answer emails; turn up for class.” (Smt_6)

Staff buy-in may appear to be an issue with innovation and change at the university as well. This has led SMT members to consider various strategies,

“In terms of the more senior staff, if 2 or 3 people resist the whole thing starts to fall apart so we have taken an approach that we will not bother those ones that we know who will have an issue; the offer is always there (they know it) but if they don’t want to get involved that is okay. Several of these cases some of them will hop on as well. We do have some senior staff that are very keen.” (Smt_2)

“I guess the buy in is what we have to focus on and perhaps also find more rewards for people; rewarding those who have become successful as a model for everybody else and not rewarding those that do not do successfully and eventually penalising them for not promoting them. We haven’t got to that far yet.” (Smt_5)

Other issues addressed by SMT members were organisational in nature with regard to innovation. For instance, the approach by which innovation was driven at the university, the relationships within the organisational hierarchy and the leadership with the SMT. An SMT member stated that,
“The problem in USP is that we have not been trying to understand the economics of Education; the finances what is the implication; how does it affect people in the lower level; there is no course in economics of education ... You have to look at that at all levels; right from the VC to the Deans to the HOS to Academics to Campus Directors; you look at their behavior, relationship, the decision making process – what is concentrated? One of the things I had big issues in this university when I became Dean was I thought I will have complete authority; you give me a $12m budget and you ask me about the output; you audit me every 3 months... it should be accepted when I make a decision here. If you are not letting that person do the work then you either don’t have the calibre of the person or you don’t have others in the team that have that calibre—and that was what’s happening to me.” (Smt_3)

A number of similarities and differences in responses from the three groups (Teaching Staff, Heads of Schools and Support Sections and the Senior Management Team) at the central campus can be identified. These outcomes can be viewed alongside the responses from the regional campuses.

In relation to the awareness of the strategic plan, not surprisingly the senior management team demonstrated a more thorough and detailed knowledge of the plan while teaching staff and heads of schools responded with a high awareness. The regional campuses had similar awareness of the strategic plan but also had notable numbers (in the minority) that were not aware. In the area of developments at campus, the regional campuses identified ‘sometimes’ in relation to development as did the teaching staff and heads of schools. The senior management on the other hand saw the development at campus as improving more often.

When questioned about the quality of IT at USP, both teaching staff and heads of schools and support services saw the quality as very positive. The regional campuses raised some concerns about the quality of the IT, while the senior management team acknowledged some deficiencies which could be improved.

A range of views were expressed when the diversity of groups were questioned about their knowledge of other USP campuses. The senior management team appeared to have excellent knowledge and had visited most if not all campuses in the USP region. The responses then diminished on examination of the other groups, the heads of
schools appeared to have great knowledge, the teaching staff had some knowledge, and the regional campuses admitted they had little knowledge.

The challenges of using new technology was put to all groups with varying responses. For example, while the teaching staff highlighted connectivity issues (which were strongly reinforced by the regional campuses) the heads of schools identified issues such as lack of skills, lack of support, staff attitudes and reluctance and the acknowledgment of time. On the other hand, the senior management team acknowledged the benefits of the innovation but recognised that successful dissemination was currently suffering. The data raised by all groups will be subjected to a more sophisticated analysis in the discussion and conclusions chapters.

6.5 Summary

This chapter concludes the presentation of findings that looked at the three groups of staff members at the central campus, i.e. teaching staff, heads of schools and support sections and the senior management team. They were all based at the main campus in Suva, Fiji. Following a presentation of participants’ profiles, findings were presented according to the theoretical framework for the study.

The next chapter presents a discussion of the findings.
CHAPTER 7 DISCUSSION

7.1 Introduction
This chapter discusses the findings in Chapters 5 and 6 in the context of the literature review and background. Importantly, this chapter brings together the findings from the regional campuses (Melanesia, Polynesia and Micronesia) and the central campus of Fiji, highlighting the similarities and differences allowing a discussion of the main points. A brief recap of the study is followed by an analysis and discussion of the case university within a framework based on the work of Rogers (2003). Where relevant, reference is made to specific campuses and/or cultural groups to discuss key aspects of the diffusion process.

Chapter 8, which provides conclusions and implications for the study on regional contexts, follows.

7.2 Recap of the study
The researcher set out to examine the process of diffusion of an innovation at a regional university, the University of the South Pacific (USP). The said innovation was Moodle, a learning management system. Rogers’ (2003) diffusion of innovations provided an appropriate theoretical tool as it allowed examination of the diffusion process, while gaining an understanding of staff members’ points of view in technology awareness and use with regional complexity. Diffusion according to Rogers (2003) comprises the four elements of innovation, communication channels, time and the social system. Briefly, the definition of diffusion is, “the process by which an innovation is communicated through certain channels over time among members of a social system” (p. 11).

Intercultural communication, geography, time and space in culture, organisational infrastructure and organisational change were considered in terms of possible factors affecting the diffusion process in this regional context. With a pragmatic view to inquiry, this primarily qualitative study focused on two sub cases (regional and central campuses) in a single social system. The study proposed opportunities for further discourse on technology adoption at the organisational and regional level.
The research questions that the study addresses are:

1. How does diffusion of a learning innovation occur in a regional university?
2. What elements of diffusion have significant influence?
   - What are the key processes in the diffusion of a learning management system?
   - What key stakeholders are involved in the diffusion of a learning management system?
3. What aspects of the regional setting impact diffusion?

7.3 Analysis of sub cases examined

The two sub cases were the regional campuses and the central campus. The regional campuses were distributed across three cultural groups of Melanesia (Fiji, Vanuatu & the Solomon Islands), Micronesia (Kiribati, the Marshall Islands and Nauru) and Polynesia (Tonga, Samoa, the Cook Islands, Niue, Tuvalu, Tokelau) located over 13 locations in the USP region. The central campus represented three groups of staff members based in Fiji. They were Teaching Staff, Heads of Schools and Support Sections, and the Senior Management Team.

7.3.1 The innovation

Prior use of learning management systems (LMS), awareness of Moodle for distance and flexible learning (DFL) and the attributes of innovation are discussed in this section.

7.3.1.1 Prior use of LMS and awareness of Moodle for distance and flexible learning

Staff members at both the regional and central campuses generally had used LMS’s. The majority of staff members were generally aware of the existence of Moodle at the university.

A major finding of this study indicates that campus size was not necessarily an issue in staff awareness and communication of the innovation. For instance, awareness would presumably be faster in campuses of smaller size. That is, where communication channels were easier; discussions were enabled and existed while staff felt more
confident in understanding the merits of the system. This was not the case from the evident lack of awareness at some of the smaller campuses.

Findings in this study indicate that longer years of service at the campuses resulted in a possibility of greater awareness of Moodle, due to familiarity and increased communication within the campus. One factor evident in the findings was that the campuses with the larger student enrolment numbers, such as the Solomon Islands campus appeared to have the higher engagement by staff with the LMS. This could possibly be attributed to the need or the acceptance that the LMS enabled better management and processes for students. Smaller regional locations would have greater opportunities for face to face interaction and less need for online communication. For example Niue campus in Micronesia had only 11 students at the entire campus.

Other factors contributed to possible lack of engagement by students with the LMS, that staff raised, were issues such as the underdevelopment in terms of roads, transportation and ICT infrastructure which limited student’s access to the main campus and Moodle. This confirms what Williams (2005) described as ‘a severe lack of infrastructure and resources’ and its possible impact on the success of an innovation.

While staff members were aware of how Moodle facilitated new learning and teaching, this was consistent with the type of work the campuses were primarily involved with, in terms of supporting DFL in the region. However, the actual way Moodle was used varied, which is also reflected in the type of work they were involved in. This supports Rogers (2003) notion that the proximity of use to the innovation determined the level of use. That is, those that were engaged continually with the use of the system, for example teaching staff at the Vanuatu campus in Melanesia and Samoa campus in Polynesia had a greater understanding and acceptance of the system.

Findings indicated the majority of staff members at the central campus were generally familiar with Learning Management System’s (LMS). This suggests that the process of diffusion would be more successful when there is a prior awareness of a similar
innovation, for example in this case the WebCT and Edison implementation at USP as Whelan and Bhartu (2007) and Schutz et al (2005) documented prior to Moodle.

There were varying explanations by the respondents to the function of Moodle for distance and flexible learning, which is reflected in the differences in levels of awareness and use of the LMS at the teaching and support level. At the Senior Management team (SMT) Level, there was awareness of Moodle and LMS’s which was consistent, but the use of it by this cohort was not. These responses were an indication that the nature of their work in which they were engaged was not related to direct use of Moodle. This response was similar to that of the Campus Directors at the regional campuses.

Therefore, important conclusions can be drawn from the study that prior use of similar innovations aids the awareness and increases the success for the ongoing use of a new innovation. In this case regional campuses were less likely to be aware of a large institutional innovation than the central campus, despite their smaller size. In this study levels of use of the innovation were determined by the proximity of use to the innovation. Prior exposure to general LMS use was a factor for diffusion.

7.3.1.2 Attributes of innovation
Compatibility and relative advantage are key attributes, according to Rogers (2003) that could explain an innovation’s rate of adoption. On close examination the most importantly ranked attributes in this study, in terms of gaining widespread acceptance of an innovation at the campuses, were the attributes of compatibility and relative advantage at the regional campuses. It appears that the wider acceptance of the use of technology may be more related to the relevance of the technology to their work and less so, if the technology was not relevant to their particular occupation. McKenzie (2001) reminds us, that if teachers see value in the use of technology then they are more likely to adopt and use it.

Therefore, there is a likeliness for wider acceptance of technology based on how staff members perceived its attributes. It appears, in this study, that if staff members saw relevance for their work, the rate of adoption of the innovation was higher. Martin in
2003 highlighted the point that if the technology is user friendly, then the adoption will be more successful. This is also consistent with Davis’ (1985) TAM model, whereby perceived ease of use and perceived usefulness factored into new technology acceptance. Further, this study demonstrated that if the innovation is perceived as better than the preceding innovation, the adoption will be higher as well.

The central campus showed similar preferences to the regional campuses for compatibility and relative advantage, ranking these attributes as the most important. This could be that the attributes related to the nature of work as well, which is reflected by the choice of teaching staff. Again, teaching staff generally felt that wide acceptance of the technology may be possible if the technology was related to their work. A key point from the study is to harness those that champion the innovation. In this case, the teaching staff members.

Teaching Staff should be seen as the key drivers of technology or as Rogers (2003) calls them, the ‘change agents’. To introduce an innovation such as Moodle, institutions should capitalise those that have direct use, in terms of teaching and learning support. Rogers (2003, p. 373) reinforces that the degree of success of change agents is usually measured in terms of the rate of adoption of innovations by members of the client system.

It was clear that the Heads of Schools and Support Sections role was an ‘evaluative’ one in the process of the diffusion. Administrative sections, such as the Centre for Flexible Learning (CFL) and Information Technology Services (ITS), had a greater knowledge of previous innovations, giving them a better advantage, resulting in a stronger knowledge to assess the next proposed options.

Similar to the regional campuses, the central campus ranked complexity, trialability and observability of lesser importance, with the only difference being the concentration of prior use of LMS’s in the teacher role mainly at the central campus.

On examination, the developer/programmer role suggested that LMS development and administration is important. This is evidenced by the location of administrative sections such as CFL and ITS at the central campus. This could be attributed, as Sahin
(2006) suggests, that the more the innovation is tried or trialled the faster the adoption becomes. Support for development and administration of any new innovation should be factored into the strategic plans for successful implementation.

### 7.3.2 Communication channels

Rogers (2003) identifies that a communication channel is the means by which messages get from one individual to another. Diffusion of an innovation occurs through a number of stages from some exposure of its existence and an understanding of its functions; to members seeking more information and forming some favourable attitude towards it; looking at the advantages and disadvantages and making a decision whether to adopt or not; using the innovation and then reinforcing that it has some positive outcomes resulting in its use or adoption.

This section discusses the findings related to communication channels at USP, awareness about Moodle, regional staff members’ preference for the type of communication method they preferred and the perceived effectiveness of communication at their campuses.

#### 7.3.2.1 First awareness of Moodle and preference for communication medium

When examining communication channels in terms of awareness of the innovation, overwhelmingly the regional campuses first became aware of Moodle through the use of email. Considering the nature of USP’s complex geography and remoteness, it is not unexpected that this may be the case as there is a heavy reliance on electronic means of communication. Noting the type of work staff members were involved in, as well as their competency with computer use, email appears to be a more expedient way to transmit and receive information in light of the dispersed regional campus locations.

There were some indications about being aware of Moodle through ‘word of mouth’ although to a lesser extent than email. Factors needing consideration from an economic view, is that USP consists of 12 countries spread geographically across a large area. Costs would be prohibitive to physically visit each nation to distribute information continually. Electronic communication is a more viable and cost effective
mechanism. On the other hand, with the small size of some of the regional campuses, it was not impractical to interact with each other physically and discuss campus affairs informally.

However, findings from the central campus suggest cultural elements were also involved in terms of word of mouth presence in relation to awareness. This finding is significant for Small Island Developing States (SIDS) which is the basis for this research study. The homogenous characteristics of these groups in terms of, subject discipline, common interests in academia and location, coupled with the impact of cultural phenomena would not make face-to-face engagement uncommon. This is similar to other innovation implementation highlighted by Sookram and Hogan (2012) in the same region.

It is evident however that as a formal mechanism for effective communication it appears that informal channels, such as word of mouth cannot be relied on to achieve optimum communication. Newsletters and written communiqués that were presumed to be effective to act as a communication channel were proven to be inadequate in this study. Overwhelmingly, the use of emails was raised as an effective communication tool to overcome geographic distances by all campuses.

While preference was given to one method of communication, it was evident that reliance on one generic type of communication could also be problematic. This study suggests a more structured, strategic and formalized communication strategy should be developed early and would better more appropriate if cultural diversity and cultural make-up is taken into consideration.

While the communication appeared generally successful, one problem was highlighted in relation to the one-way nature of the communication channel. This one-way communication suggested that individual staff members at the regional campuses were not able to partake in the evaluative aspects of Moodle, i.e. deciding about adoption of Moodle. A key stage for successful implementation of an innovation is to be able to seek information about the information allowing participants to form a favourable attitude towards it (or not).
Rogers (2003) reminds us concerning the nature of communication in diffusion, in that, an assessment by ‘near peers’ would have been done prior to communication about the innovation (to the regional campuses in this case). The result is that the regional campuses would have had to rely on information from the central campus as the only reliable source.

7.3.2.2 Effectiveness of communication and understandability

Regional staff members were generally favourable concerning the effectiveness of communication regarding new technology at their campus. Despite few indications of ineffective communication, regional staff members’ generally viewed understandability of communication and effectiveness of communication about new technology in a positive way. There was perception at the central campus however, that communication was not effective enough among the Heads of Schools. Senior Management Team attributed this view to possible inconsistencies filtering down the communication channel from their level to teaching staff in a timely manner.

While the Heads of Schools appeared to serve as intermediaries between SMT and Teaching Staff in terms of communication, this appeared to be symptomatic of a larger issue – the lack of any formal communication strategy or communication policy for the institution.

On closer examination of the information provided to staff, on the whole all locations received similar information, albeit either lacking or too much. The level of understanding expressed by staff indicated that a closer examination of the type and style of information presented was important and should be reviewed for the future. Instances of staff members complaining of too much information coming directly from SMT or a lack of communication from Heads of Schools may be clear indications that a communication plan or policy was needed.

Another dimension to this perceived ineffectiveness in communication was the view that communication was heavily centralised with a plethora of new policies (i.e. ‘policy paralysis’) being pushed down, while procedures were not perceived as effective. Reliance on word of mouth (the ‘coconut wireless’) was very minimal at the central
campus or perhaps not recognised as such. There was reliance on informal channels and it was not perceived as reliable. No proper mechanism existed for information to flow back to the central campus. Rogers and Kincaid (1981) reinforce the importance of two way communication where the newness of the innovation must be relayed and reinforced by effective communication.

7.3.2.3 Homophilous vs. heterophilous characteristics
Aspects of communication thought to be generally favourable (or not) at the regional and central campuses confirm the similar characteristics campus staff shared at their individual campuses. This is consistent on the data collected, reflected in staff member’s similar cultural backgrounds, level of education, years of service, similar IT competencies and common first languages, first at the intra-campus level then inter campus. Rogers (2003) states that communication occurs effectively with individuals that are homophilous, which is demonstrated in this study by common perceptions of communication staff members shared about the university.

Location however, posed an interesting perspective to staff member’s perceptions, particularly with the few staff members that did not think communication was effective, nor understandable. This geographical characteristic could be indicative of heterophily according to Rogers; together with differences in the type of work staff members did including the variable length of time spent working at their campuses. These factors may have contributed to their unfavourable perceptions. Caution must be taken however in terms of interpreting awareness and the language in which communication regarding new technology is used (Hall and Trager, 1953). The diverse cultural backgrounds of staff members, while similar when examining individual campuses, differs vastly when combined with the other cultural groups or the rest of USP for that matter. This reflects Wah’s (1994) view that issues in communication arise in trying to confirm whether messages from sender to receiver were universally understood. The complexity in language and linguistic issues was extremely important for this study. While official communication at USP occurred in the English language, how information was interpreted was difficult to gauge, given that English may be the
second, third, or fourth language of staff members; again a common heterophilous characteristic when viewing the USP region as a whole.

Medlin (2000) draws to our attention the importance of social/ organisational/ personal factors which may influence members and motivate their decision to adopt. This study demonstrates that the most successful implementation or adoption of the diffusion can be found at the central campus. This may be attributed to social factors, including the high concentration of teaching staff that directly use Moodle, the high degree of communication between members and the close geographical proximity.

On the other hand, the least successful in the diffusion process overall was the campuses in Micronesia. In part, this could be attributed to factors in contrast to the central campus, including geographical distance (the Marshall Islands campus being the furthest from the central campus with small numbers of staff), small numbers of teaching staff and lack of communication. This significant outcome from this study could inform other Small Island Developing States to consider the importance of socio-geographic factors when introducing new innovations.

Implications for those developing effective communication strategies is the acceptance and recognition of both homophilous and heterophilous characteristics. Dealing with staff with diverse cultural backgrounds (including language) and taking into account regional differences, a close examination of all staff involved prior to embarking on introducing an innovation should be undertaken. This study strongly indicated the need for recognition of these characteristics for favourable and improved communication and therefore more successful diffusion.

7.3.3 Time

The time aspect of diffusion concerns itself with the duration between first-hand knowledge until adoption or rejection of the innovation. Time, as an element of diffusion by Rogers (2003) occurs in three aspects: the innovation decision process, the innovativeness of an individual or unit and the innovation’s rate of adoption.
7.3.3.1 Innovation decision process

Rogers (2003) suggests that to change human behaviour, it requires a good deal of learning and time. In this study, the innovation decision to implement Moodle was made by the system as opposed to an individual. Whelan and Bhartu (2007) confirm this form of implementation as system-wide implementation but caution that a myriad of different contexts need to be considered.

The nature of communication from the central campus to the regional campuses about the innovation illustrated a one-way process. This was echoed in the opinions of some of the regional campuses about “being told what to do” by the central campus. While not overtly expressing animosity to the way new technology was introduced at USP, there was an almost underlying expectation that anything new would originate from the central campus because it had better resources, infrastructure and technology. This is consistent however with what Rogers (2003) explains as innovation decisions made by the organisation rather than the individual, i.e. where the individual (or individual campus for that matter) has little say in the process.

At the SMT level of the central campus, the aspect of time had more to do with the innovation decision process than at the organisational level. SMT members articulated the various perspectives on how LMS’s came into existence at USP. There may be an expectation on particular section(s) to take the lead in the use of certain innovations, as historically, innovation decisions such as the LMS appear to have been made by different sections of the university but with similar intentions. In the time leading up to the formal adoption of Moodle for the entire institution, two sections (Centre for Flexible Learning & School of Law) at the university were making their own innovation decisions regarding LMS use at USP as the documentary evidence by Whelan and Bhartu (2007) and Schutz et al (2005) showed.

SMT became increasingly involved with LMS’s once recommendations were presented to them about the outcomes of the evaluation process, that is, the decision to choose between existing and potential LMS’s. Given USP’s diverse characteristics, authoritative decision making was practical. Data from the study indicated that consideration for ‘Pacific or polychronic time’ when making technology related
decisions involving the 12 campuses resulted in a slower diffusion process or impacted on the adoption of the innovation. This was especially the case for this single institution-wide technology implementation.

Perhaps greater consideration of ‘Pacific time’ could have led to greater acceptance, but the slow pace at which things are known to move in the Pacific may have resulted in greater cost to the university. This study, similar to Sookram and Hogan (2012), should never lightly discount this cultural phenomenon in future diffusion of innovations for Small Island Developing States.

The study highlighted that the “system-wide innovation” had implications for the success of the innovation in that once SMT decided to adopt Moodle (Senate, 2006) for implementation in 2007, the Centre for Flexible Learning (CFL) was tasked with proper dissemination of information and knowledge of LMS use throughout the USP region. While the rollout plan by CFL was expected to be swift and immediate, priority was placed on conversions from the other LMS’s so that there were few disruptions and the transition was to be seamless to one LMS. By the time the new strategic plan (2010-12) was implemented, Moodle was a priority area in terms of learning and teaching at USP, three years to the date of official adoption. The presence of the Moodle creator at USP in 2010 further aided the diffusion process in terms of a transformation for learning and teaching as an SMT member observed. It may be looked at as a major driver for the Strategic Plan.

7.3.3.2 Innovativeness and rate of adoption

At an individual level, the study indicated it was useful to gauge staff members’ perceptions of how innovative they were in terms of Rogers’ (2003) adopter categories. Rogers’ (2003) adopter categories briefly, are innovators, early adopters, early majority, late majority and laggards. While the majority may be categorised as innovators or early adopters according to Rogers’ (2003), care must be taken in viewing these findings in terms of the type of technology and individuals’ behaviour towards the technology as far as biases were concerned.
For the regional campus context at least, evidence of proficient computer use may confirm their perception of swift approach to using new technologies. Staff members were generally agreeable as well about their colleagues using technology swiftly. There were a few disagreements from regional campuses in terms of their colleagues not using technology easily, which may suggest self-assessment of innovativeness should not necessarily be taken at face value. Mitropoulos and Tatum (2000) remind us that the number of adopters increases as the diffusion (technological) fully diffuses. However, it sheds light on the willingness of members of staff to use new technology. What this means for the element of time is that regional campus readiness for acceptance of new technology may be quicker for the diffusion process due to high levels of confidence in computer use among staff for instance.

Assessments of whether their campus would be faster in using new technology compared to other campuses were met with mixed reactions in the region. The study showed most Campus Directors were confident about their staff members being technologically capable and could handle technology use quicker for reasons such as enthusiasm at the energy and expertise of young members of staff and their heightened interest in technology.

In some instances, staff members were not very confident about their campus as their perception was based on comparisons to the central campus for which they had observed and experienced better infrastructure and support. Some felt their campus was too small to handle new technology because of infrastructure deficiencies. Their perception was that staff members at their campus resisted change and that there was little technical support available. This is supported by IT staff at the central campus claims that regional campuses were indeed deficient in IT resources and support.

Geographic proximity was of particular note from two campuses in Melanesia. This was a reason for presumed faster use of new technology because of relatively close proximity to the central campus, i.e. located in the same country as the central campus. Factors such as provision of technical support could easily be dispatched to these campuses from the central campus. Some staff members simply did not know whether their campus was capable of using new technology swiftly. Whether it was a
symptom of fewer years of experience at their campus or an unrelated aspect of their work, this perception was indicative of the minority.

Generally however, regional campuses appeared relatively untroubled by how quickly they would use new technology at their campus but were more concerned about the deficiencies in infrastructure and technical support they faced when using new technology. They may hold true for how they perceived Moodle as well.

At the central campus, Teaching Staff and Heads generally felt that they would use new technology easily suggesting a level of innovativeness despite a few who would rather observe people use it first or be persuaded. Proficient computer use may have also reflected their perceived swift approach to new technology use as was the case with the regional campuses. In stark contrast, Teaching Staff generally thought that other staff did not take up use of new technology quick enough at the central campus though they felt technology uptake was still quicker than the regional campuses. These perceptions by Teaching Staff suggest that their peers may be late adopters and laggards according to Rogers (2003).

The study found connectivity in terms of internet access in the regional campuses was seen as inferior to the central campus. Respondents suggested technical support and technology expertise were also considered to be better than the regional campuses, allowing for quicker uptake.

Another issue raised in the study was the perception of leadership at the regional campuses, in terms of actively encouraging technology use and expanding their facilities. This view however was limited to SMT, owing to their more macro level awareness of the region. This view tends to be limited from the point of view of Teaching Staff and Heads because of a lack of knowledge about the full circumstances within which the regional campus operated, though some staff members at the central campus had been with USP for a longer period of time which may explain their deeper perceptions. The regional campus perspective about the advantage the central campus had over them however was consistent to what the central campus staff generally thought.
Rogers (2003) reinforces that a stable system must work together to achieve common goals. This study found that the rate of adoption of Moodle was faster at the central campus than the regional campuses which were a consequence of the innovation originating from the central campus. The degree of awareness compared to use of Moodle at the regional campuses was a matter of necessity based on whether it was directly relevant to staff members work. Regional awareness was not so much a deciding factor in rate of adoption because staff members were more likely to make an assessment of their own campus’s uptake of new technology instead of other campuses. The degree to which staff members had to be aware of other campuses varied however, evidenced by the few that have worked at other campuses at USP or who had visited other campuses.

7.3.4 The social system

The regional campuses in this study have been defined as a ‘system within a system’, as there is a universal set of expectations that all USP staff members tend to work cohesively towards in terms of the institution’s objectives. This is articulated by purpose driven statements through the institutions’ vision and mission at the institutional level with an expectation it will filter down into the diverse work that staff members are engaged in. Findings from this study recognised an awareness of the individual’s own campus work environment as paramount. There is also a degree of regional consciousness expected, if staff members are able to understand the workings of the university at a macro level.

The discussion in this section, as with the previous elements of diffusion, focuses on the regional campuses and the central campus as sub systems relative to USP as the main social system. It explores staff members’ awareness of the strategic plan as a guiding document for the university. It also acknowledges staff members’ awareness of their own campus in terms of development as an indication of factors impinging upon new technology use. Further, the challenges of using new technology are discussed as a means of triangulating responses of staff members in terms of the other three elements of diffusion.
The political issues relating to the region is another factor that has resulted in the success or failure of adoption. While the 12 countries share political and military relations (a common characteristic of what defined this region) they all proudly hold onto different political structures, which over the period of the innovation were affected by political conflicts including coups and susceptibility to political unrest as Gold and Tuimalea’i’fano (2001) explained.

Timing was delayed and can also be attributed to other environmental issues such as climatic conditions, including cyclones and constant flooding. Students during the time of the implementation based in the central university had to leave and return to home countries due to cyclone damage. Infrastructure and ongoing success or not of internet issues, which the innovation relies heavily on, has constant impacts due to electricity cuts and flooding. The Small Island Developing States, while sharing the centrality of the main university, are impacted consistently with ongoing environmental and political issues.

7.3.4.1 Strategic plan
The strategic plan is the official guiding document for USP. It is now into its fifth iteration – USP Strategic Plan 2013-18 (progressively developed to the changing needs and accomplishments of the university) since first being introduced in 1997. Staff member’s awareness and understanding of the strategic plan may be crucial to achieving the objectives laid out in the plan (Strategic Plan, 2010-12). It is also a form of communication to staff members about the university’s priorities, in relation to this study, where the implementation of Moodle is placed. On examination of Priority Area 1 it is highlighted that in the Learning and Teaching Area, Objective 3 (USP Strategic Plan, 2010-12) is to “improve the quality of teaching in all campuses” and to “significantly expand the implementation of Moodle as a learning management system.”

Interestingly, in contrast to the regional campuses, the central campus staff members indicated they were all aware of the strategic plan and were able to articulate its function generally as a guiding document for the university. Similar to first instance of awareness of Moodle, greater awareness of the strategic plan may be due to it
originating from the central campus and staff members close proximity to the point of origin of the plan. Another possible reason may be attributed to the concentration of department Heads and middle management located at the central campus who would be involved with strategic decision planning and decision making.

Greater awareness in this instance may be more organisational than geographical. The disparity in awareness at the regional campuses may be a product of varying communication structures with regard to the individual campus setup or semantics at play if the strategic plan may have been more commonly acknowledged as the campus plan instead. As with many corporate strategic plans much energy is devoted to its construction with less to its implementation. Upon the analysing the USP Strategic Plan at the time, it became evident that the language of the plan focused on ‘what needs to be achieved’ and less (if at all) about ‘how to achieve them’. The lack of knowledge or understanding of the importance of this document could be rectified with the development of an implementation plan, outlining important milestones and outcomes for the regional campuses. Practical strategies for how to achieve the university’s strategic goals should be made explicit to tangibly realise the full potential of the plan and its guidance for staff members at USP.

7.3.4.2 Awareness of campus developments

Developments at the regional campuses can range from small to large scale. When regional staff members were asked about their perceptions of how frequent development at their campus occurred, they generally indicated ‘sometimes’ followed by ‘often’. It appeared that the larger the scope of the development, the less frequent changes occurred. For instance, acquisition of computers, upgrades to office equipment and upgrade of software programmes occurred more frequently than improvements to building facilities.

Further examination showed space constraints that some of the regional campuses had to deal with. These constraints appeared to occur on two levels, firstly, in terms of the location of the individual campus and secondly, in terms of the geographical features of the country where the campus was located. For instance, some of the properties that the campuses occupied were rental properties, which may affect their
ability to expand. Issues of limited campus space are not uncommon here especially as student numbers increased (USP Planning Office, 2012) for campuses such as those in the Solomon Islands (Melanesia) and Kiribati (Micronesia). What this says about staff member’s awareness of development is the extent to which they were able to assess their own campus capabilities, for example to facilitate new technology. There may be a lack of awareness of campus developments because of the differences in levels of staff member’s involvement with micro and macro issues at the campus. Lack of awareness of larger developments for instance may have reflected their level of work lower on the organisational hierarchy and less likely to be involved with macro level decision making. The regional campus conditions in terms of diffusion were not ideal as a sub social system for swift technology use because of the variable conditions present. The same could be said for the variable diffusion rate of Moodle at these campuses.

The central campus reflected similar levels of awareness (‘sometimes’) as the regional campuses as well and again, the level of awareness about the type of campus development reflected their involvement with micro and macro issues at the campus. Both cases reflected a minority of staff members that did not believe development was progressive nor whether development occurred. This may be indicative of a communication system that could be improved.

7.3.4.3 Quality of IT facilities and resourcing

It was evident from the study that the quality of IT facilities to support students would impact on the introduction of new technology at the regional campuses. Staff member’s generally rated the quality of IT facilities as ‘fair’ or ‘good’ across the region. Campuses in Melanesia closer to the central campus rated more positively overall and supports earlier sentiments about favourable (swift) use of new technology because of close proximity to the central campus for accessible troubleshooting. Technical support, equipment and infrastructure may easily have been dispatched to these campuses with transportation less likely to be problematic, when compared to other regional campuses due to close proximity. Perceptions by staff about frequency of computer upgrades and equipment in campus developments also support this claim.
These issues reflected the holistic view of the campuses that staff members may not be fully aware of. Similar to the lack of macro level awareness above, decisions regarding campus developments at the Campus Director’s level for instance suggest that not all staff are privy to certain plans. This is not a reflection of any insidious intent by campus management but more the unconfirmed negotiations occurring between governments and regional campuses as well as with USP. These plans for campus relocation for instance were not confirmed as negotiations were still in process at the time of the study. In terms of adequacy of resources at the regional campuses to support new technology, responses were fairly consistent with how they rated the quality of their IT facilities.

The few perceptions of inadequate resources to support new technology from campuses in Micronesia and Polynesia suggest that despite their smaller size, they too faced resourcing issues. When compared to the larger regional campuses however, they appeared to be better off. For instance, campuses in Micronesia and Polynesia include some of the smallest campuses in the USP region and student enrolments were small and fairly proportionate to campus size. One Campus Director approximated a 1:10 ratio for her campus in terms of computers to students. This may be a reasonable figure given that the central campus ratio was estimated to be upwards of 1:30 according to an ITS Manager at the central campus. However the use of wireless networking introduced in the last few years to the regional campuses has seen a gradual occurrence of laptop ownership among students according to the Campus Directors. This may suggest that despite space and IT limitations (connectivity), accessibility was improving.

The overall outlook on IT facilities may be an effect of campus developments, which in turn impacted on the diffusion process, occurring at a reasonably satisfactory level in terms of upgrade to computers and software. As with earlier instances, Campus Directors tended to rate more positively than some of their staff members, which again may point to varying levels of awareness (macro vs. micro level issues) about their campus. There is still a need for more resources at the campuses to support new technology as staff members confirmed, as well as their thoughts on technological
innovation at USP. For instance, despite varied levels of awareness and opinions, it was evident that staff members had a better grasp on their own campus activities and facilities as far as technology use was concerned. When asked about their knowledge of other regional campuses, general indications were ‘very little’ or ‘some knowledge’.

In terms of the central campus, SMT confirmed the varying developmental states of the regional campuses in relation to the central campus. Along with teaching staff, they were generally agreeable about the advantage the central campus had in terms of better quality IT facilities to support new technology. From an SMT perspective, being the administrative hub of USP came with its advantages in terms of new technology use and greater development in terms of aid and funding. The Heads of Schools and Support Sections, while supportive disagreed about the quality of IT facilities alluding to the fact that the central campus may still need improvement. Overall, the general positive responses were consistent with earlier sentiments expressed about their campus being better resourced in terms of quicker uptake of new technology compared to the regional campuses. This also supports the swifter diffusion of Moodle at the central campus.

The perceived advantage of greater resourcing at the central campus may be a perception of enrolment numbers, that is, the majority of USP students were enrolled at the central campus in Fiji. In terms of the concentration of staff members of the university as well, the central campus also had the highest numbers. Higher enrolments equate to more resources. Other possible reasons for greater resourcing at the central campus may be historic in nature and developments would have reached stronger establishment than most other campuses in the region, as it was that the first ever campus establishment for USP (Morris report, 1966) and is the administrative hub.
7.3.4.4 Challenges of using new technology

Regional staff members expressed similar sentiments about the challenges of using new technology at their campuses. They were mostly IT related in terms of connectivity, infrastructure and skills. Other issues were related to campus facilities, time, and geography and campus staff. Consistently, connectivity was seen as a major challenge because internet speed was generally seen as slow. This may also shed light on how they assessed the quality of their IT facilities as well as the adequacy of resources to support new technology at their campus. The campus itself was seen as a challenge particularly where there was a perceived lack of proper mechanisms in terms of adding and integrating new technology at the campus. Staff members felt that IT support and infrastructure was inadequate in some instances though training was needed to support the new technology at their campuses.

In terms of time, some indications related to trying to find time to learn new technology, because of work and other commitments at the campus. Another aspect of time was related to changes in technology that appeared to be erratic to some campuses. In terms of changes to technology, some staff members indicated issues with timeliness of release of software and the relative time it took to learn it before another new software or innovation was released at their campus. Often, it appeared that technology releases were not adequately paced.

Keeping up with new technology appeared to be the main challenge as well as the prospect of learning and re-learning software in rapid succession from a previous technology. A third aspect of time was related to isolation, where delays in the transmission of information about new technologies were affected by the remote location of the campus. Despite earlier confirmation about preference for email communication, it appeared that communication issues were still being experienced which may be due to infrastructure conditions being far from ideal.

Geographically, the further away a campus was physically from the central campus, the more challenges it faced with new technology use and possibly leading to a slower rate of diffusion which confirms Comin et.al (2012) view that distance played an extremely
important role in technology diffusion and that being far from technological leaders (central campus) slows down the diffusion of technology significantly.

Lee and Lee (2000) remind us that an organisation’s adaptive capability, in relation to role and responsibility redistribution, the development of new knowledge of different knowledge is required. This study demonstrated that in addition to inadequately skilled ITS staff, regional campus staff members were seen as sometimes slow to adapt to new technologies. There was also a need for training of staff in the use of technologies. There were concerns raised about the lack of participation in terms of determining the acquisition of new technology or when they did provide input, were overlooked or told it was not possible.

These challenges support Bates and Sangra’s (2011) requirements for more systematic and comprehensive training of teaching and professional staff to support the use of learning technologies. When juxtaposing Barone’s (2001) 12 campus conditions regarding shared ownership of issues involving technological infrastructure, there is a lot of room for further improvement; especially for the regional campuses where there is a sense of less control over the technologies they use. Further, these deficiencies in the regional campuses reflect key elements (resources, infrastructure, people, policies and support) of the RIPPLES model by Surry et al (2005) and the need for redress.

SMT at the central campus level further explained leadership as a key issue in technology use in addition to IT and campus infrastructure at the regional campuses. Campus Directors in the region were also seen to be ambassadors for the university in their respective countries as USP came under the respective Ministries’ of Education. Urgent development issues were present for some of the larger campuses needing more space for their students which indicated a priority list. SMT looked to the Campus Directors to be proactive in in-country politics as issues such as land allocation was the responsibility of each country. SMT generally had positive thoughts on campus leadership despite the occasional comparisons they made between the campuses and their directors. However, the comparisons can hardly be taken at face value because of the heterogeneous characteristics of each of the campuses. The type of leadership style/characteristics of Campus Directors and even Heads of Schools and
Support Sections call to mind the balance middle management plays between administrative, academic and even political roles in and outside the university setting to effect diffusion positively.

Compounding the common IT and infrastructure challenges were varying telecommunication arrangements in-country that were monopolistic in nature. In addition to USPNet, local telecommunication companies were relied on to support IT use at the regional campuses. Aid donors also provided assistance in terms of enhancing communications like the KU-band implementation but this was not consistent for every campus.

In consideration of the socio-economic, environmental and political issues which may impact on the adoption of an innovation, it is important to remember that USP and member countries rely heavily on external funding through financial aid (see Chapter 3), e.g. approximately AUD129.3 million in 2016-17 from Australia given to SIDS (DFAT, 2016). At the Gross Domestic Product level (which is an estimate of how much an individual spends as a consumer compared to the total population spending on products and services), USP member countries average GDP is approximately USD4,392. In comparison, neighbouring Australia is approximately USD46,400 and New Zealand is USD35,200 (CIA World Fact book, 2015). Telecommunication issues at the time of implementing the innovation relied on old and outdated infrastructure. While many of the countries within the social system have small land masses and small populations they have quite demanding economic needs. All of the countries that make up USP rely on similar economic flows, many experiencing weak economies with high dependence on other nations. It is a reality that telecommunication infrastructure, constantly affected by environmental and political issues will always be a barrier to the level of adoption.

On challenges of using new technology at the central campus, sentiments were similar to the regional campuses. IT issues stood out foremost in terms of connectivity, support and infrastructure. The study highlighted inefficiencies concerning the support sections at the central campus by SMT members particularly IT where a perceived ‘silo-mentality’ existed within the IT department, i.e. the sections within the
department weren’t seen as meshing in terms of support, cooperation, cross pollination of ideas and work processes.

7.3.4.5 Technological innovations at USP

When regional staff members were asked to provide comments on technological innovations at the university, they reinforced the challenges expressed earlier about using new technology, i.e. infrastructure, time and support. In addition, a lack of resources and inequalities in the state of the campuses were expressed as a means of comparison to the central campus. This may be an indication that they were generally aware of the capabilities of the central campus in relation to their own. Similar to findings of Sookram and Hogan (2012) internet access at the University of South Pacific was highlighted as a significant barrier to innovation adoption. Awareness and recognition of the technology limits and work towards improving services was also an important consideration, which aligns closely to this study. Technological innovation at USP was generally viewed as something positive and progressive in terms of enhancing the reputation for the university. There were positive comments about the state of development of USP in comparison to other organisations in the region and that development had moved forward in terms of technology. Staff members were mindful however of the realities of the region such as dispersed geography and underdevelopment despite the potential that innovation brought, particularly how it impacted the students.

Underlying the IT issues associated with innovation they articulated were the philosophical aspects of distance and flexible learning such as access and equity. This did not appear to sit well with regional campuses in terms of a perceived heavy reliance on the central campus which led to feelings of not being innovative as sub units or at the very least not feeling like they could be innovative independently. Further, there was a need expressed in terms of taking a step back to consider fixing the fundamentals before further innovation, for example ensuring a more constant supply of electricity to remote islands first before encouraging further online learning and teaching; and allowing the regional campuses more say in decisions related to technology use at USP.
These issues point to organisational friction as a result of geographical dispersion of the organisation as Alessandrini et.al (2008) suggests. A tension appeared to exist between the regional campuses and the central campus as far as having some autonomy over their own innovativeness. This may also suggest that the regional campuses were cautious of their capabilities when compared to the central campus.

7.4 Summary
A discussion of the findings of the study was presented in this chapter that examined Rogers’ framework in the regional setting of the case university. Supporting literature was also considered in terms of possible extenuating factors affecting the diffusion process. The two sub cases of the regional campuses and central campus were analysed in terms of the four elements of diffusion to inform the emergent themes in the next chapter.

Chapter 8 concludes the study with a presentation of the emergent themes, conclusions, and significant factors to be considered for other regional contexts implementing innovations.
8.1 Introduction
This chapter presents the conclusions to the study and its implications for practice.

8.2 Emerging themes
A number of key themes emerged from the study. These related to,

- The characteristics of the learning innovation for distance and flexible learning (DFL),
- The complexity of communication channels in the institutional setting,
- Staff members as change agents in the diffusion process,
- Regional disparities in learning innovation awareness and use, and
- The role of the central campus in authoritative decision making.

8.2.1 The characteristics of the innovation for distance and flexible learning (DFL)
The type of innovation and the characteristics identified in the institution emerged as a major theme of this study. The rate of diffusion of the innovation, the learning management system Moodle, relied on the extent to which it was applied by various sub units in the institution. In the first instance, teaching and support staff were the most relevant users (other than students) because of prevalence to their work. Prior use of learning management systems such as WebCT and Edison at the institution also factored into awareness and use among staff members as this determined how readily they would use Moodle as the new learning management system.

Innovation decisions, according to Rogers (2003) could be optional, giving the individual the power to accept or reject the innovation; collective where it becomes a consensus decision to accept or reject; or, as it was in the case of USP, an authority-based innovation decision, where the organisation imposed their decision on the other countries through their decision making and strategic plans.

Rogers’ (2003) attributes of relative advantage, compatibility and complexity confirms staff members’ general perceptions that this particular learning management system was perceived as better than its predecessor(s). Use of the innovation by staff was
dependent on relevance to their work and how they understood its functionality. However, it is noted that not all teaching staff used the learning management in terms of their teaching despite acknowledging their awareness of it. Also discrepancies were identified in how some programmes were using Moodle in some basic, intermediate or complex form. ‘Awareness’ was also greater for the regional campuses but not necessarily ‘use’ when it related to teaching purposes, this could be attributed to the high concentration of teaching staff at the central campus. Moodle had the ability to be modified and reinvented, which confirmed Rogers’ (2003) conditions for sustained adoption and rapid diffusion.

Moodle’s open source environment enabled it to be continuously improved and integrated with the institution’s other learning technologies. Enhancements to Moodle by the developer communities, as well as the learning systems team over time, demonstrated its ongoing capability and sustainability for USP. The nature of the innovation contributed to its advantage.

This study suggests that relative advantage, compatibility and complexity are key characteristics of an innovation which should be considered in the diffusion process. For the purpose of successfully facilitating distance and flexible learning, the innovation should be implemented with regional contexts in mind. It is suggested that each regional campus should be adequately assessed in terms of the degree to which IT support, infrastructure and the condition of campus facilities and geography are able to adequately handle the innovation.

This consideration must extend beyond the implementation phase to account for any modifications, upgrades or replacements to the innovation that may occur. A reverse approach to diffusion could also be considered in terms of the innovation being tested at a regional campus instead of the central campus to assess its capabilities in a more authentic, challenging setting.

8.2.2 The complexity of communication channels in the institutional setting
Varying degrees of awareness of Moodle via the communication channels in the institution highlighted the dynamic social system of USP. This related to the range of
communication mediums available both formally and informally. Awareness of Moodle was not set to one particular communication medium, though ideally electronic mediums appeared to be favoured in terms of practicality. This study suggests that a formal communication plan is imperative for success despite an institution already having an implied communication network and structure.

Geographic proximity was an added issue for effective communication, which was evident from two scenarios. The first was at the central campus, where the innovating unit (Centre for Flexible Learning) was closer to the main concentration of the teaching staff. The second scenario was at the individual regional campuses, where the size of the campus was relatively small when compared to the central campus.

These contexts reflect an extension of Halls’ (1976, 1981) proxemics in terms of greater awareness via informal channels. It also reflected the homophilous nature of these campuses in terms of geographical similarities, space and distance. The type of interpersonal communication should be considered dependant on the culture of the campus, whether it be regional or central when developing a formal communication plan.

Inconsistencies existed in terms of how information regarding Moodle was communicated throughout the university. This may also be a result of the geographical dispersal of the university, although electronic communication between campus locations was again more practical. Again this was consistent with Alessandrini et al.’s (2008) notion of friction as a result of distance between hierarchies. Friction in this case involved communication perceived as occurring ‘one way’ as far as the regional campuses were concerned.

Supporting Rogers’ (2003) assertion that people rely on information about an innovation being conveyed to them by an ‘expert-type authority’ in the area as opposed to individuals trying it out for themselves to decide, the study recommends that innovating units in the central campus deploy staff to the individual campuses for short to long periods of time to disseminate awareness and enhance use of the
innovation where appropriate. This successful practice can be found, for example when the Instructional Designer was deployed to the School of Law in Vanuatu.

Communication about an innovation in the local language should be considered for greater accessibility of non-English speakers. The diverse region’s homophilous and heterophilous characteristics should determine the appropriate communication medium used and the language in which the information is communicated by email, web and even print.

This study recommends that an institution’s communication channels be carefully considered when disseminating information about an innovation. A practical example would be to include a contextualised approach to disseminating information via email in terms of translating instructions, manuals and guides to the local language of the campus. This may alleviate finance issues associated with exorbitant travelling costs to some of the remote campuses if central campus deployment of staff is unlikely.

8.2.3 Staff members as change agents in the diffusion process

The importance of members of staff as change agents in the diffusion process emerged as another theme. The degree of involvement in the process of diffusion varied. The Centre for Flexible Learning for instance as seen an innovating unit playing a larger role in the decision making process of the innovation before formal adoption by USP. So too did teaching staff to which the knowledge of Moodle passed, to drive the new method of delivery at the university. To capitalise on these staff members as positive change agents or ‘champions’, organisations should consider consistent methods of implementation by staff that are incentivized, e.g. rewarding staff members who have shown some contribution to building communities of practice around the innovation or championing the use and awareness of the innovation. This is consistent with Higa, Shin and Au (1997) that to raise issues that are important for organisational adoption, it should include internal champions, access, member involvement and rewards. This important consideration should be adopted for small island developing states through the diffusion process to include rewards or incentives.
The involvement of middle management added a layer of authority to persuade teaching staff to use Moodle in their teaching. Further intervention at the senior management level gradually directed the institution down a singular path in terms of a learning management system preference. Regardless of their level of technological savviness on the adopter category continuum, buy-in was needed at all levels, at the regional campuses and the central campus for the diffusion process to be expedient. Therefore, this study recommends that for large scale innovations impacting the entire institution, consideration for various levels of staff be made on the basis of the target audience, i.e. who should be aware, who should use it and who can better disseminate information and knowledge about the innovation for appropriate critical mass.

It may also help for all levels of staff to at least try out the innovation even if it does not apply directly to them. This can enhance their understanding of the innovation and enhance their arguments when grand statements are made about the innovation at the highest levels of the organisation. ‘Practice what you preach’ and ‘you won’t know until you try’ may be words worth its weight in diffusion.

### 8.2.4 Regional disparities in learning innovation awareness and use

Unlike the central campus, the regional campuses were characterised by uneven development in terms of infrastructure and resources. This supported the RIPPLES model by Surry et al (2005) in terms of the extent to which regional disparities were prevalent in comparison to the central campus. Distance and geography were valid considerations as well in terms of regional diffusion.

In this study, further physical distance away from the innovating unit may have slowed down awareness. Therefore priority must be placed on the most remote campuses once the institution, in terms of better resourcing of IT infrastructure and IT support, has adopted an innovation. The institution could rollout the innovation in controlled measure first from some of the remote locations in order to mitigate time and communication factors impinging upon diffusion. This is similar to the reverse diffusion approach stated earlier in terms of innovation testing.
The university does satisfy what constitutes basic infrastructure across its regional campuses but the lag in development is evident when compared to the central campus. Besides the ongoing geopolitical, economic and environmental issues of each country, there are also differences in the priorities of development in the regional campuses. This is in part a reflection of the university’s strategic objectives as well as the direction of each regional campus relative to in-country developments. This had a bearing on how effective each regional campus became aware of new learning innovations from the central campus, and whether use of it was feasible in light of the resources they had.

Proper standardized infrastructure must be in place across all of its campuses if the institution is serious about an innovation that becomes a strategic objective. Greater engagement with regional governments must continue in order to achieve the university’s goals aligned with each country’s developmental priorities. This by no means will be an easy task, becoming more an ongoing activity with each new innovation.

What constitutes use from a staff member’s perspective is also limited by regional location in terms of teaching and technical support. The central campus constitutes higher usage by these standards. Indications of usage can also be seen through the programmes each campus offers. While there was uniformity in terms of programmes offered by the university, this does not necessarily translate to whether they were in demand at the campuses and ultimately offered. There were also inconsistencies in programmes that used Moodle and the extent to which they were used.

This study recommends that if an institution officially adopts an innovation, proper standards of use must be put in place when implemented so that the innovation is not something that is seen as only serving a technological purpose but a pedagogical one. This ensures that if regional campuses have a demand for a programme or course that will be offered at their campus, the learning management system component has been set up with the necessary quality assurance standards in place that satisfies both staff and student support.
Sub themes arising from regional disparities implicate the degree of innovativeness of some staff, such as the campus directors and highlight the importance of numbers of staff in the innovation process. This study discovered that the campus directors evolved their campus through their style of leadership, particularly with regard to how they prioritised technology use for learning. What is evident is that although innovativeness may be outwardly expressed as a quality they possessed, it did not always reconcile with the state of development of the campus.

In some circumstances the ability to innovate was constrained by the university’s regulations in addition to their geographical constraints, thus reflecting regional staff sentiments about their inability to be innovative. The small number of staff reflected disparities in a lack of technical support that would otherwise enhance the diffusion process in the larger regional campuses. Again this is consistent with Baptista’s (2001) view that diffusion occurs faster where the density of knowledge was higher. In the study the regional campuses reflected low density of knowledge owing to its smaller staff numbers and further distance away from the innovating unit.

As a result of the regional disparities it is recommended that innovations be gradually implemented with consideration for the technical and geographical constraints of each regional campus. This can be considered if standardizing IT infrastructure across the region is not practical within a short timeframe for implementation. This study also recommends further encouragement and incentives by Senior Management be provided to regional campuses for innovative and shared practices across the region. This can increase the knowledge density for innovations impacting the campus. Campus Directors and middle management staff can be provided proper innovative leadership skills in terms of professional development opportunities. Further technological up-skilling of USP staff in general must be an ongoing activity to reflect changes in the higher education landscape.

**8.2.5 The role of the central campus in innovation decisions**

Rogers (2003) highlights the importance of authority innovation decisions where they are more organisational than individual. In this study senior management endorsed decisions regarding large scale learning innovations such as Moodle. However, the
Chapter 8 Conclusions and implications for the study

The diffusion process was also characterised by scrutiny and consultation through formal university committees, which were based at the central campus. The decision to adopt Moodle for the institution however was not seamless. This study showed the apparent lack of an institutional innovation plan, strategic and communication plan impacted the timeliness of decisions regarding adoption. This supported a finding of a less fluid approach to diffusion of learning innovations at the university. It appears it was dependent on the particular unit that took the initiative to explore a new innovation or when a directive came from higher up in the organisation to effect change of such magnitude.

Decisions to adopt by senior management were made once the innovating unit had tested and made its recommendations about the innovation. As well, the strategic directions of the university also governed the extent of senior management decisions. In terms of Moodle, the diffusion process was underway prior to a formal adoption decision though not where it could be in terms of extensive use.

The inclusion of online learning and Moodle as identifiable items in the university’s strategic plan contributed to greater awareness and use. This reflected the nature of senior management responsibility in advancing use of the learning innovation via the strategic plan.

This study recommends centralised decision making regarding large scale innovations by the main administrative unit of the university as a positive approach. This needs to be undertaken with an organised approach to planning, consultation and communication through an innovation and communication plan.

8.3 Conclusion
The diffusion process of the learning management system could be viewed as both intended and unplanned in terms of the roles of the key actors and the disparate setting of the university. Innovation and diffusion were not a linear process, demonstrated by decision-making and communication systems that could be concluded as both proactive and reactive in nature.
In answering how diffusion of a learning innovation occurs in a regional university, this study demonstrated that diffusion occurred dynamically through a unit that innovates, evaluates, and then communicates the technology once an authoritative decision is made to adopt by the university. It was evident that the innovation originated from a single unit at the central campus. Prior knowledge of similar innovations at the institution aided the diffusion process in terms of awareness and use.

In relation to which elements of diffusion have significant influence it could be concluded from this study that the communication channel and the social system were the more influential elements in the diffusion process, specifically the methods of communication and the dispersed characteristics of the university.

Compared to the elements of innovation and time, diffusion required consistent and concise communication about the learning management system. In order for this to occur, the university, as the main social system needed to be adequately receptive to the needs of the regional campuses as sub-systems in order to affect the diffusion process efficiently.

The type and function of the innovation for distance and flexible learning (DFL) mattered little to the regional campuses in light of the adequate level of staff members’ educational backgrounds, years of service at the institution and IT confidence. Concerns and pitfalls addressed in relation to the innovation related more to the infrastructure and support than its purpose. Likewise, the element of time in innovation decision-making was a role emanating from the central campus and beyond any perceptible involvement of the regional campuses. Ultimately, diffusion was only as effective as the infrastructure, support mechanisms and the extent to which the university prioritised types of innovations, again emanating from the central campus.

In the study, a number of aspects could be identified in regional settings which impact diffusion. The regional setting posed a significant challenge of geography, which the study confirmed. Additionally, those regional campuses in closer geographical proximity to the central campus were generally better positioned to counter negative impacts in the diffusion process. Overall, the diffusion process was impacted at the
regional level by the less than ideal context of inadequate availability of IT infrastructure, resources, skills and support.

Further indications suggest that varying degrees of regional campus leadership impacted diffusion in terms of proper staff awareness and use. Campus directors who were instrumental about technology empowered their staff members more. However, with the limiting conditions the regional campuses operate under it may be safe to assume that Campus directors’ roles in these factors could be limiting.

Centralisation of operations at the university was efficient as far as large-scale innovation-decisions for the institution were concerned. On the other hand centralisation may be viewed at times as stifling if resource and development differentials were considerable. Despite a shared vision of strategic priorities, a one size fits all approach for diffusion was not ideal as 13 sub-systems operated within a larger one. If the ultimate goal for USP was universal acceptance and use of Moodle, regional diffusion still needed to consider each sub-system in terms of geography, homogeneity, interpersonal campus relationships and mode of communication. This study showed that in addition to the generally qualified and experienced nature of staff members, awareness and use were a result of direct relevance to work and how it was applied to affect DFL support when communicated from the central campus.

This study addressed a relatively small region in terms of scope. Nevertheless it was an important one in terms of understanding an underdeveloped and often overlooked contextual region as far as technology use for learning and teaching in higher education was concerned. The contribution to practice that this study makes is embedded in the characteristics of the regional university itself, i.e. geography and resources. Diffusion is adversely affected by the regional characteristics of the university located in Small Island Developing States (SIDS). The type of learning innovation is not as prominent a factor in diffusion; instead the capability of each regional campus to facilitate the innovation has far more significance in the efficiency of the diffusion process.
Addressing the inequalities of diffusion in the USP region is vital to managing the process effectively. It is idealistic to expect the regional campuses to be on par with the central campus as illustrated by the issues highlighted in the study. Working around these issues is more realistic. More innovative practices of trialling innovations in the regional campuses first could be suggested. In the process, this decentralises the function of innovative learning technology use. Innovation decision-making may also be devolved in the process but with an inclusive approach in mind.

IT infrastructure and geography can be assessed in and around these potential campuses to ensure the best possible conditions for testing and implementation. The authentic nature of the region, e.g. generally less developed infrastructure and geographically challenging characteristics, would be better reflected in the regional campuses and their ability to cope under constraints that the central campus does not work under. As a precursor, an innovation plan needs to exist to provide a clear direction for the university in terms of use of appropriate learning innovations for distance and flexible learning given the regional dissimilarities. A proper communication plan should accompany the innovation plan.

In conclusion, USP is a small university by comparison to other universities in terms of physical size, staff and student population despite its vast geographical spread. Nevertheless it represents uniqueness in terms of a truly regional setting despite its make-up of small island populations and even smaller staff numbers in the regional campuses.

### 8.3.1 Significance for Regional Contexts

Drawing together the major outcomes of this research study exposed factors that relate specifically to the significance of the regional context. The complexity and unique features of the three regional campuses combined with the central campus has identified a number of significant factors which should be highlighted providing areas which could be addressed by other small island developing states (SIDS) when endeavouring to innovate.
In summary the following areas can be drawn from this study:

- The need to plan for, develop and supply additional infrastructure and resources required for successful implementation.
- The need to see value, by all stakeholders, in the technology being proposed for it to succeed with a greater rate of adoption.
- The technology being proposed needs to be user-friendly and the user requires a competent level of technology use.
- Greater recognition and identification of the ‘change agents’ involved and then use these personnel (in this case the teachers) to progress the adoption.
- Capitalise on staff with particular expertise and commitment to technology use.
- Provide opportunities to trial the innovation across contexts (research reminds us that the more trials the better).
- Understand and identify the best form of communication according to context (in this study word of mouth was a powerful tool for either success or failure and could not necessarily be relied on). This could also apply to
- Recognition that time for adoption may vary according to context (in this unique regional context adoption time was not swift) and needs to be factored into the plan.
- Identify and use the opinion leaders (i.e. those who will lead the innovation). Inclusion of regional personnel in the implementation phase is paramount and beware that the diffusion does not become too ‘centric’.
- Understand and embrace the culture within the diffusion process. Each region will have its own cultural idiosyncrasies which needs to be recognised and catered for if successful adoption is required.
- Key stakeholders should be consulted in relation to the preferred method of communication for dissemination of new innovations.
- Factored into the diffusion process is the recognition that some members of the organisation should be appropriately rewarded or incentivised for their role in the successful adoption in innovations.
- To understand the conditions of diffusion, it is important to understand the decision making processes within the context and not work against them.
• Geographical distance was paramount to many of the elements to make diffusion successful in this study. Future diffusion in regional contexts should be aware of this important factor and plan to overcome these barriers.

• Importantly, accept that Rogers’ diffusion theory is relevant and useful to small island states to understand, describe and lead the success of the adoption of an innovation.

This study is unique in that it provided a generalised view of the diffusion process specific to an innovation for distance and flexible learning. A comparative study of a similar regional institution such as the University of the West Indies (being the closest contextual region) may further validate present possible opportunities in terms of examining geographic spread and diffusion. Other institutions, such as the Scottish university Heriot-Watt would benefit from the findings of this study. For example, Heriot-Watt has campuses not only in Scotland but also in Orkney, Dubai and Malaysia. The implementation of innovations for these universities relying on multiple off-site campuses are in some ways similar to small island states. That is, while large in size require efficient and economic solutions for the diffusion of innovations. Rogers’ framework as applied in this study would be ideal for these institutions.

Institutions with multiple campuses rely heavily on traditional methods for ideas and practices to be promoted to multiple sites. This could include new practices in terms of curriculum development or assessment procedures, to broader areas of new branding and marketing for an institution. This study has demonstrated that planned and recognized methods are required for successful implementation. Lessons learned for institutions as a result of this study include ‘unpacking’ or recognizing the key characteristics of the learning innovation being applied. Key findings, such as the importance of the communication channel should be foremost in the planning and consideration of institutions with multiple sites or campuses.

Further investigation, taking into account cultural differences in communication would be worthy of future study. The present study found communication and willingness to accept an innovation an important finding. An institution such as Heriot-Watt for example, would be working across multiple, vastly different cultural contexts. As
institutions become more globalized and boundaries diminish a new way of thinking is required for these types of educational sectors. A greater understanding of the relative advantage, compatibility and complexity of the context would enable greater adoption of the proposed innovation. These considerations are not specific to an IT, as investigated in this study but could be applied to many diffusions proposed or implemented by institutions with multiple sites.

Equity issues, perceptions of disparities, effective communication channels and the implementation of standards must be considered and applied for multiple sites to guarantee success for any innovation. Another major consideration for multiple site institutions would be the recognition of the importance of an organized approach to planning, consultation and communication at the central level of administration.

Technology has undoubtedly mediated the tyranny of distance and geography. Underdeveloped contexts such as USP however continue to juggle innovativeness with conditions not conducive to equitable technology use. Having to provide adequate service delivery for a widely dispersed student and staff base becomes all the more pertinent each time the university attempts to keep abreast with new technologies and ensuing pedagogies. The introduction of new innovations are becoming increasingly prevalent for contemporary institutions, time is relative, social systems evolve and communication channels become more fluid with the onset of technology.

As greater demands on institutions are made, clear diffusion processes should be outlined, identified and managed for success to occur.
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http://dx.doi.org/10.1177/1050651908320361


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APPENDICES

Appendix A – Initial Ethics application approval 2011
Appendix B – Ethics committee progress/ renewal report 2012
Appendix C – Ethics committee progress/ renewal report 2013
Appendix D – Sample questionnaire via Survey Monkey
Appendix E – Participant information sheet
Appendix F – Survey Monkey information sheet and consent procedure
Appendix G – Sample online responses from Survey Monkey
Appendix H – Interview script
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Appendix K – Sample coded qualitative responses in Nvivo
Appendix L – Codes for qualitative responses by respondent
Appendix A – Initial Ethics application approval 2011

15 December 2011

Dr Sarah Howard
Faculty of Education
University of Wollongong

Dear Dr Howard

Thank you for your response dated 12 December 2011 to the HREC review of the application detailed below. I am pleased to advise that the application has been approved.

Ethics Number: HE11/442
Project Title: Innovation from a distance: an examination of the diffusion of a learning management system in a regional university
Researchers: Dr Sarah Howard, Mr Valentine A R Hazelman, A/Prof Ian Brown
Approval Date: 15 December 2011
Expiry Date: 14 December 2012

The University of Wollongong/Illawarra Shoalhaven Local Health District Social Sciences HREC is constituted and functions in accordance with the NHMRC National Statement on Ethical Conduct in Human Research. The HREC has reviewed the research proposal for compliance with the National Statement and approval of this project is conditional upon your continuing compliance with this document.

A condition of approval by the HREC is the submission of a progress report annually and a final report on completion of your project. The progress report template is available at http://www.usw.edu.au/research/rsc/ethics/UOW009385.html. This report must be completed, signed by the appropriate Head of School, and returned to the Research Services Office prior to the expiry date.

As evidence of continuing compliance, the Human Research Ethics Committee also requires that researchers immediately report:

- proposed changes to the protocol including changes to investigators involved
- serious or unexpected adverse effects on participants
- unforeseen events that might affect continued ethical acceptability of the project
Please note that approvals are granted for a twelve month period. Further extension will be considered on receipt of a progress report prior to expiry date.

If you have any queries regarding the HREC review process, please contact the Ethics Unit on phone 4221 3386 or email rsc-ethics@uow.edu.au.

Yours sincerely

[Signature]

A/Professor Garry Hoban
Chair, Social Sciences
Human Research Ethics Committee
Appendix B – Ethics committee progress/renewal report 2012

RENEWAL APPROVAL
In reply please quote: HE11/442
Further Enquiries Phone: 4221 3386

11 December 2012
Dr Sarah Howard
Faculty of Education
University of Wollongong

Dear Dr Howard

I am pleased to advise that renewal of the following Human Research Ethics application has been approved. This certificate relates to the research protocol submitted in your original application and all approved amendments to date.

Ethics Number: HE11/442
Project Title: Innovation from a distance: an examination of the diffusion of a learning management system in a regional university
Name of Researchers: Dr Sarah Howard, Mr Valentine A R Hazelman, A/Prof Ian Brown
Renewed From: 15 December 2012
Expiry Date: 14 December 2013

Please note that approvals are granted for a twelve month period. Further extension will be considered on receipt of a progress report prior to expiry date.

This certificate relates to the research protocol submitted in your original application and all approved amendments to date. Please remember that in addition to completing an annual report the Human Research Ethics Committee also requires that researchers immediately report:

- proposed changes to the protocol including changes to investigators involved
- serious or unexpected adverse effects on participants
- unforeseen events that might affect continued ethical acceptability of the project.

Yours sincerely

A/Professor Garry Hoban
Chair, Social Sciences
Human Research Ethics Committee

cc: Associate Professor Ian Brown, Faculty of Education
Appendix C – Ethics committee progress/renewal report 2013

6 March 2014
Dr Sarah Howard
Faculty of Education
University of Wollongong

Dear Dr Howard,

I am pleased to advise that renewal of the following Human Research Ethics application has been approved. This certificate relates to the research protocol submitted in your original application and all approved amendments to date.

Ethics Number: HE11/442
Project Title: Innovation from a distance: an examination of the diffusion of a learning management system in a regional university
Name of Researchers: Dr Sarah Howard, Mr Valentine A R Hazelman, A/Prof Ian Brown
Renewed From: 15 December 2013
Expiry Date: 14 December 2014

Please note that approvals are granted for a twelve month period. Further extension will be considered on receipt of a progress report prior to expiry date.

This certificate relates to the research protocol submitted in your original application and all approved amendments to date. Please remember that in addition to completing an annual report the Human Research Ethics Committee also requires that researchers immediately report:
• proposed changes to the protocol including changes to investigators involved
• serious or unexpected adverse effects on participants
• unforeseen events that might affect continued ethical acceptability of the project.

Yours sincerely,

Professor Kathleen Clapham
Chair, Social Sciences - Human Research Ethics Committee
Appendix D – Sample questionnaire via Survey Monkey

**PURPOSE**
This study investigates how the use of an innovation - a learning management system, spreads through a regional university.

**METHODS & EXPECTATIONS OF PARTICIPANTS**
If you choose to participate, you are asked to fill in a questionnaire. The questionnaire will include a consent form. This questionnaire is anonymous.

Typical questions include: How long have you worked for USP? How would you prefer to be notified of the latest news and general information about USP? What is your level of confidence at doing some tasks with a computer?

**POSSIBLE RISKS, INCONVENIENCES & DISCOMFORTS**
Apart from the 20 minutes of your time, we can foresee no risks for you. Your involvement in this study is voluntary and you may withdraw your participation from the study at any time and withdraw any data that you have provided to that point. Refusal to participate in the study will not affect your relationship with the University of the South Pacific (USP).

If for some reason you may feel distressed or uncomfortable as a result of sharing your experiences you may contact the USP Research Office on +679 323 2908 or email bulatale_ra@usp.ac.tj

**BENEFITS OF THE RESEARCH**
Information gathered from this study will be used for the researchers’ doctoral thesis. The proposed outcomes of this research will enhance knowledge of regional diffusion of innovations for the developing South Pacific region and beyond.

**ETHICS REVIEW & COMPLAINTS**
This study has been reviewed by the Human Research Ethics Committee (Social Science, Humanities and Behavioural Science) of the University of Wollongong as well as the University of the South Pacific.

If you have any concerns or complaints regarding the way the research is or has been conducted, you can contact the USP Research Office on +679 323 2908 or email bulatale_ra@usp.ac.tj. Alternatively, you can contact the Ethics Officer, Human Research Ethics Committee, Office of Research, University of Wollongong on (+61) 2 4221 4457.
Appendices

QUESTIONNAIRE: Master copy

Consent Information

I have been given information about "Innovation from a distance: an examination of the diffusion of a learning management system in a regional university".

I have been advised of the potential risks and burdens associated with this research and have an opportunity to email Valentine Hazelman vh276@uowmail.edu.au with any questions I may have about the research and my participation.

I understand that my participation in this research is voluntary, I understand that I do not need to participate in the survey. I am free to refuse to participate and I am free to withdraw from the research at any time. My refusal to participate or withdrawal of consent will not affect my treatment in any way or my relationship with the University of the South Pacific. I understand that information gathered from this study will be used for the purpose of the researcher's doctoral thesis.

If I have any enquiries about the research, I can contact Valentine Hazelman vh276@uowmail.edu.au. If I have any concerns or complaints regarding the way the research is or has been conducted, I can contact:

The Research and Ethics Office at the University of the South Pacific on (+679) 323 2908 or email bulatate_re@usp.ac.fj. Alternatively, I can contact the Ethics Officer, Human Research Ethics Committee, Office of Research, University of Wollongong on (+61) 2 4221 4457.

Continue to consent form .........
Appendices

By agreeing below I am indicating my consent to:

filling out this questionnaire exploring areas such as, the use of learning technologies, computer confidence, and communication as a means of awareness about USP and the regional campuses.

I understand that the data collected from my participation will be used for the purpose of a doctoral thesis and all information provided by me will be anonymous and kept strictly confidential by the researcher.

☐ Yes
☐ No
Appendix E – Participant information sheet

Participant Information Sheet

Title: Innovation from a distance: an examination of the diffusion of a learning management system in a regional university

Researcher: Valentine Hazelman, PhD Candidate [2011-2014], Faculty of Education, University of Wollongong

You have been asked to participate in “Innovation from a distance: an examination of the diffusion of a learning management system in a regional university” research conducted by Valentine Hazelman. This is primarily qualitative case study based research. The aim of this study is to investigate how the use of USP’s learning management system (as an innovation) is diffused (spreads) throughout the region. This research occurs in three phases. Following a comprehensive document analysis and supporting theory on diffusion of innovations in Phase 1, questionnaires and interviews will be administered in Phase 2 & 3 to selected regional campus staff (Tonga, Solomons & Marshalls), Heads of Schools, Heads of key support sections and the Senior Management Team. The study cohort is key policy, decision makers and implementers as the university.

If you consent to participation, you will be asked to participate in a 20-30 minute interview or questionnaire. You would not need to commit any additional time. The interview or questionnaire will focus on your perception of how certain elements of diffusion such as communication affect the spread and use of a learning management system for learning and teaching at USP.

The following methods will be used to protect your privacy: identifying details, such as names, will not be directly linked to your responses. Research ID numbers will be used to identify participants. The research numbers will not be stored with participant data. Data collected will be stored securely in a locked filing cabinet and password protected computer in the Faculty of Education at the University of Wollongong, and will only be accessed by the researcher. Only general findings and quotes (with participants name removed for confidentiality) will be used in publications arising from this study.

Participation in this research is voluntary and you are free to refuse consent of participation and you can withdraw from the research at any time by advising Valentine Hazelman. Apart from the 20-30 minutes of your time for the interview or questionnaire, we can foresee no risks for you. All responses will be kept confidential and only available to the researcher. You can choose to not answer any of the interview questions by simply stating that you ‘do not feel comfortable answering.’ Your refusal to
participate or withdrawal of consent will in no way affect your relationship with the University of the South Pacific. Information about who chooses to participate in the study and who does not, and data collected about participants will not be made available to anyone other than the researcher. If you withdraw after the interview or questionnaire, you can request to have your responses removed from analysis and reporting.

The findings from this research will primarily be used for a PhD thesis. It will also be shared in the USP and higher education community to inform better practices for diffusing the use of learning technologies in a regional institution. Findings will also be reported in publications so that other institutions can also benefit from the information.

If you have any enquiries about the research, you can contact the researcher, Valentine Hazelman, by phone on +679 997 0862 or by email at vh276@uowmail.edu.au If you have any concerns or complaints regarding the way the research is or has been conducted, you can contact the Ethics Officer, Human Research Ethics Committee, Office of Research, University of Wollongong on +61 2 4221 4457 or rso_ethics@uow.edu.au Alternatively, you can contact the Research and Ethics Office at the University of the South Pacific on +679 323 2908.
Appendix F – Survey Monkey information sheet and consent procedure

A. Welcome

Hello!
Thank you for taking the time to complete this questionnaire. The next three sections outline the purpose of the questionnaire and include a consent form. Don’t hesitate to contact me if you require further information.

Title: Innovation from a distance: an examination of the diffusion of a learning management system in a regional university.

Researcher: Valentine Hazelton, PhD Candidate, Faculty of Education, University of Wollongong, +61 404 566 158, +679 997 0862, vh276@uowmail.edu.au

B. Information about the questionnaire

PURPOSE OF THE RESEARCH

The purpose of the research is to investigate how the use of a learning management system spreads through a regional university.

METHOD AND EXPECTATIONS ON PARTICIPANTS

If you choose to participate you will be asked to complete an online questionnaire. The online questionnaire will include a consent form. Typical questions in the questionnaire address your awareness of USP’s learning management system, the regional campuses and your confidence in using Information Technology tools.

POSSIBLE RISKS, INCONVENIENCES AND DISCOMFORTS

Apart from the 30 minutes of your time, we can foresee no risks for you. Your involvement in the study is voluntary and you may withdraw your participation from the study at any time and withdraw any data that you have provided to that point. Refusal to participate in the study will not affect your relationship with the University of the South Pacific. If for some reason you may feel distressed or uncomfortable as a result of sharing your experiences you may contact:

The Secretary,
USP Counselling Centre,
Laucala Campus, Suva, Fiji Islands
Telephone no: (+679) 323 2613
Email: senwatu_e@usp.ac.fj
Website: http://www.usp.ac.fj/counselling
BENEFITS OF THE RESEARCH

Information gathered from this study will be used for the researchers’ doctoral thesis. The proposed outcomes of this research will enhance knowledge of regional diffusion of innovations for the community. A proposed model for diffusing learning technologies appropriately at USP will be achieved in addition to recommendations for improved ways of adapting to new learning technologies.

ETHICS REVIEW AND COMPLAINTS

This study has been reviewed by the Human Research Ethics Committee (Social Science, Humanities and Behavioural Science) of the University of Wollongong as well as the University of the South Pacific. If you have any concerns or complaints regarding the way the research is or has been conducted, you can contact:

The Ethics Officer,
Human Research Ethics Committee,
Office of Research,
University of Wollongong on (+61) 2 4221 4457.

Alternatively, you can contact the Research and Ethics Office at the University of the South Pacific on +679 323 2908.

C. Consent form

I have been given information about “Innovation from a distance: an examination of the diffusion of a learning management system in a regional university”.

I have been advised of the potential risks and burdens associated with this research and have had an opportunity to email Valentine Hazelman vh276@uowmail.edu.au with any questions I may have about the research and my participation.

I understand that my participation in this research is voluntary; I understand that I do not need to participate in the survey. I am free to refuse to participate and I am free to withdraw from the research at any time. My refusal to participate or withdrawal of consent will not affect my treatment in any way or my relationship with the University of the South Pacific. I understand that information gathered from this study will be used for the purpose of the researcher’s doctoral thesis.

If I have any enquiries about the research. I can contact Valentine Hazelman vh276@uowmail.edu.au If I have any concerns or complaints regarding the way the research is or has been conducted, I can contact

The Ethics Officer,
Human Research Ethics Committee,
Office of Research,
University of Wollongong on (+61) 2 4221 4457.

Continue to consent form............
D. Consent form

By agreeing below I am indicating my consent to: filling out this survey exploring areas such as, perceptions of the use and spread of a learning management system at USP and regional factors affecting use of learning technologies.

I understand that the data collected from my participation will be used for the purpose of a doctoral thesis.

Do not proceed if you choose to answer No.

E. Questions

Part 1: Demographics

1. What campus are you based at?  
   [Menu – Tonga, Marshall Islands, Solomon Islands]

2. What is your highest formal level of qualification?  
   [Menu – Certificate, Diploma, Degree, Masters, PhD, Other please specify]

3. In what area did you receive your qualification in? E.g. business studies, computing, library studies.  
   [Text box]

4. How long have you worked at your campus?  
   [Menu – less than 1 year, 1-5 years, 5-10 years, 10-15 years, 15-20 years, more than 20 years]

5. How long have you worked at USP?  
   [Menu – less than 1 year, 1-5 years, 5-10 years, 10-15 years, 15-20 years, more than 20 years]

6. What is your current position at your campus, e.g. librarian.  
   [Text box]

Part 2: Computer use

7. What is your level of confidence in performing the following tasks – know how to use email, use the internet, word processing and/or Excel and PowerPoint?  
   [Menu of options for each of the tasks – Not at all confident, moderately confident, Totally confident]

8. How often do you use* the internet at work each week? *Use here describes actual interaction with web sites, i.e. reading articles, clicking on links, chatting.  
   [Menu – less than 1 hour, 1-3 hours, 3-5 hours, 5-7 hours, more than 7 hours]
9. Which ONE of the following do you frequently use your computer at work for? 
[Meme – Word, Email, Internet, PowerPoint, Excel, Other please specify]

10. Do you use social networking sites? E.g. Facebook, Bebo, Hi5, LinkedIn. 
[Meme - Yes, please specify which site(s), No go to Part 3]

11. If you answered Yes above, how long have you been using the social networking site(s) for? 
[Meme - < 1 year, 1-3 years, 3-5 years, 5-7 years, > 7 years]

Part 3: USP

12. Have you read the current USP Strategic Plan? 
[Meme - Yes, No]

13. Are you aware of any other strategic documents at USP? 
[Meme - Yes, No go to the next question]

14. Do you keep up to date with the latest news about USP? E.g. through the USP website, local newspapers, All Staff & Students mailing list. 
[Meme - Yes, what type of news about USP do you look for? No, go to the next question]

15. How would you prefer to be notified of the latest news about USP? E.g. through the USP website, local newspapers, All Staff & Students mailing list. 
[Text box]

16. When a new technology for distance and flexible learning is introduced at USP, how would you prefer to hear about it? 
[Meme – Website, USP bulletin, Email, Poster, Other please specify]

Part 4: Moodle & IT (Information Technology)

17. How would you rate the IT facilities at your campus? 
[Meme – On a scale of 1-5, 1 being ‘very well equipped’ and 5 being ‘not very well equipped’]

18. What are some reasons for your choice of rating for your campus IT facilities? 
[Text box]

19. Are you aware of Moodle at your campus? 
[Meme – Yes, how did you find out about Moodle? No go to Part 5]

20. How long do you think your campus has been using Moodle for? 
[Meme – < 1 year, 1-2 years, 2-3 years, 3-4 years, 4-5 years, > 5 years]

21. Do you know how to use Moodle? 
[Meme – Yes, what do you use Moodle for? No go to the next question]

22. In your opinion, what is the main function of Moodle at USP? 
[Text box]
Part 5: Innovation

23. Which of the following best describes you?
[Mem – I will adopt new technology easily, I will adopt new technology once I see a few people adopt it first, I will adopt new technology only after I am persuaded, I will adopt new technology after many people have adopted it, I won’t adopt new technology easily]

24. How easy is it for you to learn a new technology?
[Mem – Not at all confident, moderately confident, Totally confident]

25. Which of the following do you think contributes the most to the widespread use of new technology in your campus?
[Mem – the technology is better than a previous technology it replaces, the technology is suited to my needs, the technology is easy or difficult to understand, the technology can be tested, the effects of the technology are easily seen by others]

26. Which of the following do you think will allow the use of a new technology to be adopted more effectively at your campus?
[Mem – the new technology itself, communication, USP as an organisation, time]

Part 6: The USP region

27. How well do you know about the other regional USP campuses? I.e. location, Campus Director, size of campus, facilities, number of students and staff.
[Mem – I do not know anything about the other regional campuses, I know very little. I have some knowledge, I am very knowledgeable about the other regional campuses]

28. How would you compare the level of technology use between your campus and the other regional campuses (excluding the main campus in Fiji)?
[Mem – I don’t know, My campus uses more technology than other campuses, My campus has the same amount of technology use, My campus uses less technology than other campuses]

29. Do you think that the use of a new technology for distance and flexible learning will be adopted faster in your campus compared to the regional campuses (excluding the main campus in Fiji)?
[Yes Why? No why not?]

30. What are some of the challenges of using a new technology for distance and flexible learning at your campus?

Thank you
We thank you for your time and effort in completing this questionnaire. We wish you well with your future endeavours.

Regards,
Valentine Hazelman
Appendix G – Sample online responses from Survey Monkey

Q1. What campus are you based at?

<table>
<thead>
<tr>
<th>Campus</th>
<th>Answered</th>
<th>Skipped</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tonga campus</td>
<td>17</td>
<td>0</td>
</tr>
<tr>
<td>Solomon Islands campus</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Marshall Islands campus</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>0</td>
</tr>
</tbody>
</table>

Q20. How is Moodle used for distance and flexible learning at USP?

It is a learning management system used by students and lecturers to access information on the courses, submit assignments, chat and share ideas with the course lecturer and other students in the course.

I think it is a learning tool basically if not all most of your course materials is on it also you have the opportunity to link with others in terms of chat. It is also like a classroom where students can be anywhere but still in the same classroom as everyone else.

Very useful for our students.

Mode of study for some of the courses offered throughout the semester.

Student have access to information on courses and share information with students from other campuses and their tutors.

WE HAVE A STUDENT EMAIL AND PASSWORD THEN EXCESS IT.
Appendix H – Interview script

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### Interview Script

**Title:** Examining the diffusion of a learning management system in a regional university

**Researcher:** Valentine Hazelton (Faculty of Education, University of Wollongong)

<table>
<thead>
<tr>
<th>VH:</th>
<th>Bula (“Hello”) [insert Campus Directors name], how are you?</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD:</td>
<td></td>
</tr>
<tr>
<td>VH:</td>
<td>Allow for some banter as is culturally appropriate and as a means of making the interviewee comfortable as they ease into the interview.</td>
</tr>
<tr>
<td>CD:</td>
<td></td>
</tr>
<tr>
<td>VH:</td>
<td>Thank you for agreeing to this interview. I appreciate your time. As you are aware from my previous email and the information sheet, I am undertaking research into how USP’s learning management system is diffused (spread) through the region as part of my PhD studies at the University of Wollongong. Are you okay with the contents of the information sheet? I will also need your signed consent for this interview which is standard procedure for this research. I hope this is okay with you?</td>
</tr>
<tr>
<td>CD:</td>
<td></td>
</tr>
<tr>
<td>VH:</td>
<td>Seeing as this interview will be longer than 5 minutes, I will ask you as the interview goes further if you wish to continue or would like to take a break. Is this okay with you?</td>
</tr>
<tr>
<td>CD:</td>
<td></td>
</tr>
<tr>
<td>VH:</td>
<td>Shall we proceed with the interview?</td>
</tr>
<tr>
<td>CD:</td>
<td></td>
</tr>
<tr>
<td>VH:</td>
<td>Ok, so how long have you been campus director at your campus?</td>
</tr>
<tr>
<td>CD:</td>
<td></td>
</tr>
<tr>
<td>VH:</td>
<td>On average, how many students are enrolled at your campus?</td>
</tr>
<tr>
<td>CD:</td>
<td></td>
</tr>
<tr>
<td>VH:</td>
<td>How long have you worked for USP?</td>
</tr>
<tr>
<td>CD:</td>
<td></td>
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<tr>
<td>VH:</td>
<td>What is your highest formal level of qualification and in what area?</td>
</tr>
<tr>
<td>CD:</td>
<td></td>
</tr>
<tr>
<td>VH:</td>
<td>What is your level of confidence in performing the following tasks – Email - Internet - Word - Excel - PowerPoint – [Scale: Not at all confident, moderately confident, totally confident]</td>
</tr>
<tr>
<td>CD:</td>
<td></td>
</tr>
<tr>
<td>VH:</td>
<td>Do you use social networking sites like Facebook, LinkedIn etc.? If yes, what do you use them for?</td>
</tr>
<tr>
<td>CD:</td>
<td></td>
</tr>
</tbody>
</table>

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299
<table>
<thead>
<tr>
<th>VH</th>
<th>CD</th>
</tr>
</thead>
<tbody>
<tr>
<td>How versed are you in USP’s current strategic plan?</td>
<td>...............</td>
</tr>
<tr>
<td>Do you feel that your campus is achieving the desired aims of the strategic plan?</td>
<td>...............</td>
</tr>
<tr>
<td>Are you aware of any other strategic documents that USP has? If yes, what are they?</td>
<td>...............</td>
</tr>
<tr>
<td>So far so good, shall we proceed further?</td>
<td>...............</td>
</tr>
<tr>
<td>How do you keep up with the latest news about USP? E.g. website, bulletin, email.</td>
<td>...............</td>
</tr>
<tr>
<td>How would you prefer to be notified of the latest news about USP?</td>
<td>...............</td>
</tr>
<tr>
<td>What type of USP news are you most interested about? Why?</td>
<td>...............</td>
</tr>
<tr>
<td>When a new technology for distance and flexible learning is introduced at USP, how would you prefer to hear about it? E.g. website, bulletin, email.</td>
<td>...............</td>
</tr>
<tr>
<td>How would you rate the IT facilities at your campus? [Scale: On a scale of 1-5, 1 being ‘very well equipped’ and 5 being ‘not very well equipped’]</td>
<td>...............</td>
</tr>
<tr>
<td>What are some reasons for your choice of rating for your campus IT facilities?</td>
<td>...............</td>
</tr>
<tr>
<td>How did you initially become aware of Moodle?</td>
<td>...............</td>
</tr>
<tr>
<td>Approximately how long do you think your campus has been using Moodle? [Scale: less than 1 year, 1-2 years, 2-3 years, 3-4 years, more than 5 years]</td>
<td>...............</td>
</tr>
<tr>
<td>Do you know how to use Moodle? If yes, what do you use it for?</td>
<td>...............</td>
</tr>
<tr>
<td>In your opinion, what is the main function of Moodle at USP?</td>
<td>...............</td>
</tr>
<tr>
<td>Which of the following best describes you? [Scale: I will adopt new technology easily, I will adopt new technology once I see a few people adopt it first, I will adopt new technology only after I am persuaded, I will adopt new technology after many people have adopted it, I won’t adopt new technology easily]</td>
<td>...............</td>
</tr>
<tr>
<td>How easy is it for you to learn a new technology? [Scale: drop-down menu, I easily learn how to use new technology, It takes some time for me to learn to use new technology, I find it difficult to learn to use new technology]</td>
<td>...............</td>
</tr>
<tr>
<td>Thank you for responses so far, shall we proceed further?</td>
<td>...............</td>
</tr>
</tbody>
</table>
| VH | Which of the following do you think contributes the most to the widespread use of new technology in your campus?  
[Scale: the technology is better than a previous technology it replaces, the technology is suited to my needs, the technology is easy or difficult to understand, the technology can be tested, the effects of the technology are easily seen by others] |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CD</td>
<td>..........</td>
</tr>
</tbody>
</table>
| VH | Which of the following do you think will allow the use of a new technology to be adopted more effectively at your campus?  
[Scale: the new technology itself, communication, USP as an organisation, time] |
| CD | .......... |
| VH | How well do you know about the other regional USP campuses? I.e. location, Campus Director, size of campus, facilities, number of students and staff  
[Scale: I do not know anything about the other regional campuses, I know very little, I have some knowledge, I am very knowledgeable about the other regional campuses] |
| CD | .......... |
| VH | How would you compare the level of technology between your campus and the other regional campuses (excluding the main campus in Fiji)?  
[Scale: I don't know, My campus uses more technology than other campuses, My campus has the same amount of technology use, My campus uses less technology than other campuses] |
| CD | .......... |
| VH | Do you think that the use of a new technology for distance and flexible learning will be adopted faster in your campus compared to the other regional campuses (excluding the main campus in Fiji)? Why or why not? |
| CD | .......... |
| VH | What are some of the challenges of using a new technology for distance and flexible learning at your campus? |
| CD | .......... |
| VH | *Tahak* (*Thank you*) [insert Campus Directors name], we have come to end of the interview. I hope that wasn’t too stressful on you. Do you have any questions or would like to clarify anything we have just discussed? |
| CD | .......... |
| VH | Thank you very much for your time. This interview will be transcribed and then sent back to you for your perusal to allow you to amend any comments you made. |
Appendix I – Sample coded interviews in Nvivo

10th May 2012

Interview with Rakosiga Morrison currently Acting SID, CFED.

VH: How long you’ve worked at USP?
RM: Seventh year now.

VH: In what capacity?
RM: As Instructional Designer.

VH: You haven’t had any other position beyond that?
RM: 1994-1995 I was an educational tutor for one psychology course.

VH: Prior to your working here at USP where were you working before?
RM: Ministry of Education as a lecturer at Fiji College of Advanced Education for 6 years. Before going there I taught in 3 secondary schools in Fiji. I was English teacher in literature at Forms 6 & 7.

VH: What is your highest formal level of qualification?
Appendix J – Sample nodes for qualitative responses from Survey Monkey in Nvivo

Not at all when it comes to the technology, we rely too much on Suva. We don’t have too much say in the purchase of software and hardware.

Oh because we’ve been doing this fall Paperless University WS.

Reference 2 – 0.16% Coverage
It’s irritating to me but it did fail.

Reference 3 – 0.14% Coverage
And it’s kind of started by a few people in the WS.

Reference 4 – 0.06% Coverage
Appendix K – Sample coded qualitative responses in Nvivo

Name: Communication

Reference 1 - 0.36% Coverage
All staff email as it kept me quite informed of USP. USP Beat as well.

Reference 2 - 0.62% Coverage
I look up on what the VC says and what he wants. SMT news as I am interested in it. What is happening outside of Laucala.

Reference 3 - 0.76% Coverage
Yes I do but I go to the subject topic of the all staff email especially presentations; I look at the topic especially a few that have interested me.

Reference 4 - 1.00% Coverage
VH: New technology introduced on a regular basis sometimes – how would you prefer to be notified about that new technology whether it be teaching, learning or other purposes?
RM: Through email.

Reference 5 - 0.46% Coverage
Based on what I hear at meetings and conversation word by mouth particularly for Laucala.

Reference 6 - 1.28% Coverage
VH: You mentioned earlier that it is email that you prefer to communicate in terms of finding out a new technology in USP, following that if the piece of information of technology is to be learnt how would you prefer to learn about it?
RM: Hands on.

Reference 1 - 1.46% Coverage
Depends as sometimes I would like to hear it from word of mouth but other times I would like a documentation in terms of an email particularly if it needs to go across the section to get approval from another source esp going upward I’d like a documented evidence by way of email. Otherwise a telephone call or a texted message is acceptable.

Reference 2 - 2.89% Coverage
The type that reflects my work for instance if there are notices of presentations on the OER field, elearning/mlearning, course design & development, open & distance learning they would immediately grab my attention; other areas are also work related more looking into the future like strategic priority areas, marine science, sustainable developments plans that encompasses many more countries and not just the USP region/pacific I would want to go and see because I see that feeding into the larger funding models under which USP will benefit so I need to know if we do need to incorporate this as part of our future planning then I need to know what is happening out there.

Reference 3 - 3.59% Coverage
I prefer to hear it from the Tuakutuku students/scaff email; if it is an ITS generated initiative then the issue should be put out for everyone to know about but say for instance we do it a lot of ourselves here i.e. we introduce software, looking at other systems (deciding which portfolio system to use), department evaluated 2 or 3 different systems and then came up with it. During course design and development how we notify the university but I think we were involved with the course design & development what we do is that we involve with the faculty so the information flows. I prefer a broad approach that everybody gets to know together. Say for microlearning initiative which the course is hosted with a working group and FSTE, I think it is a better approach to let us all know together rather than the individuals are notified.

Reference 4 - 0.56% Coverage

Main idea in trying to sell to them is communication - using Telephone, self REACT platform and Moodle working together and emails.

Reference 5 - 2.60% Coverage

Communications about new technologies, we’ve learnt a lot from Moodle, first time ever that CFOL was involved in really a university wide project that would have such huge consequences and in fact the pivotal platform for learning & teaching. We did it ourselves, we went out there, conducted workshops – we learnt many lessons doing it that way – but looking back it’s the hard way to do it. Moodle has brought people out to the 21st century. Recently we have taken a different approach with OERs. With regard to OERs it is from the top to the bottom; with Moodle we did it ourselves from the bottom-up.

Reference 6 - 2.07% Coverage

Yes, definitely. For instance, mobile learning – being out in the region we found that they are very aware of the degree of communication within and outside their country. In 2009 Helen (SLS Tutor in Vanuatu) communicated to us in the meeting that she could communicate with a student in Santo by mobile phone - after she had done a visit there and she had gone back to Vila Campus – using texted messages. From what I have seen and we also have a video as well to prove this, the students out there while they don’t have the luxury or different types, different devices that we have here in Laucala is like a life saving.

Reference 7 - 1.42% Coverage

If we can connect through mobile with a simple texted message saying your tutorial is postponed you’ve saved them money and time as we have never been able to do this before. I think it’s the transformative power of the device in terms of education and the opportunities which they offer is different rather than technology itself.
Appendix L – Codes for qualitative responses by respondent for questionnaire and interview

The coding system in the table has been used to de-identify respondents’ responses in the survey and interviews to preserve anonymity. The initials, e.g. Em, Ts correspond to a regional campus or central campus category. _x denotes the number of the respondent belonging to that campus or category.

<table>
<thead>
<tr>
<th>Regional campuses</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interview Si_1 only</td>
<td>Solomon Islands</td>
</tr>
<tr>
<td></td>
<td>Vanuatu</td>
</tr>
<tr>
<td></td>
<td>Fiji – Lautoka</td>
</tr>
<tr>
<td></td>
<td>Fiji – Labasa</td>
</tr>
<tr>
<td></td>
<td>Nauru</td>
</tr>
<tr>
<td></td>
<td>Kiribati</td>
</tr>
<tr>
<td>Interview Mi_1 only</td>
<td>Marshall Islands</td>
</tr>
<tr>
<td></td>
<td>Cook Islands</td>
</tr>
<tr>
<td></td>
<td>Samoa</td>
</tr>
<tr>
<td></td>
<td>Tokelau</td>
</tr>
<tr>
<td></td>
<td>Niue</td>
</tr>
<tr>
<td></td>
<td>Tuvalu</td>
</tr>
<tr>
<td>Interview Tg_1 only</td>
<td>Tonga</td>
</tr>
<tr>
<td>Teaching staff</td>
<td>Ts_x -</td>
</tr>
<tr>
<td>Heads of schools &amp; support sections (All interviewed)</td>
<td>Hos_x -</td>
</tr>
<tr>
<td>(All interviewed)</td>
<td>ITS</td>
</tr>
<tr>
<td>(All interviewed)</td>
<td>CFL</td>
</tr>
<tr>
<td>Senior management team (All interviewed)</td>
<td>Smt_x -</td>
</tr>
</tbody>
</table>