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**EFFECTIVENESS OF TABLET LEARNING DEVICES IN
ONLINE AND BLENDED COURSES AT THE UNIVERSITY OF
THE SOUTH PACIFIC**

by Pritika Reddy

A thesis submitted in the fulfillment of the
requirements for the degree of Masters of Science

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School of Computing, Information and Mathematical Sciences

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March, 2017

Declaration

Statement by Author

I, Pritika Reddy, declare that this thesis is my own work and that, to the best of my knowledge, it contains no material previously published, or substantially overlapping with material submitted for the award of any other degree at any institution, except where due acknowledgment is made in the text.

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Statement by Supervisor

The research in this thesis was performed under my supervision and to my knowledge is the sole work of Miss Pritika Reddy.

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Abstract

Mobile Learning, also known as mLearning can be defined as learning that takes place within and outside of classrooms using Internet and wireless mobile devices. Mobile devices such as PDAs, iPads, Android tablets, ultra-notebook computers and cellular phones are used to enhance learning experiences of both the learners and the teachers. The access to resources via mLearning is usually in the context of learning from anywhere and at anytime. In the recent years, the concept of mLearning has gained momentum in higher education institutes around the world. The higher education institutes are incorporating mLearning as it provides convenient and easy access to education for the students enrolled. It also enhances collaborative learning, provides timely feedback to students and gives students with a more robust learning experience. Despite the apparent benefits, the success of mLearning paradigm is entirely dependent on the students' readiness and willingness to accept the mobile device as a learning tool. For mLearning devices to be integrated and used for learning and content delivery, the higher education institutes need to be sure of the user readiness, acceptance and perception of the tablet learning devices. In the Pacific region, the University of the South Pacific has implemented mLearning services for its students and there has been anecdotal investigation on how the use of these mobile devices have impacted student learning. However, there has been a dearth of studies conducted on the effectiveness of the tablet learning devices for online and blended courses offered in the university or in the Pacific region.

This research evaluates the effectiveness of tablet learning devices at a higher education institute in the Pacific region. The research investigates the readiness and perception of students to using the tablet devices for learning. The quality and success rate of the students in both the test and control setups are also compared. Together with this, the research looked at the ability of the tablet learning devices to share and create new forms of knowledge.

The research was conducted at the University of the South Pacific which is the leading higher education provider in the Pacific region. There were two case studies conducted for this research with a sample of 125 students in total, the first case study was conducted with a sample of 20 students enrolled in an online course and the second

case study was conducted with a sample of 105 students enrolled in a blended course at the university.

From the results of the research it can be concluded that students in the Pacific region willingly accepted the tablet devices for learning and perceived that the devices are an effective learning and communication tool. Interestingly, the tablet devices did not have any effect on the success rate and quality of the student grades for the respective courses they were enrolled in. The study also showed that the tablet devices were a good sharing and knowledge creating tool as the devices enabled students to conduct independent research, share ideas with peers and create new form of knowledge from the concepts they learnt.

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principal religious and moral knowledge and values of the culture were transferred to the successors so that later with time these would be passed on to the future generations (Weigel et al., 2009; Siemens, 2013). Since, there were so many things to be studied “division of labour” was needed. Increasing “division of labour” gave rise to various specialties of learners such as astronomy, geometry, notated music, calligraphy, rhetoric, logic, copying and illumination of manuscripts, theology, and philosophy. These specialties required further education and it was inculcation of these specialties that universities and other institutions of higher learning emerged (Weigel et al, 2009). Learning in the early days was based on the behaviorist theory (Clarke & Luger, 2007). Dierking (1991) and Faryadi (2007) state that behaviorism is where learning was regulated by the environment and occurred by building a series of stimulus response connections, and behavior was shaped through positive and negative reinforcements. There were many benefits of learning with behaviorist theory such as self – learning; however, this method did not promote transfer of knowledge to and from learners. Students needed to transform their knowledge in active ways and construct knowledge that they could understand themselves. Therefore, students had to use their higher cognitive thinking by applying their background knowledge to new situations (Learning-theories.com, 2016). This was the beginning of cognitive theory of learning - a broad theory that explains thinking and differing mental processes, and how they are influenced by internal and external factors in order to produce learning in individuals (Alleydog, 2016). The processes involved in cognitive theory of learning include observing, categorizing and forming generalizations of our environment. Till the late 20th century, cognitive theory was seen to be an effective theory of learning where individuals had the ability to generate their own learning experiences. The realization that students received education limited to the culture of schools, without consideration of authentic culture of outside education drove the need of a new learning theory (Bredo, 1994).

The evolution of the much needed new theory in the 21st century was possible due to the introduction of new digital media which brought about many changes to the education system. Learning now were not just mastering the skills given by the teachers but more creating, exploring and discovering knowledge –the constructivist approach replaced the cognitive learning. Constructivism is where *learning is an*

active, contextualized process of constructing knowledge rather than acquiring it – (Mohamed, 2008).

The proliferation of digital media brought broad changes and new skills into the teaching and learning processes. Siemens (2013) and Buckingham (2007) state that digital media allowed *ubiquitous access* (access anywhere and at anytime) to resources and to virtually infinite amounts of information to people, as well as affording new forms of sociality, play, creativity, social activism, networking, and collaboration. With technology seen as the prime driver of educational change, many education providers acknowledged the new digital media and employed the new methods of learning in their curriculum. The new digital environment also changed the learning modes from formal classroom based learning to self- paced and self-directed learning. Figure 1.1 shows the evolution of different learning theories with time. Behaviorist theory was seen to be dominating the 19th century, Cognitive theory in the 20th century and Constructivist theory in the 21st century. The need for each theory evolved with the need to satisfy growing demand of knowledge of the learners.

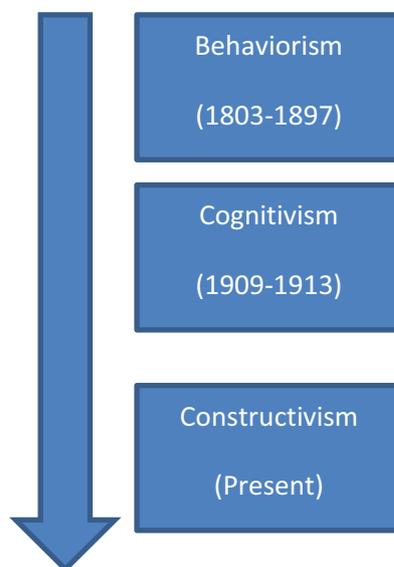


Figure 1.1 Evolution of learning theories with time.

1.1.1 Learning at Higher Education

Around 2500 years ago a philosopher named Socrates discovered the need for learning to provide answers to the questions that existing laws could not provide (Paul et al., 1997). According to Socrates every human that existed had the right to get educated and needed to learn and understand the existence of beliefs and ideas in his or her surroundings. This was probably the beginning to schools in the early years. Mondal (2015) states that education in the early years were provided at home by parents, village heads or tutors and the students learnt about physical education, music, tradition and art. With time and new ideas of new philosophers of education, growing number of students and the need to get educated beyond the walls of traditional learning, the need for higher education and a structured curriculum was developed. The curriculum at higher education institutes was adopted from various concepts taught by the European and American countries with little modifications (Preceden, 2011). Learning at higher education then developed and got restructured with colonialisation, American Revolution and Mass higher education era. Understanding the changes that have taken place at higher education in the past half a century is difficult due to the complexity of the trends associated with them(Altbach et al., 2009). Learning at higher education experienced a major shift in the educational environment and as well as in the way learning was conducted. More interactive and engaging learning environments for both the teachers and students were introduced compared to learning with facts in the past for example the use of smart boards, videos and experiments (Majumdar,2006). With the recent development of ICT, to integration into learning was necessary to improve and motivate learners for a life- long learning experiences and as well as to improve the quality of learning (Majumdar, 2006; Buckingham, 2007; Precenden, 2011).

The assimilation of ICT into education system fostered many significant changes in the way learning took place for example change in; classroom environment, content delivery, access to resources and assessment of student work (Buckingham, 2007; Mioduser et al., 2003). Learning had become more inquiry-based whereby students are able to develop their ability to creative thinking and problem solving (Buckingham, 2007). The ICT enabled learning had enforced a shift from traditional learning to a virtual learning environment. Learning through rules, drills, practices and procedures had been transformed to learning through projects, problems, inquiry, design and

discovery (Majumdar, 2006; Siemens, 2006; Wiegel et al., 2009). With the integration of the new ICT tools many universities around the globe have successfully brought positive changes in organisation of classrooms, enhanced teaching and learning through interactive and engaging content, and developed, enriched and deepened student skills (Reddy & Sharma, 2015). Therefore, the integration of ICT tools and technologies have been the new force and to an extent the prime assets which had enabled the higher education institutes to achieve their goals (Mioduser et al., 2003).

However, the higher education institutes are now facing the challenge of providing quality and lifelong education to their students. The thirst for lifelong learning and the competition in the job market have increased student enrollments at higher education institutes. The delivery of courses through traditional methods (face-to-face and print) with overwhelming numbers was a major drawback for universities to provide quality education to their students. Together with this, the traditional facilitation of distance learning had a number of issues such as; lack of support services from facilitators, feeling of isolation, lack of student motivation and student insecurities about learning which led to high drop outs (Galusha, 1998; Keegan, 1995). Therefore, a change in the facilitation of distance learning was necessary to potentially help the universities to meet the growing number of students and decrease the contributing barriers to distance and flexible learning. In order to change at least the 100 year old distance and flexible learning to real time web facilitation, ICT technologies were integrated to achieve a more sustainable eduscape.

The distance and flexible learning under the new umbrella, ICT, also gave rise to the following methods of learning and

teaching (Philip et al., 2009; Shakeb, 2011):

- | | |
|-------------------------------|-----------------------------------|
| i. Internet mediated learning | vi. advanced distributed learning |
| ii. web-based education | vii. off-site learning |
| iii. telematics environments | viii. distributed learning |
| iv. eLearning | ix. virtual classrooms |
| v. web based training | x. digital education |

The aforementioned methods have been adopted by many education providers to make the teaching and learning more accessible for students. Learning through virtual modes became most common and the concept of eLearning emerged as one of the most promising and successful mode of facilitation for higher education providers. This new method of learning (eLearning) also promoted student-centered learning and offered new and more flexible methods of teaching and learning.

1.1.2 ELearning at Higher Education

Elearning has become a fundamental part of the student learning experience in higher education. Integrating these new approaches and technologies into educational environments has opened new opportunities to raise standards, widen participation in life-long learning and improve learning experiences of learners (Shopova, 2012; Nkechinyere, 2011). Diana (2006) states that the use of eLearning tools and technologies enable the facilitators to transform the ways of teaching for example; using interactive computers to enhance knowledge building of students, model real-world systems and transactions by creating simulations hence increasing the student ability for creative thinking and discovery learning. Together with being self-paced, eLearning allows instructional content to be updated easily and leads to reinforced learning through the use of videos, audios, quizzes and discussion forums, improves retention and allows learners to customize learning materials to meet their individual needs (Kamba, 2009; Diana, 2006). ELearning initiatives have helped higher education institutes to *expand enrolments*- online courses reaches a broader geographical range of students and attracts students from all over the place, *increase revenue*- increase in online courses means increase in student enrolment therefore increase in revenue from student fees and *enhance their reputation*(Sharma et al.,2015 ;Reddy & Sharma, 2015).

Despite its apparent benefits eLearning approaches also have problems associated for example (Singh et al., 2005; Siragusa et al., 2007; Bonk et al., 2004):

- i. technological issues can be very frustrating for students and administrative of the education providers
- ii. difficulty for facilitators to understand the implementation of new eLearning environment and the delivery of responsive contents

- iii. facilitators facing difficulty in online monitoring and evaluation of students progresses
- iv. digital divide(gap between students who have and know how to use Internet and students who do not)
- v. student motivation

Since eLearning approaches had problems associated with it, the strategies and techniques the universities were employing to deliver course content to their students needed to be changed and this was possible due to industrial revolution, electronic revolution and mobile revolutions. The use of advanced technology such as Web 2.0 and the maturity of eLearning with new technological devices have given rise to the emerging concept of mobile learning. Mobile learning also known as mLearning can be defined as the use of handheld computing devices to provide access to learning content and information resources (Haag, 2011; Jill & Carol, 2004). Brown(2003) and Yousuf(2007) claim that mLearning has the potential to increase productivity by making learning available anywhere and anytime and allowing learners to participate in educational activities without the restriction of time and place. However, Conde et al. (2008) and Mirri and Salomoni(2011) state that for mLearning to be successful at pedagogical level, there needs to be several adaptations by the users, such as adaptations for the devices to be used for learning, adaptations of the devices to be used for interaction, adaptations to the content, taking into account the kind of online platform the users use to access the contents and the adaptations of collaboration processes. Figure 1.2 illustrates that mLearning is a constitute of distance flexible learning.

Also, to adopt to this ubiquitous nature of learning, the users also need to adapt to the learning tools that are integrated such as; communication tools like emails, news forums, video and audio conferencing, web chat, discussion forums and SMS, learning management system used and visualization of the learning content (Mirri& Salomoni,2011; Jill & Carol, 2004). Cope and Kalantzis define ubiquitous learning as a new educational paradigm that provides learning outside the walls of classroom using digital media.

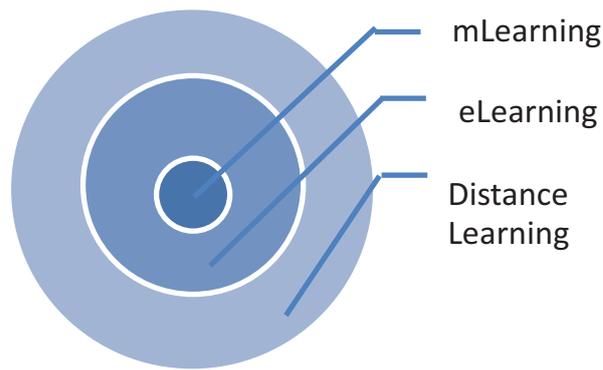


Figure 1.2 Diagram illustrating mLearning is a constitute of distance learning. Adopted from (So, 2010)

The extent to which these new technologies and digital applications are used by higher education institutes vary globally. Although majority of the students consider laptops to be the most important device for their academic success, the importance of mobile devices such as android tablets, iPads and mobile phones is rapidly increasing amongst the younger generations. These handheld devices connecting inside and outside of classrooms are convenient, flexible, engaging, and interactive and make mobile learning more attractive to students (Ocholaet al., 2013; Sharma et al., 2015). However, the choice of apps is entirely dependent on the students to boost their learning experiences. With the inclusion of mobile devices into the learning and teaching platform, the use of edutainment driven learning is effectively engaging and motivating students to learn (Khaddage et al., 2014). Another type of trending app that also targets to motivate and engage students to learn is edutainment apps such as gamification.

Gamification is a growing trend for online environments, one of the new and quite interactive methods to promote interactive learning for online environments and has motivated and caught attention of the younger generation of today (Bidarra et al., 2015; Muntean, 2011). Muntean (2011) states that gamification does not imply creating a game for education purpose; it can be used to make education more fun and engaging, without undermining its credibility. Gamification also provides students with an exciting way to study since there is an instant feedback; it improves learner engagement and provides concepts for lifelong learning (Trybus, 2014; Pivecet al., 2003). Therefore, higher education providers are encouraged to incorporate gamification together with the new eLearning tools and technologies to diversify teaching methods and promote active learning.

1.1.3 ELearning Technologies

Technology is becoming a necessity inside and outside of classrooms at this digital age. Integrating technology for learning and teaching gives lecturers an opportunity to diversify the content delivery of their lectures, display vast amount of information, and to enhance student learning. In addition to these, the use of technology for learning promotes active learning, encourages student attention and consciousness and enables better retention of concepts thorough visual stimulations (Aljawarneh et al., 2010; Buckingham, 2007; Burgess, 2003). For learners, there is an increased access to information, control over learning content and pace of learning, enhanced learning experiences, improved learner interactivity and efficiency, enhanced cognitive effectiveness, and increased flexibility of various learning styles (Ruiz et al.,2006; Graham, 2004; Hande, 2014).

The other benefits of using technology in online learning include (Gunasekaran et al.,2003; Horton & Horton, 2003; Smith, 2013):

- i. improved quality of learning
- ii. improved access to educational resources and training
- iii. improved interaction between facilitators and students
- iv. provision of technology to enable students to independently solve problems
- v. minimized travel and printing cost of students
- vi. use of immersive technologies
- vii. building digital capability
- viii. improved student motivation as they are able to engage with numerous online content
- ix. students are able to get immediate feedback and keep track of their course progress
- x. students are able to practice on core content and skills while the teacher can conduct assessments, or perform other tasks.

Today's learners prefer to learn through the immersed and rich, technology-enhanced learning environments and they select appropriate technologies to suit their own personal learning needs (Darbyaet al.,2008).The eLearning technologies can be categorized as facilitated eLearning tools; instructor-led eLearning tools and embedded eLearning tools (Horton & Horton, 2003).

A. Facilitated eLearning tools include:

- i. video and capture equipment
- ii. multimedia workstations for creating and editing video
- iii. audio
- iv. graphics and animation
- v. web-site authoring tools for creating individual web pages
- vi. organising websites and creating links and course authoring tools.

B. Instructor-led eLearning tools include:

- i. multimedia computer capable of viewing audio and video input
- ii. microphone and video camera and other web authoring tools
- iii. presentation software and server software.

C. Embedded eLearning tools include:

- i. personal computer
- ii. microphone for audio conference
- iii. course authoring tools
- iv. video camera for video conference and client software for online meeting.

The emergence of these new eLearning technologies have also been willingly embraced at all levels of education in order to reform education and to improve the availability, quality and equity of basic education (Voogt & Knezek, 2008). The eLearning technologies such as audio, video, forms of multimedia and digital media are more common and Sife et al. (2007) adds that in addition to TV/Radio, CD/DVD, the higher education providers are incorporating other eLearning tools such Learning Management Systems, podcasts, multimedia production tools and gamification to facilitate course development process and delivery of course content. A Learning

Management System(LMS) can be used to post announcements, homework, assignments, lecture notes and also act as a communication tool between facilitators and students and between peers (Georgouli et al., 2008). LMS is designed in a way to support modern pedagogies and includes online activities such as discussion forums, course resources, quizzes and surveys (Itmazi et al., 2005; Mirri & Salomoni 2011). Some examples of common open source LMS include; Moodle, ATutor, Eliademy, Forma LMS, Dokeos, ILIAS, Opigno and OLAT (Pappas, 2015).

Together with LMS, the use of web-based collaborative tools such as *ePortfolio*, *Wikis*, *blogs* and *podcasts* are seen to be the new generation of web-based tools for virtual collaborative environments (Boulos et al., 2006; Bakardjieva & Gradinarova, 2012). Bakardjieva and Gradinarova (2012), Boulos et al. (2006) and Alexiou and Paraskeva (2010) provide the following definitions:

- i. *Wiki* is a collaborative website whose content can be edited by anyone who has access to it and it can be used as a source for obtaining information and knowledge.
- ii. *Blog* is a web site that contains dated entries in reverse chronological order and engages people in knowledge sharing, reflection and constructing common knowledge discussions.
- iii. *Podcasting* uses RSS (Rich Site Summary) feeds to create audio and video content for students and users and this can be used anytime and from anywhere.
- iv. *ePortfolio* - acts as a purposeful aggregation of digital items that are ideas, evidences, reflections and feedbacks which present a selected audience with evidences of a person's learning abilities and are integrated for students personal and professional development.

The uses of ICT technologies in eLearning environment have created a deeper learning and student engagement. Clarke and Luger (2007) and Horton and Horton (2003) state that in order to benefit from eLearning, an individual needs to have a reasonable degree of ICT skills and self-confidence in using these technologies. When combined, ICT and eLearning have the potential to enable learners to learn at anytime, anywhere and at their own pace. ICT has had an enormous growth and effect on the learning and teaching at primary, secondary and post-secondary levels of education worldwide. The availability and greater access to Internet has led to an inevitable transition in the

higher education system. Therefore, to provide an opportunity to develop resources that support online learning, to reduce the negative environmental impact of education, to improve the financial position, and to give a greater contribution to society, proper integration of these ICT tools to the eLearning environment is essential. The popularity and penetration of ICT tools and technologies in the Pacific region have exponentially increased over the recent years. The inculcation of these innovation tools and technologies is changing the higher education landscape in the Pacific as well.

1.1.4eLearning at Higher Education in the Pacific Region

The diffusion of ICT and the use of ICT in the Pacific region especially for learning came into realisation with the vision of one man- Dr Jimmy Rogues of South Pacific Community (SPC) (Thompson, 2016). He saw the potential of the value of ICT and began forming smaller CROP (Council of Regional Organisations in the Pacific) agencies namely, the University of the South Pacific (USP), Forum Fisheries Agency (FFA), Pacific Islands Development Programme (PIDAP), Pacific Islands Forum Secretariat (PIFs), Secretariat of the Pacific Regional Environment Programme (SPRREP), South Pacific Tourism Organisation (SPTO), Pacific Power Association (PPA) and Pacific Aviation Safety Office (PASO). The formation of this agency was done in the 1970s. From these agencies, ICT directors were chosen and an ICT working group in the Pacific was formed and a number of projects run and funded by Ausaid.

Meanwhile, each of the CROP agencies developed its own ICT plan, and USP formed the very first and largest network in the Pacific known as USP network system (USPNet). Therefore, USP has been the very early users of ICT in the Pacific region and the system also enabled the university to link all its campuses together and open its door to distance learning and eLearning. It was later in 2012, when the responsibility of ICT moved from SPC to USP due to the fact that the university had much more experience and was extensively using ICT in the Pacific. USP now is driving the ICT initiatives and the use of ICT for education in the Pacific region. The timeline given below summarises the beginning of ICT in the Pacific region and at the University of the South Pacific.



- Late 1950's – ICT came to the Pacific
- 1960- USP started – since then ICT has been a part of USP
- 2002 – Access to EVERY Pacific Islander
- 2005 – Pacific leaders adopted Regional Digital Strategy (2005-2010)
- 2010 – Review of the 2005 -2010 Regional Digital Strategy (ICT responsibility shifted to USP)
- 2011 – Pacific ICT Ministers adopted the 2010 Framework for Action on ICT for Development in the Pacific FAIDP (2010-2015)
- 2014 – Review of the 2010-2015 FAIDP

Table 1.0 summarises the ICT penetration in the Pacific region in percentage per 100 capita with the type of Internet connection and the percentage of individuals using Internet (International Telecommunication Union, 2015).

Indicator	Percentage per 100 capita
Fixed- broadband	2.35
Mobile broadband	23.44
Household with Internet	20.68
Individuals using Internet	22.43

Table 1.0: ICT penetration in the Pacific region per 100 capita

In the Pacific today, the use of Internet and ICT tools and technologies is growing. For instance in Marshall Island, educational games are used in Math and English to improve student performance, in Tuvalu ICT software is used to raise literacy, in Cook Islands Intranet is available for peer support, and in Tonga the use of the web for research and projects is encouraged (Project, 2005). The report from Project (2005) also disclosed that the Pacific countries are working towards the curriculum development in ICT education to develop student skills, knowledge and understanding of ICT. This is done to ensure that students are able to cope up and survive independently in the changing world of technology.

USP is the pioneer institution of higher learning in the Pacific region. Established in 1968, USP leverages substantially on ICT to empower its students to passionately embrace their learning and bring about a pedagogical revolution in the Pacific. The improvement of Internet access that is approximately around 8% increase in the Internet users in Fiji (World Wide Web Consortium, 2014) while ITU (2015) figures shows that the mobile broadband subscription per 100 capita in the Pacific region is

20.5% and the percentage of individuals using Internet is 20.1%. The proliferation of the Internet and new ICT tools, the university had around 5134 students enrolled through online mode in Semester 1, 2015 across the Pacific region compared to a total of 2543 online mode students in Semester 1, 2014 (USP, 2015). With the incorporation of audio and video conferences, synchronous and asynchronous online communication and collaboration tools email and voice over Internet, USP is aiming to improve academic performance and effectiveness of 21594 students studying at USP, 61.7% of students from Fiji campuses and 38.3% regional students.

The online course management system (Moodle) is also acting as a catalyst to improve quality of the service with an increase of student enrolment at the university (Yusuf, 2011).

Modes	2015	2014	2013
Blended	5547	4365	3923
Face- to- Face	25688	24311	22192
Online	5134	2543	1714
Print	24710	27763	27478
Total	61079	58982	55307

Table 1.2: Modes of delivery at University of the South Pacific for 2013-2015.

Table 1.1 shows the different modes of delivery at USP and the three year enrollment trend. The student enrolment in: blended courses have increased by 41.39%, face-to-face course courses by 15.75% and online courses by 200% in 2015 compared to 2013. There have been because of the university's improved infrastructure and expansion of its distance courses over the years. Since, eLearning is a growing trend for higher education providers around the globe, the university is also aiming to convert its face-to-face courses to blended and online courses so that it can reach students who are geographically isolated from the main campus and completing their courses from their home countries. Looking at the current trend, it is expected that in future more courses will be offered in online mode and the number of students enrolled in these courses will grow exponentially. This is due to the fact that the university is planning to offer 60% of its undergraduate programmes with flexible learning and 30% of its undergraduate programmes by online mode by 2018 (USP, 2013).

The availability and greater access to Internet has led the USP to an inevitable transition from traditional face-to-face and print facilitation without technology to face-to-face facilitation with technology, blended and online learning. Blended mode can be any combination of the print and traditional face-to-face modes, wherein their actual contributions and weightings may differ for different researchers and education providers. At USP blended mode is defined as a course where a substantial proportion of the content that is 30-79% is delivered online with some face-to-face interactions. The higher education institutions across the globe are trying to utilize this mode to bridge the gap between face-to-face and online learning (Raturi, 2010; Bakalevu & Narayan, 2010). Blended learning fits perfectly into learning offered by USP and is successful due to its ability to accommodate the various learning needs of the on-campus and distance learning students, and giving the educators freedom to meet other tasks and responsibilities (Bakalevu & Narayan, 2010).

For students who are enrolled in blended and online courses, majority of the learning takes place via an asynchronous environment whereby students are required to have Internet connection to get access to the online materials (Chand, 2007; Sharma et al., 2015). With the intense growth in access to Internet and Internet connectivity in the Pacific region, ubiquitous learning products are becoming popular. Utilization of ubiquitous learning makes individual and group learning more productive, enhances collaboration and creates new ways of working and teaching (Monteiro & Gomes, 2013; Graham, 2013; Aljawarneh et al., 2010). Jones and Jo (2004) state that together with providing flexible and seamless learning to students, ubiquitous learning also offers great innovation in the delivery of education allowing personalization and customization of student needs.

In the Pacific region, ICT technologies have the potential to enhance peoples' lives in many ways. From day to day activities such as communication, health, social networking and now education, is the major focus of higher education providers. USP has adapted and adopted a number of ICT tools to better support and enhance student learning (Sharma et al., 2015). In the recent years the Pacific region has witnessed the university introducing mobile learning to improve and make learning easier for its students particularly the distance learners.

The mLearning project has been a new initiative of USP to promote student development and create more self-awareness about the universities' activities. The university first implemented mobile services via Short Message Services (SMS) in semester 2 of 2011, whereby students were informed of relevant course announcements via short text messages. Later, SMS quiz service, mobile course module, edutainment, SMS exam timetable service, course finder app and tablet learning project were made part of the mLearning initiatives of USP (Sharma et al., 2015). The tablet learning project has been a stepping stone for USP's success in the context of mobile learning. Selected 1st year students at various campuses were provided with tablets which were pre-loaded with course materials that enabled the students to access materials at any time from any place. These students undertook study by print and online modes in selected courses at Alafua, Emalus, Kiribati, Tonga, Solomon Islands, Lautoka and Labasa campuses. The aim of this project was to further extend the use of mobile technologies to assist students with their studies. Students had access to their course materials anytime from any location. Students also used the Wi-Fi facility at their respective campuses to access the Internet via these tablets (News@USP, 2013). With the introduction of tablet learning, USP is directing towards a paper-less education.

1.1.5 Emergence of Tablet Learning in the Pacific

The growing use of wireless technologies heralds the emergence of tablet computers in the teaching and learning pedagogy. The tablet learning devices steered a new era of mobile computing which enabled learning to take place from anywhere and anytime. By definition "*A tablet PC is a portable PC that is a hybrid between a Personal Digital Assistant (PDA) and notebook PC, equipped with a touch screen interface, and has a software application which runs a virtual keyboard*" (Techopedia Inc, 2016). The tablets come equipped with sensors, including cameras, a microphone, an accelerometer, and the touchscreen display which uses finger or stylus gestures. The two types that are commonly used by today's learners are the Androids which were released in 2009 and the iPads which were released by Apple in 2010 (Apple, 2012; Rossing et al., 2012).

Oostveen et al.(2011) andDundar and Akcayir(2012)state that the benefits of using the tablet learning devices in the eduscape include:

- i. actively engages the user and enables the learners to manipulate objects and tools in the learning environment and observe the results
- ii. enables the users to construct their own models and share their experiences
- iii. enhances collaboration and cooperation with the peers and other group members
- iv. solves ergonomic and physical problems caused by desktop computers.

To harness the benefits of the tablet learning devices in the Pacific region, USP embarked a Tablet Learning Project in Semester 1, 2013 (Tablet Learning Project, 2013). Around 600 students in the Pacific region were given free Android tablets at selected campuses to be utilized in their respective print, online or blended courses. With the pre-loaded course materials, supplements and applications, the project ensured that access to quality education was made more convenient especially to regional students (News@USP, 2013). Also, these new devices invariably reduced the big load of print materials that students had to print and carry to their classes. The students carried their portable tablets to classrooms, field-trips, tutorials, lectures and basically anywhere enabling them to read, take notes, store and share information with their peers and facilitators (Sharma et al., 2015). Also, Lucas (2007) states that integrating technology for learning not only means that students are only using technology in their daily lives but they are using technology to get access to the vast resources and tools that provides an opportunity for them to learn. For this research integrating technology – tablets are based on the SAMR model and the integration of tablets has taken learning to higher levels of SAMR. Figure 1.2 describes the SAMR model for this study. The tablets were used as a substitute for desktop and laptop computers to give learning creativity and a new direction to the way students learnt the concepts in the course. However, there was no change in the functionalities of the devices that were used. The features and functionalities of tablets were used by students to share and create new forms of ideas and knowledge for example the camera and recording features were used by students to capture raw data, share this data amongst the peers and then create new form of knowledge, for this case a presentation for the class.

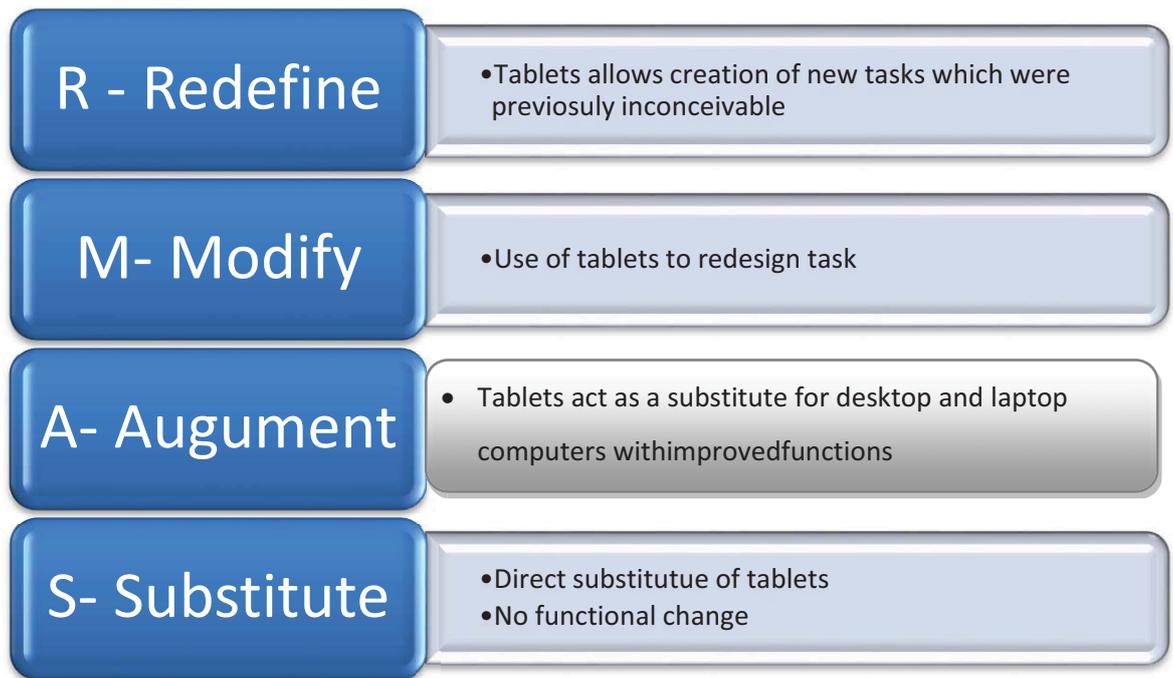


Figure 1.3 SAMR model describing the tablet learning research. Adopted from (Schrock, 2016)

The tablet PCs have also made email, instant messaging and sharing of electronic resources much easier. However, there is lack of evidence and proper institutional research that it radically improves student performance and enhances learning. The powerful features of the device such as mobility, flexibility and robustness if combined at the right platform might show effectiveness of the tablet learning devices for enhancing student learning at higher education at USP. According to the tablet learning project report which was conducted by the mLearning team at USP, the students stated that the tablets helped them throughout the semester to keep track of the courses they were enrolled in and supported them in their studies despite the fact that they faced network issues. Inspired, this research looks at the effectiveness of the tablets for student learning in online and blended courses.

1.2 Research Scope

This study investigates the impact and the effectiveness of tablet devices on student learning and student performances in an online and a blended course at a higher education institute in the Pacific region. The main objectives of this research are as follows:

- i. To conduct a survey regarding the use of tablet learning (use of Androids and iPads) in online and blended learning mode at USP.
- ii. To evaluate the quality of assigned tasks produced through integration of tablet learning in the student learning pedagogy.
- iii. To determine the ability of sharing and knowledge creation through the use of tablet learning devices (androids and iPads).
- iv. To measure the success rate of students who used tablet learning over the use of desktop PCs in terms of: attempting the quizzes, completing the online activities, submission of assignments and the completion of the course as a whole.

Hypothesis:

- i. **H₀** #there is no significant difference between the two groups in regards to the quality of the results being produced.
- ii. **H₀** #there is no significant difference in the success rate between the two groups.

1.3 Organisation of Thesis

This thesis is divided into chapters and organised in the following manner:

- Chapter 2 discusses the various works performed in the field of tablet learning and the use of mobile devices in higher education institutes. This chapter outlines the teaching and learning approaches used at higher education and the associated trends. A detailed discussion on utilisation of mLearning approaches, its benefits and challenges are also discussed. Further discussion on the emergence of tablet learning in higher education has also been outlined.

- Chapter 3 discusses the methods and techniques that were incorporated to conduct this study. The approaches used for the study, methods of data collection and devices used during the study with their background have been provided in this chapter. Also, a brief discussion on the analysis of results has been included.
- Chapter 4 consists of the results that were collected and the discussion on the findings.
- Chapter 5 concludes this study with recommendations for future work on tablet learning in the Pacific region.

Chapter 2 Background and Related Work

2.1 Overview

This chapter provides a background on higher education, its trends and approaches in the teaching and learning processes. Traditional methods of learning are being compared with student-centered learning approaches. Furthermore, the difficulties faced using student-centered learning are discussed. The paradigm shift in the teaching and learning processes are also highlighted. The concept of mobile learning and its utilization at higher education specifically in the Pacific region covers majority of the discussion in this chapter.

2.2 Traditional Learning versus Modern Learning

Progress in education is essential due to the fact that the world sees education as an impetus to a sustainable developed country. Access to quality education is priority for all educational institutes today and in order to achieve this, shift from traditional teaching and learning practices to the “learner-centered” learning was necessary. *Traditional method of teaching* can be described as the teacher being the controller of learning or “teacher dominated interaction” (Novak, 1998; Dimitrios et al., 2013). The power and responsibility is held by the teacher who plays the role of an instructor and also a decision maker. Dimitrios et al.(2013) describes traditional method of teaching using the following practices:

- i. reading texts and problems
- ii. formulating questions
- v. solving short case studies
- vi. oral presentations.
- iii. attending classes
- iv. monitoring discussions

With changing time, the shift from traditional teaching and learning to modern teaching and learning was necessary due to the following reasons (Kirkman et al., 2002; Osbourne, 2013; Wilson, 2015):

- i. to improve the quality of education
- ii. to make students more active and independent learners
- iii. to inculcate new skills and creative thinking
- iv. to provide the students more flexibility in getting access to resources
- v. to boost lifelong learning experiences.

Dimitrios et al.(2013) and Norman and Spohrer (1996)state that *modern learning or learner- centered learning* is where the focus is more on the learners needs, skills and interests, more of active learning takes place and the teacher acts as a guide or a facilitator. Modern teaching approaches consist of (Wilson,2015; Kirkman et al.,2002):

- i. watching interactive video
- ii. use of interactive whiteboards to facilitate lessons
- iii. role plays and experiments
- iv. solving of problem-based questions
- v. use of computers for learning
- vi. use of collaborative learning.

The development of ICT and investment of time and money on the ICT development initiatives by educational institutes have transformed learning. The use of these ICT technologies differ from university to university, however the main aim of all educational institutes is to encourage students to embrace these technologies as a learning tool. Thus, the learning process becomes more effective and interesting as students will be able to broaden their knowledge, develop key skills and competencies.

2.3 Higher Education- Trends and Approaches

An academic revolution has taken place in higher education in the past half a century. Universities over the world are now having an increased number of student enrollments, growing interest in professional education and training, and increased

demand in the assurance to quality education. The higher education systems are now focusing to develop students' skills, knowledge and attitudes to prepare them to confidently involve themselves in the job market. All these changes at higher education have taken place due to the advent of many new and innovative ICT tools and technologies (Sifet al.,2007).

The presence of ICT tools have expanded exponentially and touched virtually all dimensions of the higher education enterprise(Philip et al., 2009).Beginning with modes of delivery to availability of resources such as ebooks, from Open Educational Resources (OERs) to integration of social networking into academic learning and teaching, ICT tools has undeniably transformed higher education pedagogies. The growth of innovative ICT tools and technologies have blurred the boundaries of educational modes to a point where distance and flexible learning can be offered using blended and online modes (Forsyth et al.,2010). Students are now able to study from anywhere and at any time they want with all learning materials accessible online. The ICT innovations have also enabled the possibility of having Internet mediated teaching, web based education and computer mediated communication, cyber space learning, eLearning, blended learning and mobile learning (Rosenblit, 2009; Rahman, 2014; Yoany, 2006).

To enrich student learning, ICT driven learning environments were developed to provide students with self –paced learning. The use of print, audio/video cassettes, radio and TV broadcasts were replaced with telephone tutoring, teleconferencing, audio graphics, video conferencing, computer conferencing, the use of multimedia and hypermedia, e-books, online database, online discussion forums, and satellite tutorials (Rahman, 2014; Tinio, 2003).Majumdar (2006) states that the integration of ICT tools and technologies also shifted learning from teacher-centered learning to student-centered learning. Technology enhanced learning add the following valuable attributes to student learning (Pachler, 2014;Erixon, 2010):

- i. *knowledge building* – developing ideas and understanding of concepts learnt in multimodal ways
- ii. *distributed cognition*- accessing resources, composing and presenting mediated artefacts and tools
- iii. *community and communication* – exchanging, communication and participation

- iv. *engagement-* exploring, working and responding to different dimensions of interactivity and immediacy.

Moving to the 21st century learning at higher education, the penetration and adoption to Internet, online teaching and learning have become an excellent medium of content delivery Kim et al.(2005). Together with the new and innovative methods of teaching and learning, the ICT integration has seemingly given rise to the personal space of students for learning. The use of these mobile devices such as mobile phones, iPads, PDAs and tablet PCs in education have given rise to mLearning. Due to the fact that the uses of mobile devices have accelerated in the recent years, mobile learning was used to facilitate distance teaching (Chung &Khor, 2015; Gikas& Grant, 2013).

2.3.1 Teaching and Learning Approaches

There has been a shift in the teaching and learning process at higher education in this “Net Generation” era. The “Net Generation” learners can be defined as the population of young people who have grown up or are growing up in constant contact with digital media (Philip, 2007). This constant use of interactive learning by the “Net Generation” learners have led to hypermedia learning, learner- centered education and customized learning. Teaching and teaching with technology seem to have a remarkable impact on higher education learning and teaching. *Passive learning* that is learning from recalling, memorizing and practicing used to be more common during the last decade, however *active learning* that is discovering and deriving knowledge through the use of meta-cognitive skills are more fitting in this century of modern technology. Hence, there is a transition from teacher- centered learning to student – centered learning.

“Teacher- centered learning is where students put all of their focus on the teacher. The teacher talks, while the student exclusively listens. During activities, students work alone, and collaboration is discouraged”. – **Concordia online education**

Concordia (2012) and Garrett (2008) state that the advantages of teacher- centered learning include:

- i. classroom and behavior is orderly
- ii. independent learning and decision making

- iii. best approach to teach basic skills
- iv. limits student activity that disrupts student focus.

The disadvantages of teacher- centered learning include:

- i. communication with peers is limited
- ii. group work can become problematic for independent learners
- iii. inadequate opportunities to construct knowledge and understanding
- iv. facilitators rely on extrinsic motivation to influence student learning.

Since teacher- centered learning had issues with the “Net Generation” learners, a shift to student- centered learning was required.

Student –centred learning can be described as the concept of students’ choice in terms of learning (McMahon et al., 2005).

Ayele et al. (2007) defines some common forms of student-centred learning and teaching as:

- *Inquiry learning* – where the focus is on posing problems or questions which students explore to develop an understanding of the concepts.
- *Constructivism* – where the learners are expected to construct and develop new knowledge from past experiences. The definition is outdated in Section 1.1.
- *Experimental learning*- where students practice the concepts or processes that have been taught in classroom.

The advantages and disadvantages of student-centred learning include (Simon, 1999; O’Neil & McMahon, 2005; Ayele et al.,2007):

Advantages

- i. high student participation in the learning process
- ii. students are owners of knowledge
- iii. provides and connects to real life situations
- iv. enhances critical thinking and learning ability
- v. allows for multiple assessment strategies.

Disadvantages

- i. more time consuming

- ii. problems in its implementation due to availability of resources and the ability of students to understand the entire process
- iii. students may resist to try new approaches to learning.

Keeping the issues of student-centered learning in mind, integrating pedagogy and technology seemed to be an excellent medium to improve teaching and learning to facilitate life-long and enjoyable learning experiences (Majumdar S. , 2006). This also enables the learners to be more socially aware and confident, increases their motivation to participate in learning activities, enhances their communication skills, develops better understanding, broadens view of processes and systems and develops problem solving and critical thinking skills.

Also, the facilitators should acknowledge their role in creating student-centred environments. Technology training for facilitators becomes essential so that they gain more proficiency in the use of technology .As facilitators become more proficient, they become more confident, thus making them to adapt technology to their own teaching style and curriculum, rather than simply focusing on the fact that technology is being used in the classrooms (Philip A. , 2013). Teachers are not just given access to computers and the Internet, but are provided with the time to prepare to use technology effectively within the curriculum therefore meeting the needs of their diverse group of learners (Pegrum et al., 2013).

The transition from traditional instruction-based learning to virtual learning environments has created a more interactive learning and has changed the roles of both the facilitators and the learners. Facilitators have now become Sage on the stage to guide on the side (King, 1993). The backbone of this shift, ICT, is providing tools to support the learning experiences at higher education (Majumdar S. , 2006).

2.3.2 Modes of Learning

Globalisation and recent inclusion of new ICT tools in education has given a rise to new modes of learning at higher education. Modes of learning have evolved from face-to-face learning to distance learning to virtual classrooms to mobile learning (Allen and Seamen, 2011). Anderson and Dron (2011) state that the use of Web 2.0 tools allows learners to control asynchronous online learning and interactive multimedia tools such as YouTube, podcasting, online presentations and use of softwares like Animoto and typing web. The concepts of online learning and web – based learning emerged after the introduction of new ICT technologies in education. Allen and Seamen (2011) categorized distance learning in the following categories;

- A. *Traditional Course*(face-face)– the proportion of content delivered online is 0%. The traditional courses do not use any type of technology to deliver the content. The content delivered is either orally or in printed form.
- B. *Web Facilitated*- where the proportion of content delivered online is between 1- 29 %. These type of courses use web-based technology to facilitate a course by the use of a course management system such as Moodle.
- C. *Blended*– where the proportion of content delivered in print mode is around 30-79%. This might however differ from institution to institution.
- D. *Online*- where 80% of the content is delivered online.

The benefits of the distance learning include (Cavanaugh, 1999; Deal, 2002;Sharma et al.,2015):

- i. supports and promotes learning pleasure and effectiveness
- ii. provides opportunities for distance learners and working students to continue with their education
- iii. provides flexibility to student – enables self paced learning
- iv. just-in-time learning – more opportunities to study the most current material available.

On the contrary, (Kumar et al., 2013; IADL, 2013) state that despite the promises and obvious advantages to distance learning, there are problems like:

- i. possibility of compromising the quality of education that is delivered through Internet to the learners

- ii. maintenance of distance programmes is costly
- iii. technological misuses and problems
- iv. students low acceptance of distance learning
- v. lack of social and academic integration.

The traditional distance learning had many issues which hindered full exploitation of the ideologies and functionalities of the new method of learning (Sharma et al.,2015). With the development of new ICT tools, learning was integrated with technology to extend and facilitate support learning activities (Joutsenvirta, 2010). The shift now was from traditional distance learning to distance learning with technology.

2.3.3 Modes of learning with Technology

Technology enhanced distance learning at higher education provides the facilitators and learners a new and improved platform to boost lifelong learning (Sife et al., 2007). The use of Moodle and WebCT tools, online discussion forums, chat and email facilitated discussions, and peer collaborations were used as cognitive tools rather than learning received from tutors and teachers (Taradiet al., 2004). Technology integrated with learning modes gave rise to the (Allen & Seamen, 2011):

- *Technology Integrated Blended Learning* – where the proportion of content delivered online is around 30-79%. A substantial portion of the content is delivered online; there are online discussion forums and face-to-face meetings as well.
- *Online Learning* – the proportion of content delivered online is more than 80%. This type of courses has most if not all of the content delivered online and there are almost no face-to-face meetings.

The strengths and weakness of technology integrated learning modes were described as follows (Hande,2014; Graham,2004;Taradiet al.,2004):

Strengths

- i. greater learner interactivity and efficiency, motivation, and cognitive effectiveness
- ii. promotes collaborative learning which offers opportunities to develop skills for life-long learning
- iii. combines collaborative learning with web-based technology to enhance student learning.

Weakness

- i. lack of a firm framework to encourage students to learn
- ii. technological impediments compromising collaboration and communication
- iii. learners restricted to labs and structured learning spaces.

2.3.4 Learning Modes Combined with Mobile Devices

Integration of technology into different learning modes also had issues and maximum utilization of the learning platforms was not possible as learning was still constraint to a fixed location. Therefore, the use of wireless mobile devices such as PDAs, tablet devices, palmtops and smart phones which were gaining popularity in education field especially with the young generation of learners was adapted (Sharma et al., 2015). The “Net Generation” learners were more attractive to the new eduscape as it assisted them in their learning activities both inside and outside the classrooms.

The combination of eLearning and mobile devices gave rise to the concept of *just-enough* – provided the information needed, *just-for-me* – information that suits individual learners and *just-in-time* – providing access to information at the right time rather than searching for notes making the learning process more efficient (Sharma et al., 2015) and providing the learners with newer opportunities at higher education (Al-Fahad, 2009; Yousuf 2007). Brown (2013) states mobile learning devices have the capability of delivering synchronous and asynchronous communication and interaction with greater ease and at low cost while Rosman(2008) states that students found the traditional method of learning difficult and adopted assistive technology like tablets to help them study and work more efficiently.

2.4 Mobile Learning

Mobile learning has shown significant effects on the learning paradigm and has reshaped the ways of learning. It has also transformed learning from knowledge production paradigm (where learning meant doing research) into knowledge navigation paradigm (where learning meant navigating and evaluating) (Gyorgy, 2012). *Mobile learning is 'the intersection of mobile computing and eLearning which provides accessible resources wherever you are, strong search capabilities, rich interaction, powerful support for effective learning, and performance-based assessment* (Jill & Carol, 2004). Squires (2014) defines mobile learning as learning that happens without being limited to a fixed location through the use of mobile devices such as PDAs, iPads, Android tablets, ultra-note book computers and cellular phones.

The mobile devices and their related technologies like PDA's and tablet PCs are emerging as the most promising technologies to support and enhance learning. The mobile learning applications have shown to have depth and complexity and encourage wider participation even though there might be technical limitations. Participation encourages learners to assist each other and collaborative discussions also enable learners to broaden their ideas and eventually encourage more cooperative work (Parson & Ryu, 2006). The approach of mLearning also benefits the user in terms of improving literacy and numerical skills, enables users to identify where they need assistance and support and moreover helps the users raise pair self-esteem and self-confidence (Yousuf, 2007).

Mobile learning applications are now contextualizing remoteness, time, weather and location to deliver dynamic, hyper-specialized, rich content to learners via context-aware applications (Mohammed et al., 2012; Sharma et al., 2015; Park, 2011). Some examples of mobile applications are:

- *SMS notification* used at USP (purpose is to notify students with important course information, exam timetable information, course mark information, and library book due dates, and also to attempt quizzes in their courses (Sharma et al., 2015)

- *m-ARD app* – used in agriculture and rural development by providing access to information, markets, and services to millions of rural inhabitants (Qiang et al., 2012)
- *QR code apps* for libraries – to track the books loaned from the library by students (Ashford, 2010)
- *Edutainment apps*- used by USP(for educating and at the same time entertaining students) (Sharma et al., 2015).

The education system seems to be more in the hands of mobile devices. Park (2011) , Patricia (2013) and Pegrum et al. (2013) also state that integrating technology with the education system will enhance the learning experiences of both the teachers and the learners.

2.4.1 Benefits of mLearning

Mobile computing offers many opportunities for student learners. The younger generation has become accustomed to the use of mobile devices in their daily lives due to the portable nature, the ability to connect, social interactivity and individuality of mobile devices,. This high level of penetration and adoption to Internet, online teaching and learning has aided in efficient content delivery at higher education institutes(Chen et al., 2008). Mobile learning also supports higher education institutes to deliver educational content at a low cost since there is no need for large architecture, hence turning out to be the most promising method of learning in this ICT era (Appaa,2008; Kim et al.,2005).

Tom (2003) states mLearning offers opportunities for the optimisation of interaction and communication between facilitators and learners, encourages and enhances student participation in the various activities of a course. Learners absorb information at different speeds and in different ways (Geer, 2012). Educational pedagogies currently support advanced tracks and special classes to manage these needs. For example, in Finland students with special needs have separate classroom which are equipped with special technology to support their learning (Europeanagency, 2001).Mobile learning enables students to learn at their own pace, by uniquely catering

to their requirements in a personalized way. With several unique applications being used to overcome learning challenges and physical impairments, learning through mobile devices enable challenged students today to compete with their peers on a more equal footing (mobl21, 2010). Some examples of mobile apps used for special needs learners are:

- i. learning platform *Picaa* – used for students’ impairments (Lopez et al., 2013)
- ii. TAD(travel assistance device)- used to transit riders with special needs in using public transportation(Barbeau et al., 2010)
- iii. mobiMOOC- use of mobile to deliver content of MOOC (deeWard et al., 2011).

Syed (2012) statesmLearning has proven to be efficient and time saving since the facilitators can pre-assign work to students through email or school web portals.Students are notified earlier and they get a chance to prepare themselves for their classes. Online and web-based quizzes are very good examples that can be implemented in the courses. Peters (2007) states that mobile learning has created a new relationship between the learners and facilitators(more enhanced collaboration), reduced the barriers of geographical place and time, created a more efficient working environment for facilitators in terms of flexibility and less paperwork, and allowed more exciting ways to teach together with mobility.

2.4.2 Challenges of mLearning

Implementing a technology-based solution anywhere in the world specifically in education system, raises some challenges and issues that need to be addressed for the technology-based projects to be successful. Though modern technology is reforming the education system, it has its own problems that need to be solved.

The challenges of mLearning can be categorised into three different categories (Syed, 2012):

A. technical challenges:

- i. implementation of a reliable, sustainable and expandable wireless network infrastructure (Syed, 2012).For both students and facilitators

to utilise mLearning resources there need to be a reliable network structure so that the delivery of course resources by the facilitators and getting access to these resources by students is not an issue. It is often noted that Wi-Fi connection at institutional campuses is an issue in the developing countries. The contributing factors are the connection of the LAN at the institutional campus, number of devices connected to the Wi-Fi and the type of devices used by the students. The connectivity issue inhibits full maximisation of the mLearning services.

- ii. connectivity and battery life, meeting required bandwidth for fast streaming , processing platform, content security and copyright issue from authoring group (Yousef & Hamideh, 2013)
- iii. user interface (Eliyas, 2011) and risk of sudden obsolescence (Cresente & Lee, 2011) since there is always update available
- iv. technical support – experts are required to keep track of the technical changes and provide support as and where needed.

B. social and educational challenges:

- i. learner disruption due to the other features and apps available on mobile device
- ii. no restriction on learning timetable
- iii. no demographic boundary
- iv. mobile usage habits in different countries and regions (Yousef & Hamideh, 2013; Cobcroft et al., 2006; Cresente & Lee, 2011).

C. economical challenges:

- i. high cost that is associated with equipment
- ii. teacher training - educators need to cater for in order to implement mLearning in their education system (Yousef & Hamideh, 2013)
- iii. a lot of investment is required for maintenance. With maintenance comes in the cost for upgrading these devices due to technological advancements. For example within seven years the mobile devices have been upgraded from mono colour screen with limited multimedia

features to a personal organiser with computer characteristics hence the upgrade of these changes is needed (Litchfield et al.,2007).

An emerging consensus suggests that mobile technologies are changing and growing rapidly, bringing with it new devices, new standards and new expectations about mobile capabilities in the education landscape (Pegrum et al., 2013). One emerging device is tablet device which is proving to be a powerful tool for learning inside and outside of the classrooms. Moreover, tablet learning supports active, collaborative and student-centered approaches and ensures that quality learning is delivered to learners.

2.5 Tablet Learning

The growing prominence of mobile devices and the diffusion of the use of this technology in the eduscape have created seamless learning spaces. Learners are able to learn at their own time in their own personal spaces. The notions of place, time and spaces for learning have changed. Students can learn both – inside and outside of the classrooms, both in school time and after school time while learning can be scaffold by facilitators or peers or initiated by students through discussion forums, online consultation and chats(Pegrum et al., 2013;Bernado, 2013; Chen &Denoyelles, 2013).Beavers et al.(2004) states that tablet PCs enable students to work interactively both synchronously and asynchronously with easy access to content, collaborators, experts, mentors, and laboratories, so students can truly work from anywhere. Such mobility allows students to learn in real-world contexts, outside of the lecture hall and in the fields, where learning takes place more naturally (Alexander, 2004).

Tablets PCs have been around for decades. The idea of portable touchscreen devices connected to information repositories, often with advanced capabilities such as wireless connectivity, speech recognition and artificial intelligence, had been prevalent in the science fiction of the 1960s and early 70s. This era was the beginning of tablets and hereafter the use of tablets for various purposes gained momentum; for example PADD (Personal Access Display Device) and Newspads (McLellan, 2014). The first tablets were launched in 1987(Linus-Write-Top), then came the Grid Pad in 1989, MessagePad in 1993, PalmPilot in 1997, in 2000 the arrival of first tablet PC and in

2010 Apple released the Apple iPads (Bort, 2013; McLellan, 2014). By 2012, the use of tablet devices in education became prevalent. Tablets seem to have replaced laptops that were hailed in the 1990s as the cutting-edge innovation to support students in the learning process through one-to-one laptop initiatives (McLellan, 2014).

Tablet PCs share many similarities with smart phones and laptops. Pegrum et al. (2013), Linda et al. (2010) describe a tablet PC as one which is equipped with: a touch screen with an onscreen keyboard and/or a digital pen, alongside with the ability to take photos and make audio and video recordings, all of which may be subsequently edited using appropriate apps downloaded from the Internet. From a pedagogical point of view, a tablet PC attracts the attention of students more strongly and helps develop their visual memory and motivation, strengthening their personal autonomy and creativity (Bernado, 2013; Koile & Singer, 2006). Alexander (2004) and Rossing et al. (2012) state that learning with tablets increases collaboration and enables students to create new knowledge. Learners are able to stay in contact with wider range of learners hence they are able to learn, share and apply course content in context with other students. Since, students have varied learning styles, tablet effectively matches preferred learning style of the user and contributes to academic achievement. The use of hypermedia instruction enhances academic performances in students across learning styles (Edgar, 2012). Recent studies have found positive correlations between the use of educational technology and student engagement (Rossing et al., 2012).

From a teachers perspective, tablet PCs are winners because of its portable nature. These devices can be carried with the user at any time. Learning takes place in any environment the user is in. Facilitators also find the use of tablets more effective as it enables them to be pre-prepared for classes and for student's queries. Pegrum et al. (2013) states that facilitators have used the tablets as tools to support their learning and at the same time to get to experience from the tablets as tools to improve their teaching and satisfying their own students' learning in the classrooms.

Tablets enable facilitators to:

- i. stay connected with students for discussion of course issues from anywhere at any time

- ii. stay organized by using the tablet as a storage device, keep updated in notes and emails
- iii. create new sense of learning spaces and learning networks by creating multimedia virtual records in real world contexts and modifying digital work (Pamuk et al.,2013).

With the tablets in their hands students show an increased autonomy in learning allowing them to augment and enhance deep, hand-on learning in ways previously not possible (Mavrotheris et al., 2014). Tablets also enhance ‘family learning’. Learners together with the use of tablets for various tasks, note-taking and e-reading, also use it at home with their parents (Barker et al., 2005). Niace (2013), Sung and Blatchford (2014) define ‘family learning’ as any learning activity that involves both children and adult family members, where learning outcomes are intended for both, and that contributes to a culture of learning in the family for example in Taiwan a project named “Involve Me’ was carried out to promote ‘family learning’ for children aged 2-6 years and adults of the family through the use of ICT (Sung & Blatchford, 2014).

Tablet learning gives the education system a new regime if correctly incorporated. It proves to be one of the cheapest, fastest, interactive and motivational devices that students can use for learning. The use of tablets enable students to broaden their presence of mind in problem solving, improve their literacy and numeric skills, enable them to identify where they need assistance and support and moreover raise their self-esteem and self- confidence. The uses of tablet devices for education at many universities have been adopted successfully and the results are phenomenal (Sharma et al., 2015). Despite of the time and attitudinal limitations, both androids and iPads have supported the concept of mLearning and are known to be the best devices that can be used for distance and flexible learning (Allen & Seamen, 2011).

2.6 Learning with Androids and iPads

Over the last two decades, the use of wireless devices such as tablet computers in education has created compelling and rich learning experiences. The computational and graphics power, ability to connect synchronously and asynchronously to course resources has made tablet PCs the most wanted devices amongst the younger learners

at colleges and universities around the globe. Tablet computers are handheld sized devices with wireless networking capability that can be customized and installed with apps as desired. Tablet computers can be categorized into; Androids and iPads in which the Android was released by Microsoft in 2000 (Bort, 2013) and Apple released the Apple iPads in March, 2010 (Rossing et al., 2012). By the end of 2015, there will be 3.2 billion Internet users of which 2 billion users are from developed countries, 7 billion mobile cellular subscriptions, the penetration of mobile broadband will reach 47% of the households will have access to Internet at home (International Telecommunication Union, 2015). Statista (2015) states that by the end of 2016 the sale of tablets will reach a 60.3 million and the penetration will increase from 50.3% in 2015 to 53.3% in 2016 in countries like U.S. The penetration of both Androids and iPads across different countries spread at a rapid rate and so did the usage of these devices for learning and teaching. The increasing popularity of these devices has led to even greater adoption among students at the post-secondary level over the coming years to enrich educational experiences (Mang & Wardley, 2012). Since, these new technological devices were gaining popularity at all levels of education and with younger generation of today; their usage in learning and pedagogy was considered by the higher education providers.

2.6.1 Learning with iPads

The introduction of iPads in 2010 proclaimed another age of innovations to bring in mobile technologies into every home and classroom. Students, educators, and institutions are using iPad for countless educational purposes and reaping benefits. A study carried out at Drayton Hall Elementary School in Charleston, South California showed that there was a 38% increase in kindergarten reading proficiency, another study carried out at Montlieu Academy of Technology, High point North California showed a 55% increase in science test scores, there was a 95% increase in fourth grade student proficiency at Mineola Middle School in New York, 10% decline in dropout rate and 50% decline in suspension and detention rates at a middle High School in Goodband Kansas (Apple, 2012). An iPad can run Microsoft applications however if the user wants to download more apps he has to register his account on Apple. Once

the registration is done the user can upgrade the apps by the means of App Store using their Apple ID usernames (Apple, 2012).

The most recent iPad models are the iPad Air 2, released on October 22, 2014, the iPad Mini 4, released on September 9, 2015, and the iPad Pro, released on November 11, 2015 (Apple, 2012). The user interface is built around the device's multi-touchscreen, including a virtual keyboard. The iPad includes built-in Wi-Fi and cellular connectivity on select models. As of January 2015, there have been over 250 million iPads sold (Kastrenakes, 2013). Till date, there have been six versions of the iPad and four versions of iPad mini. For more information the learner is referred visit the following website: www.theverge.com/2015/4/3/8339599/apple-ipad-five-years-old-timeline-photos-videos

Teaching and learning supported by iPads are more useful and efficient if the services and applications that the device provides are used properly (Gyorgy, 2012; Pegrum et al., 2013; Lex, 2011). The use of iPad inspires creativity, allows a student to be involved in sharing and editing the content and information regardless of time and space and has the potential to flick from one application to another without any difficulty (Gyorgy, 2012). Together with this, an iPad when used in classrooms showed extensive affordance as a learning tool especially in relation to the development of critical thinking, problem solving, and decision-making, research and information fluency (Lex, 2011).

Robinson (2011) and Murphy (2011) state that the use of an iPad in learning has promoted active learning in terms of more collaborative discussions amongst peers due to its unobtrusive and tactile nature. For example, in medical field the iPads enabled students to participate and be part of a more collaborative and comprehensive lab experiments. The portability and connectivity of the device enabled students to carry out wide range of activities such as searching, collating, storage, interpretation of data and information related to their courses. Additional research capabilities such as the use of the iAnnotate app that allowed students to highlight sentences of a PDF document and then email those highlighted sections to themselves as notes to the device users. Pre-loaded software on the iPad such as the email function, notes and calendar can also be utilized by students to improve their levels of productivity due to improved planning, time management and scheduling (Murphy, 2011).

The iPads can also be an essential tool for students with special needs. This is due to the fact that an iPad comes with *accessibility features* which are built in modifications that make it easier for users with visual, auditory or other physical disabilities and *special education apps* designed by App store for people with disabilities (Stopek, 2013). For example iPads can facilitate reading improvements for students with attention deficit hyperactivity disorder (McClanahan et al., 2012). The spell-check tools facilitated by video modelling intervention and delivered via iPads can assist students with autism spectrum disorders (Kagohara et al., 2012). The touch screen design and screen size of iPads are well suited for special need students with poor finemotor skills or limited vision. This technology can offer students a sense of independence that they may have never experienced before. Their simplicity, ability to be customized, and intuitiveness are additional advantages. It has also been documented that using iPads for English language learners have assisted with socialization and enhanced academic experiences (Patricia, 2013).

2.6.2 Learning with Android Tablets

The popularity of mobile technology has penetrated every facet of our daily lives. The use of Android tablets which are another version of tablet PCs are on the rise in academic preferences (by 45%) as these devices influence students learning preferences, both within and outside of the classrooms (Chen & Denoyelles, 2013). These devices are comparatively smaller and cheaper than Apple iPads (Anderson et al., 2012). The apps installed in androids are from Google hence the users need Google ID to download and upgrade the Apps installed in the Androids.

Tablet PCs provide a wide variety of affordances such as (Anderson et al., 2012; Brophy & Walker, 2005):

- i. can enhance classroom learning environment
- ii. powerful enough to complete heavy crunching numbers
- iii. flexible enough to track assignments and due dates
- iv. compact enough to be carried to meetings and lectures.

The benefits of Androids can be categorized into two different categories (Cummings & Hill, 2015; Corbeil & Corbeil, 2007; Reddy & Sharma, 2015):

- a. Benefits to students
 - i. enhance interaction amongst peers and facilitators
 - ii. enhances self-directed learning
 - iii. rich media content therefore supports individual student learning needs.

- b. Benefits to facilitators
 - i. enable facilitators to conduct immediate and meaningful assessment of student learning and provide needed real-time feedback and assistance to maximize student learning
 - ii. act as a good grading tool (use of Moodle and other course management systems have become easier)
 - iii. enable facilitators to create lecture materials at ease and also enables them to capture meeting notes
 - iv. use the flipping classroom pedagogies to keep students actively engaged.

Android tablets also allow the installation of other apps in its system. For example a Monitoring App can be used by the facilitators to monitor students work during the class (Kamin & Fagen, 2012). For Monitoring app, an application runs on tablet PCs for both the facilitators and the students, therefore the instructor can monitor the work of the students on his tablet PC. Some trending, free educational and beneficial apps for facilitators include:

- i. *Dropbox* for uploading and storing of course related materials
- ii. *Edmodo* for collaborating with facilitators and peers in regards to course issues, also for course notification, submitting assignments and receiving grades
- iii. *Educreations* for an interactive whiteboard app that allows facilitators to create easy to follow tutorials
- iv. *Class Messengerto* keep parents privately aware of what is going on in their child's classroom (Schiola, 2015).

The use of tablet devices for teaching and learning pedagogy have been willingly adopted by higher education institutes worldwide. The benefits of the use of technology in education improve the quality of education provided to the students'

enrolled. The distance learners particularly are seen to be benefitting the most as educational content is made more accessible to them. Therefore, with the use of tablets gaining momentum for learning, the higher education providers should work on ways in which the tablet devices can be effectively incorporated into the teaching and learning pedagogy.

2.7 Tablet Learning at Higher Education

With constantly emerging technologies the education landscape is becoming more complex (Alsulami, 2016). The higher education institutes are facing a challenge on ways to incorporate these new digital technologies due to the fact that the younger generation learners already have preconceived ideas about these new learning tools and have knowledge on how to utilise these devices for learning (Cobcroft et al., 2006). According to a recently carried out survey in the Pacific region regarding the use of mobile devices for learning, there are two ends of the ICT spectrum- one on the positive end whereby learners support the idea of using mobile devices for learning and the other one is on the negative side- whereby the learners are not supporting the idea at all. This intends is creating a digital divide in terms of using technology for learning. Digital technologies provide opportunities for students to learn in multiple ways using the Web 2.0 tools. Together with this, further changes are also noticeable in classrooms for example a shift from traditional face-to-face classroom with chalk and white board to the use of mobile devices and interactive white boards for learning (Geer, 2012; Randy & Heather, 2004; Yoany, 2006).

The mode for learning has shifted from face-to-face learning to distance learning to virtual classrooms. With the integration of tablet devices the learning environment becomes better in terms of the flexibility to learning, student access to resources, lifelong learning, instant connectivity to Internet and self-directed learning which enhances student's creative thinking skills (Moeller & Reutzes, 2011; Rosman, 2008). The use of mobile devices has also distorted the concept of distance between learner and instructor enabling learners to access education at any time and from any place (Yoany, 2006; Lavery, 2012).

The higher education providers have combined eLearning with tablet learning to boost student learning experiences. The pairing of eLearning and tablet learning devices

offers appealing benefits to the “Net Generation” learners such as (Al- Fahad,2007; Brown, 2003; Rosman,2008):

- i. access to learning materials regardless of location and time
- ii. connects classmates and teachers anywhere at any time and offers newer opportunities for learners
- iii. delivery of synchronous and asynchronous communication at low cost
- iv. improved efficiency of students.

Brunett (2003) and Syed (2012) state that the use of learning management software features such as online chats, web-based quizzes, discussion forums and online tutorials have been made much easier and fruitful with the use of tablet devices. The aforementioned features give an opportunity for students to engage in more collaborative discussions with their peers and facilitators. The use of tablet PCs can further empower students to create their content and collaborate with peers and communities with and beyond classrooms - user lead education (Cobcroft et al., 2006). The flexible access to handheld technology increases the access and contribution to the sharing and reusing of learning objects, communication and content generation tools.

Tablet PCs have the ability to provide learners quicker access to course resources and Internet due to the portability when compared to other computing devices like desktop PCs. Here are some advantages of tablet PCs (Yousuf, 2007; Brown,2003; Cobcroft et al., 2006; Reddy & Sharma, 2015):

- i. improves literacy skills of learners
- ii. acts as a bridge which links the learners to other external resources
- iii. engages learners and enhances more collaborative discussions
- iv. enhances student learning experiences through exposure to technology
- v. allows students to access, process and share information in many ways
- vi. allows learning to occur just enough, just for me and just in time.

Brown (2003) states that mobile learning devices provide mobility, flexibility and have the capabilities that can be delivered with greater ease than other electronic devices for example the use of GPRS to deliver multimedia messages (MMS) and short messages

(SMS). SMS-based notification systems can be used by facilitators to inform the students regarding cancellation of classes, notifying students with important course information, exam timetable information, course mark information, library book due dates, and students can also attempt quizzes in their courses via SMS (Brown,2003; Sharma et al., 2015). Web-based notifications can be used in LMS like Moodle to send messages to students, post news and announcements through forums and using Moodle chat to interact with students. Therefore, higher education providers boost students for lifelong learning and make them *learn while you earn on-the-go* (Sharma et al., 2015).

Majumdar (2006) and Haddad and Draxler (2002) state that the use of tablet PCs for an enhanced delivery and learning of content based resources can be beneficial. To facilitate a quality online course, the use of content based resources such as ebooks, interactive media, stimulations and interactive instructional courseware are essential (Appana, 2008) . These resources help learners to access variety of educational resources and they become self-paced learning materials for students. The use of broadcast style lectures, YouTube videos, blogs and wikis are often used by facilitators to facilitate learning in 21st century. These resources can be easily incorporated in tablet PCs to (Alsulami,2016; Kisber,2013;Reddy and Sharma, 2015) ; facilitate interactive real- time learning, integrate and consolidate learning procedures, enhance learners experience with working groups, contribute towards human development and ultimately enhance information sharing and creating knowledge products.

The tablet learning phenomenon has spread across many countries and its emergence in learning is one of the initiatives for the Pacific region. Educators are utilizing this new technology - tablet PCs as a means of enhancing the teaching and learning processes.

2.8 Tablet Learning at University of the South Pacific

Formal schooling in the Pacific region started with the missionaries and education was provided at home or church schools (Thompson, 2016). With time the government took over and schools and colleges were built and education was more formalised in the Pacific region. Soon the need for higher education led the learners from the Pacific region to travel overseas to pursue their education. The leaders then in particular the

Pacific Island Forum decided that a regional tertiary education provider was needed. Since it was not possible for any one country in the Pacific to form a tertiary institute, a regional University – The University of the South Pacific was formed and which is jointly owned by the 12 member countries (Thompson, 2016). The University started in (1968) and it has been part of ICT development in the Pacific as mentioned in 1.1.2. The formation of the university was based on the distance learning model and this was facilitated through paper – based distance learning. Since, this was not very effective and to achieve better education outcomes and reduce cost, the integration of ICT was seen as an effective learning tool.

Over the past few years many universities over the world have adopted mLearning technology to provide flexible learning environment to the “Net Generation” learners of the 21st century. USP has utilized its ICT to empower its students to bring about a pedagogical revolution in the Pacific. The university offers a wide range of academic programmes at the undergraduate and postgraduate levels.

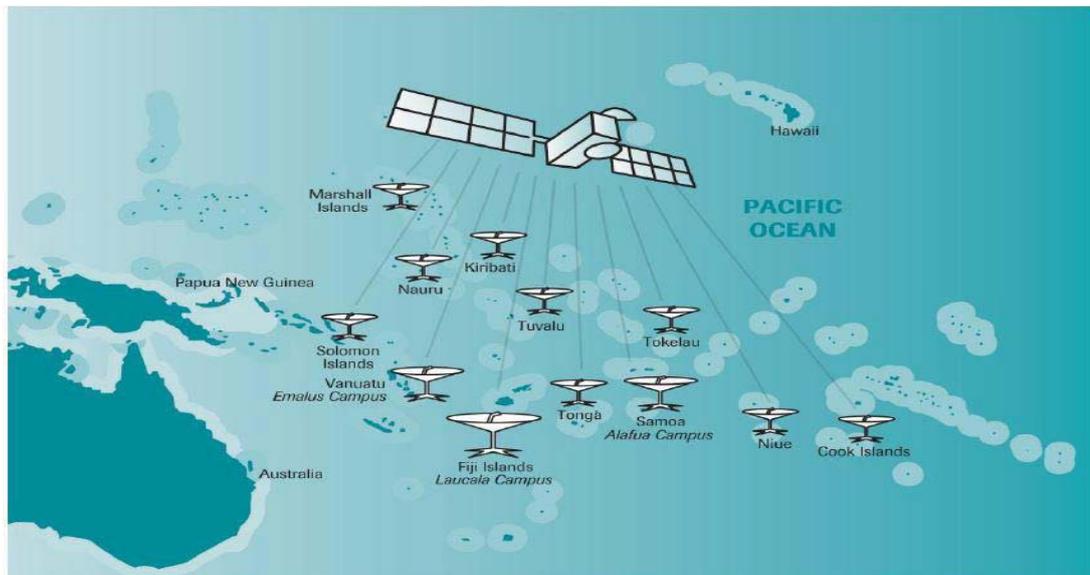


Figure: 2.0 USP member countries connected throughout the Pacific region using the USPNet. Adopted from USP strategic plan 2013-2018.

Figure 2.0 illustrates the network coverage of the USP across its 22 member countries. USP provides quality education to all its member countries. In addition to this, the university offers programmes through distance and flexible learning in a variety of modes (face-to-face, print, blended and online) and technologies with the

commitment to meet the academic requirements of the region (Reddy & Sharma, 2015). However, due to the geographical location of the campuses, access to educational content and delivery becomes a challenging task. The university uses its own telecommunication system USPNet, which uses satellite and links all the regional campuses (Sharma et al., 2015).

As discussed in 1.1.5, USP has been the custodian of ICT from the beginning of ICT in the Pacific region, previously under Pacific Island Forum then later the university itself. In the Pacific region, the access to technology and Internet has improved. The Pacific regional campuses such as Tonga and Vanuatu are already reaping the benefits of improved connectivity of the newly connected South Cross Cable network while Solomon Island and Samoa are next on the list for the improvement of the connectivity (International Telecommunication Union, 2015). With new, improved technological developments and ICT devices in the Pacific region, the university is now able to offer working students in the region an opportunity to continue with their education. Moving from face-to-face facilitation to online facilitation with the uptake of ICT to provide flexible, more interactive and quality learning to the students enrolled. Some of the ICT tools used by the university in its pedagogy to enhance and engage their learners include smart classrooms, Moodle based early warning system, online mathematics diagnostic test, mobile learning (SMS based notification system, edutainment), eMentoring and multi-modal courses (Sharma et al., 2015). The support services provided to the students include provision for video and audio conferencing, broadcasting, and communication through satellite, Moodle chat, YourTutor service and eMentoring support through the Big Blue Button.

Since the penetration of the usage of mobile devices in the Pacific increased from 49% in 2007 to 93% in 2014, integrating the mobile device for content delivery and effective facilitation of courses was the innovative approach the University of the South Pacific incorporated to improve its reach to its enrolled students (Sharma et al., 2015). The students in the Pacific region were quick to adapt the mLearning service provided by USP due to the fact that they were quite experienced in the social usage of the mobile technology, in particular “facebook”. The students found the use of mobile technology very effective as it made learning easier, provided easy access to information and knowledge and supported student learning (Sharma et al., 2015). The

implementation of mlearning tools (SMS notification, SMS quiz service, mobile course module) web and mobile based services and apps (edutainment, course finder) and tablet-based learning, and the support services such as (Provision for video conferencing, audio/video satellite and broadcasting the university was able to (Sharma et al.,2015; Reddy & Sharma, 2015):

- i. provide accessibility to quality education to all students in the Pacific region
- ii. overcome digital divide amongst regional campuses
- iii. provide accessibility to learning support across university campus
- iv. make learning a more exciting and interactive experience for learners
- v. enable students to learn at their own pace.

As one of its strategies to enhance the student learning experience and engage the “wireless” generation, the university introduced tablet devices into its teaching and learning the process in 2013. Although the uptake of the tablet learning devices in the Pacific region is very low, the fact that there is low awareness, securing of the apps is expensive and the usage of the mobile devices for learning is low. This research is introduced to study the readiness and perception of students towards tablet learning devices for an online and a blended course. Implementation of tablet learning can be declared a success if the students embrace the new technology for their learning purposes. The research also, looks at the effectiveness of using the tablet learning device for student learning processes.

Chapter 3 Methodology

3.1 Overview

This chapter describes the techniques that were employed to conduct this research. This work involved two surveys that were carried out to evaluate student readiness, perception and effectiveness of using tablet learning devices in an online and a blended course at the USP. Furthermore, the effectiveness of the use of tablet learning devices (iPads and Androids) was evaluated in terms of the quality and ability to share and create knowledge in the student learning pedagogy.

The research was conducted using interviews and survey to seek answers to the following objectives:

- i. Perception and readiness towards mLearning
- ii. Ability of students to create and share knowledge using tablets

The following table shows the objectives and the methods used:

Objectives	Interview	Pre- survey question	Post- survey question	Other instruments used
Perception and readiness towards mLearning	Case study 1 N= 3	4 questions	6 questions	
Ability of students to create and share knowledge using tablets	none	4 questions	6 questions	Presentation as an assessment

Table3.0: Survey Research Design to achieve the respective objectives

Two case studies were conducted to gauge the effectiveness of tablet learning in the student learning process. The first case study involved the use of iPads and the second case study utilized the Androids and the iPads. The tablet learning method (iPads and androids) was then compared with the traditional method of learning (use of laptops and desktop PCs). The study also considered the quality of student assessments and their success rate. Data was collected through the questionnaires and data analysis was done using SPSS software and Microsoft Excel software.

3.2 Case study Approach

The case study method is one of the most effective research methods when it comes to understanding real-life events (Yin, 2003; Zainal, 2003). A case study approach provides an opportunity to gain insights into a case and enables researchers to gather data from a wide range of sources (Baxter & Jack, 2008; Zainal, 2007). The collection and comparison of the data in case study method enhances data quality based on the principle idea convergence and the confirmation of the findings.

For this research, the case study approach was utilised for the following reasons: the case is being studied at its early stage and there are questions like “how”, “what” and “why” that needs to be answered. Two case studies were conducted: the first case study was conducted with the use of iPads for student learning for a first year online course while the second case study was conducted with both the use of iPads and Android tablets for learning in a first year blended course. The major focus of this study was to evaluate the readiness, the acceptance and the perception of the students to the use of the tablet learning device for learning at USP. The study also focused on the quality of student results and success rate of the students in the 1st year online courses at the University of the South Pacific.

3.2.1 Case Studies

Table 3.1 summarises the two case studies that were conducted for the survey.

Attributes	Case Study 1	Case Study 2
Campus	Laucala	Labasa, Tuvalu and Lautoka
Course	UU100A – online course	UU100 – blended course
Number of Students	10 students	43 students
Device Provided	Apple iPad	Labasa Campus- Android Tablets Lautoka Campus – Android Tablets Tuvalu Campus– iPads
Number of weeks	7 weeks	5 weeks
Objectives tested	<ul style="list-style-type: none"> • Student readiness and acceptance of using the device for a fully online course 	<ul style="list-style-type: none"> • Student readiness and acceptance of using the device for a blended course

	<ul style="list-style-type: none"> • Success rate of students and quality of the students assessments produced at the end of the course compared to the control group 	<ul style="list-style-type: none"> • Success rate and quality of the student assessments produced at the end of the course compared to the control group • The ability of the device to share and create new knowledge
Campus details	<p>Student Toll: 33392</p> <p>Number of PCs Available: More than 250</p> <p>Availability of Wi-Fi: Yes</p>	<p><i>Labasa Campus</i></p> <p>Student Toll: 976</p> <p>No. of PCs Available: 80</p> <p>Availability of Wi-Fi: Yes</p> <p><i>Lautoka Campus</i></p> <p>Student Toll: 2752</p> <p>No. of PCs Available: 50</p> <p>Availability of Wi-Fi: Yes</p> <p><i>Tuvalu Campus</i></p> <p>Student Toll: 435</p> <p>No. of PCs Available: 30</p> <p>Availability of Wi-Fi: Yes</p>
Student services	<p>USPNet – include provision for video conferencing, audio/video satellite, broadcasting, e-Mentoring services, big blue button and Your tutor services</p>	<p>USPNet – include provision for video conferencing, audio/video satellite, broadcastinge-Mentoring services, big blue button and Your tutor services</p>
Learning services	<p>SMS notification, exam timetable application, quizzes application, course finder application and entertainment module.</p>	<p>SMS notificationexam timetable application, quizzes application, course finder application and entertainment module. (For all campuses)</p>

Table3.1: Survey Particulars for both the case studies.

3.3 Data Collection Process

For this research the data collection methods comprise of: interview process, pre-course and post-course questionnaires and personal observations during the research period.

Interviews can be used as a useful data collection tool for a research. Interviews allow the sample group or the ones who are being studied speak to for themselves, give their views and opinions on the topic (Rodrigues, 2015).

Questionnaire analysis can be quantitative or qualitative (Mcleod, 2014). For this study, qualitative content analysis approach was used. Qualitative content analysis refers to a research method for subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns (Zang & Wildemuth, 2009; Mcleod, 2014). There are three approaches to qualitative content analysis; conventional qualitative content analysis, directed content analysis and summative content analysis. Data is collected through interviews or open ended questions. This study involves the utilisation of directed content analysis. Hsieh and Shannon (2005) state that in directed content analysis, there is some existing literature about an issue, however it is incomplete. The goal of a directed approach to content analysis is to validate or extend conceptually a theoretical framework or theory.

3.3.1 Determining the sample

The growing use of mobile technology at colleges and universities is the most current trend that has been adopted by the younger generation today (Rossing et al., 2012; Bernado, 2013). Whether its email, chat, games, learning or communication, tablets are changing the student learning and teaching pedagogy. For this research, a quasi- experimental study was carried out.

A sample of 63 students participated in the two case studies. 20 students for case study 1 and 43 students for case study 2.

Table 3.2 shows how the students were distributed and what devices were used.

	Experimental Group	Control Group
Case study 1 (online) (20 students)	10 students (Using iPads)	10 students (using a device of their choice)
Case Study 2 (blended) (43 students)	Campus A- 14 students , B- 17 students (Androids) and C- 12 students (iPads)	Campus D- 14 students , E- 16 students and F- 13 students (using device of their own choice)

Table 3.2 Summarised data for the number of students and devices used at each campus.

For case study 1, a total of 20 students were studied; 10 students were in the experimental group who used the iPads and the other 10 students were in the control group. The students were invited to participate in the survey and the interested students were provided with an iPad each (iPad 2) which the students had to return at the end of the survey period. The control group students used a device of their choice to complete the assigned assessments in the course. The preferred devices of the control group students was desktop computers at the campus or home, laptops and notebooks. The location for this study was Laucala Campus in Suva, Fiji.

For case study 2, a sample of 43 students enrolled in UU100 - a recently designed blended course were part of the experimental group and the test campuses were *Labasa Campus = A, Lautoka Campus = B and Tuvalu Campus = C*. The campuses which were part of the control group were *Marshall Island Campus = D, Kiribati Campus = E, Nauru Campus = F, Solomon Island Campus = G*. For Campus A and Campus B Android tablets were distributed to the students and Campus C students were given the iPads. The students were invited to participate in the research and the interested students (volunteers) were each provided with a tablet device, which were returned at the end of the survey period. Two types of tablet learning devices (Androids and iPads) were used which were pre-loaded with course materials, supplementary materials and help videos for various topics and assessments.

3.3.1.1 About the Course

The course UU100 titled Communication and information Literacy is a 1st year generic course offered in both blended and online modes. The duration of the course is 14 weeks. The aim of this course is to ensure that all incoming students develop knowledge and competence in the use of computers and information resources. It

covers fundamental concepts of computers and their applications. The course is designed to address the broader imperative for students to develop their capacity to locate, access, evaluate and use information efficiently and effectively. The facets presented in the course are closely aligned with the Research Skills Development framework.

The course UU100A titled Information Literacy is an online course which is offered to the students enrolled in their 1st year degree programme from S1, 2014 onwards in either of the following:

- Bachelor of Engineering (BE) programme - ME and/or EE streams
- Single/Double major in Computing Science (CS)
- Single/Double major in Information Systems (IS)
- Bachelor of Geospatial Science (BGS) – Analyst and/or Developer streams
- Double major in Geospatial Science (GS)• Diploma in Geospatial Science (GS)

The duration of this course is 7 weeks.

3.3.2 Devices used in the study

The use of mobile devices and related technologies such as mobile phones, smart phones and PDAs' has increased significantly in the learning and educational sector (Almaiah&Jalil, 2014; Bernado, 2013). The use of tablets for education purpose is making its way into higher education. The predominant features of these devices especially the physical characteristics such as such as a large screen, motion sensors, and portability enable active and collaborative learning in the classrooms (Diemer et al.,2012). A detailed discussion on learning with iPads and Androids has been covered in sections 2.6.1 and 2.6.2. Therefore, this study has used the two most trending tablet learning devices, the Android tablets and the iPads as learning tools. The features of each are tabulated in Table 3.3.

Picture of the device		Picture of the Device	
	Tablet		iPad
Model	L090-2V	Model	Apple iPad Air 2
Operating System	Android 4.03	Operating System	iOS 8.1
Processor(CPU)	VIA 8850 1.2 GHZ Cortex A9	Processor	Triple-core 1.5 GHz Typhoon
Memory	1GB	Memory	2GB
Storage	8GB	Storage	16GB
Camera	Front 0.3MP camera	Camera	8MP
Screen Size	9 inch	Screen Size	9.7 inch
Screen Type	LCD capacitive screen	Screen Type	LED-backlit IPS LCD, capacitive touchscreen
Screen Resolution	800 x 400 pixels	Screen Resolution	1536 x 2048 pixels
Wireless	802.11 b/g/n	Wireless	Wi-Fi 802.11 a/b/g/n/ac, dual-band, hotspot
Sim Cad slot	No	Sim Cad slot	No
Gravity Sensor	Yes	Gravity Sensor	Yes
Bluetooth	No	Bluetooth	Yes
Battery	4.5 hours	Battery	10 hours
Speaker	yes (built in)	Speaker	yes (built in)
Microphone	yes (built in)	Microphone	yes (built in)
Size	240 x 148x 12mm	Size	9.7 inches
Weight	500 grams	Weight	437 grams

Table 3.3 Summarised characteristics of the devices used for the study.

3.3.3 Interview Process

An individual in-depth interview was carried out for case study 1 where 3 students were interviewed. The interview was basically based on the students experience on the utilization of the device for different purposes during the course of the study. The interview period was for about 10 minutes whereby, the students were asked to give their opinions on the utilization of the mobile devices for learning. This interview included follow up questions from the pre-course and post course questions were asked so that the students could give detailed explanations on the views they presented in the

questionnaires. The interview questions helped in validating the responses received from the sample in terms of using the devices for learning.

Since, the interview questions were a follow up to the questionnaires, the interview also showed that the responses received by the students were reliable and hence could be used for the research.

The following interview questions were asked:

- i. Do you own an ICT device of your own? If yes, which one?
- ii. Are you competent in using the device? In what way do you use the device?
- iii. What was your reason for participating in the survey?
- iv. Is using an iPad as a learning tool a good idea?
- v. Is an iPad good for doing research and assignments?
- vi. What are some of the negative features of an iPad?

3.3.4 Questionnaires

A questionnaire is a concise, preplanned set of questions designed to yield specific information to meet a particular need for the research topic (Key, 2007) and has a definite purpose that is related to the objectives of the study being carried out (Mcleod, 2014). Key (2007) and Mcleod (2014) define a close-ended questionnaire as one which calls for “yes” or “no” as an answer or open which calls for free response from the respondents. Janice (2008) states that open-ended questions engage respondents which harness creativity, self-expression, and richness of detailed and factual information. In addition to this open-ended questionnaires can be an opportunity to get suggestions for future surveys.

For the purpose of this study, open ended questionnaires were distributed to the sample chosen. Two sets of open ended questionnaires were designed; pre-course questionnaires and post-course questionnaires. Once the filled questionnaires were collected, analyses of the questionnaires were done accordingly. For the questionnaires to have validity a pilot test was run. Questionnaires were initially designed and given to a group of students who had no problems in answering the questions. The questions were clear and the questionnaire was user-friendly. Also, from the data gathered it was evident that the questions in the questionnaire were valid since the results

reinforced the hypothesis of the research. Since, the data was qualitative there was no need for reliability test.

3.4 Analysis of results

For the purpose of this study a statistical analysis was carried out with the results gathered from the two case studies. Kalla(2011) states that statistical analysis has being proved to be a very useful tool to get approximate solutions when the actual process is highly complex or unknown in its true form. Gibilisco (2014) states that statistical analysis describes the nature of the data, explores the relation of the data to the underlying population, creates a model to summarise understanding of how data is related to the underlying population, proves the validity of the model and employs predictive analysis to run scenarios that will help guide future actions.

For this study, the interview questions were tabulated according to the responses given by the three students for each questions. The answers for the pre- course and post course questionnaires were analyzed using the SPSS software. The distribution of the data collected was tested and it was found that the data was not normally distributed therefore anonparametric statistical analysis was conducted. Microsoft excel was used to make the graphs for both the studies. These two tests were carried out to find if there was any significant difference between the results of the control group and the test group. For graphical representation of the data Microsoft spreadsheet was used. To test for the quality of the assigned task, a “chi- *square*” test was conducted where the p-value was evaluated to “ $p \leq 0.05$ ”. This test was conducted for Course Total, ePortfolio Mark, Final Mark and Student Grade.

Chapter 4 Results and Discussion

4.0 Overview

This Chapter is divided into two sections. The first section focuses on the results and analysis for case study 1, while the second section consists of the results and analysis of case study 2.

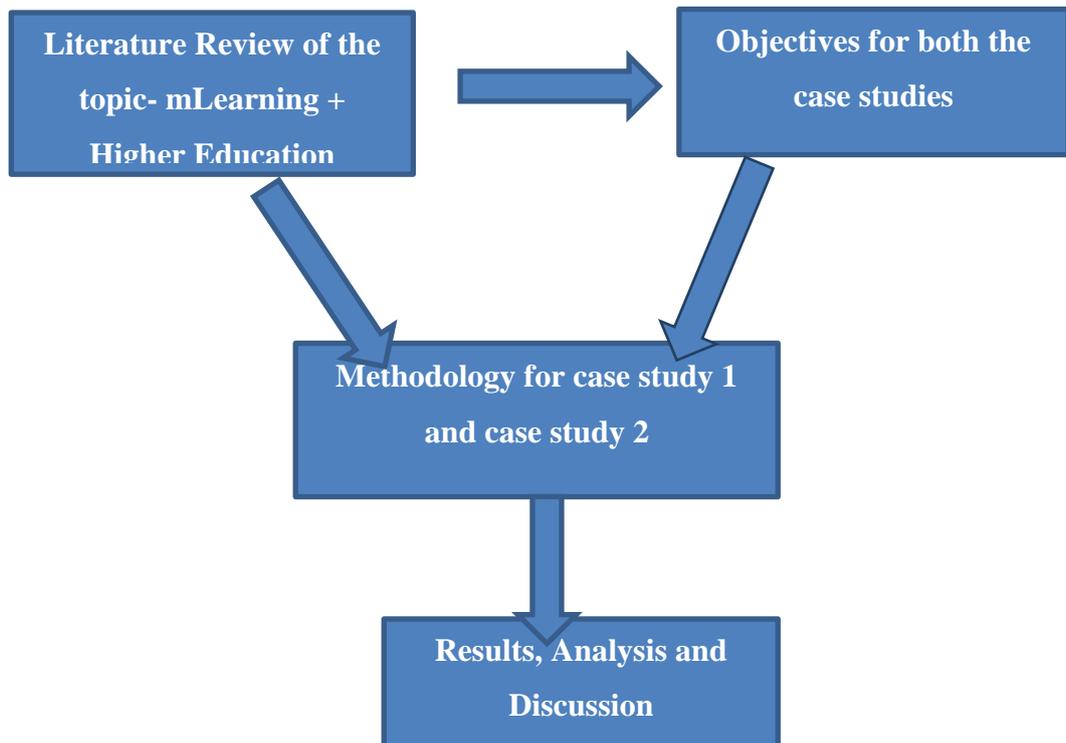


Figure 4.0: Conceptual model of analysis.

Figure 4.0 explains the conceptual model for the study. As per the model the objective for the study was drawn from the gaps present in the literature on mLearning. This study specifically looks at mLearning in the Pacific region. The methodology and objectives for both the case studies was dependent on the literature review of the research that was conducted in earlier researches of the study. The study was conducted with appropriate methods and the results were collected and analyzed. This section presents a discussion of the results gathered from this study.

As mentioned in section 3.2.1, this study was conducted on the students taking UU100A at Laucala Campus. This course is a fully online course at USP and offered to students who are majoring in Computing (double or single major Computer Science and Information System), Geospatial Science and Engineering courses. Since the course is fully online, the students can enroll anywhere from the various university

campuses in the region. For this study a total of 20 students who were voluntarily part of the sample from Laucala campus were studied; 10 students were part of the control group and 10 students were part of the experimental group. The students were supported using various mediums in the course such as discussion forums, eMentoring and online chats, face –to- face support and support through emails. For the sample, class announcement was made regarding the survey and students who were interested to participate in the survey were included in the test group. The test group students were provided with an iPad each for their 7-weeks learning journey. These iPads were returned after the completion of the course. Results were collected and analysed as per the objectives of this study.

4.2 Objective 1: To conduct a survey regarding the use of Tablet learning (use of androids and iPads) on online learning mode at USP.

Case Study 1

A total of 20 students participated in this. Survey and interview questions were used to gather data. The interview data is presented in Table 4.0

Changes in technology have altered the opportunities for teaching and learning at universities around the globe. Internet, email, chat, instant messaging, podcasts and PDAs are the most current trends which have forced the educators to evaluate the quality and the way the content delivered to students(Buckingham,2007;Deal,2002). Even though there are many benefits of mobile learning, unpreparedness of students and non- acceptance of these devices as learning tool can be crucial issues (Rossing et al., 2012). Nassuora (2013) states that the success of mLearning is dependent on two important factors; students' positive attitudes towards the acceptance of the device as a learning tool and the support provided by the universities to implement mLearning. If students have positive attitude towards using mobile devices as learning tool (like they do for social networking and gaming), then implementing mobile learning will not be a problem at all. However, Wardley and Mang(2012), Haag(2011) and Cavanaugh (1999) state that the mobile devices like iPads and Androids have gained popularity and are likely to have greater adaptation by post-secondary level students in the coming era whilst adopting technology for the sake will not guarantee improved learning outcomes and enriching educational experience.

In the Pacific region, In the Pacific region access to mobile devices and broadband technology has improved in recent years. The development of ICT and the much needed ability of higher education institutes to provide flexible learning to students, the use of wireless technology by education institutes emerged as a new trend (Sharma et al., 2015). Mobile Learning is becoming popular in the Pacific region due to the portability of devices, engaging students in both active and passive learning, providing students with learning in their own space and at their own time, and boosting the facilitation of distance learning programmes. However, there is no such study conducted to evaluate the effectiveness of mLearning in the Pacific region.

Hence, this study focuses on the readiness, acceptance and perception of students to the use of tablet learning devices for their learning purposes. To achieve this objective, two separate methods were incorporated; one was the interview session and the other one was the use of pre-course and post course questionnaires. For the interview all the participants were given an invitation for the interview session however only 3 students turned up therefore only three students were interviewed; two students were part of the control group and one student was part of the test group. The results of the interview is summarised in Table 4.0.

Statements	Student 1	Student 2	Student3
S1: Do you own an ICT device of your own? If yes, which one?	Yes, I own a laptop	Yes, I own an iPad and laptop.	Yes, I own a desktop computer
S2: Are you competent in using the device? In what way do you use the device?	Yes, very much. Using the laptop for doing assignments , learning, gaming , social networking and net surfing	Yes I am. Using the laptop for learning and assignments and iPads for social networking, games and net surfing.	Yes, for research, learning, games and surfing the Internet
S3: Reason for participating or not Participating in the survey.	Did not feel the need to as I am more comfortable with my laptop for learning.	I did not want to participate as I am more comfortable using laptop for learning.	I chose to be part of the survey to experience learning with new technology which is becoming very evident in its use as a learning tool
S4: Is using an iPad as a learning tool a good idea?	Yes, it is a very good learning tool due to its portability. Learning materials can be accessed from anywhere at any time.	Yes, sometimes as it is portable. I feel it's good if one is competent using it. It might act as good accessible tool for the course materials.	Definitely yes, its portability really made my learning journey for 7 weeks much easier. I was able to get access to

			course materials easily and read my notes even when I was travelling.
<p>S5: Is an iPad good for doing research and assignments?</p>	<p>Yes, in terms of research. If network connectivity is present then research materials can be obtained at any point in time, however in terms of doing of assignments, issues like scrolling functions, writing functions of iPad makes it difficult and time consuming for one to complete assignments.</p>	<p>Not really sure as I have not used iPad before for assignment however it might be possible if one tries to and most beneficial to use if it's an online course</p>	<p>Yes. There was connectivity issue at the campus as Wi-Fi was not available at all spots. However enable hotspot from my mobile made my life easier and I was able to do research conveniently. In terms of assignments, I did not face any difficult as the browser and the</p>

			interface of the iPad was user friendly.
S6: Negative features of iPads.	Negativity of iPads includes connectivity issues, availability of applications like pdf, MS Office and restriction to download application to the iPads. Difficult to scroll, write, transfer and save.	Connectivity is very poor especially when doing the quiz. Laptop is more powerful. In addition to this, downloading is also an issue with iPads.	For me, the only negativity was unavailability of pdf application and saving documents to my iPad.

Table4.0 Summary of the data collected during the interview process for Case Study 1.

The results of Table 4.0 clearly show that students are yet to adapt to learning with mobile technology due to the fact that traditional substitutes or alternatives like laptop and desktop computers are available and work to students satisfaction. Though 100% of the students agree that an iPad is a good learning tool due to its portable nature, fast access to Internet, easy access to course materials, connectivity in the Pacific is always an underlying issue to make full utilization of the device for learning. The connectivity issue is prevalent in most campuses of the university throughout the region. The Laucala campus which is based in Fiji has managed to overcome this issue through the improved network infrastructure over the recent years. However, sometimes the connectivity issues specially with connecting to Wi-Fi spots still exists. Another important factor mentioned by students was the inability of the device to download files from Internet such pdf and winzip files. This could be a reason because students have yet to explore all the features and apps in the device. Though securing of Apple apps can be expensive for students in the Pacific region, it is utmost important that students know how to use the installed apps in the device. The students seemed to have utilized the device for games, communication and social networking being the most common. These show that in the Pacific region, using the tablet devices for learning is still a growing concept, untapped. From these results, it is also apparent that training workshops for students is important and introduction of such ICT tools in the first degree and 2nd degree levels of schooling. This recommendation and conclusion can be made here as well as in the final chapter.

The results from the pre- course questionnaires are summarised below:

Results from Pre-Course Questionnaire

	<i>No Device</i>	<i>Desktop</i>	<i>Laptop</i>	<i>iPad</i>
<i>No Experience</i>	2			
<i>Music and Internet</i>		2	2	
<i>Keeping Contact</i>				1
<i>Communication (Email and skype)</i>			3	

Table 4. 1 Student experiences with different devices for case study 1.

For this case study the sample size was 10 due to the availability of limited tablet learning devices (iPad). Since the affordability of the device by the students is an issue, the research was conducted with the devices made available by the university. Table 4.1 summaries student experiences with different devices. From the results, 20% of the students did not have any experience in using any of the computing devices. These students were found to be from a geographical location where the uses of computing devices were minimal. Looking at the Pacific region, getting access to Internet and owning a computing device differ from family to family and from one location to the other. Some contributing factors that can lead to the students not having access or experience to computing devices are: family income, accessibility to Internet and digital divide. Since the students did not have any experience in using the devices for learning, they decided to participate in the survey to learn how to use the device for their academic work. The survey also provided an opportunity for these students to get hands-on experience in using wireless technology for learning, communication and personal usage. The other 80% of the students did have experience in using the computing devices; however, it was not for learning or their academic work. The uses of the computing devices were mainly for music, web surfing, personal matters, social networking and communication. Being part of the survey gave them an exposure on ways they can use a mobile device for academic purposes. Therefore another interesting fact gained from this study was the popularity of the students using the tablets for social networking specially Facebook. Section 2.8 entails more information on use of mobile devices in the Pacific.

A.

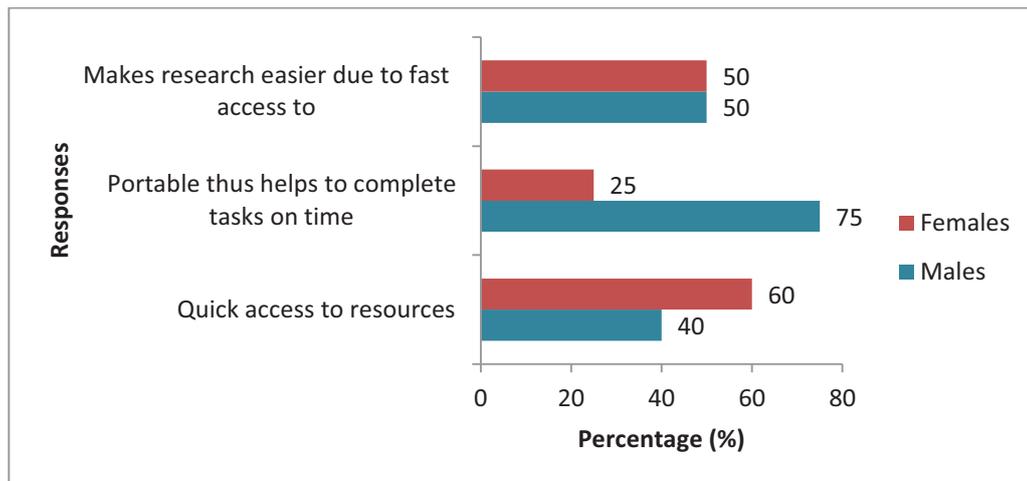


Figure 4.1 An iPad acts as a good learning tool sorted at gender level

Figure 4.1 summaries students' responses on the iPads being perceived as a good learning tool sorted at gender level. From the figure it can be seen that even before the survey was carried out, 100% of the student indicated that iPad can act as a good learning tool (since the devices were an e-repository, it provided access as and when needed, the camera features enabled students to capture raw data and use their cognitive skills to come up with new idea of learning). Looking at the male participants, 75% stated that that an iPad can best assist them in completing their tasks as it was portable and allowed work to be done from anywhere and at any time, while 60% of the females supported the idea that an iPad provides quicker access to resources (notes, assignments and quizzes) hence minimized the cost of printing needed for the course. The remaining 25% of the males supported the idea that the iPads were a good storing device which could be used for their daily storage of music files, assignments, pictures and recordings. On the other hand from the female population, the remaining 40% supported the idea that the ability of the device to connect to Wi-Fi from anywhere at the campus made research much easier for them to get access to resources for the courses they were enrolled in. (NB: the installation of apps on the devices were restricted).

The students in the control group also supported that the iPads could be a good learning tool for online courses due to the fact that the inclusion of new technology into learning could not be avoided and need to be experimented with (20%). The device is also portable and much easier to handle compared to desktops and laptops (50%) while

there were 30% of the students who thought that learning with iPads is not a good idea since there was very limited knowledge and training in using the device for learning purposes.

Looking at the pre-course results the participants tend to have a positive attitude towards using the tablet learning devices for their study since they had seen the effective use of the devices by their friends (30%), read about the use of the device on social networking sites (30%) and read about the device and its usability on news, articles and blogs (40%). Therefore trying these devices for their learning purposes seemed to be an experimental study for them as well as a learning experience.

Result from Post- Course Questionnaire

A.

	<i>Satisfied</i>	<i>Somewhat Satisfied</i>
<i>Fast Access to Internet</i>	3	
<i>Quick access to course resources</i>	5	
<i>User-Friendly</i>	1	
<i>Difficulty in downloading</i>		1

Table 4.2: Participant satisfaction level with reasoned satisfied indicator.

Table 4.2 describes the satisfaction level of the students using the iPads for their course. According to the results 90% of the students were satisfied using the device for their academic work. This was due to the fact that the devices were of portable nature hence provided a quick and easy access to the notes, quizzes and assignments and helped them to keep track of their marks and weekly course announcements (50%). Since the device was user-friendly that is easy to touch interface, robust features like alarm, reminders and flagging of important pages (10%) it was easy for the students to keep track of assessment due dates and important concepts needed for the assessments. The remaining 30% of the students stated that the devices provided an easy access to Internet on the campus and the connection to Wi-Fi made their lives easier in terms of connecting to Internet. On the other hand 10% of the students who were not really satisfied with the functionality of the device. The dissatisfaction came

from the difficulty in downloading course assessments which were in pdf format, MSoffice format and compressed format- the student indicated that the device did not support downloading of the listed format of files. Also, since the device was from Apple, downloading other apps to the device was not possible (Students were restricted from downloading of apps).A detailed explanation to securing apps for iPads has been discussed in section 2.6.1.

B. In the post- course survey the students were asked the following question “*Do you think iPad is the best device to be used for online course when compared to other devices?*”

- I. As per the results the students (100%) indicated that iPads were the best device that could be used for a fully online course. The reasons are collected in Figure 4.2.

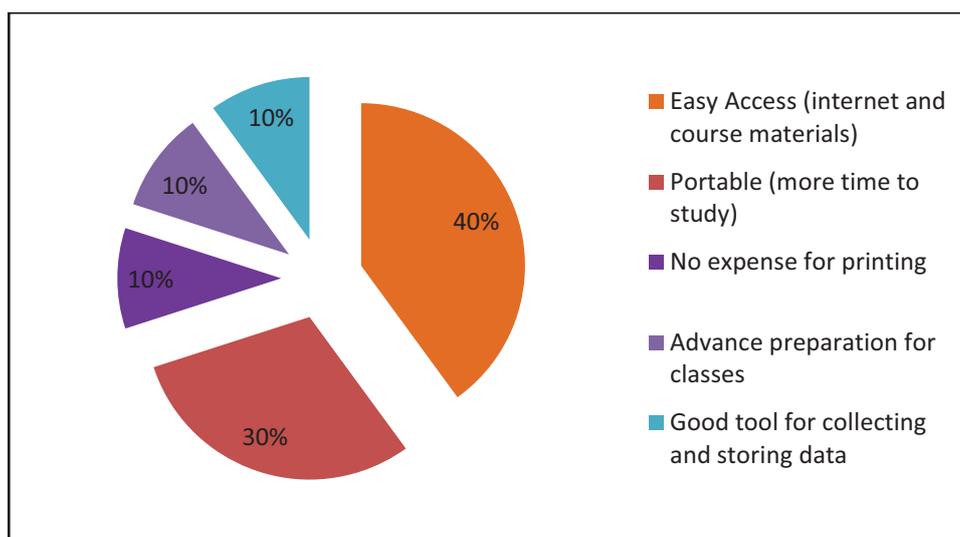


Figure 4.2 Participants view on why an iPad is the best learning tool for online courses for case study 1.

Figure 4.2 illustrates the various reasons that the students outlined as to why the iPads were the best learning tool for online courses. Although the iPads were a new learning tool which students did not have much exposure specifically in the Pacific region, the response was positive when it came to using the device for learning. One of the evident features that made the device popular amongst students was its portability that gave a faster and easier access to course materials and easier connection to Internet since the students don't have to hunt for computers in the computer labs. For regional campuses, the number of computers in the computers labs is few which does not satisfy the

demand of the increasing student numbers. The trend of fully online courses had just started at USP and not many students who are enrolled in these courses have access or ownership to portable devices. Many a times it is noticed that students who are enrolled in fully online courses face the difficulty of completing their online tasks on time or they face difficulty while completing it and the reasons associated with it are; getting access to a computer or connectivity issues or less collaboration with peers and facilitator. Therefore, when the students were provided with an iPad, it gained popularity as students found it easier to complete their tasks with the use of the device. The test group mentioned that the iPads also reduced cost of printing as they carried the entire course materials in their “pockets”. This also made referencing to course resources for various assessments much easier.

As for the control group, the response was as follows; 70% stated that the iPads could be a better device when compared to the desktop and laptop because of its portable nature and the ease to get connected to learning whenever they wanted. However, there was still some uncertainty regarding the device to be used for learning. Also, 20% of the students indicated that the iPads were not better than desktops and laptops as it had issues like downloading of files, scrolling through the documents and typing since the screen was touch sensitive. This group of students did have some experience using the iPads and they obviously did not like the idea of using the iPads for doing assignments since using the tablets for writing was not done with ease. The remaining 10% of the students mentioned that the device is similar to desktop and laptop and he was comfortable using either for academic purpose.

II. Though the use of iPads for an online course received positive feedback from the students, there was a different response when the participants were asked to give their choice of the device to be used for future learning. From the sample, 10% of the students chose to use their laptops for future learning as the device was more comfortable to be used especially to complete the course assessments. The participants also stated that the use of drag and drop feature and Microsoft suite was much easier to use with laptops than with tablets. Whilst, 90% of the students chose the tablets as an effective learning tool due to the fact that the device kept them much organized and planned. Since the students were able to access the course shell at anytime and from anywhere, they were constantly engaged through the iPads in the course activities and

followed up on the course announcements such as time and venue for support sessions, remedial classes and due dates (30%). The students were also able to keep track on their progress on the assessments and also follow up with the special news and announcements made in the course especially remedial classes and online support sessions (30%). Students also stated that the device made collaboration and discussion on course assessments easier (30%).

Since the device was portable and had access to Internet the students found it easier to get into contact with their peers and their facilitators whenever they needed assistance. This was due to the fact that the tablets enabled the students to connect to Wi-Fi and reach out to their peers and facilitators. From the results 10% of the students stated that the features of the device made learning more fun and understandable. Some of the features mentioned were the ability of the device to do voice and video recording which students used during support sessions, good picture quality, organizer – was used for keeping track of due dates and access to social networking sites when connected to Internet which was seen to be the most effective way in which students collaborated with their peers and facilitators.

4.3 Case Study 2- Results from Pre- Course Survey

The results from case study 2 are presented in this section. For the purpose of the study the three campuses that were part of the study will be named as follows; *Labasa Campus = A, Lautoka Campus = B, Tuvalu Campus = C.*

Campus	A		B		C		Total Percentage
	M	F	M	F	M	F	
Gender							
No experience		4	2	4	3	5	41.9
Internet and social networking	1	3	2	4	1	1	27.9
Movies and Games	2	2	1	2	2	0	20.9
Access to resources			2	0			4.7
Electronic Bible	1						2.3
Workshop and Recording	1						2.3

Table 4.3 Participant experience on using the tablets according to gender for case study 2.

Table 4.3 shows that around 42% of the participants had no experience in using tablets. A higher percentage of the females had no experience using the mobile device (72.2%) and from the data collected it was evident that the female population was not much exposed to technology and was not ready to get engaged with these new devices in their daily lives. The male participants seem to be more experienced with technology and had used the device for communication, as a storage tool, for entertainment purposes and for work as well (52%). Interestingly, this was due to the fact that the males were more engaged in using technological devices in their free time while the females were more engaged in doing other activities which are more common in the Pacific like household chores, weaving, socializing and religious activities.

B. Tablet Learning Devices as a learning tool

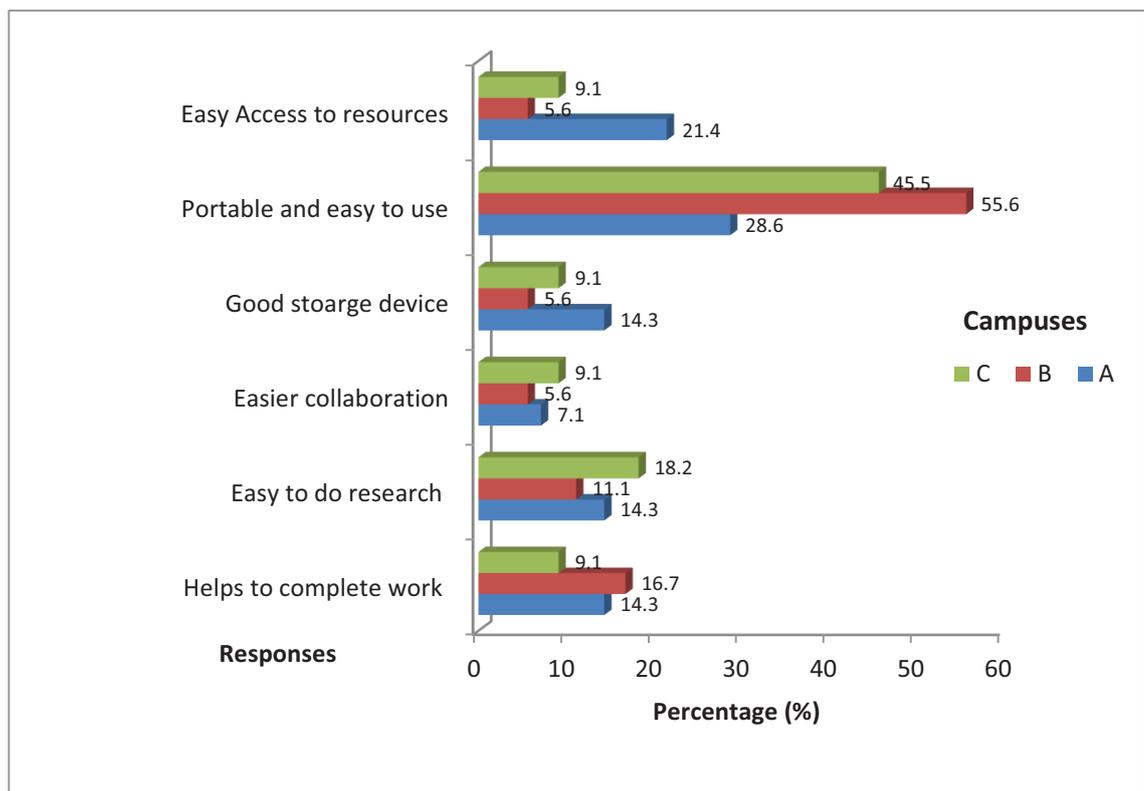


Figure 4.3 Participants view on tablets as a learning tool before the survey.

According to Figure 4.3 majority of the participants agreed that the devices were portable thus easy to use (43.2%). The size, weight and interactive screen of the devices were the most outstanding features which made them most desirable tool for learning. Another interesting response noted was the ability of the device to Internet connection as needed for research and communication (21.9%). This showed that the

participants understood about the ability of the devices connecting to Wi-Fi and getting connected to Internet for research and communication purposes (online chats, skype and use of emails). However, from the data gathered it was evident that the participants also understood that the tablets provided faster access to their course resources (12%). The pre-course survey revealed a lot aspects about the students in the Pacific region such as; the students applying new technology for learning, students awareness on integrating the tablet devices for learning and, the most important one, the eagerness to learn how to apply and use the tablet devices for their learning purposes.

Table 4.4 summarises the views on the tables as a learning tool by the control and the experimental groups. The control group also seemed to be supportive of the idea of using the tablets for learning

	Experimental Group (%)	Control Group (%)
Helps to complete work	13.4	18.6
Easy to do research	14.5	18.6
Easier collaboration	7.3	7.0
Good storage device	9.6	9.3
Portable and easy to use	43.2	27.9
Easy Access to resources	12	18.6

Table 4.4 A comparison between control group and experimental group on tablets as a learning tool.

As per the results, a greater percentage of the students in the control group were supportive of the idea that the tablets were a good learning tool and could help them to; complete their work, do research and get easy access to resources. However, the students stated that there were many issues linked to using the device such as affordability, connectivity and training that needed to be looked at especially in the Pacific region. On the other hand, more students in the experimental group supported the idea of the tablets being portable and easy to use, using the devices for storage and for easier collaboration.

Results from Post – Course Questionnaire for Case Study 2

Table 4.5 summarises the satisfaction of the participant at the three campuses.

<i>Campus</i>	<i>A</i>		<i>B</i>		<i>C</i>	
	Satisfied	Not Satisfied	Satisfied	Not Satisfied	Satisfied	Not Satisfied
<i>Helped in Advance Learning</i>	1		2		1	
<i>Provided Easier Access to Notes and Videos</i>	8		6		5	
<i>Made Research easier since the device was portable</i>	1		1		1	
<i>Taking Pictures and sharing of notes, activities and photos were much easier</i>	1				2	
<i>Was really helpful when it came to completing assessments during the network outage</i>	4		1		3	
<i>Learning from anywhere at anytime</i>			3			
<i>MSWord is not installed</i>		1		2		
<i>Does not allow downloading of pdf and other applications</i>						1

Table 4.5 Participant Satisfaction level with reasons sorted by campus

As per the results in Table 4.5, 90.7 % of the students were satisfied using the tablets for their blended course. This was due to the fact that the tablets were preloaded with course resources such as topic notes, help videos on various topics and important concepts in the course. This reasoning was same throughout the test campuses. Another important feature of the tablets that was found to be beneficial was that the students were able to complete their tasks even during network outage at the campus due to the fact that the devices housed the course materials (e-repository). This was for Campus A and Campus C, the underlying issue at these campuses was connectivity which hindered the students from getting connected to LMS to get access to their course assessments. Since the students were facing difficulty in getting access to the resources, this was the time when the tablets were used to facilitate learning for the students at the aforementioned campuses. Campus B did not have any such issues due to the following; the geographical location of the Campus is a city where connectivity

is not normally an issue. According to the results, 9.3 % of the students were not satisfied using the tablets (iPads and androids) for learning purposes due to the fact that; MS Office was not installed. Since, the device was tested before distribution and it was ensured that the tablets did have other options to open word and pdf documents, the age group of this group (9.3%) of the students was considered. It was found that this group of students were from mature category and were not very competent with the apps and features of the device. The results also shows that the tablets therefore it was concluded that these students were not able to navigate and find these optional softwares in their tablet devices.

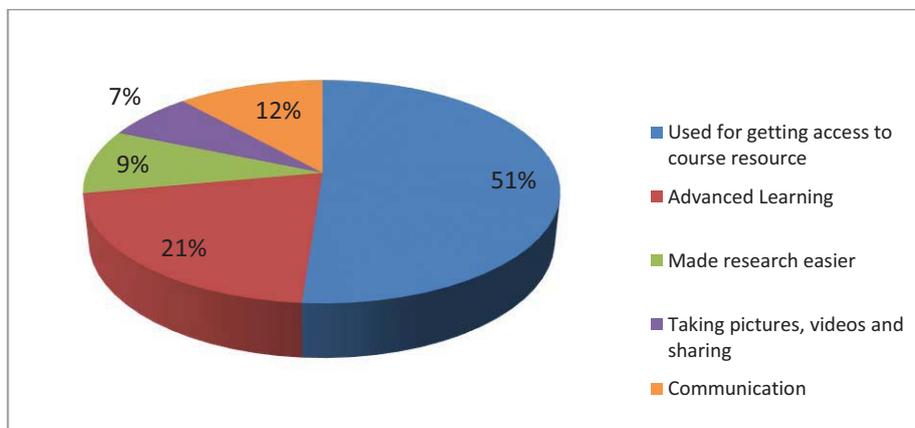


Figure 4.4.0 Student Perception on the use for tablets for experimental group for case study 2.

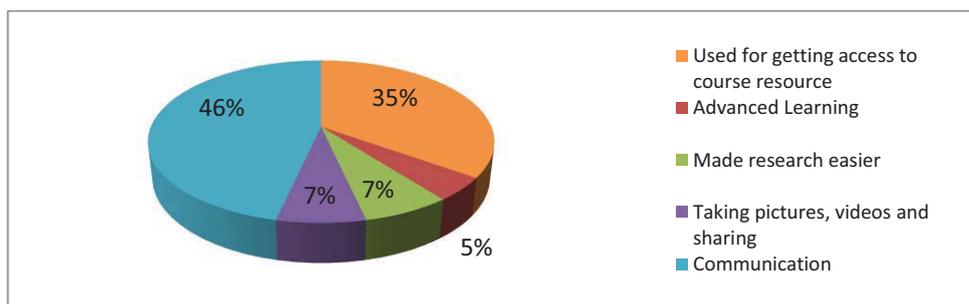


Figure 4.4.1 Student Perception on the use for tablets for control group for case study 2.

Figure 4.4.0 and 4.4.1 illustrates student perception on the use of tablets for both the experimental group and the control group. As per the results, the experimental group stated that the tablets were mostly used for getting access to course resources. This was due to the fact that the devices were preloaded with course notes and videos. The

minimal use of the device by the students was for taking pictures, recording and sharing. On the hand, the control group perceived that the maximum use of the tablets would be for communication purposes, for communicating with peers, facilitators through emails and social networking sites. The control group of students also perceived that the minimal use of the device would be for advance learning since the students needed to be trained in using the full functionalities of the devices . In the Pacific region, the uses of mobile devices are mostly for communication and social networking hence the students have a preconceived idea that the tablets work best for social networking rather than learning.

B. Student perception on Tablets as best devices for learning in a blended course when compared to other devices.

I.

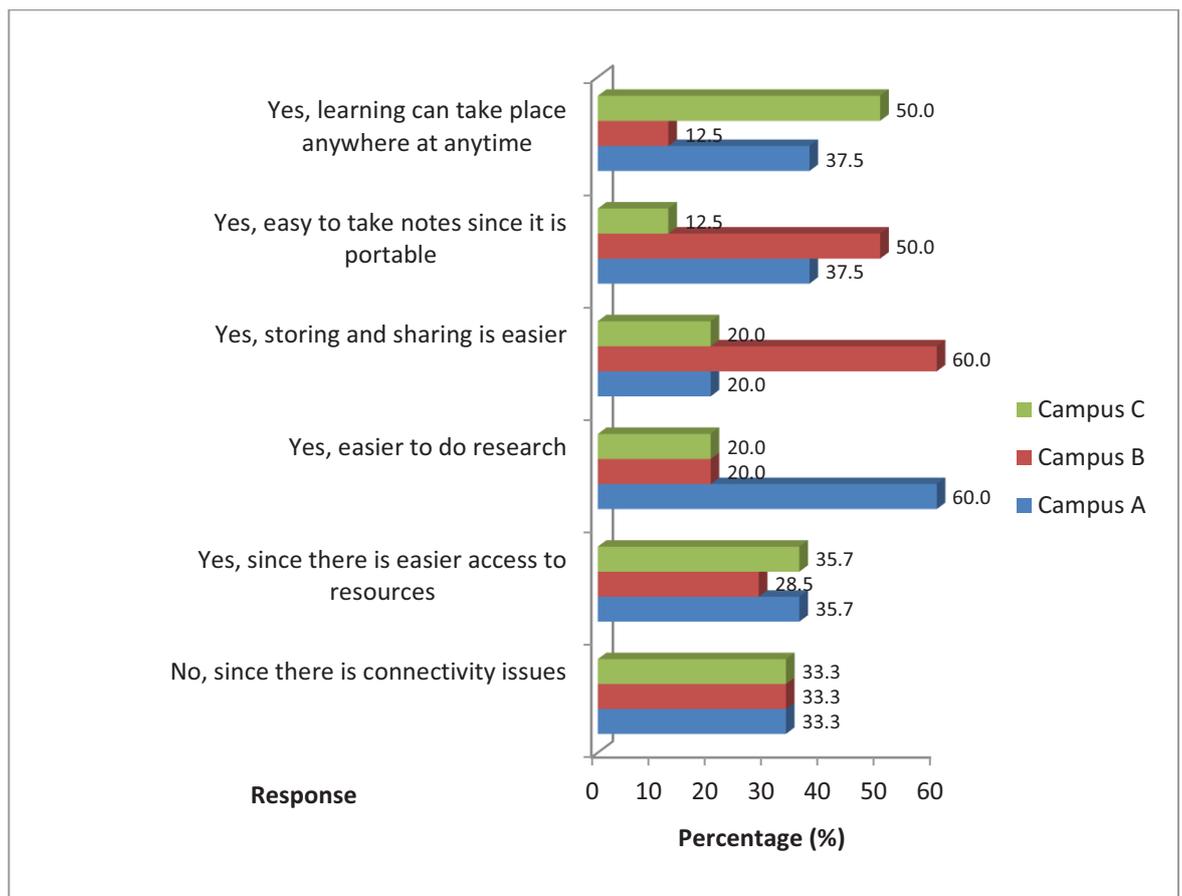


Figure 4.5 Participants response on the tablets as the best learning devices for a blended course for experimental group.

Figure 4.5 illustrates varied responses from the participants on the tablets being the best device for a blended course (93%). This was due to the fact the tablets were portable and provided easier access to course resources. As discussed in detail in 2.8, in the Pacific the content delivery of courses has been an issue due to the geographical isolation of the university campuses. With improved network and inclusion of the new ICT tools, USP has come up with new and effective ICT initiatives like tablet learning projects to make the life of their enrolled distance learners easier. The students also felt that the devices enhanced their learning as they were able to stay connected to the LMS from anywhere and at anytime. Although there are alternatives to the tablet devices available like personal desktop computers, laptops and notebooks (most common ones in the Pacific region) the students preferred tablet devices because of the portable and engaging nature of the device. On the other hand, 7% of the participants stated they would prefer using their own personal computers because there was a lot of difficulty in making full utilisation of the tablets due to connectivity issues and familiarity of using the device for learning. There was one participant from each of the test campus in this category and this proved that in the Pacific, connectivity to wireless communication technologies is still an underlying issue.

II.

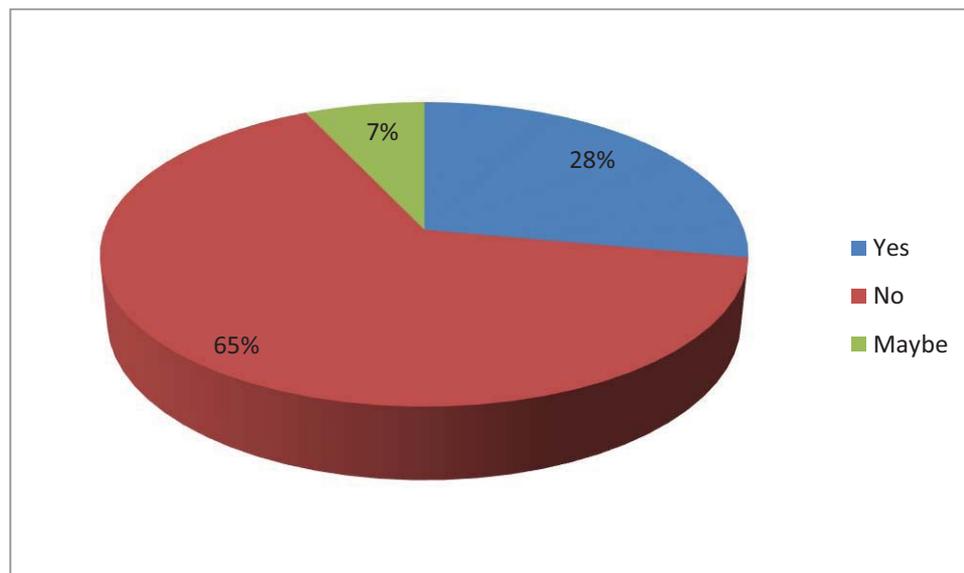


Figure 4.6 Control group's response on the tablets being the best device for blended courses.

Figure 4.6 illustrates the responses from the control group to tablets being the best devices to facilitate learning for blended course. As per the results, 65.1% of the participants stated that the tablets were not the best devices to be used for blended courses. This was due to the fact that the tablets were expensive in the Pacific region when compared to other parts of the world. Affordability of the device and securing apps especially in the Pacific seemed difficult. Another important issue identified was the competency in using the device. Although the use of mobile devices in the Pacific has exponentially grown over the recent years, the device had only been used for communication and social networking. Using the device for learning would be a great challenge for the students as well as the facilitators' therefore proper awareness and training need to be put into place first. The result also indicates that 27.9% of the students agreed that the tablets could be the best device for a blended course since the device was portable, pocket sized course e-repository that could give access to the course materials from anywhere and at anytime. There were about 7% of the students who were basically unsure about using the tablets for learning. These students were found to be not really aware of the functionalities and proper usage of the tablet devices. These show that in the Pacific region, for the tablets to be brought into upfront teaching and learning practices, a proper awareness and training need to be put into place. The students need to be informed and trained on the features, functionalities and usage of the devices features before the devices are distributed to them for learning purposes.

c. Will you use the tablet for learning for a blended or online course in future?

The students from all the three campuses (100%) agreed that if given a chance they would like to use the tablet devices in future for their blended and online courses. The students found the tablet devices to be an effective learning and collaborativetool when compared to desktop and laptop computers. The various reasons by the participants are graphed below.

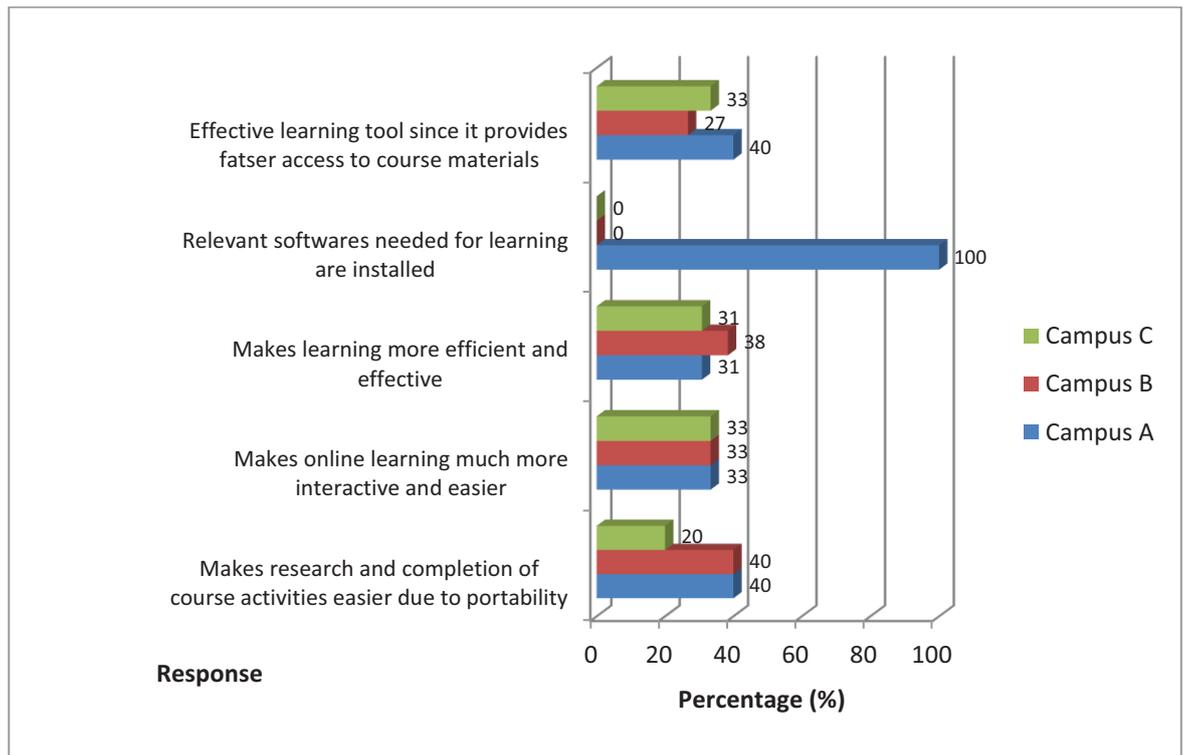


Figure 4.7 Participants responses for using tablets for future learning in blended and online courses.

Figure 4.7 illustrates participants' response to using the tablets for future learning. Although the students indicated in previous questions that they did face issues in using the device for learning and preferred their personal desktop and laptops computers, there was a growing interest in these students to use the tablets for learning in future. The students indicated that the device eased their problems of getting access to course materials and keep up with the course activities. With the pre- installed notes and videos in the device, students got to experience a more enhanced learning. The control group students also agreed that they would want to use the tablets for learning in future (100%). The most important factor for the tablets being placed at priority for learning was the fact that mobile learning is a growing concept at higher education institutes in the Pacific. With today's generation placing more emphasis on using mobile devices in their lives for social networking and communication, the concept of using the devices for getting access to their higher education content is slowly making its way in the Pacific region. Therefore, to keep up with technological advancement and its uses for education, the students think that with little coaching provided they would want to use the tablets for their learning especially in online and blended courses.

Looking at the results for case study 1 and case study 2, the students had positive attitude towards using the tablet devices for learning. The students were able to embrace these new devices for their learning very effectively and complete their respective course. Although the devices had issues especially in regards to connectivity, the students perceived that the devices were an effective, efficient learning and collaborative tool. This was also perceived by the control group students as the students felt that the tablet devices kept them connected with relevant authorities and facilities and at the same time provided access as and when needed. Looking at the readiness of the students in regards using the tablets for future learning, both the control and test group students showed much needed readiness for using the device. This is due to the fact that the students were interested to learn and know more about the functionalities of the devices and recommended and requested for workshops to the use of the devices for future learning. Together with the higher education providers, the students have also realized that technological advancement cannot be avoided thus a little change in attitude would lead them boost their learning experiences at higher education institutes. Therefore, this study concludes that students in the Pacific have positive attitude and are ready to make tablets their new learning tool in future for learning in higher education.

4.3 Objective2: To evaluate the quality of assigned tasks produced through the integration of tablet learning in the student learning pedagogy.

Tablet learning is known to have the ability to improve the efficiency and quality of education at higher education (Catherinet et al., 2012). With increasing use of modern information and communication technology for learning, the higher education providers have been challenged and questioned about the quality of content delivered to students enrolled in various modes at their institutions (Batagan & Boja, 2009). As entailed in chapter 1 and chapter 2, the penetration of Internet and the use of ICT tools in the livelihood of people in the Pacific have increased over the years. Together with using ICT technology in the various facet of livelihood, the USP which is a pioneer institute in the Pacific region has integrated mobile learning into their upfront teaching

and learning. The effective use, successful delivery of course content and benefits to students of ICT tools in education has always been a question for many educationists. Therefore, this study was conducted to evaluate the effectiveness of tablet learning on the quality of student assigned tasks. The evaluation was done for three different components of the online/blended course which totaled to give students flexi final grade in the course; *Coursework Total* which included assignment 1 and assignment 2 marks and lab marks, *ePortfolio marks* – student collection of tasks for the course and the *final grades* – which includes of coursework and ePortfolio marks of the students. Since the distribution of data was not normal, as a statistical analysis, a “*Mann-Whitney U*” test was conducted where the p-value was calculated to test the hypothesis. The results of the study are provided in table 4.7.

A. Case Study 1

Hypothesis:

Ho #there is no significant difference between the two groups in regards to the quality of the results being produced.

H1 # there is significant difference between the two groups in regards to the quality of the results being produced.

	<i>Course_Total</i>	<i>EPortfolio_Marks</i>	<i>Final_Marks</i>
<i>Mann-Whitney U</i>	43.000	37.500	44.000
<i>Wilcoxon W</i>	98.000	92.500	99.000
<i>Z</i>	-.530	-.946	-.454
<i>Asymp. Sig. (2-tailed)</i>	.596	.344	.650
<i>Exact Sig. [2*(1-tailed Sig.)]</i>	.631 ^b	.353 ^b	.684 ^b

Table 4.6 Results from “chi-square”test for quality of assessments.

Table 4.6 shows the results generated in regards to the quality of the three assessments that were an integral part of the course. Since the $p > 0.05$, this means that there is not enough evidence in the data collected to reject the null hypothesis (Ho) hence it can be stated that for the given population for the study conducted, there is no significant difference noted in the quality of the students assessments produced by the experimental and control groups. This means that the tablet devices did not have any

effect on the quality of the students' assessments. This can be due to the fact that the students were given the flexibility to use any device for their assessments; the test group was not constraint to use only the tablets.

In order to conduct the test for the quality of the grades produced, a “*chi-square*” test was carried out. The results are tabulated in Table 4.7 and Table 4.8.

		Group		Total
		Control Group	Experimental Group	
Grades	A	2	8	10
	A+	4	1	5
	B+	2	1	3
	C	1	0	1
	E	1	0	1
Total		10	10	20

Table 4.7 Grade distribution for each group of students.

“ <i>chi-square</i> ” Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.733 ^a	4	.102
Likelihood Ratio	8.895	4	.064

Table 4.8 “*chi-square*” Test result for quality of grades.

As per the results in Table 4.7 and Table 4.8, although the grades look more favorable on the experimental group, the *p-value* was calculated to get a better view on the quality of the grades of the two groups. The *p-value* is greater than 0.05 therefore it can be stated that there is no significant difference in the quality of grades produced between the students of the test and control groups at the end of the 7 weeks. It can be stated that the tablets did not make any difference on the quality of grades produced. This is due to the fact that the tablets were for the first time introduced as upfront learning tool to students for an online course in the Pacific region. The students lacked the competency of using the device effectively to improve the quality of their learning. Therefore in future before the tablets are used for upfront learning, a training session needs to be conducted to find the impact of the tablets on the quality of student grade.

B. Case Study 2

In order to evaluate the quality of assessments produced by the students who used tablet learning devices for their study in a blended course in the Pacific Region, a “*Mann-Whitney U*” test was conducted where the p-value was calculated to test for the hypothesis. The result of the study is tabulated in Table 4.9.

Hypothesis:

H₀ #there is no significant difference between the two groups in regards to the quality of the results being produced.

H₁ # there is significant difference between the two groups in regards to the quality of the results being produced.

<i>Test Statistic</i>							
	<i>Assignment1</i>	<i>Assignment2</i>	<i>Labmarks</i>	<i>Coursework</i>	<i>Eportfolio</i>	<i>Total</i>	<i>GPA</i>
<i>Mann-Whitney U</i>	912.500	906.500	931.500	890.000	1023.000	979.500	1025.000
<i>Wilcoxon W</i>	1858.500	1852.500	1877.500	1836.000	1969.000	1925.500	1928.000
<i>Z</i>	-2.068	-2.100	-1.797	-2.217	-1.142	-1.587	-1.112
<i>Asymp. Sig. (2-tailed)</i>	.039	.036	.072	.027	.253	.113	.266

Table 4.9 Test Result for blended mode course.

Table 4.9 summaries the test results for the quality of the course assessments for the blended course. Since the $p > 0.05$, the null hypothesis cannot be rejected hence it can be stated that there is no significant difference noted in the quality of the results produced by the students in the course from the Pacific region.

To test for the quality of the grades produced, a “chi-square” test was carried out. The results are tabulated below Table 4.11 and Table 4.12.

			Grade								Total	
			A	A+	B	B+	C	C+	D	D*		E
Group	Control	Count	19	16	5	7	1	2	1	0	5	56
	Test	Count	11	9	5	8	1	5	2	1	1	43

Table 4.10 Grade distribution for test and control group students.

“chi-square” Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.874 ^a	8	.446
Likelihood Ratio	8.466	8	.389
N of Valid Cases	99		

Table 4.11 Chi-Square Test result for quality of grades.

Table 4.10 and Table 4.11 show that the p -value > 0.05 therefore it can be stated that there is no significant difference in the quality of grades of the test and control groups. Once again, for this case study with a much larger sample size the tablets did not make any difference on the quality of grades produced at the end of the course. It can therefore be stated that for students in the Pacific region, there needs to be special coaching carried out before it can be given to the students to be used for learning purposes. As the course was a blended course, the students need to learn how to use the tablet devices effectively to get access to course resources and carry out various tasks in the course which utilize the full functionalities and features of the tablets.

4.4 Objective 3: To measure the success rate of students who incorporated tablet learning

Brown (2003) states that one of the benefits of mLearning is its potential to increase productivity and student performance by making learning available anywhere and anytime.

For the purpose of this study the performance and success rate of students in the control group was compared with the test group. A “Mann-Whitney U ” test was conducted and the p -value was used to accept or reject the hypothesis for both the case studies.

A. Case Study 1

For this case study, the assessments that were tested for student success rate were *course total* which comprised of Assignment, online reading of notes and online quizzes, *ePortfolio marks* and *final marks*.

Hypothesis:

Ho #there is no significant difference in the success rate between the two groups.

H1 # there is significant difference in the success rate between the two groups.

	<i>Course Total</i>	<i>EPortfolio Marks</i>	<i>Final Marks</i>
<i>Mann-Whitney U</i>	43.000	37.500	44.000
<i>Wilcoxon W</i>	98.000	92.500	99.000
<i>Z</i>	-.530	-.946	-.454
<i>Asymp. Sig. (2-tailed)</i>	.596	.344	.650
<i>Exact Sig. [2*(1-tailed Sig.)]</i>	.631 ^b	.353 ^b	.684 ^b

Table 4.12 Test result for the success rate of the students.

As per the results in Table 4.12, the $p\text{-value} > 0.05$, H_0 cannot be rejected. Therefore, it can be stated that for case study 1, there is no significant difference in the success rate and performance of students between the two groups. Students who used the iPads performed basically same in all the assessments as students in the control group. This is due to the fact that the students in the Pacific region still have to get used to the idea of using the tablets for learning purposes. The ownership of the device in the Pacific region is quite low since the device is expensive and students are still yet to learn how to use the device effectively for learning. Another contributing factor could be the sample size which did not make any difference in the success rate. The sample size of this case study was smaller because of the availability of a limited number of the iPad devices.

B. Case Study 2

For this case study, the assessments that were tested for student success rate were course total (comprised of assignment 1, assignment 2 and labmarks), ePortfoliomarks, final marks and student GPA.

Hypothesis:

H₀ #there is no significant difference in the success rate between the two groups.

H₁ # there is significant difference in the success rate between the two groups.

	Assignment 1	Assignment 2	Labmarks	Coursework	EPortfolio	Total	GPA
Mann-Whitney U	912.500	906.500	931.500	890.000	1023.000	979.500	1025.000
Wilcoxon W	1858.500	1852.500	1877.500	1836.000	1969.000	1925.500	1928.000
Z	-2.068	-2.100	-1.797	-2.217	-1.142	-1.587	-1.112
Asymp. Sig. (2-tailed)	.039	.036	.072	.027	.253	.113	.266

Table 4.13 Test result for success rate of student for case study 2.

Table 4.13 shows the results for case study 2, the *p-value* was used to evaluate the success rate and performances of a sample of students in a blended course. It can be stated since the *p-value* for assignment 1 < 0.05, *p-value* for assignment 2 < 0.05, *p-value* for coursework < 0.05, there was a significant difference noted in these three assessments between the experimental and the control groups. The experimental group of students seemed to have performed better in these assessments and the reason could be since the tablets were an e-repository the students in the experimental group had access to the course resources 24/7 which enabled them to perform better than students in the control group. In this case it can be concluded that the tablets seemed to be effective in terms of gathering resource for the research assignments and completing it on time. The performance of students in regards to the completion of lab activities for the experimental group was seen to be better. Hence, it can be concluded that the

tablets were a good accessing tool and since it was portable and learning took place at anytime from anywhere the students managed to complete their lab activities on time. However, since the p-value for “Total” and “GPA” > 0.05 , we cannot reject the H_0 hypothesis, hence it can be stated that there was no significant difference noted in the overall success rate between the control and experimental group. Here again, with a larger sample size no difference was noted in the quality of the grades of the students. Although students in experimental group seem to have been more active in the course participation activities, this did not make any significant difference in the overall grade of the two groups.

4.5 Objective 4: Case Study 2 –

Students ability of sharing and knowledge creation

The emerging concept of mLearning has transformed the 21st century learning at Higher Education Institutes. Mobile devices such as iPads and android tablets are making learning more interactive and have proven to improve student ability to think, share and create new knowledge. A case study that was conducted at Medical Institute in California stated that the tablets were used effectively by the third year students to collaborate regarding the schedule, meetings and patient records (Alegria et al.,2014). The tablets also promoted learning that is through sharing of idea and creation of new ideas amongst the practicing doctors and the third year medical students. McDemott (1999) states that although the tablets have been integrated at various facets of live, it is very important that people understand that these innovative devices can also be used to share knowledge that cannot be documented and apply it appropriately to create new form of knowledge. In the Pacific region, the varied use of tablets has been an on-going practice. Students are using the device but not really realizing the device can be used for more than what they can ever imagine. Hence, for the purpose of this study-case study 2, the experimental group was assigned a task to test for the ability of the tablet devices for sharing and knowledge creation. The results are summarised in Table 4.14.

<i>Response</i>	<i>Region</i>			<i>Total</i>
	<i>Tuvalu</i>	<i>Labasa</i>	<i>Lautoka</i>	
<i>No Idea</i>	0	1	1	2
<i>Yes</i>	15	11	7	33
<i>No</i>	1	4	5	10

Table 4.14 Students' ability to share and create new knowledge.

Table 4.14 show that 73.3% of the students agreed that the device did enable them to share information and discover new knowledge. This was due to the fact that the students used the devices for gathering raw data and pictures for their presentation for the course. During the course the students were divided into their respective groups. Each student collected the raw data of the important concepts and things related to their environment. Once the data was collected it was shared amongst the group members using email, Bluetooth feature of the tablets and social networking sites. After the students came up with a topic for the presentation to the class, the combined data was collected, evaluated and interpreted by the group members. The slides of the presentation included the data collected, summarised information and new discovery they made during the process. However, 22.2% of the students did not agree to the statement that the tablets enabled them to share and create new knowledge, the major reasons students gave was the unavailability of Internet connection which hindered their ability to collect and share information with their peers. Since, the course was in blended mode, students were not able to share information via emails due to the network outage at the campus. Also, 4.4% of the students in the region had no idea about the concept of sharing and discovering knowledge by using the tablet learning devices. The reason could be, they might have been practicing the concept but not realizing that the devices actually had the ability to share information and create new knowledge.

These results show that students do have an idea about the ability of the tablets to be used for sharing and creating new knowledge. These students are yet to discover this special feature of the device hence needs some sort of awareness and training programs before they embark on their online courses using tablets. Another important factor that can be stated is that Pacific region has progressed in terms of the use of technology for various purposes especially social networking, communication and to some extent using the device for learning amongst the younger generation. The use of social networking sites in particular facebook has enhanced ICT competency amongst the people in the Pacific. The USP is already using Facebook as an advertising medium to

create awareness about the courses it offers and each faculty has its own Facebook page where they promote their courses and educational activities to the general public. Therefore, in future integrating Facebook with learning would be a good idea for education providers to boost learning experiences for their students.

Chapter 5 Conclusion and Recommendations

5.1 Overview

This chapter summarises the outcomes of the research conducted to achieve its objectives. Research objectives and questions are presented followed by the contributions of the research. A discussion on the limitations, challenges and future work is also made in the conclusion.

5.2 Research Objectives

The main aim of this research is to evaluate the effectiveness of tablet learning devices for an online and a blended course at a higher education institute in the Pacific region. This research looks at the factors that contribute to the readiness of the students from the University of the South Pacific to using the tablet devices as a learning tool. Revisiting the research objectives, this study was conducted to answer the following research questions:

- a. To conduct a survey regarding the use of tablet learning (use of androids and iPads) in online and blended learning modes at USP
- b. To evaluate the quality of student assessments, a comparison of control and experimental group
- c. To measure and compare the success rate of students of the control and experimental group
- d. To determine the ability to sharing and knowledge creation.

5.3 Research Findings

In order to find the answers to the research questions, literature review was conducted on the concepts of eLearning and mLearning frothily at a higher education institutes. It was noted that the passionate adaptation of mobile technological in the teaching and learning pedagogy at higher education has transformed students academic life in terms of communication, gathering information, allocating time and attention, and conceivably how the students learn. Integration of new intuitive media

and ICT innovation into education is esteemed to be the main way forward for higher education institutes to naturally enable and motivate students to learn, subsequently enhancing quality and long lasting learning. The utilization of tablet learning devices is the developing pattern at higher education today as it is connected with more prominent independence and inspiration to learn. This study provides an initial reaction to the inclusion of tablets as a learning tool in a blended and online course at the University of the South Pacific in the Pacific region.

For the first question (a), the survey was conducted to test the readiness and perception of the students. From the results, it was seen that 32.1% of the students did not have any experience in using the tablet devices. However, 99% of participants were satisfied using the tablet devices for learning and agreed that the devices were an effective learning tool for future. The tablet learning devices were also well adopted by the students as a learning tool for the online and blended courses. The tablet learning devices acted as an impetus for the students enrolled in these courses to communicate with their peers, keep track of their progress in their courses, getting easy access to the course materials and easier collaboration with their facilitators. There were some participants who thought that these devices might not be suitable for learning due to the fact that there were connectivity issues and they lacked the ICT competency in using the device for learning.

For part (b) and (c), the study revealed that there was no significant difference in the success rate and quality of student assessments produced in each course. The students from both the experimental and the control groups of the study performed in the similar manner when the overall performance was measured using the “*chi-square*” test. This shows that students are yet to adopt the tablet devices as upfront learning tool. Another contributing factor could be that the students were not restricted to use the tablets for completing their assessments. They were given flexibility to use any device they were comfortable with when it came to completing and submitting their assignments. It can also be gathered that students need to be motivated to be creative and innovative while using the device for completing their assessments in the course. This student behavior

seemed to be lacking within the university students. This is due to the fact that although the uptake of ICT tools in the Pacific has increased in recent years and people are using it in their daily activities, there still exist a digital divide in using these technologies for learning purposes. To reap fruitful benefits from using the tablet devices for learning, there needs to be an awareness conducted by respective stakeholders or project incharge for the university staffs, students and general public on the features, functionalities and benefits of using the tablet devices for learning purposes. Although, the tablet devices cannot replace face-to face facilitation, or desktop computers, or laptops, it surely can make distance and flexible learning much interesting and easier for the students.

For part (d), 73.3% of the participants stated that the tablet devices were a good sharing tool hence enabled them conduct independent research, share the ideas and data with their peers and create new forms of knowledge from existing and new information they learnt in their respective courses. This shows that the devices stimulate students thinking abilities to create a new model of the concepts they have learnt. The concept of sharing using the tablets were also seen to be effective when there was network outage at the respective campus during the duration of the course. The students used the Bluetooth feature to share resources with other students.

The analytics of this research study can be used by higher education providers to improve the quality of learning, participation and knowledge building at higher education institutes in the Pacific region. The realism that the tablet learning devices have the potential to be utilized as an effective learning tool is very important. Despite the fact that the device is costly and securing apps in the Pacific region can be an impediment to its conceivable development of convenience, this however should not degrade the utilization of tablet devices for learning.

The uptake of the tablet learning devices is particularly low in the Pacific region and this is due to the fact that there is lack of sufficient awareness regarding the use of the tablet devices for academic purposes. The success of these devices in education will only increase if there is sufficient awareness and training conducted for the students

for 1st and 2nd year students at different faculties. This can also be a step forward towards a change in attitude and success rates of students using the devices for learning. For a more definite result of evaluating the success rates and quality of assessments produced by the users of tablet learning devices for learning, the study can be replicated with a larger sample size with defined instructions. Also, the researchers can conduct a research on other factors that contribute to the success of tablet learning at higher education like readiness and contribution factor for the facilitators and the stakeholders.

5.4 Limitations of the Research

- i. The participants were chosen from one particular course that is one online and one blended course. The sample size of the population was also a limitation in this research due to the availability of the tablet devices.
- ii. The students were given the flexibility of using any device that is laptops, desktops or tablet devices to complete their assessments. This might be a contributing factor that did not show any significant difference between the experimental and control groups.
- iii. Awareness and training session for the students were not conducted before the study. This indeed prevented the students to fully maximize the tablet devices for learning.

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Appendix

Interview Questions

1. Do you own an ICT device of your own? If yes, which one?
2. Are you competent in using the device? In what way do you use the device?
3. Reason for participating or not Participating in the survey.
4. Is using an iPad as a learning tool a good idea?
5. Is an iPad good for doing research and assignments?
6. What are some negative features of the tablets/iPads?

Research Questionnaire: Tablet Learning

Pre-Course Survey

Gender: _____

Age: _____

1. Do you own have desktop computer, laptop, iPad/ tablet? If yes, Please state which ones.

2. a. Do you have any experience of having an iPad? If yes, please explain how have you used it and what applications have you used.

b. How do you think an iPad can be best used as a learning tool?

3. Why did you decide to participate in the research?

4. a. Do you think a fully online course compound to face-to-face? Please explain.

Research Questionnaire: Tablet Learning

Post Survey

Gender: _____

Age: _____

1. Were you satisfied using an iPad through your 7 weeks learning journey?
2. Did using an iPad support your academic work for UU100A? Explain in what ways.
3. Do you think using an iPad for an online course is beneficial compared to other options? Please explain.
4. List the difficulties (if any) you faced while using an iPad for UU100A.
5. Would you want to use an iPad again for your studies? If yes, how do you think an iPad can support your learning in the future?
6. Please add any further comments about your experience of learning with an iPad.