

## Student Readiness and Perception to the Use of Smart Phones for Higher Education in the Pacific

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**Abstract**—The emergence and advancement of Information Communication Technologies have transformed facilitation and content delivery in higher education worldwide. The Pacific region is no exception, the most commonly owned used tool amongst the people are the mobile phones. The extensive use of mobile phones in the Pacific is making a niche of its own in the education landscape. This paper explores the readiness and perception of students using mobile devices for learning in the Pacific. An exploratory research design was conducted whereby an online questionnaire was used to collect data for this study. The results revealed that students welcomed the idea of using smart phones for learning. However, the readiness of students for mobile driven education is dependent on various factors which are explored in this paper. In addition to this, majority of the students perceived that using the mobile devices for their higher education learning is a good idea.

**Keywords**- *Mobile learning, readiness, perception, Pacific, higher education, smart phones*

### I. INTRODUCTION

The emerging growth of wireless technologies and the escalating subscriptions to Internet have intensified the use of mobile devices as an effective learning tool. The use of mobile devices in education is increasing at a rapid pace at all levels of education in the developing countries [1]. The students enrolling in higher education are already well versed with the mobile technology for various aspects of their daily lives [2]. In developing countries the uptake of mobile learning has improved educational standards, made educational services available in remote areas and created cost efficient and flexible learning solutions [3]. According to [4] the concept of mobile learning in the Pacific region is an emerging concept and it is leading to many innovative learning strategies which have boosted sustainable and quality learning. The use of mobile devices for learning has become possible in the Pacific region due to the improved network infrastructure, connectivity, electrical power and user competency. According to [5] the mobile broadband subscription per 100 capita in the Pacific region is 20.5% and the percentage of individuals using Internet is 20.1%. Since the usage and ownership of mobile phones is increasing, it is very important that the educators in this mobile era look at the possibilities of integrating mobile phones to learning [6]. However, the successful integration will heavily depend on the learners'

readiness and acceptance of the mobile devices as a learning tool.

### II. ICT AND EDUCATION

The acronym ICT refers to Information and Communication Technologies which can also be described as human interaction through the use of computing or technological devices [7]. The enormous growth of ICT has impacted the education landscape. Its integration into education connotes variety of learning environments that is from a stand-alone computer in classrooms to a facilitation which is done through pre-packaged computer technology [7]. References [8], [9] and [1] state that integrating ICT tools and technologies have; improved capabilities and scope of instructors, changed the educational delivery, created opportunities for greater and more comprehensive learning and enhanced quality of education. ICT has transformed learning at all levels of education and changed pedagogical approach to make ICT less peripheral to schooling and more central to student learning. The ICT- driven learning environments have enforced a shift from traditional face-to-face learning to virtual learning to reach distance learners and enhance the content delivery and support to these learners [10] [11] [1]. Therefore the traditional distance learning changed to a real time web facilitated learning whereby ICT tools were integrated to deliver educational content to students. The change in facilitation of distance learning was necessary because 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 dropouts [11]. With the development and diffusion of new ICT tools, technology was integrated in education to extend and facilitate learning and content delivery.

### III. EVOLUTION OF MOBILE LEARNING

With the growing demand of access to resources from students and the need to improve learner experiences at higher education, the concept of eLearning was adopted and adapted by the education providers. References [12] and [13] state that the approach of eLearning opened new opportunities to raise standards, widen participation in lifelong learning and enabled the facilitators to transform the ways of delivering content to students. The process of eLearning also allowed students to design their own study programs based on their interest and

time hence driving the learners to be self-direct and autonomous [14]. Despite the apparent benefits, eLearning has problems such as rapidly paced technological developments, digital divide, competencies and professional development of the facilitators and Internet connectivity [14] [15].

More recently, we have witnessed the rapid development and popularity of wireless and mobile technologies. The concept of mobile learning (mLearning) was born when eLearning was combined with wireless devices, network infrastructure was improving and there was a growing usage of interconnected these devices [9]. Mobile learning can be defined as the ability of the learner to learn when on the move in his or her own time and space [16] [17] [18]. The approach of mLearning is attractive due to the fact that the devices are portable and affordable, enhance learner collaboration and creative thinking, encourage discovery learning for students and provide flexible access to course resources [19] [18] [4]. Mobile devices such as palmtops, laptops, tablet PC's and iPads were heavily leveraged to facilitate and promote enticing and intuitive learning experience [20]. Together with reducing digital divide and printing cost, higher education institutes found these mobile devices to be an excellent medium of content delivery to the "Net Generation" learners. Recently, amongst the most common mobile devices like PDAs, android tablets and iPads, mobile phones or smart phones are making its own niche in education landscape. Smart phones which are classified as hybrid of PDAs and mobile phones are seen as a new effective learner engagement tool in the education curriculum [21]. Smartphones have the capability to run complex software, store huge amount of data, run wide range of apps (support for office productivity, web browsing, media production, social media, communication and entertainment), conveniently and directly connect to the Internet through protocols including WI-FI, 3G and 4G indirectly through Bluetooth [6] [21]. A research conducted in Malaysia found that currently mobile phones are the most popular types of technology that are popular and commonly owned by students [6]. Another Educause survey that was conducted in 2014 showed that out of the 95% students who owned smartphones, 77% indicated that they had used smartphones for accessing course syllabus, LMS, checking grades and for capturing data during field trips [22]. Since, the varied use of smartphones amongst today's students is common, it can be used to offer amazing capabilities to students and facilitators. The teaching and learning processes can be enhanced and content delivery could be designed and enhanced for more effective learning and to achieve positive results. These functionalities are possible due to the computing power of the smartphones such as; portability (easy to carry by anyone, anytime and anywhere), low cost (preferably cheaper than other mobile devices), better connectivity (Bluetooth and internet) which provides easy and fast access to information, gives a personal feel and personal space to learners, engages students (as students have different learning styles, learners can personalize their smartphones according to their needs) and learners have learn-on-the go option (learning from anywhere at any time) [23].

Undoubtedly, this world wide phenomenon is also true for the Pacific. The prevalence of the ownership and usage of smart phones has shown an exponential growth amongst the young generation in the Pacific due to the falling prices of mobile devices, data plans and mobile calls [4]. Therefore, higher education institutes are now placing greater emphasis on using the mobile phones as learning and teaching resource.

#### IV. BACKGROUND

In the Pacific Region there are 22 developing island countries and territories as depicted in Figure 1. These countries and territories had in the past faced the challenges of smallness and geographic isolation. Now, there is improved access to technology such as mobile and broadband [5]. The University of the South Pacific (USP), which is the leading higher education provider, was facing the difficulty of reaching out to its students which were geographically isolated. Since, the ICT power was with the university, it changed the facilitation of its courses by incorporating ICT and mLearning services to improve flexible, more interactive and quality learning to their students [11]. Moreover, [20] states that the use of mLearning services (edutainment, SMS notification) that USP provides, is seen to be one of the potential mediums that has enabled the university to facilitate a more collaborative and reflective learning over the recent years.

There are a number of tertiary institutions such as national universities and training institutions in the Pacific region, with the only regional institution providing tertiary education being The University of the South Pacific, setup in 1968 and jointly owned by 12 nations of the Pacific.

The high school graduates in the Pacific have the option of:

**Universities** (The University of the South Pacific, Fiji National University, The University of Fiji, National University of Samoa, University of PNG, University of Technology PNG, University of New Caledonia, University of French Polynesia, University of Guam) or,

**National Institutes** (Technical College of Fiji, Solomon Islands College of Higher Education, The Tonga Institute of Higher Education, Tonga Teachers College, Vanuatu Institute of Technology, Vanuatu Institute of Teacher Education, American Samoa Community College, Palau Community College, College of Micronesia - FSM, College of Marshall Islands, Kiribati Institute of Technology, Kiribati Teachers College, Northern Marianas College).

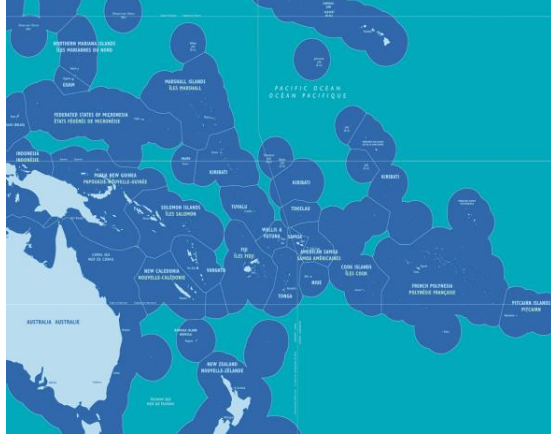


Figure 1. The 22 Developing Nations of the Pacific.

## V. METHODOLOGY

An online survey was conducted to find out the readiness and perception of students in the Pacific towards the use of smartphones for higher education. The aim was to gauge students' readiness as a prerequisite to future integration and implementation of mobile devices in higher education in the Pacific.

The online survey was created using Google form since it is one of the most efficient methods to gather information from the students of 22 countries of the Pacific. The research survey information together with the link of the online survey (<http://goo.gl/forms/mFwWcWNCmj>) was disseminated to the participants using various media channels such as USP student email distribution, Moodle forum postings, Moodle messaging, Pacific Islands Chapter of the Internet Society (PICISOC) discussion list and Facebook.

The survey was open for five months from January to June 2016 only to the 22 developing nations of the Pacific excluding Australia and New Zealand as they were developed nations [24]. Residents of other countries were not allowed to participate as only the 22 countries were listed in the countries list of developing nations of the Pacific [24]. Participants were allowed to participate in the survey only once and their response was automatically stored in a Google sheet file in Google drive. This was done to ensure the security of data collected. No login was required to ensure increased participation since it allowed the participants to directly answer the survey questions without the need to login.

A total of 18 (6 demographic and 12 research related) questions were included in the online survey. The survey included short answer, multiple choice, check boxes and dropdown type of questions. A total **3171** participants answered the online questionnaire.

After the end of six months, the survey was closed for data analysis. The Google sheet file was downloaded from Google drive. Data cleaning was completed first after which the IBM SPSS and MS Excel software was used to analyse the data collected. Frequency tables, pie charts, bar graphs and Chi-square Goodness of Fit Test was used to display the results.

## VI. FINDINGS

### A. Demographics

This section considers results from the data collected on participating countries and device ownership.

**Table I** provides a breakdown of participants in percentage per regional country. From the data collected, Fiji has the largest number of participants. This correlates well to the statistics provided by (International Telecommunication Union, 2015) that in Fiji by the end of the year 2015, the mobile broadband subscription per 100 capita was estimated to be 42.3%, percentage of households with internet was 29% and percentage of individuals using internet was 41.8%. This was relatively higher compared to other Pacific countries. As such the students have easy access to Facebook and Internet (these two advertising methods were used for the online survey). From the questionnaire it was also gathered that the participants from other countries who were also registered students were working, had mobile phones and internet access. Interestingly, majority of the participants were females who were students and between the ages 18-21. Results also show that out of the sample 40.9% were males and 59.1 % were females.

TABLE I. PERCENTAGE OF PARTICIPANTS PER COUNTRY

<i>Country in the Pacific</i>	<i>Percentage</i>
Cook Islands	0.4
Federated States of Micronesia	0.3
Fiji	72.9
French Polynesia	0.1
Guam	0.1
Kiribati	2.2
Marshall Islands	0.4
Nauru	0.4
New Caledonia	0.1
Niue	0.0
PNG	0.5
Samoa	2.3
Solomon Islands	6.9
Tokelau	0.2
Tonga	4.0
Tuvalu	1.8
Vanuatu	7.3

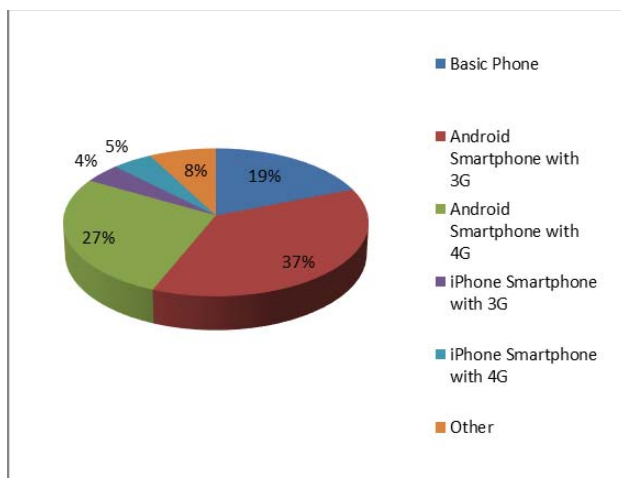


Figure 2. Type of Mobile device owned by the participants.

**Fig. 2** illustrates that every participant taking this survey owned a mobile device. This is in line with the recent surveys conducted that the penetration of the usage of mobile devices in the Pacific has increased from 49% in 2007 to 93% in 2014. The smartphone is common amongst the Pacific students was Android Smartphone 3G, followed by Android Smartphone 4G and Basic phones. Android version of smartphones with 3G (37%) was more common due to the fact that the phones are cheaper and affordable compared to the iPhones. Also, securing the apps for Androids was easier and cheaper compared to the iPhones in the Pacific since the apps installed in androids are from Google hence the users' just needs Google ID to download and upgrade the Apps installed while for iPhones one needs to download apps from App Store using their Apple ID usernames. The students also stated that their Android 3G phones fulfilled the services they needed for their day to day activities such as SMS, connecting to Internet and communication; therefore they did not need an expensive and high technology phone like iPhone.

TABLE II. MOBILE PHONE SERVICES USED ACCORDING TO PARTICIPANT AGE

Descriptors (Age group)	SMS or Calling	Social Networking	Photography	Communication	Music Videos	Email	News Alert	Course Work	Lectures
< 18	84	69	73	55	77	65	51	39	33
18 - 21	1601	1377	1313	1109	1452	1231	835	820	971
22 - 26	670	581	552	467	586	526	361	326	418
27 - 34	401	329	337	277	324	311	203	148	180
> 34	303	224	234	187	225	224	139	83	110
<b>Total</b>	<b>3059</b>	<b>2580</b>	<b>2509</b>	<b>2095</b>	<b>2357</b>	<b>2664</b>	<b>1589</b>	<b>1416</b>	<b>1712</b>

### B. Student Readiness

This section considers results from the data collected on student readiness to the use of mobile phones for learning.

#### 1) Mobile Phone services used:

**Table II** shows the services students use from their mobile phones. The results are from the questionnaires which allowed students to pick multiple services from the list given. Majority of the participants use their mobile phones for text messaging (96.5%) followed by listening to music and videos (84%). An interesting observation was that the participants also use their mobile phones for accessing lectures (53.9%) and completing courses (44.6%). Also, the use social networking was seen to have a high percentage in the survey (81.3%) of the students due to the fact that the most common app used by participants was Facebook (88.1%). The use of emails by students were about 73.4% and use of mobile phones for photography was found to be 79.1%. Last but not the least services were participants using the mobile phones for communicating using apps such as Skype, Facebook Messenger and Viber was 66% and receiving news alerts were 50.1%. The other common apps that were used by the participants include; YouTube (73.4%), Viber (60%), Google apps (67.8%). The participants also used twitter, WhatsApp, Skype, Dropbox and gaming apps however these were not so common.

The aforementioned results show that the participants did have little exposure or experience in using the smartphones for learning purposes, however to have a full blown mLearning service in the region, the use of mobile phones need to be successfully integrated into teaching and learning pedagogy. In order to achieve desirable results, the level of ICT and mobile competency of the participants is very important. **Fig. 3** shows levels of ICT and mobile competencies of participants. Majority of the participants in the region had average level of competency (48.4%), 34.8% of the participants had high level of competency, 11.8% of the participants were highly competent while in total 5.0% had low competency or were not competent at all. This indicates that in order to have a successful platform for mLearning, before it is integrated to upfront learning and teaching, proper training in regards to using mobile phones for learning needs to be conducted.

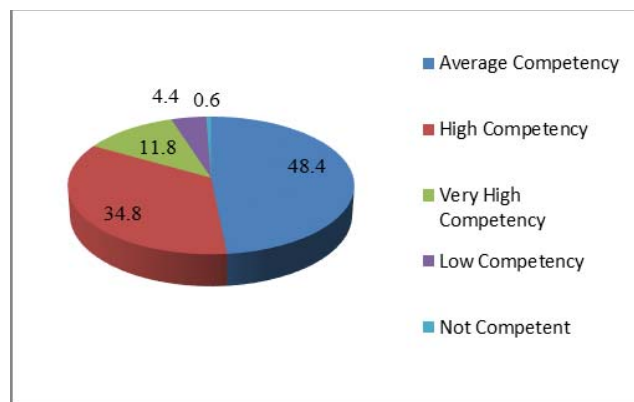


Figure 3. Mobile and ICT competency of participants.

#### 2) Mobile Phones for Academic purposes:

The survey tested further to see if the students had used their mobile phones for academic purposes. Results show that 86.1% of the students had used their mobile phones for learning purposes while 13.9% did not. The common apps used by the participants for learning were Dropbox, YouTube, Google apps, office apps, pdf reader and voice recorder.

Fig. 4 shows that students had knowledge about utilising their mobile phones for learning. This is due to the fact that the participants from different countries were exposed to the new technologies for learning. Recent studies show that in the Pacific, the penetration of ICT is at its peak and the educational institutes are already incorporating the use of mLearning services in their learning and teaching pedagogy. Since the participants were students they were aware and had experience of the mLearning services that were offered to them. Currently, the most common service that the students were familiar with was the receiving of SMS notification in their mobile phones regarding their respective courses such as assessment due dates, announcements for the course, assessment grades and exam time table. The students also indicated that the use of Wi-Fi at their respective campuses or subscription to data plans offered in their countries enabled them to get access to the other services such as access to course resources, attempting quizzes and communication with peers and facilitators in their mobile phones.

From the results, it can be concluded that the students' readiness to the use of mobile phones is positive in the Pacific. The students are using their mobile phones for learning at the *basic level* for example SMS notification, email and communicating with their peers and facilitators, at an *advanced level* – using their mobile phones for accessing course materials, completing course activities and keeping track of their results in their respective courses. Although, the competency level of students is not impressive, training and workshops can be conducted so that students are well prepared for mLearning services using mobile phones in future.

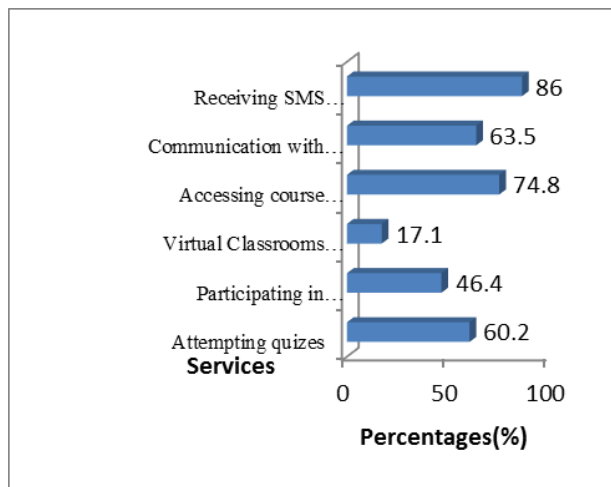


Figure 4. Mobile phone services used for learning by participants.

TABLE III. RESPONSE TO THE USE OF MOBILE PHONES FOR FUTURE LEARNING PURPOSES.

### C. Student Perception

Descriptors	Response	Percentage (%)
Mobile phones for online learning in future	Yes	94.8
	No	5.2
Mobile phones for academic use in future	Yes	90
	No	10

This section considers results on student perception to the use of mobile phones for learning.

#### 1) Mobile phones for use in Learning

The second major aim of the survey was to investigate the perception of students towards the use of mobile phones for future learning. Two descriptors were used for this section; one was the use of mobile phones for academic use in future and the other one was the use of mobile phones for online learning in future. The results are tabulated in Table III.

Table III shows that 94.8% of students positively responded to the question that using the mobile devices for online learning is a good idea whilst 5.2% did not agree to this. In regards to using the mobile phones for academic use in future, 90% of the students are positive that using the mobile devices for future academic purpose will be beneficial to them while 10 % of the students did not agree to this.

To give validity to the results in Table 3, a Chi- square Goodness-of-Fit Test was carried out. The hypothesis is as follows:

Ho: Students perceive that mobile phones are not beneficial for academic use and online learning.

H1: Students perceive that mobile phones are beneficial for academic use and online learning.

Since the  $p = \text{value} < 0.05$ , we can reject the null hypothesis and say that there is enough evidence in the data collected that shows that mobile phones are beneficial for academic use and online learning.

TABLE IV. CHI-SQUARE TEST RESULT FOR VALIDITY TEST FOR TABLE III

	Mobile phones for online learning in future	Mobile phones for Academic Usage
Chi-Square	2548.927 <sup>a</sup>	1640.795 <sup>a</sup>
df	1	1
Asymp. Sig.	0.000	0.000

#### 2) Mobile phones as a learning tool

TABLE V. STUDENT RESPONSE ON USING MOBILE DEVICES FOR LEARNING PURPOSES

Descriptors	Yes (%)	No (%)
Makes learning more convenient	83.0	7.0
Mobile devices are user-friendly	54.2	45.8
Learning takes 24/7	76.6	23.4
Easy access to learning resources	78.5	21.5
New innovation to education	61.1	38.9
Laptops and Notebooks are better for learning	4.0	96.0
Uncomfortable with user- interface for learning	1.5	98.5
Mobile devices are best for social networking	2.0	98.0
Mobile devices has little or no access to internet	1.2	98.8
Learning with technology is a distraction	1.3	98.7

Table V shows that students perceive the mobile phones to be a good learning tool. From the table, there is one descriptor that had almost a 50-50 response, "Mobile phone is user- friendly" (54.2 %: 45.8%). This feature of the mobile device was not that impressive amongst students as from students comments it was gathered that the sensitive touch screen of smartphones were not very favorable when it came to learning and attempting quizzes. However, mobile phone is a good learning tool as it provided more convenient and flexible learning environment, students are able to learn at their own pace and time in their own comfort zone. The participants also agreed that mobile phones are a new innovative tool in education which could not be avoided (64.5%) and for a more robust higher education experience, inclusion of technology is needed.

Participants who stated that mobile phones are not a good learning tool, also stated that the mobile phones are good for social networking rather than learning. The problem of network support and problems with interface of the mobile phones were another issue that made it not a good learning tool (1.5% of the students state this). From this group, 4.0% of the students preferred to use their laptops and notebooks for learning because they found these devices to be more convenient to access resources and complete their course assessments.

The results also show that students perceived mobile phones to be an effective learning tool. Although the platform for using mobile phones for academic use had some issues, students are still positive about using them for their higher education learning. Students' positive perception towards using the mobile phones for educational purposes in the Pacific should act as a driving factor for the educational institutes to invest into mLearning as this is a tool that will take education to greater heights in the Pacific.

## VII. CONCLUSION

This paper presents the findings of student readiness and perception to the use of mobile phones for higher learning in the Pacific region. It is established from the survey that the students in the Pacific region are ready to use mobile phones for learning. Also, a very high percentage of the students perceived that the mobile devices are a good learning and communication tool, makes learning more engaging and self-learning, and is a new innovation to education. However, there were some students who stated that the mobile devices are a distraction to their academic work due to the apps installed. Also, connecting to networking and getting access to free network to access the course resources is a problem for those students who were not ready to incur these additional cost for learning.

Since, it is evident that the students in the Pacific have positive attitude towards the idea of integrating mobile phone for academic purpose and perceive that they can be good learning tools, educational institutes should now invest in creating awareness and training sessions for students on the use of mobile phones for academic purpose. Also, universities in the Pacific need to improve their network structure and education providers need to integrate social networking sites for learning as well so that social networking sites is not considered a distraction. For future work, an investigation on the readiness and perception of facilitators for using mobile phones for academic purpose can be carried out.

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