Assessing Students’ E-Learning Readiness at the University of Papua New Guinea Open College

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Abstract— Prior to the implementation of an e-Learning system in any learning, training or commercial institution, user readiness is an essential step in ensuring users can comfortably and competently use the system. In developing countries like Papua New Guinea and the Solomon Islands, open and distance learners are faced with unique challenges as the University of Papua New Guinea Open College plans to implement an e-Learning system suitable for them. This study attempts to identify some of these challenges and assess students’ e-Learning readiness based on their qualifications or levels of study. Variables that are considered are students’ ages, experience with Information and Communication Technology tools, computer literacy and knowledge of the Internet. The status of students’ e-Learning Readiness is also discussed and conclusions made with reference to the Technology Acceptance Model. Finally, recommendations for policy makers and academics are offered with respect to the findings of this study with hopes that relevant actions are taken to improve students’ e-Learning readiness.

Keywords- e-Learning; Readiness; University of Papua New Guinea Open College; Open and Distance Learning; Technology Acceptance Model.

I. INTRODUCTION

Since the inception of Open and Distance Learning (ODL) at the University of Papua New Guinea (UPNG) in 1974 [1], teaching and learning programs have been delivered via a print based mode of course delivery. In keeping abreast with current pedagogical approaches and in a move at improving the quality of their print based ODL course delivery, the University of Papua New Guinea Open College (UPNGOC) has been making initial efforts to complement some of these printed learning materials with some forms of multimedia technology. In a bolder step, UPNGOC is also in the process of implementing an e-Learning system for their learners to complement the print based course delivery. An open source learning management system (LMS), Moodle, has been adapted as the chosen platform to facilitate e-Learning. Before the implementation of this e-Learning system at UPNGOC, it is important that all stakeholders are adequately prepared to ensure the system will be effective and provide a quality teaching and learning experience for all. This study investigates the e-Learning readiness of ODL students at UPNGOC based on their, ages, levels of education, experience with the use of Information and Communication Technology (ICT) tools, computer literacy and knowledge of the Internet. The study employs both quantitative and qualitative research methods respectively. An e-Learning readiness survey was initially administered to students and findings discussed with reference to a model of technology acceptance and issues relating to e-Learning readiness.

II. BACKGROUND

A. Papua New Guinea and Solomon Islands

Papua New Guinea (PNG) is a developing country in the South Pacific region. Located, directly north of Australia, PNG also shares borders to the west with Indonesia and to the east with the Solomon Islands. PNG is made up of the eastern half of the island of New Guinea, the islands of New Britain, Manus, New Ireland, Bougainville and thousands of smaller surrounding islands. With a population of approximately 7 million people [2] and a land mass of 462,840 km² [3], PNG is home to over 800 distinct linguistic or tribal groups and a very diverse range of flora and fauna. The landscape on the mainland is quite rugged and treacherous in many places and most island communities are isolated and remote. This makes it difficult to construct reliable roads or railway systems linking all provinces on the mainland to the capital city and this in turn leads to the lack of affordable and reliable transport in the country. In the end the greatest setback is the lack of access to the major services of health and education to the bulk of the populace. PNG’s literacy rate still stands at only 56% according to the national census carried out in 2000 [4]. According to PNG’s National Higher Education Plan, there has been an increase in the number of school leavers in the country since 1995 [5]. This has been the result of the implementation of education reforms which allowed more students the opportunity to complete secondary school but did not cater for increasing access to institutions of higher learning or universities.

Solomon Islands lies east of PNG and is by comparison a much smaller country with a population of 515,870 people as of the 2009 Census [6] and a land mass of 28,400 km² [7] spread out over 9 main island groups. Until the upgrading of the Solomon Islands College of Higher Education to the National University of Solomon Islands this year [8], there has been no university in the country to serve its citizens’ higher education needs. School leavers typically have to travel abroad to enroll in university level programs and gain tertiary qualifications. In improving access to higher education to its
citizens, ODL centers from universities in PNG and Fiji have also been established in the capital city, Honiara.

B. University of Papua New Guinea and University of Papua New Guinea Open College

PNG’s oldest and largest university, UPNG was established in 1965 by an act of parliament in the lead up to PNG’s independence in 1975 [9]. It consists of 5 schools: Humanities & Social Sciences, Natural & Physical Sciences, Business Administration, Law and Medical & Health Sciences. In addition to the schools, UPNG also delivers some of its diploma and degree courses through ODL. UPNGC is the entity responsible for the facilitation of ODL programs for UPNG and it delivers all ODL programs through a predominantly print based mode. UPNGC operates through a network of 23 study centers (known as open campuses or uni centers) throughout PNG and in the neighboring Solomon Islands with over 11,000 students enrolled in its various programs[10]. Its headquarters is at UPNG’s main campus in Port Moresby.

III. AIMS OF STUDY

In the implementation of an e-Learning system at UPNGC, students will be at the receiving end as their learning will be affected either positively or negatively by it. It is important at this stage therefore, that a concrete image of students’ computer literacy, familiarity with the Internet and perceptions towards e-Learning is gauged. The aims of this study are to:

- ascertain actual levels of students e-Learning readiness and identify challenges that students may face in the implementation of e-Learning at UPNGOC;
- make recommendations for policy makers and academics to consider in designing appropriate learning content which is contextually relevant and tailored specifically to meet UPNGOC students’ needs.

IV. METHOD

The UPNGC students’ e-Learning readiness study was carried out by way of a survey. Paper based questionnaires were dispatched between May to June 2012 from UPNGC headquarters to its 6 open campuses. The questionnaire comprised 12 items designed to elicit students’ demographic data, computer and ICT literacy levels and perceptions towards e-Learning. A total of 179 responses were received from 3 out of the 6 open campuses. 5 of the responses were deemed invalid when respondents failed to answer 3 or more questions. This left a remainder of 174 completed responses compiled and analyzed for this study.

V. SAMPLE

A. Locations of respondents

Survey forms were received from Mt. Hagen, National Capital District (NCD) and Honiara open campuses. Fig. 1 shows the locations of respondents in PNG and the Solomon Islands.

B. Education Levels of Respondents

The survey was completed by 90 students enrolled in the Certificate in Tertiary and Community Studies Program (CTCS) and 84 students enrolled in Diploma or Degree Programs. Unlike the Diploma and Degree Programs which are coordinated from UPNG’s academic schools, the CTCS program is designed and courses facilitated entirely by UPNGOC. It is a pre-tertiary qualifying program allowing learners to complete the equivalent of a higher education qualification (years 11 and 12) or to enroll in required courses to upgrade their year 12 results and apply for entry into higher learning institutions. The goal of the CTCS program is to provide opportunities to a large segment of the population who for some reason or another failed to pursue formal studies or have become social liabilities and would like to maximize their life potential” [11]. Due to the large number of school leavers in PNG each year, CTCS has become an alternative pathway for many young school leavers to enter tertiary or higher learning institutions.

VI. FINDINGS

Selected results from the survey are presented here to draw forth an image of the status of students’ e-Learning readiness prior to e-Learning implementation at UPNGOC.

A. Students’ Age Distribution

At UPNGOC there are opportunities for many school leavers each year who are unable to pursue higher education due to the shortage of space in higher learning institutions. UPNGOC allows them to enroll in programs which will enable them to qualify for a tertiary education or enter into an institution of higher learning. The high number of young learners can be seen in Fig. 2. The learners are grouped according their program of enrollment.
The survey findings show that the majority of students in both Diploma/Degree and CTCS programs fall between the ages of 18-25 years. However, it is also observed that there is a slightly higher percentage of 18-25 year olds enrolled in the CTCS program compared to the Diploma/Degree Programs. There is also a slightly higher percentage of 26-32 year olds and 33-40 year olds enrolled in Diploma/Degree Programs as opposed to those enrolled in CTCS. Overall, the mean age of students was 23 years and the Standard Deviation was calculated to be 4.1.

B. Students’ experiences with the use of Information and Communication tools

In this digital age, it is often assumed that people have access to or are familiar with the usage of ICT tools. It is however vital that students are asked to state which ICT tools they are familiar with in order to gain insights into their levels of preparedness for the adoption of e-Learning. In this survey, students were asked whether or not they had used the following three ICT tools:

- The Internet
- Audiocassettes
- Compact Discs (CDs) or Digital Versatile Discs (DVDs)

Students were allowed to select more than one of the ICT tools based on their experiences. The results can be seen in Fig. 3.

The most commonly used ICT tools by both groups of students was shown to be CDs and DVDs. Students enrolled in Diploma/Degree programs have rated the Internet to be their second most commonly used ICT tool at a rate of 57% (n=48) and the popularity of audiocassettes fall slightly behind at 49% of the total number of respondents (n=41). CTCS students on the other hand have rated audiocassettes to be the second most commonly used ICT tool with 53% of the respondents (n=47) indicating that they have used them. For CTCS students, a lower percentage of respondents (i.e. 30% or n=27) indicated having some experience in how to use the Internet.

C. Students’ levels of computer literacy

Students’ levels of computer literacy are of course one of the most important aspects of readiness for e-Learning. If students are not computer literate, they will be placed in a difficult situation when e-Learning is first implemented. Fig. 4 presents the students levels of computer literacy based on their experience.

In observing their levels of computer literacy, it was seen that the majority of Diploma/Degree students possessed knowledge of how to use computers (i.e can either use Word/Excel, are proficient or advanced computer users). Only 17% of the Diploma/Degree students (n=15) indicated that they had
never used computers before. CTCS students however presented a slightly different picture with almost half of the students stating they had never used computers before (i.e. 48%, n=43).

D. Students' knowledge of the Internet

In addition to the prior question on the use of ICT tools, the survey also required students to state whether or not they had some knowledge on how to use the Internet. The results are shown in Fig. 5.

![Figure 5. Students' knowledge of the Internet by program (n=174)](image)

The results indicate that over half of the Diploma/ Degree students (i.e. 65%, n=55) possess knowledge of how to use the Internet, whilst only 27% (n=17) do not know how to use the Internet. Responses from the CTCS students on the other hand showed that most students had no knowledge on how to use the Internet with only 38% of the CTCS students (n=34) indicating that they do know how to use the Internet.

E. Students’ perceptions towards e-Learning

The survey further required students to indicate on a 5 point Likert scale, how they felt by the statement that ‘the implementation of e-Learning would enhance their learning.’ Fig. 5 presents the findings of students’ perceptions towards e-Learning.

![Figure 6. Students perceptions towards e-Learning by program (n=174)](image)

The results illustrate that Diploma/ Degree students are greatly in support of the statement that ‘the implementation of e-Learning will enhance their learning’ with over half of the respondents expressing agreement with the given statement. A total of 32% of students (n=27) strongly agree and 26% of students (n=22) agree with the statement. In comparison, the results from the CTCS students on the other hand reveal that students hold great uncertainty towards the statement that ‘the implementation of e-Learning will enhance their learning.’ A total of 32% of the respondents (n=27) felt unsure, 16% (n=14) disagreed and 11% (n=10) strongly disagreed with the statement.

VII. DISCUSSION

Before a discussion on the survey findings, it is worth noting that certain limitations of this survey may have affected the overall findings. Despite the participation of a fair number of respondents in the survey, the number of CTCS respondents from Mt. Hagen Open Campus outnumbered those from the other two open campuses. There were also more Diploma/ Degree respondents from NCD and Honiara Open Campuses as opposed to Mt. Hagen.

In trying to understand the factors that determine users’ intentions to use new technologies, a number of Models have been proposed. One of the earliest Models was the Theory of Reasoned Action (TRA) which stated that ‘individual behavior is driven by behavioral intentions where behavioral intentions are a function of an individual’s attitude toward the behavior and subjective norms surrounding the performance of the behavior’ [12]. The TRA generally stressed that the users’ positive or negative feelings about performing a behavior would influence their actual usage of a new technology.

A revised version of the TRA can be applied in understanding the results of this e-Learning readiness survey. The Technology Acceptance Model (TAM) is a theory which initially brought forward the proposition that people’s acceptance or rejection of new technologies was determined by their attitudes towards a system [13]. Their attitudes were said to stem from two main beliefs:

- Perceived Usefulness.
- Perceived Ease of Use.

Fig. 7 presents a full illustration of the TAM highlighting that certain external variables all affect the perceived ease of use and perceived usefulness of users in shaping their attitudes towards accepting or using a new technology.
In summary, if potential users of a new system felt a perceived ease of use, based on external variables, this would lead to a perceived usefulness of the new system. A perceived usefulness would then lead to positive attitudes and encourage the users to use the new system. [14] In this study, the three external variables presented would be the students’ experience with the use of ICT tools, students’ computer literacy levels and students’ knowledge of the Internet. Students’ ‘perceived ease of use’ of e-Learning is seen in their perceptions towards e-Learning. The TAM has been chosen to be used in this study in order to gain valid and reliable insights into users’ perceived ease of use and perceived usefulness of e-Learning adoption, in spite of their experiences with computers, ICT tools and knowledge of the Internet.

A. Computer Anxiety

A most important external variable in this study is that of students’ levels of computer literacy and how this affects students’ ease of use. Computer anxiety is a recognized term in the field of psychology and can be defined as the generalized emotional distress or the tendency of an individual to be uneasy, apprehensive, and/or phobic towards current or future uses of computers [15]. In this survey, the findings presented in Fig. 4 show that 48% of CTCS students had never used computers before. Having no knowledge of the use of computers implies that there possibly exists a high level of computer anxiety amongst CTCS students. Consequently, the findings show that 32% of CTCS students are unsure of whether or not e-Learning can enhance their learning. The Diploma/Degree students show some level of computer anxiety but to a much lesser extent with only 17% of the total having no knowledge of using computers.

B. Computer literacy and perceptions towards e-Learning

In observing the relationship between computer literacy and perceptions towards e-Learning, however, Table I shows that the perceptions of respondents towards e-Learning is not necessarily affected by their computer literacy.

<table>
<thead>
<tr>
<th>Program</th>
<th>% of computer literate students</th>
<th>% of students holding positive perceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTCS</td>
<td>52 (n=46)</td>
<td>41 (n=37)</td>
</tr>
<tr>
<td>DIPLOMA/DEGREE</td>
<td>83 (n=70)</td>
<td>58 (n=49)</td>
</tr>
</tbody>
</table>

There are a total of 52% (n=46) of the CTCS respondents who are computer literate, but only 41% (n=37) who responded positively towards e-Learning adoption. On a greater scale, 83% (n=70) of the Diploma/Degree students stated they were computer literate, but only 58% (n=49) responded positively towards e-Learning adoption. Overall, there are clearly doubts that exist in the minds of students towards e-Learning adoption, despite the fact that many are computer literate. Thus, it can be said that students’ perceived ease of use’ or lack of it is not determined by their computer literacy levels in this case.

C. Knowledge of the Internet and Internet Efficacy

The other important variable in assessing students readiness of e-Learning is their ‘knowledge of the Internet’. For Diploma/Degree students’, the number of respondents having knowledge of how to use the Internet is seen to be over fifty percent (i.e. 65%) of the total respondents but still not at an extremely high level. CTCS students rate very low with only 38% of the total indicating knowledge of how to use the Internet. Based on this alone, it can be said that possibly the perceived ease of use for a new e-Learning system will be higher for Diploma/Degree students than CTCS Students and therefore more positive attitudes may be formed by them to use the e-Learning system compared to CTCS students.

Internet self efficacy refers to what people believe they can do online now or in the future, without referring to their skills at performing Internet related tasks[16]. In the case of this study, Internet self efficacy is discussed regarding students perceptions to use an e-Learning system. Considering that a good number of respondents in this survey did not know how to use computers or the Internet, the Internet self efficacy of the respondents, according to their perceptions towards e-Learning was seen to be higher for the Diploma/Degree students than the CTCS students.

In Table II, it is seen that respondents’ knowledge of the Internet, may or may not necessarily give them a positive outlook towards the adoption of e-Learning.

<table>
<thead>
<tr>
<th>Program</th>
<th>% of students with knowledge of the Internet</th>
<th>% of students holding positive perceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTCS</td>
<td>38 (n=34)</td>
<td>41 (n=37)</td>
</tr>
<tr>
<td>DIPLOMA/DEGREE</td>
<td>65 (n=55)</td>
<td>58 (n=49)</td>
</tr>
</tbody>
</table>
For both groups of students, there are slight (though not largely significant) differences between the number of students having knowledge of the internet in comparison to the number of students holding positive perceptions towards e-Learning adaption (i.e. ‘perceived ease of use’ and ‘perceived usefulness’ of e-Learning).

D. Steeper learning curve for some students

It is extremely vital at these preparatory stages of e-Learning implementation, that all forms of computer anxiety and doubts about using e-Learning are addressed. In a study carried out on the role of e-learning in engineering education at the Queensland University of Technology in Australia, one problem identified in directing undergraduate students to any potential e-learning media was that some students faced steeper learning curves than others in using computers and associated learning software [17]. It is further stated that this causes impediments to students’ progress or results in them rushing through a course in attempts to keep up with their peers.

Similarly, at UPNGOC, the implication of this issue not being dealt with would lead to students being faced with steeper learning curves in their learning. In addition to trying to understand the content matter of the courses they are enrolled in, students will be faced with the challenge of trying to accept, understand and comfortably use LMSs in the implementation of e-Learning. Student learning goals and outcomes will definitely not be effectively achieved if students are not well oriented to the basics of computing and Internet usage.

VIII. CONCLUSION

An e-Learning Readiness Survey was administered to UPNGOC students to assess their levels of e-Learning readiness, based on their ICT experience, computer literacy levels, knowledge of the Internet and perceptions towards e-Learning. In this study, the TAM was only used to understand students’ ‘perceived ease of use’ and ‘perceived usefulness’ of e-Learning prior to its utility at UPNGOC. Further studies will focus on students’ actual usage of e-Learning once it has been implemented at UPNGOC. Although there are some limitations acknowledged in this study, the following conclusions can be made:

- Most students enrolled in Diploma/Degree courses have the necessary experience in the usage of ICT tools, computer literacy and knowledge of the Internet required to begin using an e-learning system. Students’ perceived ease of use and perceived usefulness of e-Learning however, is seen in just over 58% of respondents, regardless of their experiences.
- CTCS students have less experience in terms of computer literacy and knowledge of the Internet. Responses indicate that only 41% of the total respondents felt a perceived ease of use and perceived usefulness of e-Learning.

In preparation for e-Learning implementation, the UPNGOC management can take the following relevant steps to ensure students are prepared to use the proposed e-Learning system and improve their ‘perceived ease of use’ and ‘perceived usefulness’ of e-Learning:

- Reduce computer anxiety by designing and delivering a short introductory course to computing and the Internet primarily targeting CTCS students and those Diploma/Degree students who have no experience with using computers and the Internet. This would include the provision of computers and Internet access and enable students to become comfortable and competent with using computers for their learning.
- Deliver relevant training to students in how to use Moodle, which is the chosen LMS for e-Learning implementation at UPNGOC. This should erase the doubts held by students who have the necessary knowledge of how to use the Internet and are computer literate, but do not hold positive views towards e-Learning adaption.
- Trial out e-Learning implementation as a complementary media only and not for the delivery of fully online course content.

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