Mauritius Research Council

Report on the study "Assessing the factors influencing the adoption of ELearning among undergraduates in a developing economy: A survey among Undergraduates in Mauritius."

Final Report

Mauritius Research Council

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MAURITIUS RESEARCH COUNCIL

Report on the study "Assessing the factors influencing the adoption of ELearning among undergraduates in a developing economy: A survey among Undergraduates in Mauritius."

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ii. the respondents who participated in the survey,
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vi. colleagues of the Faculty of Law and Management for their administrative support and academic inputs.

EXECUTIVE SUMMARY

The purpose of the research was to (i) assess the factors that can affect the effective delivery of online undergraduate degree programmes in Mauritius and (ii) determine the extent to which university's undergraduates are ready and willing to enroll on online degree programmes. Being among the few studies investigate this phenomenon from a developing economy perspective, this study contributes to extant literature on the use, role and importance of ICT in tertiary education as well as its acceptance by students. Findings are of relevance to policymakers in formulating strategies aimed at promoting and facilitating the implementation of ELearning among university's students.

Following a thorough review of extant literature and empirical studies on the adoption of ELearning, a modified Technology Acceptance Model (TAM) was proposed. Two focus group interviews were conducted with undergraduate and MBA students and a semi structured interview was conducted with the Director, ELearning, Ministry of Education and Human Resources. Data were collected by means of a questionnaire from 490 students of the University of Mauritius and Open University of Mauritius who have previous experience of a mixed mode learning. Data gathered has enabled the research team to identify relevant issues that can influence adoption of fully online degree programmes over the traditional classroom delivery.

Findings of survey revealed that gender, type of course, Internet experience, prior experience in ELearning/mixed mode courses and initial proficiency level in ELearning significantly impacted on student's intention to enroll for a fully online degree programme while learner's dimension, course's dimension and instructor's dimensions had an impact on the Perceived Ease of Use (PEOU) and Perceived Usefulness (PU). Furthermore (PEOU) and (PU) were both found to be predictors of attitude towards ELearning. Finally, attitude towards ELearning and intention to enroll on an online degree programme were found to be statistically significant. Therefore, to ensure effective implementation of ELearning in Mauritius, it recommended that (i) students are sensitized on the benefits of ELearning, (ii) training are provided to students on the use of online portals to facilitate interactions and learning, (iii) more modules are offered on a blended mode by the University, (iv) the design of the learning platforms is user friendly and (iv) universities invest on IT related facilities and provide training to the tutors amongst others.

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1.0 INTRODUCTION

In the field of modern education, ELearning is evolving as the new paradigm. Higher educational institutions in developed countries are seizing this opportunity by adopting technological innovations within the learning environment (Adewole-odeshi, 2014). These innovations are taking over the traditional learning methods by engaging students to learn through various web technologies. ELearning is defined as a system which uses internet technology to deliver information to students with interactions through computer interfaces (Technology, 2012 & Adewole-odeshi, 2014).

Over the years, although E-learning has been adopted by many private and public institutions in both developed and developing countries, its implementation are not evenly dispersed worldwide. According to Qteishat (2013), this disparity was mostly dominant in the developing countries like Jordan, Kenya and Tanzania. Furthermore, eight countries including the United States, South Korea, India, South Africa, China, Malaysia, United Kingdom and Australia have made significant development towards the implementation of ELearning (Lepi, 2013). For example, 81% of the institutions in United States offer at least one fully online course and 67% recognized online education as a critical long-term strategy (Cleveland-Innes & Garrison, 2010). In addition, China is also providing online courses to a quarter million students (Pudaruth *et al*., 2010). The use of a web-based learning environment liberates interactions between learners and instructors which, in turn, help to overcome the limitation of time and space. Furthermore, the implementation of Information and Communication Technology (ICT) in field of education has improved teaching and learning over years. Such improvements enable people to keep pace with the latest changes taking place in the business world (Zaharias & Poylymenakou, 2009).

1.1 Background of the study

By the late 20th century, the rapid rise and development in ICT has positioned this sector as the 5th pillar of the Mauritian economy. Moreover, the Government has the firm intention of transforming Mauritius into a digital island in the near future. In 2015, the Internet World Stats predicted that the internet penetration ratio in Mauritius would turn around 43.3 % while the number of internet users was forecasted at 803,896 (representing 60 % of the population).

According to the Global Information Technology Report (2013), Mauritius is ranked at the 55th place in the network readiness index. Realising the load of opportunities that improvements in ICT present to the Mauritian tertiary education sector, private and public universities in Mauritius have started implementing online courses. For example, the Open University of Mauritius (OUM) which was established in 2012 offers undergraduate and post graduate programmes on an open and distance learning mode, which requires an extensive use of modern technologies. This paradigm shift has changed the learner's perception of open and distance learning such that in 2015 the number of students registered at the Open University of Mauritius (OUM) stood at 4000 (Open University Website, 2016). In the recent years, the University of Mauritius, through the Centre for Innovation and Lifelong Learning (CILL) and the Virtual Centre for Innovation and Learning Technologies (VCILT) designed fully online Information Technology (IT) related undergraduate degree programmes. In 2015, the University of Mauritius launched the first fully online MBA programme in collaboration with an Australian institution. Moreover, academics of the University of Mauritius are being encouraged to develop online modules and to incorporate ICT innovative features to make the learning environment more interactive. Also, the Government of Mauritius has the intention of transforming Mauritius into a regional education hub. While establishing University branches abroad is costly, offering online degree programmes remains a feasible option.

1.2 Problem Statement

The importance of online education is increasing due to the rising stress to catch up with the developed countries in meeting global competitiveness standards (Hawkins, 2002). This trend is driven by the variations in the students' demographic factors, in educational delivery market conditions and in the innovation technology itself (Concannon *et al*., 2005). However, with the integration of the information system into higher education, several barriers are associated to it such as technology infrastructure, faculty effort, technology satisfaction, and graduates competency (Surry *et al*., 2005). In addition, the implementation of ELearning has failed among universities due to the high cost of technology, poor decisions, competition, and the absence of a business strategy (Saadé, 2003 & Elloumi, 2004). These factors led to an alarming situation where the drop-out rate on the ELearning programmes has been on an increasing trend.

Ulrich (2014) defined drop-out rate as the absolute termination in the higher education system without obtaining an academic degree. Studies revealed that a drop-out rate of 20% to 80 % is prevalent in the field of e-learning (Maxwell, 2014).

In Mauritius, students apply for a seat at public or private universities to read for an undergraduate degree of their choice after completing the Higher School Certificate (HSC) or A Level. However, in public universities such as the University of Mauritius applicants have to compete for a seat on programmes where the intake is low. It is believed that with online degree programmes, unsuccessful applicants can get an opportunity for read for a degree of their choice. On the other hand, online degree programmes relieve the university in terms of the space required to run courses.

On the supply side, the first ELearning practices at the University of Mauritius can be traced back to the year 2001. Over the years, access to education and to the university has increased and a mixed mode system has become an accepted practice among the learning community and in the University's system. However on the policy side, the reaction has been timid and there is a lack of decision making to make ELearning a mainstream teaching as well as to transform the university into a real fully-mode institution. This had the effect of ELearning remaining on the boundary of the system being treated in a logic of permanent beta experimentation (Santally, 2013).

Furthermore, it has been found that although some universities in Mauritius are running online courses; no studies have been carried out on the adoption of ELearning among students within the Mauritian tertiary education system. It is believed that an ongoing assessment of a new system is essential in crystalising its expected benefits and in ensuring its sustainability. For instance, Prof and Pilli (2004) note that the electronic learning approach needs ongoing changes in its structure and content, particularly, the suggested areas for improvement by students namely communication and student support.

Against this backdrop, the present study aims at analysing the factors influencing the adoption of ELearning among undergraduates in Mauritius. This study will fill in the apparent research gap and contribute to the extant literature on ELearning in universities. The findings of the study will help in improving the learners and academic relationship. Moreover, it will shed light on the

barriers impeding the effectiveness of fully online degree programmes such that necessary actions can be taken to reduce drop-out rate among learners enrolled on fully online degree programmes in Mauritius.

1.3 Aim and objectives of the study

The aim of this study is to assess the factors influencing the adoption of fully online degree programs among undergraduates in Mauritius. The specific objectives are:

1. To analyze the benefits of online degree to the undergraduates and to the university.
2. To identify the factors that can potentially affect the effective delivery of fully online degree programmmes in Mauritius.
3. To determine the extent to which university's undergraduates are ready and willing to accept fully online delivery degree programmmes over the traditional classroom delivery.
4. To make recommendations on how to improve the delivery of fully online courses in Mauritius.

1.4 Significance of the study

The significance of the study can be analysed from different perspectives. First of all, being the first study to assess the factors affecting the adoption of ELearning among undergraduates in a Small Island Developing State (SIDS) like Mauritius, it fills the apparent gap that exists in extant literature in the field of education and ICT in universities. It is found that existing research has been carried out in developed countries while the SIDS economies have not been represented in the body of literature. Secondly, by providing fresh insights from a new context, the study offers a unique contribution to the ongoing discussion on the use, role and importance of ICT in tertiary education as well as its acceptance by the students. Thirdly, it presents further research needs that require immediate, medium or long term attention from stakeholders of the tertiary education sector as a whole. Fourthly, the study provides knowledge and guidelines that may be of help to policymakers in formulating appropriate strategies aimed at promoting and facilitating the implementation ELearning among university's students. In short, the study provides new and valuable insights to the students, academics, planners and social scientists in the areas of ELearning.

1.5. Statement of Hypothesis and Conceptual Framework

In line with objectives of the research and being consistent with extant literature, the following hypotheses have been postulated:

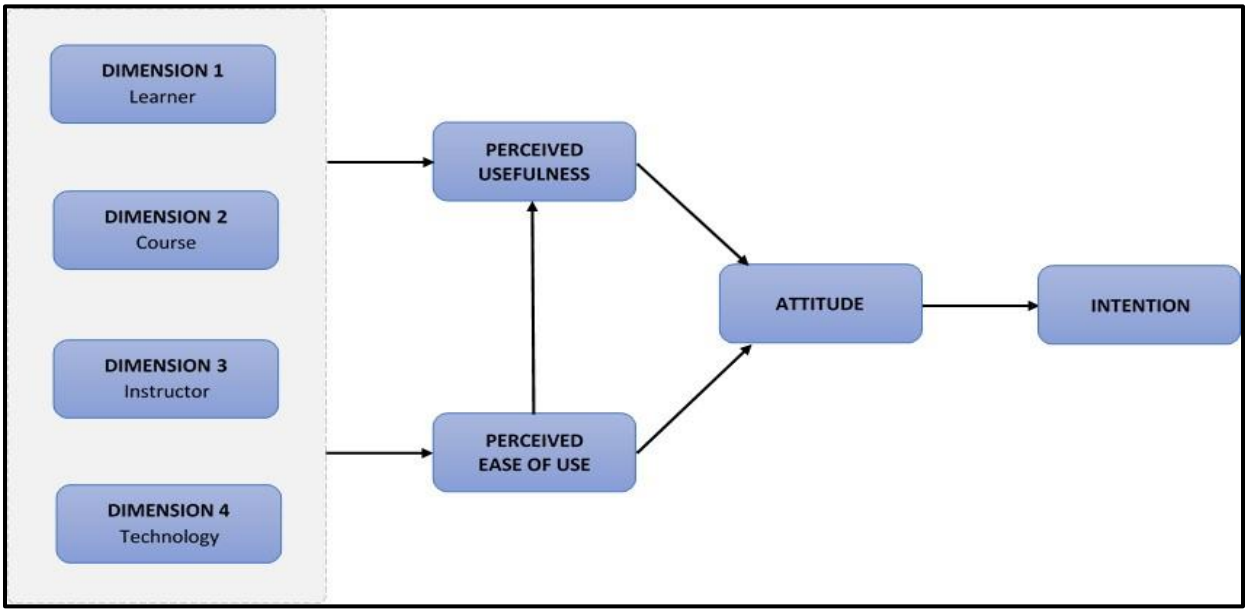
H [1]: University students' behavioral intention to use ELearning is affected by their attitude, perceived usefulness, perceived ease of use, ELearning self-efficacy, instructor and student readiness, technology dimension, and course dimension.

H [2]: University students' ELearning attitude is affected by their perceived usefulness, perceived ease of use.

H [3]: University students' perceived usefulness of ELearning is affected by their perceived ease of use, ELearning self-efficacy, instructor and student readiness, technology dimension, and course dimension.

H [4]: University students' perceived ease of use of ELearning is affected by their ELearning self-efficacy, instructor and student readiness, technology dimension, and course dimension.

Figure 1: Proposed Conceptual Framework



Source: Author (2017)

1.6 Assumptions

A few assumptions have been made for this study. Firstly, to obtain an objective response from the respondents, it was assumed that the sampled students participating in the survey have knowledge and prior experience of hybrid or distance learning mode. This prior exposure to the distance learning mode was considered important since characteristics of the learning mode which is very similar to that of eLearning as they include both an element of self-study which is facilitated by the use of ICT. Moreover, prior experience on distance learning mode would make them conversant with the key terms of the questionnaire. Secondly, the data is not considered to be unbiased. Thirdly, the policymakers and the students have answered the interview questions in an honest and open manner.

1.7 Limitations

As with all studies, this study also has its own limitations which can narrow down scope of the conclusions. Firstly, the sample was drawn only from two public universities namely the University of Mauritius (UOM) and the Open University of Mauritius (OUM) due to lack of access to other private universities. Thus, it is believed that the respondent's views could not be generalised to the private universities. The second limitation is derived from the geographical location of the current research (i.e. Mauritius) and its application to other SIDS economies. It is believed that the findings may be applicable to other SIDS economies that share common demographic characteristics with Mauritius as well as implementing Elearning at tertiary level. However, they may not be necessarily relevant to other SIDS economies that are not on the same level of socio economic development. We also consider that the present study may not have considered other issues such as the local culture which that could also affect the effective implementation of Elearning.

1.8 Definition of Terms

E-learning

The Instructional Technology Council (ITC) and the National Center for Education Statistics (NCES) define Elearning as the process of learning that is facilitated through the use of Information and Communication Technology (Noesgaard *et al*., 2015). According to Desai *et al*. (2008), Elearning differs from traditional way of learning as it can be both synchronous and asynchronous. Synchronous Elearning is when students and faculty interact simultaneously at a

specific time using the internet for direct communication. On the other hand, under asynchronous Elearning, the students and faculty interact at different times by placing messages or coursework in files that are accessed at different times (Qteishat, 2013).

Distance learning

Distance learning is an "*institution-based, formal education where the learning group is separated and interactive telecommunications systems are used in order to connect learners, resources, and instructors*"(Simson, 2000 ; Jimison, 2012).

Higher Education Learning Approaches

Learning at higher educational institutions occurs in the following four main approaches:

- **Traditional learning**: This approach implies that the delivery system is based on a classroom setting with a lecturer give a lecture and students listen and write notes. Interaction between the lecturer and student has been viewed as an essential learning element under the traditional way of learning (O'Malley & McCraw, 1999). In Mauritius, the traditional approach is still prominent in the education system.

- **Web-facilitated learning**: where programs require the use of web-based technology to facilitate a face-to-face course. Many institutions use a course management system or web pages such as Moodle or blackboard to post the syllabus and assignments (Allen *et al*., 2011).

- **Mixed mode learning or blended learning** takes advantage of the best of both practices by blending traditional and distance learning into one learning (Simson, 2000 and Graham & Dziuban, 2008).

- **Fully online course** is one where most or all of the content is delivered online with typically no face to face meeting. In 2011, 80 % of the courses in US are run online (Allen *et al*., 2011).

2.0 Review of the Literature

In line with the research objectives of the study, extant literature has been reviewed to provide insights on the issues surrounding the adoption and implementation of Elearning in higher education. Various models have been used in the literature to (i) analyse the factors influencing the adoption of E-learning and to (ii) predict the learner's intention to use Elearning. These models include the Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Motivational Model (MM), Theory of Planned Behavior (TPB), Model Combining the Technology Acceptance Model and Theory of Planned Behavior (C-TAM-TPB), Model of PC Utilization (MPCU), Innovation Diffusion Theory (IDT), and Social Cognitive Theory (SCT). However, the TAM model has been used in this study as it (i) has the advantage of being specific to information technology, (ii) is considered as universal model which has a strong theoretical base and (iii) has a wide empiric support (Davis, 1989). Furthermore, Ajzen and Fishbein (1980) and Al-suqri and Al-kharusi (2015) consider the TAM model as far better than the Theory of Reasoned Action.

The structure of this section is as follows. In the first instance, the benefits of online degrees to the undergraduates and to the university are analysed. It is then followed by a discussion on the challenges faced in the implementation of Elearning in universities. The last part reviews the Technology Acceptance Model (TAM) upon which the theoretical framework of the study will be developed.

2.1. Benefits of E-Learning to Undergraduate Students

Many assumptions have been made concerning the use of technologies by the net generation students. However, studies have come to show that these digital natives are significantly different in nature, especially in their academic use of technology (Corrin *et al.,* 2010).There are various benefits which are associated with E-learning to the undergraduates (Vaghjee, 2014; Teo, 2011).

2.1.1. Convenience and Flexibility

One of the prime reason that supports Elearning is convenience and flexibility (Northrup 2002; Young & Norgard 2006). The first category under convenience and flexibility is schedule flexibility. Flexible learning enables learners to choose their aspects of study, typically the 'when,

where and how' (Higher Education Academy, 2013). The second category is the ease of accessibility, where the educational materials can be accessible for students at any time. The latter can review lectures, discussions, explanations and comments. They can also share notes with each other to help facilitate community learning. Thirdly, the students may be able to choose from a wider range of degree programmes. In addition, there are some institutions that offer degree programmes that might not yet be available through nearby public or private institutions. Normally, on-campus courses are typically scheduled in a more rigid format, with a minimum duration of 50 minutes and others running longer. Night classes may last for nearly three hours. One of the benefits of distance learning is that students may not have to sit for long periods of time. Lessons can be paused when needed and notes read at their own will. This is in accordance with studies which have revealed that one of the advantages of online courses to students is that they fit in better with the students' schedule, enabling them to take more hours as compared to traditional way of learning (Young & Norgard, 2006). Elearning is even opening new doors to students who may already be working, who may have disabilities, or who may not be classified as a traditional student in one way or another (Chung, 2008).

2.1.2. Time Efficiency

The time saving element introduced by mixed mode education tools is one of the very important benefits to the students. This is so because they have instant access to course materials at any location. They do not have to spend time walking across campus to the instructor's office or searching for a reading in the library. Swan and Springfield (2010) reported that Elearning is given high preference by the students as it is more convenient and easily accessible at their own time and pace, thus, avoiding wastage of time and cost travelling to the campus.

2.1.3. Student Enrichment

Interaction is one of the categories of student enrichment. In comparison with the brick and mortar classes, where the conversation could have moved past the point and the student are not able to comment, Elearning may be less intimidating. Hence, it can increase student interaction. Next is online communication. Instructors can be more approachable in the online setting. The students may feel more comfortable talking openly with their teachers through online chats, emails, and newsgroup discussions rather than in the traditional approach of learning. Indeed, online learning

also cuts out having to wait for office hours. The final component is time to absorb material. The US department of education reported that on average, students who adopted Elearning performed better than those receiving face-to-face instruction and that their level of satisfaction is high (Suanpang & Petocz 2006; Bhatiasevi, 2011 and Bentley *et al*., 2012). Furthermore, according to Barker and Wendel (2001) students in virtual schools showed greater improvement that their conventional school counterparts in critical thinking, researching, using computers, learning independently, problem-solving, creative thinking, decision-making, and time management.

2.1.4. Cost effective choices

Through the cost-effective choice, students may be able to save money by not having to physically attend classes. Online courses may help individuals cut down or eliminate costs of transportation and other expenses incurred by attending classes in a traditional setting. Furthermore, some web-based classes may not require physical textbooks, as reading materials may be available either through the school's own library or their partnerships with e-libraries and other digital publishers. E-textbooks might offer substantial savings for students, adding up to hundreds of dollars a year (Bartley & Golek, 2004).

2.2. Benefits of E learning to the Universities

Electronic learning is altering the technique by which teaching and learning is taking place on the university campuses. South Africa is one among the developing countries that is adopting the Elearning strategy in order to catch up with the developed countries (Technology, 2012). Several benefits are associated to the implementation of ELearning by universities.

2.2.1. Development in skills

Elearning technologies bring as much change to instructors as they do to students (Jones & Shea, 2004). In an Elearning environment, instructors shift from being the primary source of students' knowledge to being the manager of the students' knowledge resources (Romiszowski, 2004). For example, under the brick and mortar approach, the instructor delivers the content to the class and provides answers to their questions. On the other hand, under an asynchronous Elearning environment, the instructor mostly coordinates the content and then the students peruse it at their own pace (Teo & Gay 2006). Thus, the skills that are most important for an instructor to possess

may depend on the Elearning attributes of their course. The online learning also involves technical complexity from instructors as well as students (Jones & Shea, 2004). New software applications are being learnt by the course administrator. Studies have shown that the main challenges of technical support for Elearning initiatives include a lack of knowledge of how to alter instructional design to be effective for courses using technology and a lack of confidence in using these applications to teach (Arabasz & Baker, 2003). Instructors may also be concerned with the acceptance of Elearning tools among their students. Henceforth, they should provide them with various types of content, create fun, provide immediate feedback, and encourage interaction to increase acceptance (Lee *et al*., 2009). Another important consideration is the amount of time that instructors take to create and administer Elearning courses**.** A study in 2003 found that faculty and support staff spent almost twice as many hours providing online versions of courses compared to the traditional way of teaching (Doughty *et al*., 2003). Unless incentives are provided to encourage instructors to use Elearning technology, resistance to additional workload is likely to occur.

2.2.2. Lecturers do not need to be physically in their office to attend queries

Because of the omnipresent nature of the Elearning, lecturers do not need to be physically present in their office to respond to students' queries. They can execute their tuition responsibilities anywhere and anytime (Grani *et al*. 2003; Mr de Villiers, 2005). However, according to the University of South Australia, the lecturers have to be in their offices during the official working hours in the institution. Despite this omnipresent traits of Elearning that infer virtual execution of tuition, the preceding concept was emphasized as a disagreement that the institution will have to consider and change.

2.2.3. Reduction in cost

Elearning is paperless. Thus, the cost in terms of paper is reduced. There will be no need to print multiple pages of tutorial notes for approximately 10,000 students enrolled on undergraduate programmes. This will also enhance the institutional drive towards going green. Indeed, the costs in terms of postage services including the risk of postage delays are reduced. These delays disrupt institutional scheduling processes and procedures. With Elearning, challenges of late delivery or loss of assignments will be lessened. Furthermore, costs related to logistical arrangements of tutors and lecturers travelling to conduct discussion classes will be minimized (Ncube *et al*., 2014).

2.2.4. Help in expansion and standard

Study conducted at the UNISA showed that the new drive towards technology might assist the university in widening access and expanding its student base by deploying Elearning as a tool to attract prospective students. UNISA, being the sole monopoly in online distance learning in South Africa, re-organised and scaled-up it systems to maintain its competitive advantage, as many other universities in the country were threatening the monopoly by offering more online courses. Elearning was much-appreciated as a good initiative that would enable the university to improve its standard of education in terms of computer literacy and competency of both staff and students in accordance with international standards (Ncube *et al*., 2014).

2.3. Challenges of E-learning

Though E-Learning is associated with several benefits, dropout rate has been reported as 20% to 80%. At the Harvard University and the Massachusetts Institute of Technology 95 % of the students who had enrolled for online courses had dropped them before getting a completion certificate (Lauerman, 2014). Hence, reducing the dropout rate has been one of the major challenges of the Elearning system. The following paragraphs elaborate on the main challenges that can influence the implementation of E-Learning.

2.3.1. Technical Limitations

In the early years of distance learning, the persistent root of worriedness was the technical problems. Consistent unpredictability in technology may lead to usability troubles for tutors and learners (Cavanaugh *et al.*, 2000). Research had concluded that technical concerns have a major negative impact on the Elearning results due to an increase in frustration (North *et al*., 2000). This explain why attrition rates are usually low in online than traditional classroom teaching (Brown *et al*, 2003).

2.3.2. Loss of intervention by teachers and isolation

Compared to traditional learning, it has been noted that tutors barely ever engage in exchanging ideas and information with reference to online coaching. In fact, online instructors are more likely to ‘educate’ and ‘develop’ courses in isolation due to lack of face to face interaction (Ottosson, 2003). Not only that distance learning students lack the ability to interact face to face with faculty,

but indeed, they also miss out on person to person feedback from their peers, which as the study states, can cause students to doubt their own abilities.

2.3.3. Lack of Computer Literacy

Computer literacy is major barrier in Elearning. Many blended learners expressed feelings of intense anxiety about the technology (Wang *et al*., 2010). For the acquisition of ELearning systems, it is necessary to have good knowledge of the computer. When students are uncomfortable with the necessary technology and the learning platform, they may require assistance beyond what an instructor or help desk can provide (Levy, 2007).

2.3.4. Time Management

Students resist with the high level of independence and time management which are required to complete an online course (Brophy, 2010). However, students may even possess poor time management skills. For example, postponement may make the self-paced learning process less effective even though learners are able to work at their own speed in completing their assignments. This, in turn delay the time consciousness to learning and academic courtesy (Alobiedat *et al*., 2010).

2.3.5. Cheating

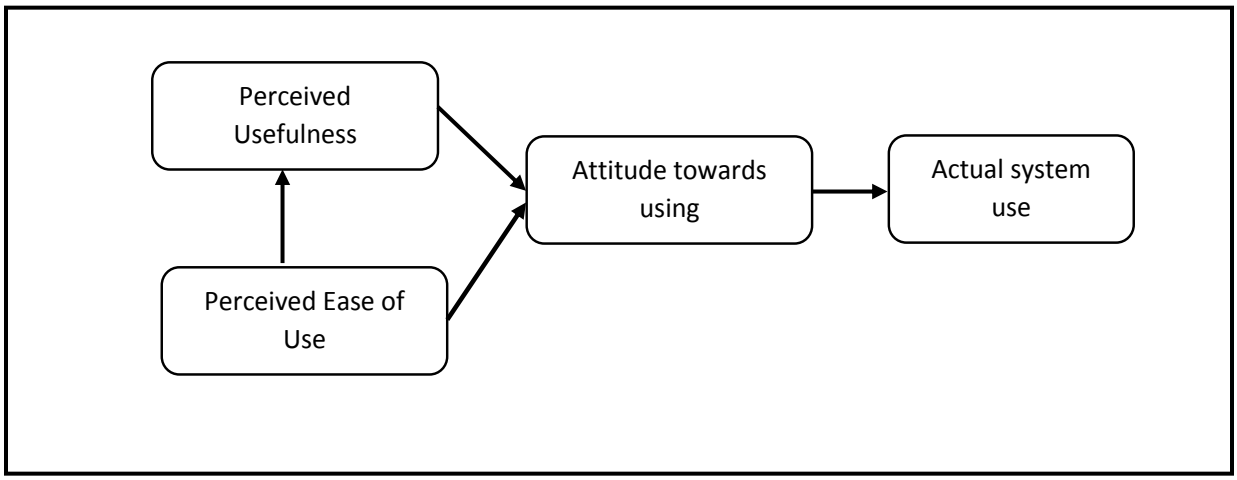
One of the major concerns of Elearning is cheating. To Kerka (2000) the lecturers will not know whether the students themselves have done their own assessment/assignments. Furthermore, Stoner (1996) and Weippl (2005) note that those students, who are willing to cheat, usually may reveal their login details to another person for the purpose of impersonation. Under the brick and motar approach, the need to correctly identify a student is well understood and the requirement is to produce a student ID card which includes a photograph (Gathuri *et al*., 2014). The traditional approach of using a photo ID card and matching it with a student's login details in online environments is generally adopted (Vollans, 2008). This approach provides an added security layer, whereby a human invigilator ensures the correctness of the student taking the test. Based on exiting literature, there exists an implicit consideration of threats in summative e-assessments (Wisher *et al*., 2005).

The next section presents the Technology Acceptance Model (TAM) which has been widely used to analyse users' intention to adopt a new system that is based on the use of the Information and Communication Technology (ICT). This model has also been used to develop the theoretical framework for this study.

2.4. Technology Acceptance Model (TAM)

Originally proposed by Davis in 1986, the TAM is one of the well-known model which has been used to predict the behavior of a user concerning information technology (Legris & Ingham, 2003). The TAM demonstrates how external variables influence attitude and intention to accept and use Information Technology (IT). Furthermore, it is considered as an anchor factor in the implementation of technology (Kumar, 2013). The adoption of technology has in fact gained importance through the TAM in forecasting the extent of user acceptance, its relationship to system usage and its associations with the system being used (Davis, Bagozzi & Warshaw, 1989). As a result, the TAM has introduced a suitable scale for predicting users' acceptance and the usage of technology, based on perceived usefulness and perceived ease of use.

Figure 2: Original TAM model

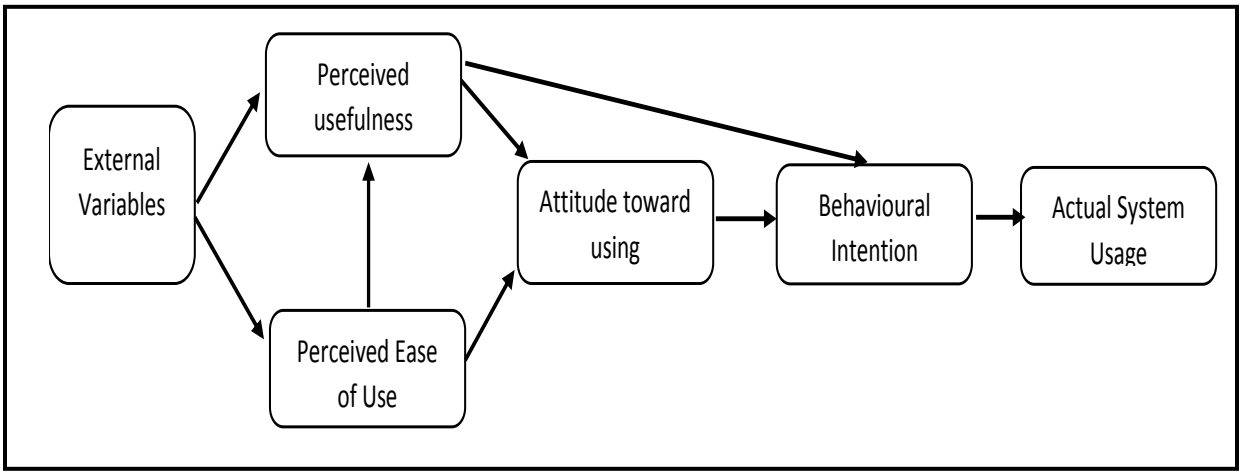


Source: Davis (1986)

The main difference between TRA theory and the TAM is that the former takes into consideration the subjective norms, along with attitudes, as factors which directly affect behavioral intention and then actual behavior; while in the TAM, the subjective norm is omitted and depends purely on attitudes which directly predict the actual system use, without identifying behavioral intention.

Secondly, the TAM depends on just two types of belief to predict attitude, while TRA theory depends on a number of salient beliefs to predict attitude. Later, the TAM was subject to modifications. In the modified version, Davis, Bagozzi and Warshaw (1989) added the behavioural intention dimension as they assumed that users would have an enhanced intention to use the technology if they had a high level of belief about the tool's usefulness, regardless of their attitudes. In addition, external variables were added that could affect users' beliefs. The revised version is known as TAM1 which explains usage based on users' internal beliefs, attitudes and behavioural intention as shown in Figure 3.

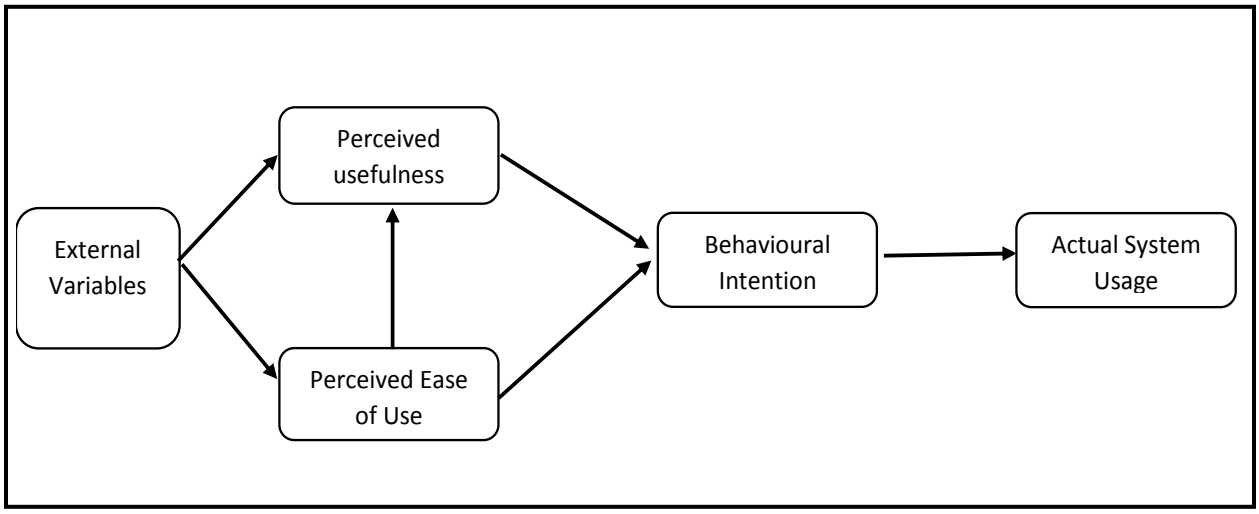
Figure 3: TAM 1 Model (First revised Version of TAM)



Source: (Davis, Bagozzi & Warshaw, 1989)

In 1996, the TAM was re-adjusted by Davis and Venkatesh. They found that perceived ease of use and perceived usefulness had a direct effect on behavioural intention and hence, they concluded that users might be using technology even if they do not have favourable attitudes, and they stated that attitude did not entirely mediate the influence of perceived usefulness on the behaviour intention. Thus, Davis and Venkatesh (1996) excluded attitudes from the TAM Model and postulated that attitudes do not play a significant role in users' behavioural intention to use, since attitudes are confined by performance and effort expectancies (Venkatesh *et al*., 2003).

Figure 4: Final version of TAM1



Source: (Davis &Venkatesh, 1996)

Consequently, in 2000, Venkatesh and Davis revised the TAM 1 by introducing specific variables such as job relevance, output quality, result demonstrability and perceived ease of use, as cognitive processes. Furthermore, they integrated subjective norms, voluntariness and images as processes of social influence (Venkatesh & Davis, 2000). It has been seen that all these factors were directly and exclusively connected to perceived usefulness, without any relationship between these factors and perceived ease of use. A diagrammatic representation of an the amended version (TAM 2) is presented at Annex 1 (Figure 4)

2.5 Factors impacting on the use of fully online degree program

2.5.1 Learner's Dimension

2.5.1.1 E-learning self-efficacy

Efficacy is "the power to produce an effect" and self-efficacy is the belief in oneself to produce a desired effect. Bandura (1995) defines self-efficacy as the beliefs in one's capabilities to organize and execute the courses of action required to manage prospective situations and to produce given attainments. Research on self-efficacy and Internet is related to learners' confidence and their capability of using the Internet to seek for information. Extant literature on the adoption of ELearning has categorized self-efficacy into three namely **computer self-efficacy**, **internet efficacy** and **information-seeking self-efficacy**. In Essene, studies on self-efficacy and computers are principally related to confidence that a user has in his capability in using computers and other types of technology.

Empirical studies also show a positive and significant relationship between academic self-efficacy and computer self-efficacy, and between prior experience and student satisfaction. However, computer self-efficacy and student satisfaction have no positive or significant relationship. Likewise, Simmering *et al*. (2009) found that computer self-efficacy is not related to motivation to learn in online courses; however, computer self-efficacy was positively related to prior experience with online learning. Furthermore, Gregg & Designer (2011) note that computer self-efficacy was a statistically significant predictor of student satisfaction and there was a positive relationship between student satisfaction and future intention to take online courses. Womble (2007) also observed a positive relationship between computer self-efficacy and student satisfaction in online learning environments. Consistently, findings from another study revealed that computer self-efficacy is one of the main determinants of student satisfaction with blended ELearning system environments (Wu *et al.*, 2010). Moreover, a study by Pellas (2014) among 305 university students enrolling online courses, found that computer self-efficacy has a positive relationship with students' cognitive and emotional engagement factors, and a negative relationship with behavioral factors.

On the other hand, Joo *et al*. (2000) found that there was no significant relationship between Internet self-efficacy and students' performance on the written test in web-based instruction. From a survey among 180 students taking online courses, Alqurashi (2016) found that Internet self-efficacy has a positive significant but very weak relationship with student satisfaction; however, Internet self-efficacy was not a significant predictor for student satisfaction. Moreover, a survey by Tang & Wei (2013) among 219 distance learners revealed that those who have higher self-efficacy for information seeking and ability to use information showed higher self-efficacy for online learning and exhibited greater knowledge in online resources. On the other hand, distance learners who have low self-efficacy for information seeking showed more interest in learning how to use the library resources but not the strategies to use online resources.

2.5.1.2 Computer Anxiety

According to Piccoli *et al*. (2001), computer anxiety is a significant factor that affects ELearning satisfaction. Anxiety arises from mental pressure and is comprised of trait anxiety and state anxiety (Cattell & Scheiir, 1961). Normally, trait anxiety is a constant and enduring internal personal

characteristic while state anxiety is due to external environment (Spielberger, 1976). Previous research has shown that computer anxiety is a kind of state anxiety (Heissen, Glass & Knight, 1987). The higher the computer anxiety, the lower is the level of learning satisfaction and hence, intention to use the system. The definition of computer anxiety in this research is the level of learners' anxiety when they apply computers in ELearning. According to Pei-Chen *et al*. (2006), computer anxiety was a significant negative variable in determining the satisfaction level in the adoption of ELearning. This implies that, as the level of computer anxiety increases, the learners were less satisfied with the use of ELearning courses.

2.5.2 Course Dimension

2.5.2.1 Course Flexibility

The level of satisfaction and participation concerning Elearning courses are positively influenced by the flexibility in time, location and methods (Leidner & Jarvenpaa, 1995; Berger, 1999 and Arbaugh, 2002). Similarly, by eliminating the physical barriers, more dynamic interactions are fostered based on the establishment of constructive learning and opportunities for cooperative learning (Salmon, 2000). With no restrictions on time and space in Elearning, students can communicate instantaneously, anytime and anywhere (Harasim, 1990; Taylor, 1996). It can also contribute virtually in reducing awkwardness related with traditional way of learning. With the availability of discussion group, learners are freer to express themselves and ask questions (Finley, 1992; Harasim, 1990 & Strauss, 1996). Most ELearning courses have been adopted by working people (Ellram & Easton, 1999; Arbaugh & Duray, 2002). ELearning course flexibility is defined as the perception that a learner has on the efficiency and effects of adopting e-learning in their working, learning and commuting hours (Tsai & Finger, 2008).

2.5.2.2 Course Quality

The quality of the ELearning programs plays a vital role in the adoption of ELearning in particular, the determination of the level of satisfaction (Piccoli *et al*., 2001). The characteristics of ELearning system consist of online interactive discussion and brainstorming, multimedia presentation for course materials and management of learning processes, assisting learners in establishing learning models effectively and motivating continuous online learning. Hence, course quality is considered

as an important predictor for the adoption of ELearning. This has been empirically found in a study by Tsai and Finger (2008) which established that the quality of the ELearning course positively influence ELearner's satisfaction.

2.5.3 Instructor's Dimension/ Characteristics

Instructors play a diversified role in ELearning. This is true as the instructor has changed from being the main source of students' learning in traditional learning styles, to being the director of students' learning resources in ELearning (Romiszowski, 2004). The needs for new skills are therefore required for the success of the adoption of fully online degree program. One of the major skills that instructors sometimes lack on an online course is the ability to provide a well-designed framework and delivery system, with appropriate assessment methods and the promotion of collaboration and communication. Zainuddin and Kamaluddin (2012) explains that the effectiveness of online courses may be determined by the extent to which students are provided with opportunities to communicate and collaborate with their peers and with the instructor via different tools. In addition, the tutor should provide students with different sources of learning that give them the chance to learn using different methods.

The instructor's attitude is another factor that plays an important role for the use of ELearning and integrating ICT in the learning process. According to Olson (2005), instructors' attitudes, teaching styles towards technology may also impact learning consequences. Similarly if instructors maintain a positive attitude towards using technology in the learning process, they will be more willing to engender useful perceptions for the acceptance and incorporation of technology into learning processes (Technology, 2012). In the same context, Sun *et al.* (2008) concluded that student's satisfaction can be affected by instructors' attitudes. They further reported that 'when instructors are committed to ELearning and exhibit active and positive attitudes, their enthusiasm will be perceived and further motivate students'. Indeed, there is a statistically significant positive effect of the instructor's characteristics on the perceived ease of use (Alkandari, 2010).

Several studies have examined the instructor's characteristics as external factors in the acceptance of ELearning amongst students. According to a survey by Selim (2007), the critical factors were grouped into four sets, namely instructor characteristics, student characteristics, information

technology and technical support. It was revealed that these variables had good validity coefficient values and a high impact on learners' acceptance of ELearning. In addition to these, it was also found that university's supports combined with instructor's characteristics are important for the effective and efficient learning and student acceptance. Likewise, Lee *et al*. (2009), using regression analysis to analyse the learner's ELearning acceptance in Korea found that instructor's characteristics are positively related to perceived usefulness. Moreover, perceived usefulness was revealed as the highest predictor of the intention to use ELearning. In another study, conducted in the Indonesian Open University, Lee and Hsiao (2014) concluded that the instructional design, technological factors, instructor's characteristics and self-efficacy were important factors facilitating learners' acceptance of ELearning while the instructor's characteristics were not a dominant factor in predicting the perceived ease of use.

2.5.4 Technology Dimension

2.5.4.1 Internet Quality

Various researches across different countries showed that technology and internet quality play an important role in determining the students' intention in adopting ELearning courses (Piccoli *et al*., 2001; Webster & Hackley, 1997). A software tool with user-friendly characteristics such as learning and memorizing few simple ideas and meaningful keywords requires little work from its users. Users will be willing to adopt such a tool with few barriers and hence, satisfaction and intention will be improved (Mcgill *et al*., 2001). Therefore, the higher the internet quality and its reliability, the higher will be the learning effects (Piccoli *et al*., 2001).

The ELearning system may also be characterized with learning and discussion using other equipment such as video conferencing (Isaacs *et al*., 1995). Therefore, both technology quality and internet quality are determining factors in ELearning (Piccolo *et al*., 2001). Moreover, empirical research undertaken by Webster and Hackley (1997) studying the learning effects on the technology-mediated distance learning of 247 students revealed that the quality and reliability of technology, as well as network transmission speed have an impact learning.

2.5.4.2 Technical Support

It refers to the degree to which university provides experienced staff or other facilities to support ELearning amongst users. Studies showed that technical support has a positive influence on perceived ease of use and perceived usefulness which are the main factors affecting the attitudes of students using WebCT. Furthermore, results also proved the meaning of perceived ease of use and perceived usefulness when managing the relationship between technical support, attitudes and WebCT usage (Tselios *et al.,* 2011).

Using the TAM, Arias *et al*. (2015) sought to identify major factors affecting students' adoption of ELearning systems in Jordan. A strong direct effect of self-efficacy on perceived ease of use, but not on perceived usefulness was found. Equally, there was a direct effect from technical support on perceived usefulness but not on perceived ease of use. However, there was no evidence of the effect of system interactivity on perceived usefulness or perceived ease of use.

Another study by Lee and Hsiao (2014) revealed that the strongest predictor for the adoption of ELearning was the university support followed by self-efficacy. Furthermore, in investigating post-graduate students' attitudes at the University of the Punjab with regard to the adoption of ELearning, Mehra and Omidian (2010) added technological and pedagogical support, pressure to use and ELearning stressors as independent variables to TAM Model. The results of the survey revealed that the variables that may be applied in predicting students' attitudes towards the adoption of ELearning are perceived usefulness, intention to use, ease of use, pressure to use and technical and pedagogical support.

ELearning is also dependent on basic infrastructure such as Internet, computers, software and a responsible administrative unit (Gunawardana, 2006). With the maturing of computing offerings such as office productivity software and email, campus network infrastructure as well as fast and reliable internet access is essential for many campus needs. For example, in Thailand, 60 % lecturers stated that one of the major problems with the system is that students cannot get access to it from outside. Secondly, the Internet bandwidth was not fast enough to handle the extra load generated by ELearning. Indeed, the foundation infrastructure (hardware, software and Internet) were considered inadequate by 59.3% of technicians (Azimi, 2013 and Saekow *et al*. 2011).

2.5.5 Environmental Dimension

When an individual integrates others' opinions into his/her belief and performs a similar behavior to others, it is known as subject norm (Venkatesh & Davis, 2000). In other words, other's opinions have been making significant contribution in shaping an individual's intention to use technologies (Venkatesh & Davis, 2000). In this way, subjective norm is related to behavioral intention. The subjective norms construct had the strongest relationship with Behavioral Intent of the three independent variables (Subjective Norm, Attitude toward the Act and Perceived Behavioral Control). Nevertheless, Armitage and Carter (2004) after reviewing 185 studies involving the Theory of Planned Behavior found the Subjective Norm construct to be the weakest predictor of intention. According to O'Malley and O'Malley (1998), students were not significantly influenced by Subjective Norms. However, in 2009, Troung found Subjective Norms as a significant predictor in predicting intention to use technology.

2.5.6 Perceived ease of use, Perceived Usefulness and Attitudes

Perceived ease of use, Perceived Usefulness and Attitudes are the three main components that have been developed by Davis (1989) under the TAM. Perceived Usefulness is defined as the extent to which a user believes that using technology will improve his performance. Perceived Ease of Use refers to how much effort is required to use the technology. These are the two main factors that affect the attitude of a user, which in turn determines his behavioral intention towards technology (Venkatesh, 2000).

In general, based on previous researchers, Perceived Ease of Use and Perceived Usefulness have been determined as the main factors influencing the acceptance and usage behavior of information technologies. It has been proved in studies that if an individual is at ease with an online system, its productivity also increases. Many researchers have used the TAM to measure students' acceptance of online learning tools (Chang, 2010). For instance, Kwasi (2007) found that the Perceived Ease of Use has a direct and positive impact and effect on the intention and attitude to use the system. His results were also congruent to other researchers such as Chang (2010), Saadé and Galloway (2002) and Technology (2013). In contrast, Chesney (2006) concluded that Perceived Ease of Use did not have any direct and significant influence on the intention to use the system.

A thorough review of the literature further revealed that the impact of Perceived Ease of Use, Perceived Usefulness and Attitudes on the intention to use online education vary from one study to another. Some claimed that Perceived Ease of Use had a significant influence on the intention to use the system (Su & Tsai, 2013). Other studies on the student's usage of online learning such as Saade and Galloway (2002) and Halawi (2008) revealed similar findings, that is, both Perceived Ease of Use and Perceived Usefulness are key determinants for the system usage. In other words, if students perceive an ELearning tool to be easy to use, they would also perceive the tool to be useful. In addition, Perceived Usefulness were found to be the most significant variable in predicting the intention to use the online learning system (Su & Tsai, 2013) while Saeed (2008) found that Perceived Usefulness has an influence on the intention to use but was not the most influential factor. Moreover, studies using TAM and models derived from TAM demonstrated that there is a relationship between Perceived Usefulness and Perceived Ease Of Use and behavioral intention in the acceptance and adoption of technology (Surendran, 1989 and Fred, 1989).

Lastly, Attitudes had been found as the major factor in the ELearning process in many studies (Ah, 2015). For instance, if lecturers believe that technology is insufficient to satisfy their own needs or that of their students, they will resist using it in the learning process (Yildrim, 2000). Hence, successful ELearning engagement requires users to possess a positive attitude towards it (Huang & Liaw, 2005). Thus, attitude has been hypothesized as having a direct relationship with intention to use (Malhotra & Gallette, 1999). In terms of attitude, perceived usefulness, perceived ease of use, and subjective norms turned out to be significant (Park *et al*., 2009). The willingness to participate as an online instructor will have an effect on the online interaction with the learners. In order to make educational success, a positive attitude is fundamentally required. For example, if teachers regard computers negatively or with suspicions, the educational utilization of computer will be limited (Woodrow, 1991). Similar findings have been found from studies conducted in South Africa and Iran (Eslaminejad *et al*., 2016 and Mafenya, 2013)

2.5.7 Other Factors

In addition to the above factors, there are also some socio-demographic factors that influence the adoption of fully online degree programmes in universities. These include experience, gender and region.

2.5.7.1 Experience

In general, those students who have experience in using online technologies find it easier to participate in ELearning effectively. A study among first year students' in the University of South-Africa revealed that respondents were responding to the questions on the basis of their personal life experiences rather than within the educational context of online learning. According to Patrick (2013), lack of experience to use online learning technologies has been found as an obstacle for learners to participate in ELearning effectively. This explains the reasons for which most of the participants indicated that they need training on the use of Information and Communication Technologies (ICTs).

2.5.7.2 Gender

Gender plays a strategic role in understanding the differences in opinions, concerning the usefulness, attitudes and perceptions of ELearning. There is strong evidence about the existence of gender inequalities in the field of ELearning. In most schools in the developing countries, females are less likely to use ICT in their learning (Papaioannou & Charalambous, 2011; Liaw & Huang, 2011). According to UNESCO (2008), fewer girls are attending secondary schools and therefore universities in the Sub-Saharan Africa. With the existence of gender gap in the field of ICT, fewer girls or women in developing countries have mobile phones, for example, or visit Internet cafes, possibly due to cultural expectation (Anie, 2011)**.** Recently, Senegal found that 11% of men and only 5% of women were internet users and there was even less documentation of the impact of ELearning on girls as compared to boys (ITU, 2011). In contrast to this, it was found that female students tended to accept the use of ICT more than their male counterparts (Rhema & Miliszewska, 2014; Zabadi & Al-alawi, 2016). Sharma (2013) found no gender differences in relation to the attitudes towards ELearning. Thus, the recent research indicates that the gap between men and women (gender divide) is narrowing (Gillwald *et al*., 2010; UNESCO, 2012).

2.5.7.3 Region

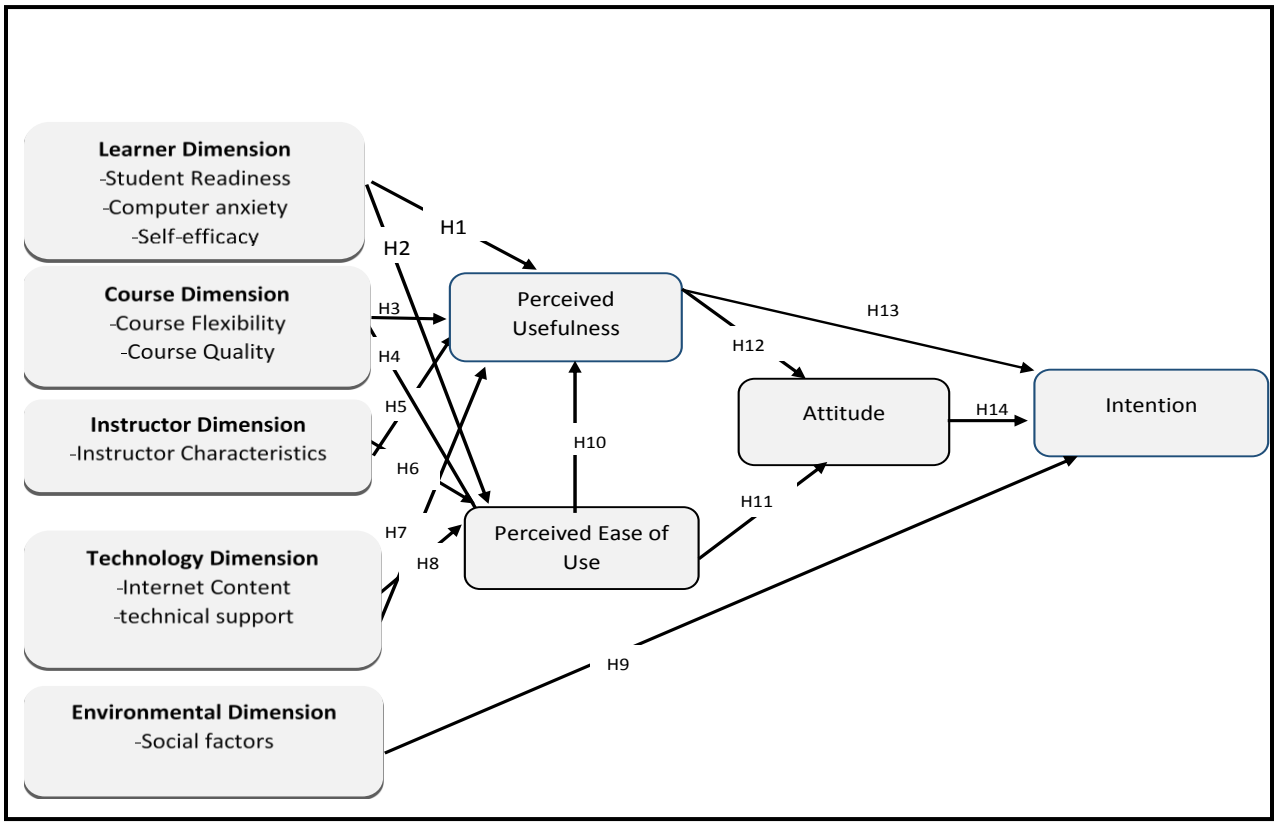
Another determining factor that influences the delivery of a fully online degree course is region. Region is broadly divided into rural and urban. Research has shown that urban students hold a more positive attitude towards ELearning as compared to rural areas (Rhema & Miliszewska, 2014).

2.6. Proposed Model for this study

In the current study, the TAM1 model has been implemented, where the external variables were modified and adopted in the local context as attitudes played a significant role in identifying students' acceptance of technology and in determining a person's behaviour (Albert & Aschenbrenner, 1975). Many studies have concluded that students' attitudes affect their behavioural intention, and a significant relationship between them was outlined. Thus, attitude was taken into consideration in the model. Socially, from the TRA perspective, students' behaviour intentions mainly rely on their attitudes towards ELearning (Albert & Aschenbrenner, 1975) and therefore intentions to use ELearning are predicted via attitudes. Furthermore, as per the aim of the current study to investigate the influence of specific factors on students' attitudes towards the adoption of fully online degree programmes in Mauritian universities and on students' intention to use ELearning, the researcher has found it relevant to use the version of TAM which includes attitudes. Moreover, the identity of the TAM has been preserved. In a similar vein, the researcher has found that the TAM was "much simpler and easier to use but a more powerful model of the determinants of user acceptance of computer technology than TRA theory" as described by Igbaria *et al*. (1997).

On the other hand, the TAM2 was not applied for the current study as this model introduces specific factors (Refer to Annex 1) that are not meaningful and relevant for this study. As mentioned previously, the aim of this study is to investigate the influence of specific factors in terms of learners' dimension, course, instructor, environmental and technology dimension on students' attitudes to fully online program. As the study endeavors to investigate the relationship between students' attitudes and students' intentions to use ELearning through the perceived ease of use and the usefulness, the TAM1 Model was found to be the most convenient model.

Figure 5: Proposed TAM 1 model for the current study



Source: Author

2.7. Limitations of the Technology Acceptance Model

The TAM is a well-recognized model in Information System that has contributed to a better understanding of user's acceptance of IT based solutions. It has also succeeded in achieving its determination more easily than has the TRA theory (Igbaria *et al.,* 1997). Venkatesh and Davis (2000) argue that several empirical studies have concluded that TAM1 constantly clarifies a considerable percentage of the variance (approximately 40% in usage intentions and behavior, compared to the Theory of Reasoned Action).

Nevertheless, the TAM has been criticized due to certain limitations. The main criticism directed at the TAM involves the method of investigation, which mainly consists of self-reported data typically gathered using a survey method that contains multiple items (Chuttur, 2009). This has been considered by Legris, Ingham and Collerette (2003) as a subjective measure, providing imprecise and relative indicators for system usage. Moreover, Straub and Burton-Jones (2007)

and Salovaara and Tamminen (2009) argue that the TAM ignores the social variables/issues and cultural features as well as other user behavior. In this regard, Benbasat and Barki (2007) concluded that the TAM has misled researchers by using serious salient behaviors' which could have affected users' decision on technology acceptance.

To cater for the above criticisms, substantial modifications to the original TAM were made by integrating other theoretical models into the TAM. These modifications aimed at adapting the TAM to the continuing modifications in information technology, in order to provide more interpretations of users' acceptance (Benbasat & Barki 2007), as well to increase the predicative capacity of the TAM. Despite these limitations and criticisms, the TAM Model is still a demanding and most tested model for explanations and making predictions about technology acceptance (Yousafzai *et al*., 2007). These facts has been confirmed by several TAM1 meta-analysis studies in the literature (Liu, 2004). For example, the meta-analysis confirmed that the findings from the original TAM1 model was significantly verified where perceived usefulness was considered a critical factor for IT adoption, even over perceived ease of use. Likewise, Schepers and Wetzels (2007) conducted quantitative meta-analysis for 63 studies using the TAM1 in different countries, using different sample size and populations as well as other tools. Their aim was to verify the underlying relationship between TAM components, particularly the importance of perceived usefulness and perceived ease of use in forming students' attitudes towards IT.

Another meta-analysis conducted by King and He (2006) on 88 studies revealed that TAM1 was powerful and robust in predicting user acceptance. Furthermore, using a meta-analysis Lee, Kozar and Larsen's (2003) investigated studies published from 1986 to 2003 that applied TAM1. Hence, they concluded that the TAM1 is the most influential model utilized in different studies to investigate the acceptance of IT and IS and to predict usage. Their findings also revealed that the TAM was frequently developed to render it applicable to a range of subjects, information systems and the environment. This explains the reasons for which researchers incorporated other theoretical models. It can thus be deduced that the TAM has broadly received experimental and theoretical evidence from researchers using the replicated TAM, with a set of technology tools and under varying circumstances (such as different cultures, fields, factors and users).

3.0 RESEARCH METHODOLOGY

3.1 Introduction

In the previous section, the study's conceptual framework was developed. This section is a detailed explanatory note on the methodology used for the current study. It begins with an overview of the research approach adopted in this study. It is then followed by a description of the research instruments in terms of their construction, content, and psychometric properties. Their validity and reliability are then investigated following which the procedural steps used for data collection are presented. Furthermore, this chapter details the population and sample for the study together with the statistical approach finally being used for data analysis.

3.2 Research Design

Research methods are classified into two namely qualitative and quantitative approach, each having its own strategy for collecting and analyzing data, as well as the conclusion and generalisation drawn. In order to achieve the objectives of the current study, a mixed method (QUALQUANT) has been utilised.

3.2.1 The Qualitative Approach

The qualitative approach emphasizes primarily on exploratory research. It is used mainly to understand the underlying reasons, opinions, and motivations. It also provides an insight into the problem or helps to develop ideas or hypotheses for potential quantitative research. Moreover, qualitative research is used to uncover trends in thought and opinions, and dive deeper into the problem. There are various data collection methods under qualitative approach. These include focus groups (group discussions), semi structured interviews and participation/observations. In the current study, a semi structured interview has been administered among undergraduates and postgraduate students and the Director of Education, Ministry of Education to obtain more insights on ELearning and Education in Mauritius.

3.2.2 The Quantitative Approach

Under the quantitative approach, the problem is being quantified by generating numerical data or data that can be transformed into useable statistics. For this study, attitudes, intention, behaviors, and other defined variables are quantified and the results can be generalized to a larger sample population. Quantitative data collection methods are much more structured than qualitative data collection methods. Quantitative data collection methods include various forms of surveys such as online surveys, telephone interviews, longitudinal studies or systematic observations.

3.2.3 Mixed Mode Approach

Punch (2009:288) defines mixed methods quite simply as '*empirical research that involves the collection and analysis of both qualitative and quantitative data*'. For the past two decades, research has adopted combinations of methods and approaches, rather than purely applying just one or other of qualitative and quantitative means for social and behavioural investigation (Teddlie & Tashakkori, 2009). Thus, a great deal of attention has been awarded to the mixed methods as they are becoming increasingly recognised as the third major research method (Johnson, Onwuegbuzie & Turner, 2007).

By mixing the two methods, the researcher can identify common points between the results of quantitative and qualitative research, thus leading to strong evidence in confirmation of conclusions reached using the mixed method. This will also increase opportunities to generalise results, as well as enabling the researcher to attain deep, accurate and more reliable results. Moreover, this combination will enable the researcher to formulate and discover ideas and variables to be investigated in future. Likewise, it is more practical as it tends to solve problems using multiple worldviews (using both numbers and words) and combines both inductive and deductive thinking. Hence, the researcher is not limited to any one, single method while striving to resolve a research problem (Creswell & Plano Clark, 2011).

3.3 The study population

The definition of the target population is very crucial for any study. It defines those units for which the findings of the survey are meant to generalize (Lavrakas, 2008). For this study, the target population represents all the undergraduate students from public universities who have

already adopted or had experience with a mixed mode or blended learning system. The targeted population includes undergraduate students from the Open University of Mauritius (OUM) and University of Mauritius (UOM) while the unit of analysis has been defined as an undergraduate student who has already adopted or has experience with a mixed mode or blended learning system.

3.4 Sample Determination

Cochran (1977) has provided many justifications for estimating the sample size of a survey as well as determining the sample design. The appropriate sampling method will depend on the objective of the study. This section describes the procedures for determining sample size using Cochran's (1977) (Refer to formula -Equation 1).

The confidence level is range of values for the estimated population parameter. Given that using a survey does not yield 100% confidence, it is important to determine the level of confidence in order to determine the margin of error. For instance, a 95% confidence interval means that there is a 95% probability that the population parameter lies within the interval. For this research, the total number of undergraduate students who had knowledge of mixed mode system is estimated at 15,000. Using a confidence interval of 95%, the margin of error has been estimated at 4.3%

$$n = \frac{C^2PQN}{C^2PQ+(N-1)d^2} \longrightarrow \textbf{Equation 1}$$

Where, t^2 *is the confidence interval= 95%*
C= critical value for the confidence interval=1.96
P =0.5
Q= (1-P) = 0.5
$d^2 = margin\ of\ error$
N= total number of undergraduate students who had a knowledge of mixed mode system= 15000

$$d = c\sqrt{\frac{N-n}{N-1}}\sqrt{\frac{PQ}{n}} \longrightarrow \textbf{Equation 2}$$

$$= 1.96\sqrt{\frac{15000-500}{15000-1}}\sqrt{\frac{0.5*0.5}{500}}$$

$$= 4.3\%$$

3.5 Sampling Methodology

The sample design is based on the determination of sample size, allocating them to the selected sample and ways of grouping units on a frame (Statistics Canada, 2009). The two categories of sampling are probability and non-probability sampling (Hall, 2008). Under probability sampling, each element has a known non-zero chance of being included in the sample. Also, the confidence interval for the statistic can be estimated since the proportion of the population that the sample is representing is known. Examples are simple random sampling, stratified sampling, systematic sampling, cluster sampling and multi-stage sampling. Non-probability sampling is one where there is no random selection and the proportion of the population the sample is representing is unknown. Examples of non-probability sampling include convenient sampling, quota sampling, snow ball sampling.

For this study, a convenient sampling method has been preferred. Convenience sampling, also known as availability sampling, is a specific type of non-probability method that relies on data collection from population members who are conveniently available to participate in study. It is also a mode of sampling where the first available primary data source will be used for the research without additional requirements. In other words, this sampling method involves getting participants wherever they can be found and typically wherever it is convenient. In convenience sampling no inclusion criteria are identified prior to the selection of subjects, all subjects are invited to participate.

3.6 The Study Instrument

3.6.1 Designing the study questionnaire

To answer the research questions of this study, a questionnaire based on the Technology Acceptance Model (TAM) has been designed. It consists of 2 sections- Section A and Section B. Section A sought information on the demographic variables such as gender, age, region, type of course, level of education, the number of years the student have been using computers and internet, the frequency of use, the number of years the learner has been using ELearning system and their proficiency level. Section B is based on the perception of ELearning on a 5 point Likert scale (47 items).

Section B, comprising of closed-ended questions, was primarily meant to test the hypotheses of the study. This section required the participants to select appropriate answers from a limited number of available answers determined by the researcher (Hartz, 2010). There are several reasons that support the use of closed-ended questions. Firstly, it is easier for participants to fill out as it does not require much time and effort. Secondly, data analysis is easier. Thirdly, closed-ended questions have been found ideal when the items of a variable are already fully understood as it ensures that all the respondents are faced with the same categories of response, thus, allowing quantitative statistical analysis to be standardised (Johnson & Christensen, 2008).

The questionnaire was designed based on the proposed Technology Acceptance Model which comprises of the following constructs:

1. Learner's Dimension
2. Course Dimension
3. Instructor Dimension
4. Technology Dimension
5. Environmental Dimension
6. Perceived Usefulness
7. Perceived ease of use
8. Attitude

A set of statements measured on a five point Likert Scale was formulated for each construct as presented in Table (1):

Table 1: Construct Development (Questionnaire Design)

Construct	Statements
Learner's Dimension	1. I am ready to use a fully online system in my program 2. I am able to use the e-learning system well without any assistance 3. E-learning provides a more useful educational platform than that of the traditional way of learning 4. I feel confident when I use e-learning tools for learning 5. I am able to accomplish my tasks easily when I use e-learning tools 6. I am able to use communication tools in e-learning system (e.g. discussion forums, chat rooms) 7. I am able to upload and download files to and from the e-learning system 8. Using an online platform makes me feel nervous 9. I hesitate to use a computer for fear of making mistakes I cannot correct 10. Computers are somewhat intimidating to me
Course Dimension	1. E-learning allows me to learn at my own pace and in my own time 2. E-learning allows me catch up with a class that I cannot attend 3. E-learning saves me a lot of time rather than attending a class 4. E-learning allows me to choose topics in order of my preference 5. Courses that are run online are of better quality 6. Online course content meets my requirements for effective learning 7. Learning materials in the e-learning system are aligned with the course objectives 8. Learning materials in the e-learning system are available in various formats (e.g. MS Word, PDF, e-library) 9. The online course content is well supported by multimedia (e.g. audio recordings, videos, pictures) 10. E-learning provides me with updated information for my courses
Instructor Dimension	1. Instructors have experience in using modern ICT tools 2. Instructors are easily contacted via communication tools (e.g. email, Twitter, etc.) 3. Instructors provide me with clear instructions on how to use the e-learning system 4. Instructors respond quickly to my queries 5. Instructors possess adequate technical skills to use an E-learning system in their teaching

Construct	Statements
Technology Dimension	1. The university employs specialists to address technical problems in the e-learning system 2. I am satisfied with the speed of the Internet 3. When there is a technical problem with the e-learning system, I can always make email enquiries to the dedicated email address 4. I find that the Internet connection fee is high 5. A hotline is available when there is a technical problem with the e-learning system
Environmental Dimension	1. E-Learning allows me to get information from online sources more easily 2. The E-learning platform allows me to interact more with classmates 3. My peer groups encourage me to use an e-learning system for my university courses
Perceived Usefulness	1. Web-based learning will enhance my effectiveness in the program 2. E-learning improves my performance 3. E-learning is useful in my course 4. E-Learning enhances my productivity
Perceived ease of use	1. Learning to operate the e-learning system will be easy for me 2. E-learning makes the learning process more effective for me 3. I find it easy to get the E-learning system to do what I want it to do 4. It is easy for me to become skillful at using the e-learning system
Attitude	1. Adopting ICT and e-learning increases my level of satisfaction 2. Working with computers requires a lot of technical ability 3. E-learning makes my learning more interesting 4. E-learning supports my self-learning and independent study 5. E-learning saves me time and effort when researching information

3.6.2 Hypothesis Formulation

Hypotheses	Effects
H1	Student readiness to PEOU
H2	Course dimension to PEOU
H3	Technology dimension to PEOU
H4	Environmental Dimension to PEOU
H5	Student readiness to PU
H6	Course dimension to PU
H7	Technology dimension to PU
H8	Environmental Dimension to PU
H9	PEOU and PU
H10	PEOU to attitude
H11	PU to attitude
H12	Attitude to intention

The closed-ended questions questionnaire for the current study was designed based on the study objectives, theoretical framework and previously published measures, and most importantly, the TAM1. Based on these resources, the study model which included ten constructs was developed following which the study hypotheses were determined and the finally the questionnaire was designed. The relationship between the constructs are presented at Figure 5 (page 26)

3.6.3 Pre-Testing

Newby (2010) and Kumar (2011) emphasized the need for the draft questionnaire to be piloted by experts in questionnaire design, which would eliminate most of the potential problems for respondents in either understanding or interpreting a question. The primary stage of conducting the survey on a small scale rather than with the whole sample to determine the efficiency of the survey is known as pilot testing. A pilot test among 25 students was conducted at the University of Mauritius. Undergraduate students were chosen randomly and a self-administered interview was conducted. For the pilot test a modified version of the TAM questionnaire was used. After completion, the participants were asked if the wording of the questionnaire was clear and if the time was enough to complete the questionnaire or make any inquiries about it. Based on the feedback from the students on the pilot study, the questionnaire items and timeframe were considered as sufficient. The demographic characteristics of the respondents who participated in

the pilot survey terms are presented at Table (19.0) – Annex 6. The views of the academics on the questionnaire were also sought.

3.6.4 Construct Validity

Construct validity concerns the extent to which measures of the dimensions of a construct really reflect the construct itself and more specifically, '*it refers to the conceptual coherence across all items that constitute a characteristic*' (Hartas, 2010:75). It is determined by finding out the effect of each construct on the entire variance observed in a phenomenon (Kumar, 2011:180). In the current study, construct validity has been confirmed through factor analysis after administering the study instrument in its final form among undergraduates. Factor analysis is known as a 'statistical method used to find a small set of unobserved variables (also called latent variables) which can account for the covariance among a larger set of observed variables (also called manifest variables) (Albright & Park, 2009). Thus, it is usually used to find out the correlation between the variables (Kline, 1994).

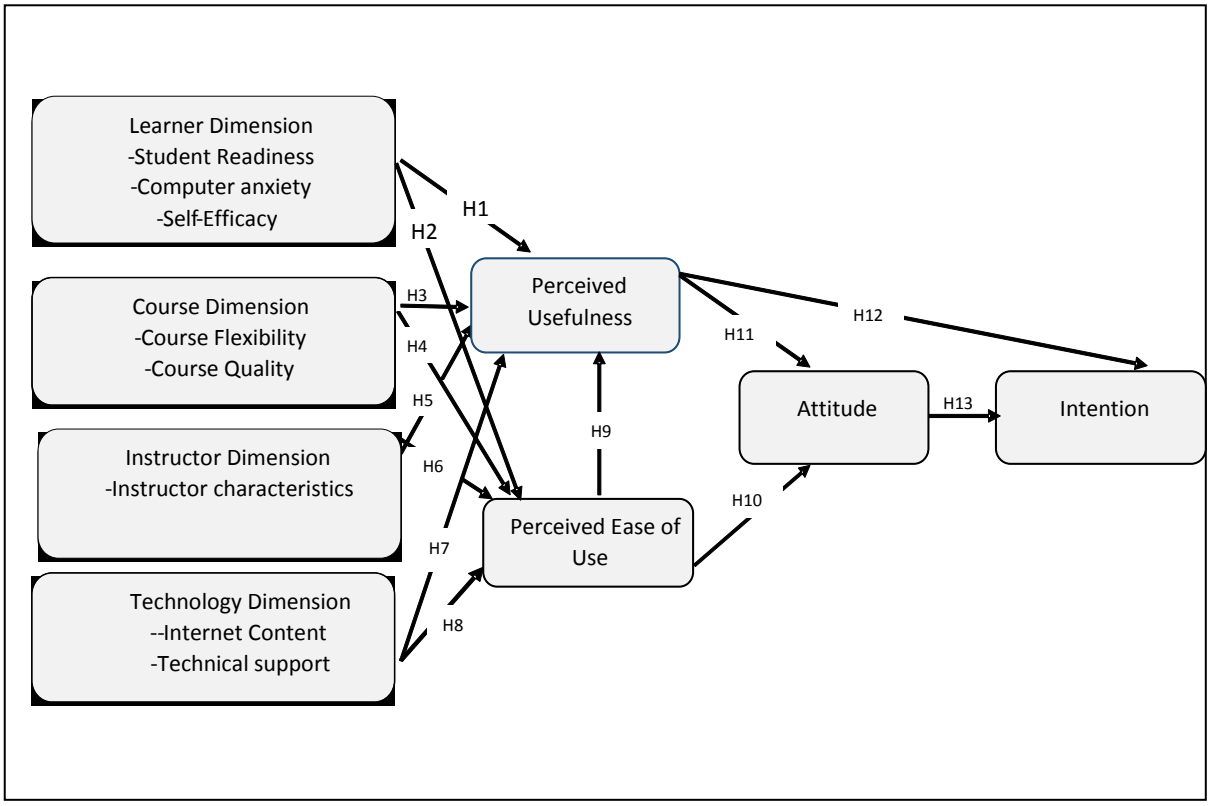
3.6.5 Internal Consistency

To ensure internal consistency of the research instrument, a Cronbach's Alpha for each Likert scale was calculated to show (i) whether the scale was reliable and (ii) the average inter correlations among the items. Cronbach's alpha is a tool used to measure how reliable the scales are and how closely the set of items are related (Kline, 1993). Scales with fewer numbers of items tend to have lower coefficient of alpha (Streiner, 2003). According to Kline (1993), the threshold is 0.7, that is, a Cronbach's alpha coefficient of ≥ 0.7 is acceptable. However, according to Loewenthal (2004), the lower the number of variables under a Likert scale, the lower will be the Cronbach alpha. Cronbach's alpha was measured for each construct. The results are presented in the Table (2)

Table 2.0: Cronbach Alpha

Factors	Cronbach Alpha	Items	Corrected Cronbach Alpha	Eliminate
PEOU	0.701	4		
PU	0.713	4		
Attitude	0.689	5	0.727	A2
Learner dimension	0.709	10		
Course dimension	0.778	10		
Instructor dimension	0.740	5		
Technological dimension	0.652	6	0.705	TS3
Environmental dimension	0.386	3		

Since, environmental dimension have a totally low Cronbach alpha (0.386), it has been removed from the analysis. However, under Attitude, a Cronbach alpha of 0.689 is obtained while under Technology dimension, a Cronbach of 0.652 is resulted. This is due to the correlation among the different variables. Henceforth, variable A2 and TS3 respectively has been eliminated from further analysis, resulting to a Cronbach alpha of greater than 0.7. The revised model is presented in the following diagram:



3.6.6 Editing, Coding, Data Entry and analysis of completed questionnaire

Completed questionnaires may contain blanks or irrelevant answers. Before the data are processed and analyzed, they should be remedied. Prior to data entry, the answers have to be coded using a symbol or value. The data is then captured for eventual processing and analysis using computer software such as R, SPSS and Matlab amongst others. For this study, SPSS 21 has been used to analyze the variables. Finally the data is analyzed using descriptive statistics and well as statistical models such as Linear Regression, Factor analysis and Binary logistics that will be used to derive conclusion on the study.

The next section presents the findings of the research.

4. Analysis of Data

4.1 Introduction

This section aims at presenting and analysing the data collected. It starts with the presentation of the description of the sample profile.

4.2 Descriptive Analysis

This section focuses on the summarization of the respondents' details took part in the survey. The population comprised of undergraduates who have an experience in the mixed learning mode. A total of 500 questionnaires were administered and 494 questionnaires (98.8%) were considered complete and appropriate for analysis.

4.2.1 Respondent's Demographic Profile

Table (3.0) shows that the majority of the respondents are female (66.4%) while 33.6% are male students. This is a true reflection of the gender distribution in universities in Mauritius where female outnumber male students. This trend can be attributed to the higher rate of success among female candidates at the Higher School Certificate (HSC) level compared to the male candidates. It was also observed that the majority of the students (50%) were in the age bracket 19-21 years. 27.1% (n=134) of the respondents were in the age bracket 22-24 years while 22.3% (n=110) were aged above 25 years. Most of the students in the age brackets (above 25) were enrolled on programmes at the Open University of Mauritius.

The percentage of students coming from the urban region (50.8%) was slightly higher than the percentage of students coming from the rural region. A majority (70.4%) of the students were enrolled on full time programmes while 28.7 % were registered on a part time degree course. Among the respondents, 49.4 % were in their third year of study, 15 % in their second year of study and 34.4% in their first of study. The high proportion of respondents in the third year of the study is considered important in displaying a true picture of students' intention to use ELearning as they are more familiar with modules running on a mixed mode.

With regards to the respondents' experience with the Internet, 65.8% were classified as good, 19% were rated excellent and 11.1% was valued as satisfactory. A slight percentage (2.6%) rated their experience with the Internet as poor. Hence, the responses are considered as highly relevant

in the context of this study as previous studies revealed that experience with the Internet and IT related facilities largely influence learners' intention to use ELearning. For example, exposure to and familiarity with such tools reduce the level of anxiety and change users' perception towards the use of IT based facilities. Furthermore, results show that 54.9% of the respondents had 1 year's previous experience in ELearning, 14.8 % has 2 years' previous experience in ELearning and 19 % has more than 3 years' previous experience in ELearning. This may be explained by the fact most of the programmes consist of one module or two modules offered on a distance learning/mixed mode over an academic year. The traditional face to face lecturing is still the widely used method in the universities. Given that the ELearning involves the use of computers, it was important to collect information of the respondent's computer skills. As shown in Table 3 more than half (53%) of the respondents rated themselves as intermediate, 27.9 % as novice and 9% as expert.

Table 3.0: Descriptive Statistics-Respondents' Profile

Variables	Attributes	Number of respondents	% of respondents
Gender	Male	165	33.6
	Female	326	66.4
	Missing	3	
Age group	19-21 years	247	50.0
	22-24 years	134	27.1
	25 and more	110	22.3
	Missing	3	0.6
Residential Area	Urban	251	50.8
	Rural	234	47.4
	Missing	9	1.8
Type of course enrolled	Full-time	348	70.4
	Part-time	142	28.7
	Missing	4	0.9
Year at University	Year 1	170	34.4
	Year 2	74	15.0
	Year 3 or higher	244	49.4
	Missing	6	1.2

Variables	Attributes	Number of respondents	% of respondents
Internet Experience	Very poor	7	1.4
	Average	55	11.1
	Good	325	65.8
	Excellent	94	19.0
	Missing	7	1.4
Prior Experience in e-learning	1 year	271	54.9
	2 years	73	14.8
	3 years	58	11.7
	4+ years	36	7.3
	Missing	56	11.3
Initial Proficiency level	Novice	138	27.9
	Intermediate	266	53.8
	Expert	45	9.1
	Missing	45	9.1

4.2.2 Intention to enroll on a fully online degree

This part of the analysis consists of a descriptive cross-sectional analysis of students' intention to enroll for a fully online degree across demographic variables. Since intention has been measured on a 10-point semantic differential scale [1 = highly unlikely to 10= highly likely], means have been calculated for each level of every demographic variable under Section A of the survey questionnaire for comparative purposes. A more elaborate and scientific way of distinguishing any significant differences between intentions of students is given in the inferential part of this document under "Cross-sectional analysis" at Table (21.0) in Annex (8).

The following figures present the Cross Sectional Analysis between the intention to enroll for a fully online degree programme and demographic variables.

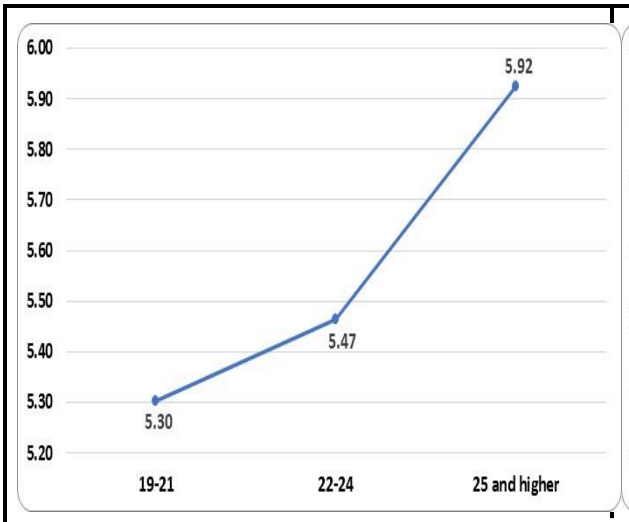


Figure A: Mean Intention by Age Group (years)

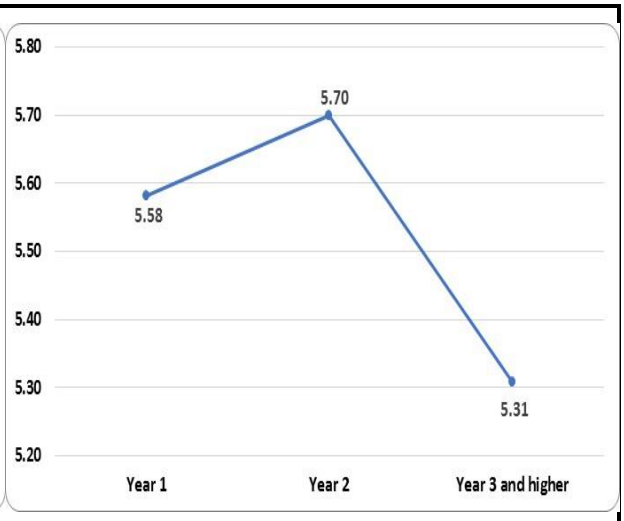


Figure B: Mean Intention by Year of Study

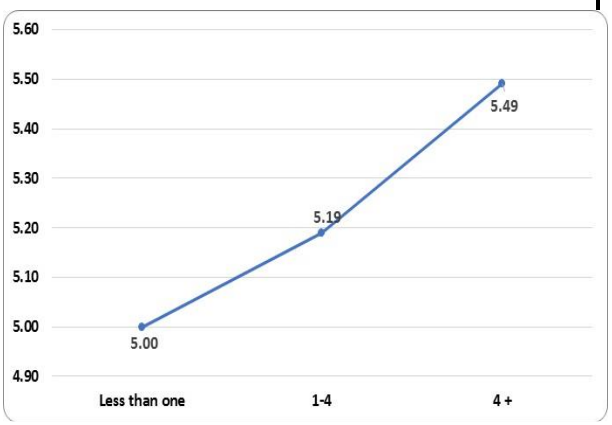


Figure C: Mean Intention by Number of Years using the Internet

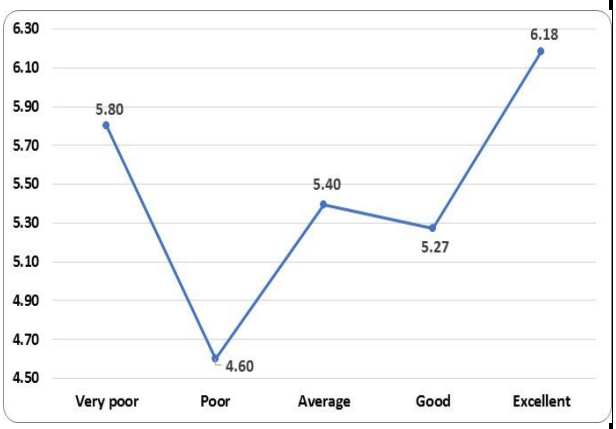


Figure D: Mean Intention by Internet Experience

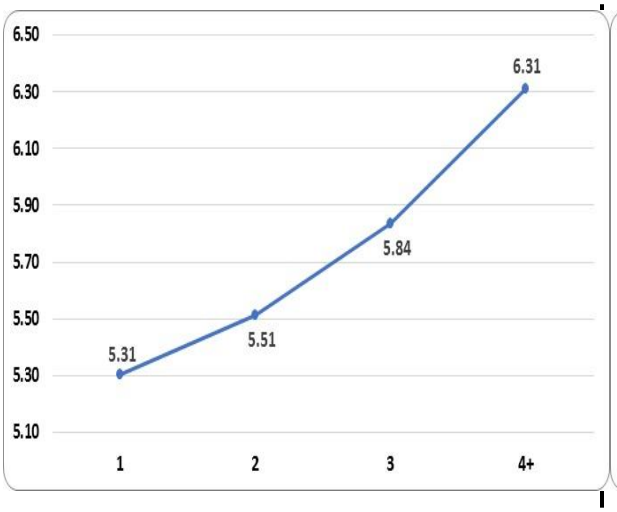


Figure E: Mean Intention by Prior Experience (years) in E-learning Courses Using the Internet

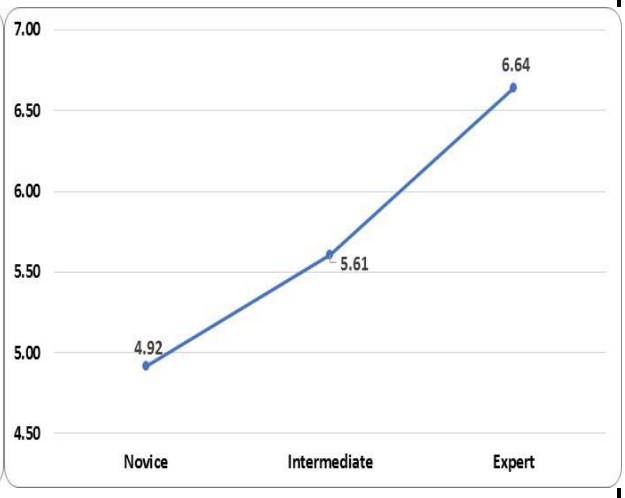


Figure F: Mean Intention by Initial Proficiency in E-learning

While it was found that gender plays a key role in influencing opinions concerning the usefulness, attitudes and perceptions of ELearning, this study notes that there was no major difference between male's (*mean =5.94*) and female's *mean =5.2)* in their intention to enroll on a fully online degree course. This may be due to that fact that the Internet facilities are readily available to both males and females at an earlier age compared to other developing countries where females are less likely to use ICT in their learning (Papaioannou & Charalambous, 2011). Findings of the study are in line with Sharma (2013) who found no gender differences in relation to the attitudes towards ELearning while in a similar vein (Gillwald *et al*., 2010) and UNESCO (2012) clearly noticed that the gap between men and women (gender divide) is narrowing.

No major difference has been found in the mean intention for enrolling on an online programme among students from the rural area (*mean=5.58*) and urban area (*mean=5.31*). With regards to the type of programme, it was found that the mean intention to enroll for an online degree programme was the higher among the part time students (*mean= 5.99*) compared to full time students (*mean=5.28*). This may be due to the fact that part timers realise the importance of the limited time they have to balance between their professional and personal obligations. Online degree is an alternative means to study for a degree while having a decent work-life balance.

It was also found that students in the higher age brackets (25 years plus) are more likely to enroll on online programmes (*mean= 5.92*) compared to the lower end (19-21 years) with a mean of slightly above 5. The age group 25 years plus comprises mainly of working people who are registered on distance learning programmes. These students generally opt for distance learning courses because of their professional, personal and family commitments. This flexible mode of learning eliminates the three hours face to face lectures and the need to travel to the University. Findings further revealed that second year's students are more likely to enroll on online programmes (*mean= 5.70*) compared to Year 1 students (*mean=5.58*) and Year 3 students (*mean=5.31*).

Moreover, students having the highest number of years of exposure to the Internet are more likely to opt for online programme (more than 4 years*, mean=5.49*) compared to those with one year of exposure (*mean= 5.00*). Similarly, the intention to enroll on online programmes was the

strongest among students with an excellent Internet experience (*mean= 6.18*) followed by students with a very poor internet experience (*mean= 5.80*) while the mean for those with an average internet experience was 5.40. These findings are similar to the findings of Alqurashi's (2016) and Womble's (2007) studies which found a significant positive relationship between Internet self-efficacy and student satisfaction in online learning environments

With regards to the influence of the learner's initial proficiency in ELearning on their intention to enroll on fully online degree programmes, it was found the mean intention was the highest among the expert (*mean= 6.64*), followed by intermediate (*mean=5.61*) and novice (*mean= 4.92*). This can be explained by the fact that ELearning requires a minimum set of skills which is acquired through experience. Furthermore, according to Patrick (2013), lack of experience to use online learning technologies has been found as an obstacle for learners to participate in E-learning effectively

Furthermore, it has been observed the intention to enroll on online programme was the highest among students with a high experience (expressed in years) in ELearning and the use of the Internet. For example, the mean intention for those having more than 4 years' experience in ELearning was 6.31 while the mean intention for students having 1 year of experience was 5.31.

4.2.2.1 Testing for association between intention of enrolling for a fully online degree and demographic variables

The testing was conducted in an attempt to confirm if students' intention of enrolling for a fully online degree programme (henceforth known as *Intention*) and the demographic variables (gender, age group, residential area, type of course, level of study, length of time using the Internet, Internet experience, prior experience in ELearning/mixed mode courses and initial proficiency level in e-learning) were statistically significant.

The Shapiro-Wilk test revealed that the composite score for the test variable (*Intention*) did not follow the normal distribution (W (460) = .957, $p < 0.01$), thus favouring non-parametric testing. Hence, the Mann-Whitney U and Kruskal-Wallis H tests were used to determine the significance of the association between *Intention* and demographic variables with two and more than two options respectively. The results are given in the following table.

Table 4.0**:** *Testing for association between intention of enrolling for a fully online degree and demographic variables*

Variable	Operational measures	Statistic	*p*-value
Gender	Nominal (male, female)	-3.793	**.000****
Age group (years)	Nominal (undergrad, post grad)	4.869	.088
Residential area	Nominal (urban, rural)	-1.085	.278
Type of course	Nominal (full-time, part-time)	2.761	.006**
Level of study	Ordinal (years 1, 2, 3+)	2.173	.337
Length of time using the Internet (years)	Ordinal (<1, 1-4, 5+)	0.856	.652
Internet experience	Ordinal ("Very poor" to "Excellent")	10.755	**.029***
Prior experience in e-learning/mixed mode courses (years)	Ordinal (1, 2, 3, 4+)	8.551	**.036***
Initial proficiency level in e-learning	Ordinal (novice, intermediate, expert)	20.251	**.000****

* $p < 0.05$ ** $p < 0.01$

Analysis showed that gender (t = -3.793, $p < 0.001$), type of course (t = 2.761, p = 0.006). Internet experience (χ^2 (4) = 10.755, p =.029), prior experience in e-learning/mixed mode courses (χ^2 (3) = 8.551, p = .036) and initial proficiency level in e-learning (χ^2 (2) = 20.251, $p < 0.001$) significantly impacted on students' *Intention* of enrolling for fully online degrees.

Bearing in mind that higher means indicating greater intention, descriptive statistics (means and standard deviations) were used to explain the results for "gender" and "type of course" in the absence of non-parametric *post hoc* tests. It was found that males (M = 5.94, SD = 2.088) intended to enroll for fully online degrees more than their female counterparts (M = 5.24, SD = 2.083) did. For "type of course", there was a greater intent from part-time students (M = 5.99, SD = 2.181) to enroll for a fully online degree than from full-time students (M = 5.28, SD = 2.058).

With regards to "Internet experience", "prior experience in ELearning/mixed mode courses" and "initial proficiency level in e-learning", non-parametric *post hoc* tests (via pairwise comparisons) were used, given that these four variables had more than two responses. Test results showed that

there was a significant difference between the intentions of students with "good" and those with "excellent" Internet experience (t (4) = -3.175, p = .015), in that the latter had a greater intention of enrolling for a fully online degree (indicated by the negative t-value in the SPSS *post hoc* test table).

As far as "prior experience in ELearning/mixed mode courses" is concerned, the only significant difference in intention was that between students with one year's experience and those with 4+ years of experience (t (3) = -2.685, p = .044), with obviously those with greater experience having a greater intention to enroll.

Lastly, *post hoc* tests also showed that there were significant differences in intentions among students belonging to all three categories (novice, intermediate and expert) of "initial proficiency level in e-learning": novice and intermediate (t (2) = -2.936, p = .010), novice and expert (t (2) = -4.301, p < .001), and intermediate and expert (t (2) = -2.674, p = .022).

4.3 Multiple Regression Analysis

In order to reveal support for the different hypothesis, multiple regression analysis was carried out to determine the significance of:

i. The impact of each of the four dimensions (*Instructor*, *Learner*, *Course* and *Technology*) on the *Perceived Usefulness* of the delivery of online degree programmes (**Multiple Regression Analysis 1)**,

ii. The impact of each of the four dimensions (*Instructor*, *Learner*, *Course* and *Technology*) on the *Perceived of Ease of Use* of the delivery of online degree programmes (**Multiple Regression Analysis 2)**

iii. *Perceived Ease of Use* and *Perceived Usefulness* on *Attitude* (**Multiple Regression Analysis 3)**

4.3.1 Multiple Regression Analysis 1

Dependent Variable: *Perceived Usefulness*

Independent Variables: *Learner, Course, Instructor, Technology*

Prior to proceeding with multiple regression analysis, the main assumptions to confirm the validity of the results were checked as presented at Annex (9). Using the enter method it was found the predictors explained a relatively significant amount of the variance in *Perceived Usefulness* (F (4, 399) = 120.288, $p < .001$).

Table 5.0: Analysis of variance (N = 404)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	1435.111	4	358.778	120.288	.000
Residual	1190.078	399	2.983		
Total	2625.188	403			

Dependent Variable: Perceived Usefulness
Predictors: (Constant), Learner, Course, Instructor, Technology

The predictors were then entered in the model one at a time using hierarchical regression in order to determine the extent to which each explained the variability in *Perceived Usefulness*. Table 6 shows that they explained 54.7% of the shared variance with the dependent variable (R^2= .547, R^2 $_{Adjusted}$= .542). The most influential dimension was *Instructor* (28.3%, $p < 0.001$) while *Learner*

and *Course* respectively explained 17.2% ($p < 0.001$) and 8.8% ($p < 0.001$) of the variability in the dependent variable. *Technology* did not significantly account for the variability in *Perceived Usefulness* (0.3%, $p = 0.098$).

Table 6.0: Model summary (N = 404)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	Sig. F Change
1	.532[a]	.283	.281	2.16368	.283	158.758	**.000**
2	.675[b]	.455	.453	1.88805	.172	126.941	**.000**
3	.737[c]	.544	.540	1.73081	.088	77.170	**.000**
4	.739[d]	**.547**	.542	1.72704	.003	2.749	.098

a. Predictors: (Constant), Instructor
b. Predictors: (Constant), Instructor, Learner
c. Predictors: (Constant), Instructor, Learner, Course
d. Predictors: (Constant), Instructor, Learner, Course, Technology
Dependent Variable: Perceived Usefulness

Moreover, while bearing in mind that no attempt was made to obtain a structural model for predictive purposes, the table of coefficients also showed that *Instructor* ($\beta = .119$, $t\,(399) = 2.532$, $p = .012$), *Learner* ($\beta = .243$, $t\,(399) = 5.347$, $p < .001$) and *Course* ($\beta = .442$, $t\,(399) = 8.539$, $p < .001$) were significant predictors of *Perceived Usefulness* (see Table 7.0 below). *Technology* was yet again found to be non-significant ($\beta = .068$, $t\,(399) = 1.658$, $p = .098$) at the 5% level.

Table 7.0: *Significance of predictors (N = 404)*

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	.286	.678		.422	.673		
Instructor	.098	.039	.119	2.532	**.012**	.512	1.952
Learner	.120	.022	.243	5.347	**.000**	.552	1.812
Course	.197	.023	.442	8.539	**.000**	.425	2.354
Technology	.062	.037	.068	1.658	.098	.679	1.472
Dependent Variable: Perceived Usefulness							

4.3.2 Multiple Regression Analysis 2

Dependent Variable: *Perceived Ease of Use*

Independent Variables: *Learner, Course, Instructor, Technology*

To validate the second part of the TAM, multiple regression analysis was reconducted with the same predictors, but this time with dependent variable as *Perceived Ease of Use*. The main assumptions were verified at Annex 10.

Table 8.0**:** *Analysis of variance (N = 412)*

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	1461.267	4	365.317	121.732	.000
Residual	1221.400	407	3.001		
Total	2682.667	411			

Dependent Variable: Perceived Ease of Use
Predictors: (Constant), Learner, Course, Instructor, Technology, Learners

Table 9.0: *Model summary (N = 412)*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	Sig. F Change
1	.498[a]	.248	.246	2.21854	.248	135.047	**.000**
2	.701[b]	.491	.489	1.82630	.244	196.026	**.000**
3	.738[c]	.545	.541	1.73021	.053	47.687	**.000**
4	.738[d]	**.545**	.540	1.73233	.000	.001	.982

a. Predictors: (Constant), Instructor
b. Predictors: (Constant), Instructor, Learner
c. Predictors: (Constant), Instructor, Learner, Course
d. Predictors: (Constant), Instructor, Learner, Course, Technology
Dependent Variable: Perceived Ease of Use

On entering the predictors one at a time in the hierarchical regression model, it was found that they explained 54.5% of the shared variance with *Perceived Ease of Use* (R^2 = .545, R^2_{Adjusted} = .540). *Instructor* (24.8%, $p < 0.001$) and *Learner* (24.4%, $p < 0.001$) explained the most variability in the dependent variable, while *Course* accounted for only 5.3% ($p < 0.001$) of the shared variance. *Technology*, yet again, did not significantly explain the variability in *Perceived Ease of Use* (0.0% to 1 decimal place, $p = 0.982$).

In line with the findings of the previous regression analysis, the table of coefficients (Table 10.0 below) showed that *Instructor* (β = .125, t (407) = 2.714, p = .007), *Learner* (β = .376, t (407) = 8.393, p < .001) and *Course* (β = .348, t (407) = 6.836, p < .001) were significant predictors of *Perceived Ease of Use*. *Technology* was, once again, clearly not significant (β = .001, t (407) = 0.023, p = .982) at the 5% level.

Table 10.0: *Significance of predictors (N = 412)*

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	.061	.678		.091	.928		
Instructor	.104	.038	.125	2.714	**.007**	.524	1.908
Learner	.187	.022	.376	8.393	**.000**	.558	1.793
Course	.157	.023	.348	6.836	**.000**	.433	2.311
Technology	.001	.037	.001	.023	.982	.688	1.453
a. Dependent Variable: Perceived Ease of Use							

4.3.3 Multiple Regression Analysis 3

The researcher also considered it important to verify whether *Perceived Ease of Use* and *Perceived Usefulness* had a direct significant impact on *Attitude* by regression the latter on both *Perceived Ease of Use* and *Perceived Usefulness*. It is to be noted that the aim of this exercise was to check whether *Perceived Usefulness* has a mediating effect between *Perceived Ease of Use* and *Attitude*. The variances of the two predictors were non-zero: (*Perceived Ease of Use*, variance = 6.506; *Perceived Usefulness*, variance = 6.763). The bivariate correlations between the two predictors are given in Table 11.0. Hierarchical regression revealed that the two predictors explained a significant amount of the variance in *Attitude* (F (2, 444) = 301.058, p < .001).

Table 11.0: Bivariate correlations for TAM

	Zero-Order *r*		
Variable	*Perceived Ease of Use*	*Perceived Usefulness*	*Attitude towards enrolling for a fully online degree*
Perceived Usefulness			.567**
Perceived Ease of Use		.683**	.431**
Mean	13.583	13.712	14.203
SD	2.553	2.596	3.451

** p < 0.01

Table 12.0: *Analysis of variance (N = 447)*

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	1897.532	2	948.766	301.058	.000
Residual	1399.237	444	3.151		
Total	3296.770	446			

Dependent Variable: Attitude
Predictors: (Constant), Perceived Usefulness, Perceived Ease of Use

Table 13.0: *Model summary (N = 447)*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	Sig. F Change
1	.620[a]	.384	.383	2.13618	.384	277.457	.000
2	.759[b]	.576	.574	1.77523	.192	200.359	.000

a. Predictors: (Constant), Perceived Ease of Use
b. Predictors: (Constant), Perceived Ease of Use, Perceived Usefulness (Dependent Variable: Attitude)

Using a hierarchical regression model (see Table 13.0 above), it was found that the two predictors explained 57.6% of the shared variance with *Attitude* ($R^2 = .576$, $R^2_{\text{Adjusted}} = .574$). *Perceived Ease of Use* (38.4%, $p < 0.001$) explained the most variability in the dependent variable, while *Perceived Usefulness* accounted for only 19.2% ($p < 0.001$) of the shared variance.

Table 14.0: *Significance of predictors (N = 447)*

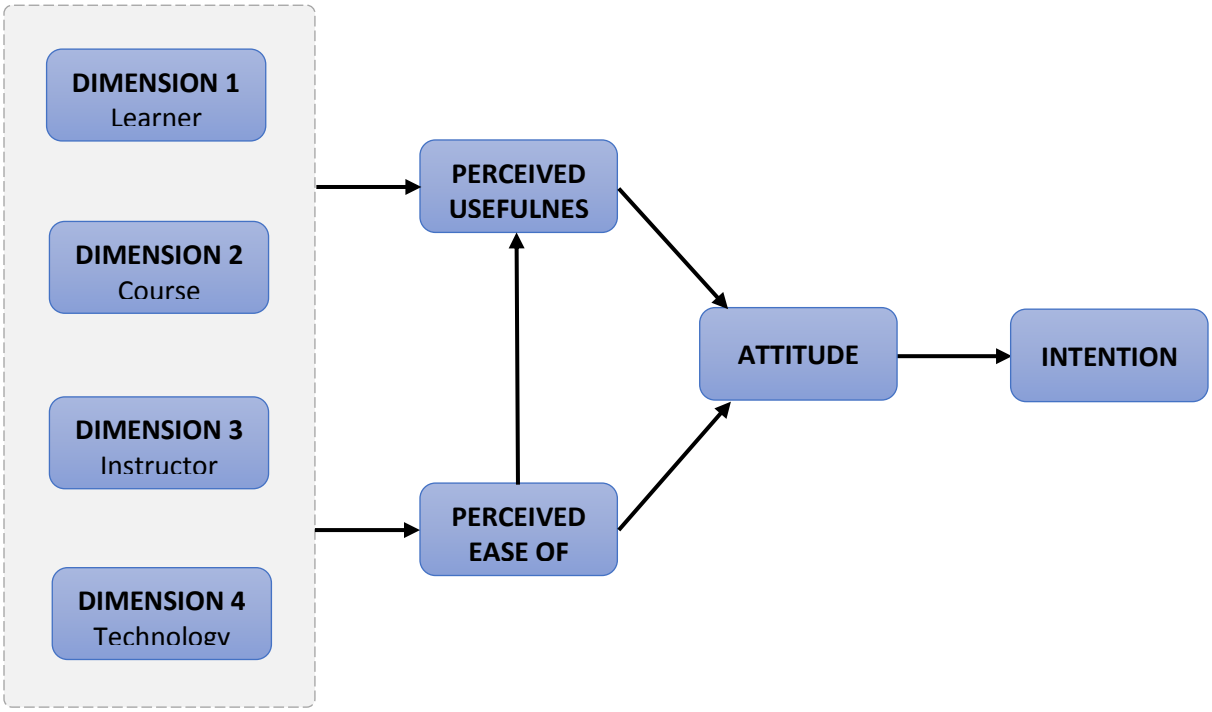
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	2.462	.493		4.997	.000		
Perceived Ease of Use	.218	.046	.204	4.786	**.000**	.526	1.902
Perceived Usefulness	.634	.045	.604	14.155	**.000**	.526	1.902
a. Dependent Variable: Attitude							

The table of coefficients (Table 14.0) shows that *Perceived Ease of Use* ($\beta = .204$, $t\,(443) = 4.786$, $p < .001$) and *Perceived Usefulness* ($\beta = .604$, $t\,(443) = 14.155$, $p < .001$) were both significant predictors of *Attitude*. Thus, *Perceived Usefulness* has no mediating effect between *Perceived Ease of Use* and *Attitude*. Lastly, the correlation between *Attitude* and *Intention* was determined via Pearson's coefficient ($r = 0.263$, $n = 469$, $p < 0.01$), thus validating the last part of TAM.

5.0 Correlation analysis

Analysis also included the validation of the proposed Technology Acceptance Model in the context of this research. Firstly, Pearson product-moment correlation was used to assess the relationships between *Perceived Ease of Use*, *Perceived Usefulness* and *Attitude*. It is well known that correlation does not imply causality, but given that TAM is an already validated and well-established model showing all unidirectional relationships, it suffices to measure correlations in the place of causal relationships. Using the composite scores for each of the three constructs, based on the mean of the items representing them, the following bivariate correlation coefficients were computed by SPSS.

Table 15 shows that there were significant positive correlations between *Attitude towards enrolling for a fully online degree* and both *Perceived Ease of Use* ($r = 0.431$, $n = 479$, $p < 0.01$) and *Perceived Usefulness* ($r = 0.567$, $n = 468$, $p < 0.01$). *Perceived Ease of Use* is also strongly and positively correlated to *Perceived Usefulness* ($r = 0.683$, $n = 468$, $p < 0.01$). Thus, as would be expected, that part of TAM was validated, given the technological nature of online degree. To sum up, there was enough evidence to reject all 13 null hypotheses at the 5% level of significance (as mentioned in the proposed TAM).



Technology Acceptance Model (TAM)

Table 15.0: Summary of Hypothesis Testing

Independent Variables	Dependent Variable	R Square Change	Hypothesis
Instructor	Perceived Usefulness	.283	Accepted ($p < 0.001$)
Learner	Perceived Usefulness	.172	Accepted ($p < 0.001$)
Course	Perceived Usefulness	.088	Accepted ($p < 0.001$)
Technology	Perceived Usefulness	.003	Rejected ($p = 0.098$)
Instructor	Perceived Ease of Use	.248	Accepted ($p < 0.001$)
Learner	Perceived Ease of Use	.244	Accepted ($p < 0.001$)
Course	Perceived Ease of Use	.053	Accepted ($p < 0.001$)
Technology	Perceived Ease of Use	.000	Rejected ($p = 0.982$)
Perceived Ease of Use	Attitude	.384	Accepted ($p < 0.001$)
Perceived Usefulness	Attitude	.192	Accepted ($p < 0.001$)

Moreover,

1. A strong and positive correlation was found between *Perceived Ease of Use and Perceived Usefulness* ($r = 0.683$, $n = 468$, $p < 0.01$),
2. A positive correlation were noted between *Attitude towards enrolling for a fully online degree* and *Perceived Ease of Use* ($r = 0.431$, $n = 479$, $p < 0.01$), and
3. A positive correlation were noted between *Attitude towards enrolling for a fully online degree* and *Perceived Usefulness* of SM ($r = 0.567$, $n = 468$, $p < 0.01$)

7.0 Exploratory Factor Analysis (EFA)

The factorability of the 31 items grouped under the four dimensions labelled as *Learner*, *Instructor*, *Course* and *Technology* in the proposed model was examined. Prior to conducting EFA, it is always crucial to verify a few conditions that would confirm the factorability of these variables. The following observations were made:

- 29 out of the 31 items correlated at least 0.3 with at least one other item,
- The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .832, above the recommended value of .5 (Field, 2005), and Bartlett's test of sphericity was significant (χ^2 (465) = 8376.23, $p < .001$),
- The determinant of the correlation matrix is 1.33×10^{-9}, indicating that there is some amount of multicollinearity among the predictors, as this value is less than 0.00001; however, as will be seen later in multiple regression analysis, even when all predictors were included, none had a VIF exceeding 10, indicating that multicollinearity was not a serious problem,
- The diagonals of the anti-image correlation matrix were all over 0.5 (Field, 2000), supporting the inclusion of each item in the factor analysis and
- The communalities were all above 0.3, further confirming that each item shared some common variance with other items.

These indicators concluded that there is reasonable ground for conducting factor analysis. Using principal components analysis, with orthogonal rotation (Varimax), seven factors were extracted. The initial eigenvalues showed that the first two factors explained 14.198% and 10.998% of the shared variance respectively, while each of the remaining five explained a shared variance not exceeding 9%. The following correlation matrix for the factors was obtained.

Table 16.0: *Component correlation matrix (N = 494)*

Component Correlation Matrix							
Component	1	2	3	4	5	6	7
1	1.000						
2	.294	1.000					
3	.017	.138	1.000				
4	.146	.092	.113	1.000			
5	.084	.141	-.066	-.127	1.000		
6	**-.408**	-.286	-.152	-.212	.028	1.000	
7	-.255	-.106	-.171	-.221	-.022	.247	1.000

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.

It is observed from Table 16.0 above that the magnitude of only one of correlations exceeded the Tabachnick and Fiddell (2001) threshold of .32, meaning that Varimax rotation could well provide the best-defined factor structure. The rotation component matrix for the final solution is presented in Table 18.0.

After finding the common denominators of the regrouped sets of statements, the proposed factor labels suited the extracted factors and were thus retained as *Benefits of e-learning*, *Perceived usefulness and ease of use of e-learning platform*, *E-learning communication channels, relevance and expertise*, *Training and online support for e-learning*, *Quality of e-learning instructors*, *Internet connectivity* and *Cyberphobia*. Internal consistency for each of the scales was examined using Cronbach's alpha and found to be relatively high, except for the last latent factor: .848 for *Benefits of e-learning* (10 items), .802 for *Perceived usefulness and ease of use of e-learning platform* (6 items), and .730 for *E-learning communication channels, relevance and expertise* (5 items), .994 for *Training and online support for e-learning* (2 items), .831 for *Quality of e-learning instructors* (3 items), .967 for *Internet connectivity* (2 items) and .569 for *Cyberphobia* (3 items).

Table 17.0: *Descriptive statistics for the seven factors related to the effectiveness of delivery of online degree programmes (N = 494)*

	No. of items	**M (SD)**	**Skewness**	**Kurtosis**	**Alpha**
Benefits of e-learning	10	3.600 (.610)	-.431	1.335	.848
Perceived usefulness and ease of use of e-learning platform	6	3.080 (.694)	-.173	.549	.802
E-learning communication channels, relevance and expertise	5	3.453 (.615)	-.411	.934	.730
Training and online support for e-learning	2	2.960 (.996)	-.133	-.201	.994
Quality of e-learning instructors	3	3.270 (.792)	-.282	.211	.831
Internet connectivity	2	2.830 (1.16)	-.070	-.960	.967
Cyberphobia	3	3.604 (.802)	-.322	-.132	.569

Composite scores were created for each of the seven factors, based on the mean of the items which had their primary loadings on each factor, whereby higher scores indicated greater impact on the effectiveness of delivery of online degree programmes.

E-learning communication channels, relevance and expertise was the factor that students reported as the most influential on the effectiveness of delivery of online degree programmes (3.453), with a negatively skewed distribution (-.411). The descriptive statistics presented in Table 17.0 above also show that the distributions of all factors were negatively skewed, whereas only three of them had negative kurtosis, namely *Training and online support for e-learning* (-.201), *Internet connectivity* (-.960) and *Cyberphobia* (-.132).

Table 18.0**:** *Rotated component matrix: factor loadings based on principle components analysis with Varimax rotation for 31 items related to the effectiveness of online degree programmes (N = 494)*

	Component						
	1	2	3	4	5	6	7
I am able to upload and download files to and from the e-learning system	**.706**						
Learning materials in the e-learning system are available in various formats	**.659**						
E-learning allows me to choose topics in order of my preference	**.638**						
E-learning allows me catch up with a class that I cannot attend	**.624**		.390				
I am able to accomplish my tasks easily when I use e-learning tools	**.604**	.390					
E-learning will save me a lot of time rather than attending a class	**.600**						
E-learning provides me with updated information for my courses	**.584**						
The online course content is well supported by multimedia	**.564**						
I am able to use communication tools in e-learning system	**.537**						
Instructors possess adequate technical skills to use an E-learning system in their teaching	.429				**.401**		
E-learning allows me to learn at my own pace and in my own time	**.424**		.386				
I am ready to use a fully online system in my program		**.875**					
E-learning provides a more useful educational platform than that of the traditional way of learning		**.873**					
Online course content meets my requirements for effective learning		**.631**					
Courses that are run online are of better quality		**.541**					
I feel confident when I use e-learning tools for learning	.411	**.526**					
I am able to use the e-learning system well without any assistance		**.492**					
The university employs specialists to address technical problems in the e-learning system			**.689**				
Instructors have experience in using modern ICT tools			**.665**				

When there is a technical problem with the e-learning system, I can always make email enquiries to the dedicated email address			**.655**				
Instructors are easily contacted via communication tools	.300		**.551**				
Learning materials in the e-learning system are aligned with the course objectives			**.439**				
The institution offers training courses on how to use the e-learning system				**.927**			
A hotline is available when there is a technical problem with the e-learning system				**.923**			
Instructors respond quickly to my queries					**.901**		
Instructors provide me with clear instructions on how to use the e-learning system					**.901**		
I find that the Internet connection fee is high						**.964**	
I am satisfied with the speed of the Internet						**.956**	
Computers are somewhat intimidating to me							**.781**
I hesitate to use a computer for fear of making mistakes I cannot correct							**.780**
Using an online platform makes me feel nervous							**.581**
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.							
a. Rotation converged in 6 iterations.							

Note. Factor loadings < .3 are suppressed (Hair *et al*., 1998)

Overall, these analyses indicated that seven distinct factors were underlying the effectiveness of online degree programmes and that these factors were significantly internally consistent, with the exception of *Cyberphobia* (α = .569). All 31 items were relevant to the analysis, so that the original proposed factor structure was retained.

8.0 Discussions of the findings

Except for technology, the three independent variables (namely instructor, learner and course) are considered as significant predictors of Perceived Usefulness and Perceived Ease of Use. While Perceived Usefulness is defined as the extent to which a user believes that using technology will improve his performance, Perceived Ease of Use refers to how much effort is required to use the technology. According to Venkatesh (2000), these two factors determine the user's behavioral intention towards technology as it affects his attitude. The following paragraphs provide discussions for the supported hypothesis.

8.1 The impact of Perceived Usefulness and Perceived Ease of Use on the Attitude towards enrolling for a fully online degree

Perceived Usefulness and Perceived Ease of Use have been used in several studies (refer to Su and Tsai, 2013; Saeed, 2008) to predict the intention to use online learning system. Findings of this study revealed:

i. A positive correlation between *Attitude towards enrolling for a fully online degree* and *Perceived Usefulness* ($r = 0.567$, $n = 468$, $p < 0.01$). This means that students who believe that ELearning will improve their performance will be more likely to enroll on a fully online degree. These results correspond to the findings of Surendran (1989), Saeed (2008) and Su and Tsai (2013) studies which revealed that Perceived Usefulness has an influence on student's intention to use online learning systems.

ii. A positive correlation between *Attitude towards enrolling for a fully online degree* and *Perceived Ease of use* ($r = 0.431$, $n = 479$, $p < 0.01$). In other words, it means that if the student is at ease with an online system, his level of satisfaction and productivity increases. This result is in line with those of Kwasi (2007) and Chang (2010) who found that the Perceived Ease of Use has a direct and positive impact and effect on the intention and attitude to use the system.

Furthermore, factor analysis indicates that students classified Perceived usefulness and ease of use of e-learning platform as one of the most influential factor on the effective delivery of online degree programmes.

8.2 The impact of instructor's, learner's and course's characteristics on Perceived Usefulness and Perceived Ease of Use

Findings also revealed that the instructor's, the learner's and the course's dimensions impact on the Perceived Usefulness and Perceived Ease of Use.

8.2.1 The impact of instructor's characteristics on Perceived Usefulness and Perceived Ease of Use

As discussed in the literature, given the significant roles of the instructor in the learning and support activities, the latter's attitude towards ELearning significantly influences learners' perception about ELearning. According to extant literature, instructor's attitudes toward E-learning have a positive effect on learners' perceived ease of use and usefulness of the system, participation and motivation in E-learning. On top of having the right attitudes, it is equally important that instructors possess the right IT skills to (i) deliver effectively the courses online and (ii) provide timely support when the learners face problems. According to the findings of the survey, the instructor's characteristics is considered as a significant predictor for *Perceived Usefulness* (β = .119, t (399) = 2.532, p = .012) and *Perceived Ease of use* (β = .125, t (407) = 2.714, p = .007). This confirms the findings of Romiszowski, (2004), Olson (2005) and Sun *et al.* (2008) who found that the instructor's attitude plays an important role for the use of e-learning and integrating ICT.

Moreover, "*Quality of e-learning Instructor*" was one of the factors that students reported as being influential on the effective delivery of online degree programmes. Focus group discussions with students enrolled on the mixed-mode undergraduate programme identified the lecturers' availability "*Lecturers should be available on fixed slots*" and their ability to deal with technical issues as potential factors affecting the effective delivery of online degree programmes. Moreover, focus group discussions with the Postgraduate students revealed serious issues with respect to the lecturer's computer skills "*Lecturers are not computer literate and lack training"*. Students proposed that "*lecturers should be provided with training*" to "*improve their teaching skills*"

8.2.2 The impact of learner's characteristics on Perceived Usefulness and Perceived Ease of Use

Learner's self-efficacy is instrumental in the effective implementation of E-learning. Womble (2007) and Gregg and Designer (2011) found that computer self-efficacy is a statistically significant predictor of student's satisfaction in online learning environments while Wu *et al.* (2010) described computer self-efficacy as one of the main determinants of student's satisfaction with blended e-learning system environments. In the context of the present study, self-efficacy can be described a learner's belief and judgment that he or she is capable of participating on an online learning systems (including computer, the Internet and web-based instructional and learning tool). Therefore, a high level of self-efficacy implies that the learner is more confident in accomplishing E-Learning. It may also change positively their perceptions towards ease of use and usefulness of the system. Hence, learner's familiarity with technology based system is important when taking online courses.

Findings of this study revealed that learners' initial proficiency in ELearning influence their intention to enroll on fully online degree programmes such that the mean intention was the highest among the expert (*mean=6.64*), followed by intermediate (*mean=5.6*1) and novice (*mean= 4.92*). Moreover, students having the highest number of years of exposure to the Internet were more likely to opt for online programme (more than 4 years*, mean=5.49*) compared to those with one year of exposure (*mean= 5.00*).

Similarly, the intention to enroll on online programmes was the strongest among students with an excellent Internet experience (*mean=6.18*) followed by students with a very poor internet experience (*mean=5.80*) and those having an average internet experience (*mean=5.40*). Furthermore, "*Cyberphobia"* is one of the emerging factors (from the factor analysis) that can impact on the effectiveness of E-Learning. This means that the more people are afraid of computers, new technology or the Internet, the less likely they will enroll on online degree programmes. From the focus group discussions with students enrolled on the mixed-mode undergraduate programme, it would seem that the learner's level of computer literacy is crucial in using the online system as well as in interacting with the lecturers and peers. The findings further revealed that learners' characteristics is considered as a significant predictor of *Perceived Usefulness* (β = .243, t (399) = 5.347, p < .001) and *Perceived Ease of Use* (β = .376, t (407) = 8.393, p < .001).

The above implies that online degree programmes would be most welcome among the younger generation who is technologically well versed or any other users who have an acceptable experience in using the Internet. Familiarity with the Internet and technology will lessen the learner's anxiety towards ELearning and will increase the learner's information seeking efficacy which is key in reading for a degree on an online mode.

8.2.3 The impact of course's characteristics on Perceived Usefulness and Perceived Ease of Use

According to Leidner and Jarvenpaa (1995) and Arbaugh (2002), the course characteristics such as flexibility in time, location and methods positively influence the level of satisfaction and participation concerning ELearning courses. Moreover, the design of the ELearning program is an important factor when considering ELearning as a wrongly designed programs, in particular, the contents, may raise serious doubts among existing and prospective learners. The online programs should, therefore, be designed in such a way that they increase the perceived benefits and perceived ease of use. Findings of this study indicate that the course's characteristics is a significant predictor for Perceived Usefulness ($\beta = .442$, $t\,(399) = 8.539$, $p < .001$) and Perceived Ease of Use ($\beta = .348$, $t\,(407) = 6.836$, $p < .001$). Similar findings were reported by Tsai and Finger's (2008) study.

9.0 RECOMMENDATIONS

To ensure effectiveness of online degree programmes and adoption of E-Learning the following recommendations are made:

1. **Sensitise students on the benefits of ELearning**

As revealed by the findings of the study, it is important that students are informed about the benefits of innovative IT based learning systems over the traditional class room learning techniques. Information on the benefits of ELearning can be communicated to prospective students by the Universities during the education fairs/events or during open days organised by the Universities or other institutions.

2. **Provide training on the use of online portals and other educational technologies to existing/prospective students**

Through training and familiarity with the system, students can evaluate the ease of use and benefits of ELearning which, in turn, can motivate them to enroll on the online courses

3. **Run modules using a blended approach facilitated by the use of IT**

The Universities should also develop and run modules (where appropriate) on a blended approach, facilitated by the use of IT. The running on modules on a blended mode may equip students with the right skills and knowhow that can motivate them to adopt ELearning in the future. Moreover, students can share their experience in ELearning with other existing/prospective students through word of mouth communication.

4. **User friendly platform**

The design of the online modules should be user friendly so that students do not have to put in much efforts in understanding and using the new system. User friendliness will enhance user's perception on the ease of use.

5. **Offer more part time courses to the working people**

Given that working people are likely to enroll on online degree courses due to their family and social commitments (*mean= 5.99*) compared to full time students (*mean=5.28*), it would seem appropriate to that Universities offer more programme choices to them.

6. **Incentives by University to enroll on online degree programmes**

Furthermore to encourage students to register on online degree programmes, universities can consider a reduction in the fees to pass on the cost savings associated to the normal delivery of lecture (that would have otherwise been encountered). Where the costs saved are substantial, the universities may also consider providing free of charge IT tools such laptops and tablets to encourage and facilitate the learning process.

7. **Investment by the University on IT related facilities and other support to enhance E-Learning**

The universities should invest more on the IT related facilities to facilitate E-Learning on the campus including the extension of the Wi Fi facilities to a wider area as well as increasing broad band. A dedicated desk with the required facilities should be set up to address technical problems with respect delivery of programmes.

8. **Provide training to lecturers**

The universities should ensure that the lecturers involved in the delivery of the online degrees/online modules have the right skills and knowhow to address key technical issues surrounding E-Leaning. This can be achieved by giving them appropriate training and by sensitising them on the benefits of ELearning so ensure a smooth transition. The training should aim at making them more versatile in using the online education system.

9. **Facilitate communication between learners and lecturers**

Communication with students is key in a context where students have limited (if not any) face to face contact with the lecturer. Therefore, to ensure timely communication between the learner and the lecturer, it is important that the latter is trained and encouraged to use new means of electronic communication such as Twitter, blogs and social media.

10. **Planned change approach**

Moreover, given that the difficulty to change to the new IT based system seems to be more of a cultural rather than a pedagogical issue (as revealed from the findings of the focus discussions), there is a need to educate students on the importance of online education. Values, beliefs and

habits are not developed overnight but they are rather deeply ingrained in the culture. This implies that the paradigm shift from traditional method of learning to a new IT based system cannot be done overnight. This transition should be well planned and should start at the earlier stages of the education that is primary and secondary level. The present Government's initiative undertaken to provide tablets to primary and secondary schools students may contribute in changing the mind-set of the future graduates towards these innovative learning approaches by increasing their confidence and capability. Last week, the Honorable Prime Minister launched 350 free WI- Fi across the island with a view to facilitate and democratise access to Internet for Mauritians. Such initiatives which aim at transforming the island into a digital contribute towards the improvement of the citizens' computer self-efficacy, internet efficacy and information-seeking self-efficacy which have been identified as essential features in the adoption of system using computers and other types of technology such as ELearning. Similarly, familiarity with IT based systems since the young age can reduce the level of anxiety which is considered as a significant factor that affects learning satisfaction concerning the adoption of E-Learning (Piccoli *et al*., 2001).

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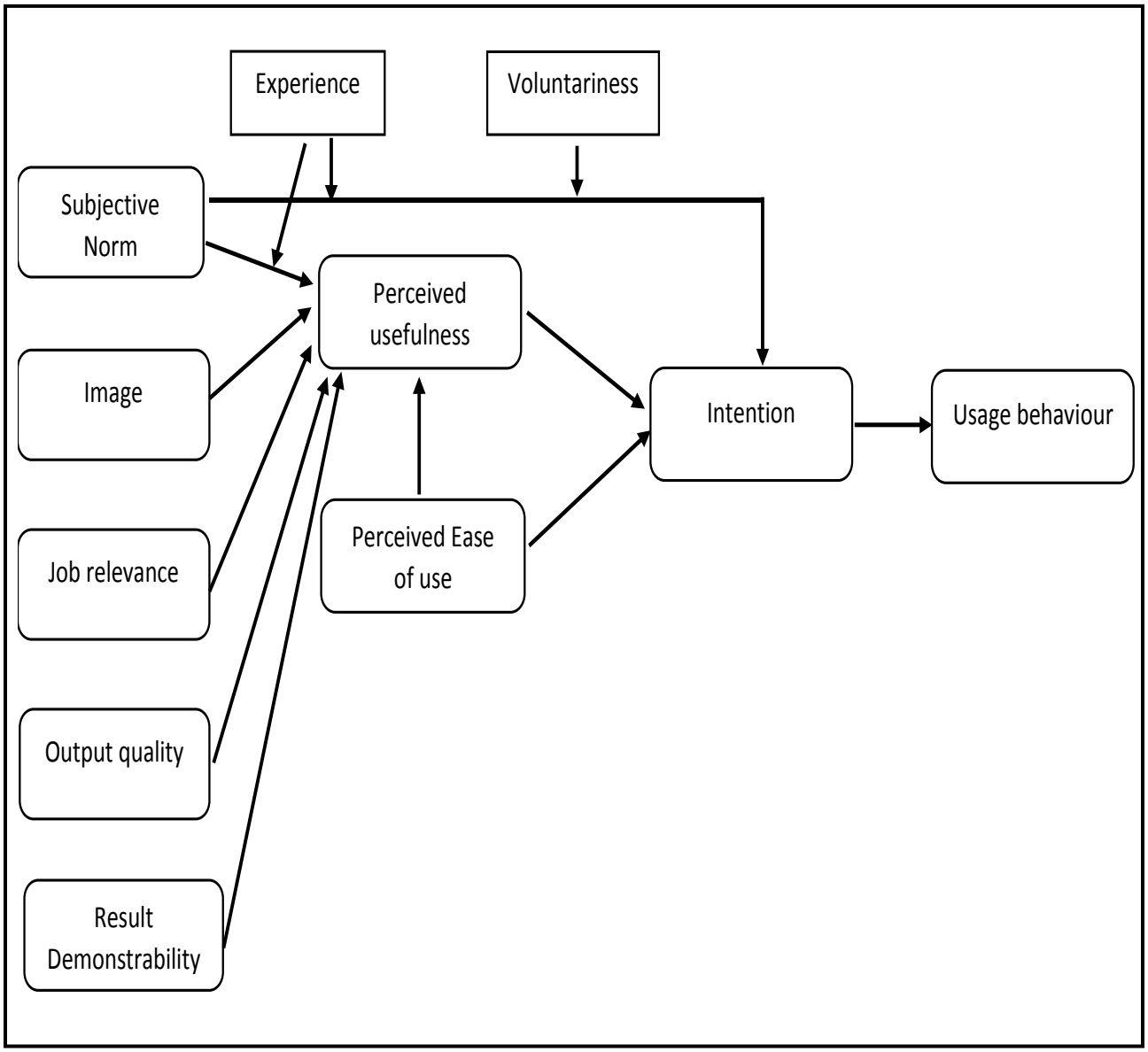
Annex 1

Figure 6: Technology Acceptance Model 2



Source: Venkatesh and Davis (2000)

Annex 2-Questionnaire

Questionnaire Number ☐

Assessing the Factors Affecting the Effectiveness of Delivery of Online Degree Programs in Mauritius: A Survey among Undergraduates

Dear Participant,

The aim of this study is to identify the factors affecting the effectiveness of online degree programs in Mauritius, as well as the benefits of e-learning.

This questionnaire should take you around 10 minutes to complete. As such, there is no right or wrong answers. However, the usefulness of survey findings depends on the accuracy of your answers. Rest assured that all data will be kept confidential and used for research purposes only, and that research findings will be published in an impartial manner.

Your participation is entirely voluntary and you have the right to withdraw at any given moment. Should you have any queries or concerns about being part of this survey, please contact me via e-mail: h.jugessur@gmail.com.

Thank you for your precious time and co-operation in giving your honest personal views.

JUGESSUR, Ashi
Researcher

PLEASE READ THESE INSTRUCTIONS CAREFULLY

1. Please use black or blue ink to fill the questionnaire by ticking the appropriate box (es).

2. In accordance with the Data Protection Act 2004, responses are anonymous and completely confidential. By responding to this questionnaire, you are agreeing that the data that you provide may be used for research.

Definition of E-Learning: E-learning is defined a system which uses internet technology to deliver information to students with interactions through computer interfaces.

SECTION A: DEMOGRAPHIC INFORMATION

1. Gender

☐ Male ☐ Female

2. Age group (years)

☐ 19 – 21 ☐ 25 or more
☐ 22 – 24

3. Residential area

☐ Urban ☐ Rural

4. Type of course enrolled for

☐ Full-time ☐ Part-time

5. Year at University

☐ Year 1 ☐ Year 3 or higher
☐ Year 2

6. For how many <u>years</u> have you been using the Internet?

☐ Less than 1 ☐ 5 or more
☐ 1 – 4

7. How would you classify your Internet experience?

☐ Very poor ☐ Good
☐ Poor ☐ Excellent
☐ Average

8. Prior experience in e-learning/mixed mode courses

☐ 1 year ☐ 3 years
☐ 2 years ☐ 4+ years

9. Your initial proficiency level

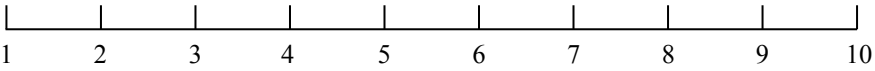
☐ Novice ☐ Expert
☐ Intermediate

SECTION B: PERCEPTION OF E-LEARNING

10. Please tick the appropriate box for each of the following.

	Yes	**No**
Are you currently exposed to a fully online module?		
Are you comfortable with a **mixed-mode** learning system?		
Are you able to adopt a fully online degree program?		

11. On a scale of 1 to 10 (1 = highly unlikely to 10 = highly likely), how likely are you to enroll for a fully online program? Please ENCIRCLE your answer (number) clearly.



Highly unlikely **Highly likely**

Please rate the extent to which you agree with the following statements related to the e-learning system.

	1 = Strongly disagree 3 = Neutral/Not sure 4 = Agree **2 = Disagree 5 = Strongly agree**	**1**	**2**	**3**	**4**	**5**
1.	Adopting ICT and e-learning increases my level of satisfaction	☐	☐	☐	☐	☐
2.	I am ready to use a fully online system in my program	☐	☐	☐	☐	☐
3.	Using an online platform makes me feel nervous	☐	☐	☐	☐	☐
4.	I am able to use the e-learning system well without any assistance	☐	☐	☐	☐	☐
5.	Courses that are run online are of better quality	☐	☐	☐	☐	☐
6.	Online course content meets my requirements for effective learning	☐	☐	☐	☐	☐
7.	E-learning allows me to learn at my own pace and in my own time	☐	☐	☐	☐	☐
8.	Instructors have experience in using modern ICT tools	☐	☐	☐	☐	☐
9.	The university employs specialists to address technical problems in the e-learning system	☐	☐	☐	☐	☐
10.	I am satisfied with the speed of the Internet	☐	☐	☐	☐	☐
11.	Web-based learning will enhance my effectiveness in the program	☐	☐	☐	☐	☐
12.	It is easy for me to become skillful at using the e-learning system	☐	☐	☐	☐	☐
13.	E-Learning will allow me to get information from online sources more easily	☐	☐	☐	☐	☐
14.	Working with computers requires a lot of technical ability	☐	☐	☐	☐	☐
15.	E-learning provides a more useful educational platform than that of the traditional way of learning	☐	☐	☐	☐	☐
16.	Learning materials in the e-learning system are aligned with the course objectives	☐	☐	☐	☐	☐
17.	E-learning allows me catch up with a class that I cannot attend	☐	☐	☐	☐	☐
18.	Instructors are easily contacted via communication tools (e.g. email, Twitter, etc.)	☐	☐	☐	☐	☐
19.	When there is a technical problem with the e-learning system, I can always make email enquiries to the dedicated email address	☐	☐	☐	☐	☐
20.	The E-learning platform allows me to interact more with classmates	☐	☐	☐	☐	☐
21.	I find that the Internet connection fee is high	☐	☐	☐	☐	☐
22.	I feel confident when I use e-learning tools for learning	☐	☐	☐	☐	☐
23.	Learning to operate the e-learning system will be easy for me	☐	☐	☐	☐	☐
24.	E-learning improves my performance	☐	☐	☐	☐	☐

	1 = Strongly disagree 2 = Disagree 3 = Neutral/Not sure 4 = Agree 5 = Strongly agree	1	2	3	4	5
25.	I hesitate to use a computer for fear of making mistakes I cannot correct	☐	☐	☐	☐	☐
26.	E-learning makes the learning process more effective for me	☐	☐	☐	☐	☐
27.	Computers are somewhat intimidating to me	☐	☐	☐	☐	☐
28.	E-learning will saves me a lot of time rather than attending a class	☐	☐	☐	☐	☐
29.	I am able to accomplish my tasks easily when I use e-learning tools	☐	☐	☐	☐	☐
30.	I can be influenced by my peer groups to use e-learning system	☐	☐	☐	☐	☐
31.	I find it easy to get the E-learning system to do what I want it to do	☐	☐	☐	☐	☐
32.	Learning materials in the e-learning system are available in various formats (e.g. MS Word, PDF, e-library)	☐	☐	☐	☐	☐
33.	E-learning is useful in my course	☐	☐	☐	☐	☐
34.	Instructors provide me with clear instructions on how to use the e-learning system	☐	☐	☐	☐	☐
35.	A hotline is available when there is a technical problem with the e-learning system	☐	☐	☐	☐	☐
36.	E-learning makes my learning more interesting	☐	☐	☐	☐	☐
37.	I am able to use communication tools in e-learning system (e.g. discussion forums, chat rooms)	☐	☐	☐	☐	☐
38.	Instructors respond quickly to my queries	☐	☐	☐	☐	☐
39.	E-learning supports my self-learning and independent study	☐	☐	☐	☐	☐
40.	E-learning saves me time and effort when researching information	☐	☐	☐	☐	☐
41.	The online course content is well supported by multimedia (e.g. audio recordings, videos, pictures)	☐	☐	☐	☐	☐
42.	E-learning allows me to choose topics in order of my preference	☐	☐	☐	☐	☐
43.	The institution offers training courses on how to use the e-learning system	☐	☐	☐	☐	☐
44.	E-Learning enhances my productivity	☐	☐	☐	☐	☐
45.	I am able to upload and download files to and from the e-learning system	☐	☐	☐	☐	☐
46.	Instructors possess adequate technical skills to use an E-learning system in their teaching	☐	☐	☐	☐	☐
47.	E-learning provides me with updated information for my courses	☐	☐	☐	☐	☐

Thank you again for your participation.

Interview with Mr. Auckbur, Director of eLearning at the Ministry of Education

The semi- structured interview focused on the following dimensions of ELearning

1. Benefit of ELearning for professional
2. Challenges of ELearning to Professional
3. Benefits of eLearning to the universities
4. Factors promoting eLearning in universities
5. Challenges of implementing eLearning as a policymaker
6. Evolution of eLearning in universities in Mauritius over time

Benefit of ELearning for professional

1. **Flexible**

   He believed "*public officers cannot be released for long time and therefore such type of courses is a great opportunity for them to enhance their knowledge and engage in new areas*".

2. **Synchronous and Asynchronous engagement**

   It entails both synchronous (live lectures and video conferencing) and asynchronous way of learning (offline discussion) way of learning.

3. **Text and files can be downloaded and uploaded easily.**

Challenges of ELearning to Professional

Absence of face to face interaction

Lack of interaction and communication between students and lecturers can be serious challenges as we as Mauritians, have been involved in the traditional way of learning. But once, we get geared, this problem will be solved.

Annex 3- Findings of Semi Structured Interview with the Director, ELearning, Ministry of Education

Benefits of eLearning to the universities

1. **Catch the Market needs**

   He stated that nowadays university graduates learn just for the sake of passing the exams. But with the adoption of eLearning, the latter will capture mature learners (those who can manage their time, learn by their own, use their problem solving skills). Hence, universities should leverage on technology.

2. **Reduction in cost**

   The universities do not need to engage lecturers

Factors promoting eLearning in universities

1. **Technological factor**- Ability of university to expand in the ICT platform.
2. **Social factor**
   Continuous training is required by the workforce (development). The use of top-up programs to enhance the skills of the workforce. Thus, the workers opt for mixed mode/ eLearning in universities.

Challenges of implementing eLearning as a policymaker

1. **ELearning requires a lot of attention.**

   According to the Director, eLearning on a broader view seems to be easy but it is a real challenge especially for a small island like Mauritius. It requires expert and resource person on a more flexible approach. The first challenge is in terms of human resource. That is, getting tutors ready to use the eLearning platform.

2. **Smallness of the expert base in specific areas**
3. **The cultural mindset**
   The Mauritians have a tendency to get into higher education in a face to face mode. In this process, the learner obtains academic knowledge without any prior work experience. According to him, there should be a paradigm shift. Through fully online degree mode, the student gains working experience and making himself competitive in the market.

Annex 3- Findings of Semi Structured Interview with the Director, ELearning, Ministry of Education

Evolution of eLearning in universities in Mauritius over time.

1. In the past we had Open University of Mauritius (2012). " we have got many mature learners and we see potential to implement a fully online degree programme in Universities'
2. Mobile learning is also an element by virtue which is of great availability of connectivity.
3. The future is good, depending on the evolution of technology.
4. Mauritius is a small island (geographical aspect is small). Hence, ability to adopt a fully online degree programme is not appropriate. In this context, a face to face approach is much more appropriate- student can shift easily and come to universities on Saturday. Even bus fares is cheap. Countries like Africa and India has adopted eLearning in a large scale- No need to move from North to South to attend a course.

According to you what measures should be taken to ensure effective delivery of fully online degree programme?

1. Adopt the fully online degree programme by taking into consideration the local reality. Mauritians like socialization
2. Level of training provided to both lecturers and students/ care for planning
3. Should meet the need of the country. Countries like Comoros, Madagascar have no internet access, thus they cannot implement eLearning.
4. Should be suitable to the programs being run. Not every courses/programs can be fully online.
5. Meet the need of the industry

The focus group comprised of 5 respondents enrolled on the BSc (Hons) Banking and Financial services Level 2 programme which is run on a mixed mode

	Respondent 1	Respondent 2	Respondent 3	Respondent 4	Respondent 5
Experience of mixed learning mode		Excited, encouraging at start but latter depressed, disappointed, discouraged. Hard, No support from lecturers, Lack of skills lecturers, Lack of knowledge about the course	Hard, teaching skills have to be improve No online discussion	Disappointed Discouraged	Difficult Communication Problem
Advantages of a fully online program to universities	Lecturers are allowed to do more classes-development in skills More revenue is earned	Reduction in cost More Revenue is earned as more students will be enrolled	Reduction in cost-less lecturers are needed	More Income-attract many students Less lecturers are appointed Low cost-reduction in rental cost	Low Cost
Disadvantages of a fully online program to universities				Lack of technical skills	
Advantages of a fully online to students	Flexibility	Flexibility Cost-effective choices	Flexibility Cost-effective choices Student enrichment	Flexibility especially for married women Access to learning materials	

	Respondent 1	Respondent 2	Respondent 3	Respondent 4	Respondent 5
Disadvantages of a fully online course to students	No interaction between lecturer and students No motivation to pursue the course				Lack of interaction on the platform
Barriers of adopting a fully online program	Lack of teaching skills	Lack of technical skills from lecturers Lack of internet access in class	Lack of internet access Not appropriate for classes like mathematics, accounting		
Factors affecting ELearning	Age & Gender	Mixed mode is better than fully online	Cost Internet Availability	Infrastructure Internet quality and access Computer literacy	Costs Internet access and availability Infrastructure Not appropriate for every module
The Future of ELearning in Mauritius	Can be implemented to the Y generation in 30 years' time Poor families cannot afford to buy PCs	Adopted by intelligent students Poor families cannot afford to buy PCs	Poor families cannot afford internet access Government should provide grants in order to purchase PC/laptops		If it is free, it will be beneficial
On a scale 0 to 10, intention to adopt a fully online mode	2	2	3	3	2

The focus group comprised of 4 respondents enrolled Trimester 3 of the MBA programme which is run on a fully online mode

	Respondent 1	Respondent 2	Respondent 3	Respondent 4
Experience of mixed learning mode	No exam-encouraging Skillful, Discouraging (lack of support)	Discouraging (Lack of support) Prefer mixed mode Mostly applicable to MSc/MBA classes not practical classes	Challenging, very interactive Excited to use technologies	No exams, flexible, challenging
Advantages of a fully online program to universities	Cost free course-no access to library, logistics Broaden the student base	Low cost- Paperless More revenue for the University	No use of university resources -low cost Increase in revenue	Broaden Student Pace
Disadvantages of a fully online program to universities	Cheating (No Control) Lack of skills for lecturers Poor platform Lack of responsibility	Unskilled lecturers Lecturers are not computer literate and lack training	Cheating (No Control) Poor management of the e-learning platform	Poor management of the e-learning platform
Advantages of a fully online to students	Flexibility Exposure to 'industry' based projects Low transport costs	Flexibility Low transport costs	Flexibility-working people Reduce transport costs Access to digital library	Flexibility Access to more learning materials
Disadvantages of a fully online course to students	Lack of guidance and support Feedback to queries takes a lot of time Lack of interaction	Lack of support Communication problems	Lack of guidance Short and tight deadlines Low internet access Feedback to queries takes a lot of time	Lacks feedback Lacks communication Lacks team working

	Respondent 1	Respondent 2	Respondent 3	Respondent 4
Barriers of adopting a fully online program	Low internet speed, Lack of software proficiency, Not every students have a PC or laptop, Low access to digital Library, User-friendly platform, Not appropriate for every modules	Platform should not be complicated Students have the practice of 'spoon-feeding' Lack of motivation	Finance resources provide e-learning courses. Not everyone has access to internet. Poor families will have problem. User friendly platform. No appropriate for practical/science module.	Should be implemented since first year of undergraduate programme. Lack of Team work Lack of infrastructure
Factors affecting ELearning	Flexibility 'Personality' of the student Region is not a factor	Access to internet Platform should be encouraging Infrastructure	Technology Flexibility Impact on gender, age, experience and region	Internet Access/Quality Ease of Use
The Future of ELearning in Mauritius			Mixed mode can be adopted to undergraduates Fully online to post graduates	Can be adapted especially to post graduate students
Other Issues	More infrastructure Promote fully online courses (campaigns)	Guidance and support is vital Availability of a Technical person Lecturers should be provided with training	For e-Learning success, Guidance and support is required Lecturers should be available on fixed slots	Student interaction is predominately needed

Table 19.0: Pilot Test Results-Respondents' Profile

Variables	Attributes	No of respondents	% of respondents
Gender	Male	5	20
	Female	20	80
Age group	19-21	10	40
	22-24	14	56
	25 or higher	1	4
Region	Rural	11	44
	Urban	14	56
Course type	Full time	22	88
	Part-time	3	12
Level of education	Year 1	0	0
	Year 2	1	4
	Year 3	24	96
Internet experience	Very poor	1	4
	Poor	3	12
	Average	3	12
	Good	14	56
	Excellent	4	16
eLearning experience	1 year	16	64
	2 years	4	16
	3 years	3	12
	4+ years	0	0
Able to adopt a fully online programme	Yes	11	44
	No	14	56

Table 20.0: Mean of Statements

	Mean	Std. Deviation
E-learning allows me catch up with a class that I cannot attend	3.89	.920
E-learning allows me to learn at my own pace and in my own time	3.80	.962
E-Learning will allow me to get information from online sources more easily	3.73	.870
I hesitate to use a computer for fear of making mistakes I cannot correct	3.73	1.112
Computers are somewhat intimidating to me	3.72	1.064
Learning materials in the e-learning system are available in various formats	3.72	.932
I am able to upload and download files to and from the e-learning system	3.69	.879
E-learning saves me time and effort when researching information	3.66	.941
E-learning supports my self-learning and independent study	3.64	.902
Instructors are easily contacted via communication tools	3.64	.995
E-learning will saves me a lot of time rather than attending a class	3.59	1.115
Learning to operate the e-learning system will be easy for me	3.56	.895
E-learning provides me with updated information for my courses	3.54	.936
E-learning is useful in my course	3.51	.927
I am able to use communication tools in e-learning system	3.49	.939
Adopting ICT and e-learning increases my level of satisfaction	3.47	1.944
I am able to accomplish my tasks easily when I use e-learning tools	3.47	.896
Working with computers requires a lot of technical ability	3.47	1.034
E-learning makes my learning more interesting	3.44	.938
When there is a technical problem with the e-learning system, I can always make email enquiries to the dedicated email address	3.41	.885
E-Learning enhances my productivity	3.41	.914
The online course content is well supported by multimedia	3.40	.929
E-learning allows me to choose topics in order of my preference	3.40	.934
It is easy for me to become skillful at using the e-learning system	3.39	1.018

Annex 7 – Mean of statements

	Mean	Std. Deviation
Learning materials in the e-learning system are aligned with the course objectives	3.38	.833
E-learning improves my performance	3.38	.881
Using an online platform makes me feel nervous	3.38	1.080
Web-based learning will enhance my effectiveness in the program	3.38	.893
Instructors have experience in using modern ICT tools	3.34	.906
I feel confident when I use e-learning tools for learning	3.34	.871
I find it easy to get the E-learning system to do what I want it to do	3.34	.923
Instructors possess adequate technical skills to use an E-learning system in their teaching	3.32	.839
E-learning makes the learning process more effective for me	3.29	.909
Instructors respond quickly to my queries	3.26	.958
Instructors provide me with clear instructions on how to use the e-learning system	3.23	.939
I am able to use the e-learning system well without any assistance	3.21	1.091
The university employs specialists to address technical problems in the e-learning system	3.16	.901
I can be influenced by my peer groups to use e-learning system	3.14	.983
E-learning provides a more useful educational platform than that of the traditional way of learning	3.09	1.056
The E-learning platform allows me to interact more with classmates	3.07	1.149
I am ready to use a fully online system in my program	3.07	1.040
Online course content meets my requirements for effective learning	3.00	.887
The institution offers training courses on how to use the e-learning system	2.96	.999
A hotline is available when there is a technical problem with the e-learning system	2.96	.999
I am satisfied with the speed of the Internet	2.84	1.171
I find that the Internet connection fee is high	2.82	1.184
Courses that are run online are of better quality	2.76	.928

Mean measured on a Likert Scale 1 to 5, 1 being strongly disagree and 5 being strongly agree

Table 21.0: Descriptive cross-sectional analysis of Intention across demographic variables

Variable	*Attributes*	*Mean*	*Standard deviation*
Gender	Male	5.94	2.088
	Female	5.24	2.083
Age group (years)	19 – 21	5.30	2.030
	22 – 24	5.47	2.084
	25 or more	5.92	2.293
Residential area	Urban	5.58	2.036
	Rural	5.31	2.176
Mode of study	Full-time	5.28	2.058
	Part-time	5.99	2.181
Level of study	Year 1	5.58	2.048
	Year 2	5.70	2.533
	Year 3 or higher	5.31	2.011
Length of time using the Internet (years)	Less than 1	5.00	-
	1 – 4	5.19	2.133
	5+	5.49	2.106
Internet experience	Very poor	5.80	4.025
	Poor	4.60	2.074
	Average	5.40	1.736
	Good	5.27	2.071
	Excellent	6.18	2.179
Prior experience in e-learning/mixed mode courses (years)	1	5.31	2.072
	2	5.51	2.229
	3	5.84	1.730
	4+	6.31	2.455
Initial proficiency level in e-learning	Novice	4.92	1.864
	Intermediate	5.61	2.115
	Expert	6.64	1.986

APPENDIX 9– Assumptions for Multiple Regression Analysis 1

1. An analysis of standard residuals indicated that there was one outlier (case E304), with a residual magnitude of 3.37, thus not exceeding the threshold value of 3.29 (Dart, 2013). The dataset was thus reduced to 493 cases.
2. Tests to see if the data met the assumption of no multicollinearity indicated that the latter was not a concern, since all four factors had a Tolerance value exceeding 0.1 and VIF less than 10 (see Table 22.0).

Significance of predictors (N = 404)

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	.286	.678		.422	.673		
Instructor	.098	.039	.119	2.532	**.012**	.512	**1.952**
Learner	.120	.022	.243	5.347	**.000**	.552	**1.812**
Course	.197	.023	.442	8.539	**.000**	.425	**2.354**
Technology	.062	.037	.068	1.658	.098	.679	**1.472**
Dependent Variable: Perceived Usefulness							

3. A Durbin-Watson value of 2.002 (between 1 and 3) confirmed that the assumption of independent errors was also met (see **Table** below).

Dependent variable: "*Perceived Usefulness"*

Table 9.1: Model Summary[b]

R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			Durbin-Watson
				R Square Change	F Change	Sig. F Change	
.739[a]	.547	.542	1.72704	.547	120.288	.000	**2.002**
a. Predictors: (Constant), Technology, Learners, Instructors, Course							
b. Dependent Variable: Perceived Usefulness							

4. The histogram of standardised residuals (**Figure H1.1** below) indicated that the data contained approximately normally distributed errors (mean of 3.92×10^{-16}), as did the normal *P-P* plot of standardised residuals (**Figure H1.2** below), which showed points that were very close to the line.

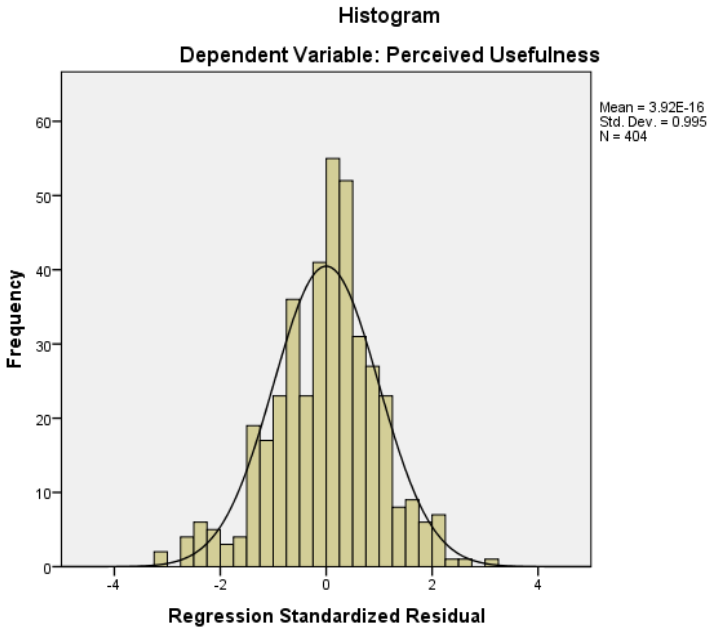


Figure H1.1: Histogram of Standardised Residuals

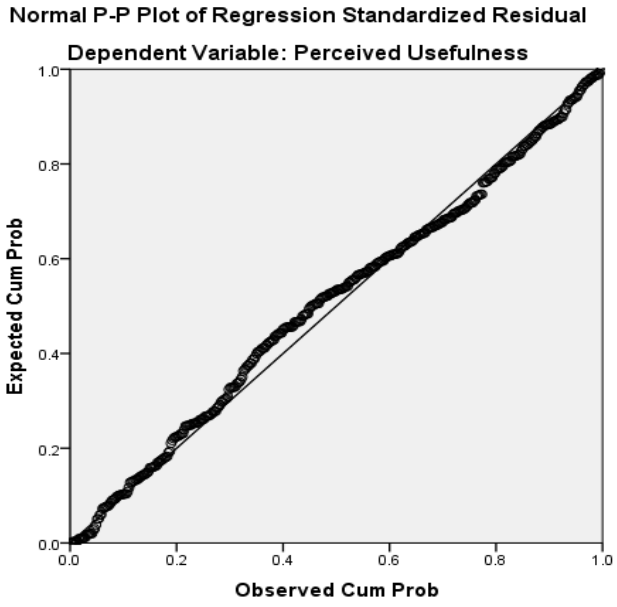


Figure H1.2: Normal *P-P* Plot of Standardised Residuals

5. The scatterplot of standardised predicted values (**Figure H1.3**) indicated that the data met the assumptions of homogeneity of variance and linearity, since the cloud of points did not exhibit any visibly significant increase in variance with increasing values of standardised predicted values (i.e., typical funnel shape in case of heteroscedasticity).

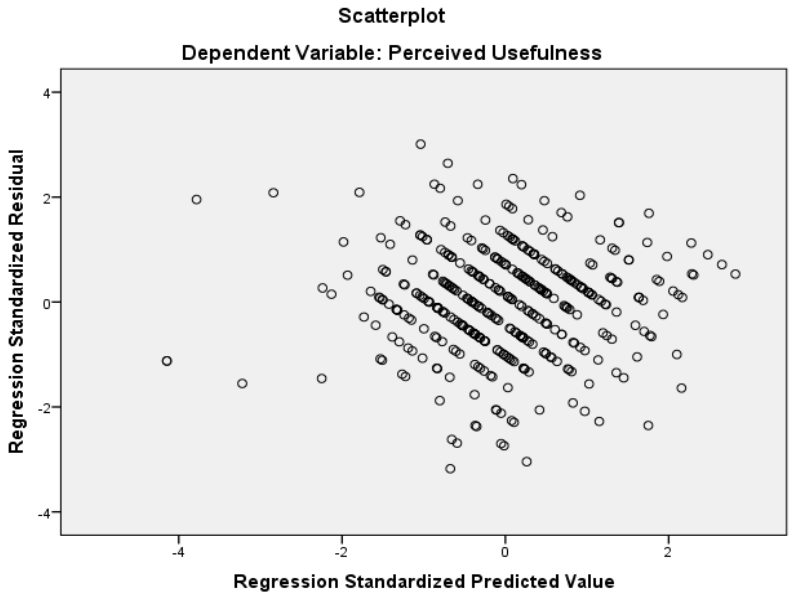


Figure H1.3: Scatter plot of Standardised Residuals

6. Finally, the data for the predictors also met the assumption of non-zero variances (*Learner*, variance = 26.034; *Course*, variance = 32.456; *Instructor*, variance = 9.658; *Technology*, variance = 7.813).

Bivariate Correlation

The bivariate correlations between *Learner* (M = 34.131, SD = 5.098), *Course* (M = 34.486, SD = 5.695), *Instructor* (M = 16.467, SD = 3.109) and *Technology* (M = 15.622, SD = 2.792) were also computed, as shown in the Table below:

Bivariate correlations (N = 493)

	Zero-Order *r*			
Variable	*Learner*	*Course*	*Instructor*	*Technology*
Instructor				.536**
Course			.613**	.408**
Learner		.663**	.437**	.243**
Mean	34.131	34.486	16.467	15.622
SD	5.098	5.695	3.109	2.792

** $p < 0.01$

APPENDIX 10 – Assumptions for Multiple Regression Analysis 2

1. In this case, the analysis of standard residuals revealed no outliers, with no residual exceeding the threshold value of 3.29 (Dart, 2013). Once again, the Tolerance values of the four predictors were greater than 0.1 (VIF less than 10), meaning that there was no multicollinearity among them (see **Table** below).

Table: *Significance of predictors (N = 412)*

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	.061	.678		.091	.928		
Instructor	.104	.038	.125	2.714	**.007**	.524	**1.908**
Learner	.187	.022	.376	8.393	**.000**	.558	**1.793**
Course	.157	.023	.348	6.836	**.000**	.433	**2.311**
Technology	.001	.037	.001	.023	.982	.688	**1.453**
a. Dependent Variable: Perceived Ease of Use							

2. The independence of residuals was also confirmed by a Durbin-Watson value of 1.953 (Refer to Table **I.2** below).

Dependent variable: "*Perceived Ease of Use"*

Table I.2: Model Summary[b]

R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			Durbin-Watson
				R Square Change	F Change	Sig. F Change	
.738[a]	.545	.540	1.73233	.545	121.732	4	**1.953**
a. Predictors: (Constant), Technology, Learners, Instructors, Course							
b. Dependent Variable: Perceived Ease of Use							

3. The normality of standardised residuals was quite clear from the histogram (**Refer to Figure I.1.1 below**)

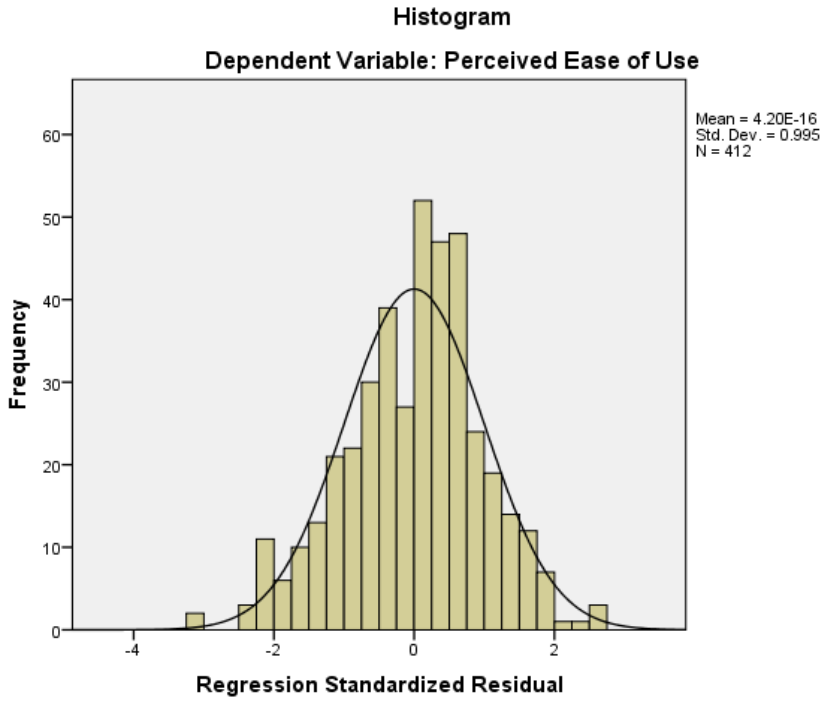


Figure I.1.1: Histogram of Standardised Residuals

4. Normal *P-P* plot the latter showing that points were very close to the line of normality (mean of 4.20×10^{-16}) refer to **Figure I.1.2** below

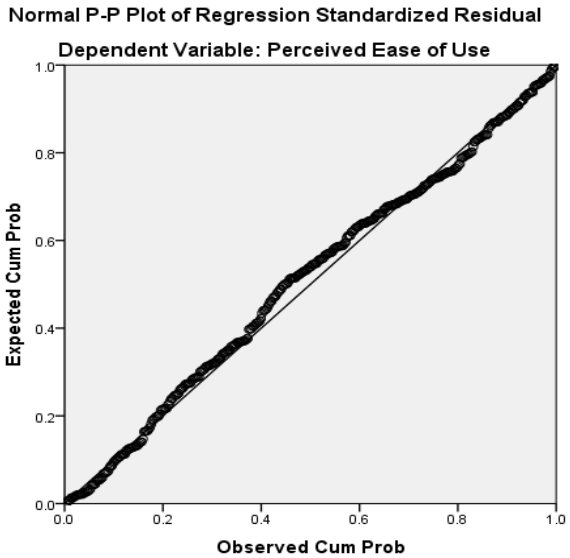


Figure I.1.2: Normal *P-P* Plot of Standardised Residuals

5. Homoscedasticity and linearity was obvious from the scatterplot of standardised predicted values (**Figure I.1.3**).

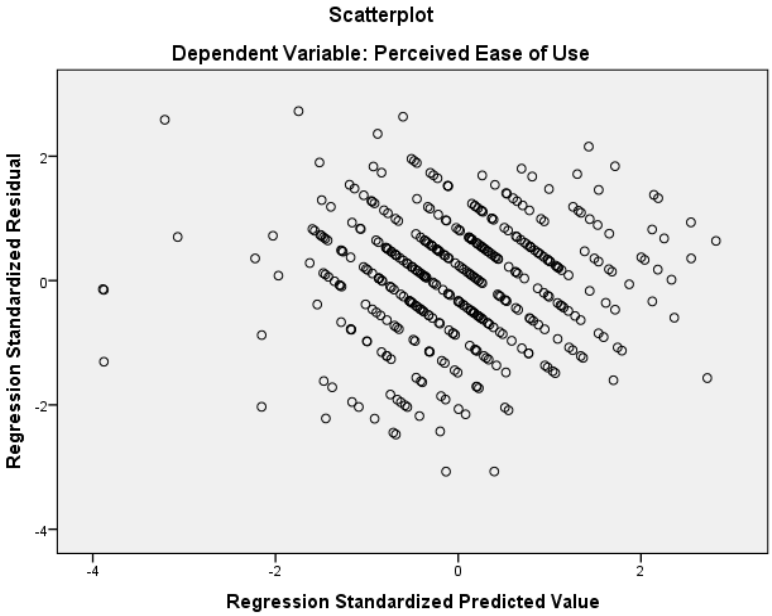


Figure I.1.3: Scatter plot of Standardised Residuals

6. **Bivariate Correlations**

The variances (non-zero) of the predictors slightly changed, as compared to those in the previous regression model, since this time there are 494 data point, instead of 493: (*Learner*, variance = 25.987; *Course*, variance = 32.429; *Instructor*, variance = 9.663; *Technology*, variance = 7.797). The bivariate correlations between the four predictors are presented in the following **Table**:

Table: *Bivariate correlations (N = 494)*

	Zero-Order *r*			
Variable	*Learner*	*Course*	*Instructor*	*Technology*
Instructor				.536**
Course			.610**	.408**
Learner		.662**	.438**	.243**
Mean	34.131	34.486	16.467	15.622
SD	5.098	5.695	3.109	2.792

** $p < 0.01$

Hierarchical regression revealed that the predictors explained a significant amount of the variance in *Perceived Ease of Use* (F (4, 407) = 121.732, $p < .001$).

APPENDIX 11 – Assumptions for Multiple Regression Analysis 2

1. The analysis of standard residuals revealed two outliers (cases E008 and E200), with respective residuals of 10.55 and 12.72, thus exceeding the threshold value of 3.29 (Dart, 2013). These two observations were removed so that the eventual size of the data was 492, prior to analysis.

2. The Tolerance value of the two predictors was 0.526 (greater than 0.1) and had the same VIF of 1.902 (less than 10), indicating an absence of multicollinearity between them (see Table below).

Significance of predictors (N = 447)

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	2.462	.493		4.997	.000		
Perceived Ease of Use	.218	.046	.204	4.786	**.000**	.526	**1.902**
Perceived Usefulness	.634	.045	.604	14.155	**.000**	.526	**1.902**
a. Dependent Variable: Attitude							

3. The independence of residuals was also confirmed by a Durbin-Watson value of 2.051 (Refer to Table below)

Table E3: Model Summary[b]

R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			Durbin-Watson
				R Square Change	F Change	Sig. F Change	
.759[a]	.576	.574	1.77523	.576	301.058	.000	**2.051**
a. Predictors: (Constant), Perceived Usefulness, Perceived Ease of Use							
b. Dependent Variable: Attitude							

4. The normality of standardised residuals was quite clear from the histogram (**Figure J.1.2**). The latter showing that points were very close to the line of normality (mean of 6.74×10^{-16})

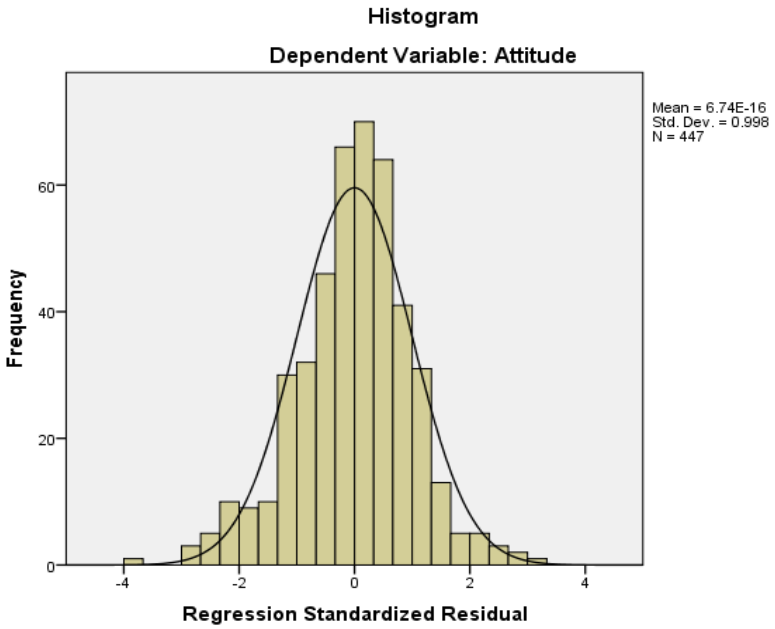


Figure J.1.2: Histogram of Standardised Residuals

5. Normal *P-P* plot (**Figure J.1.3below**) showing that points were very close to the line of normality (mean of 6.74×10^{-16}).

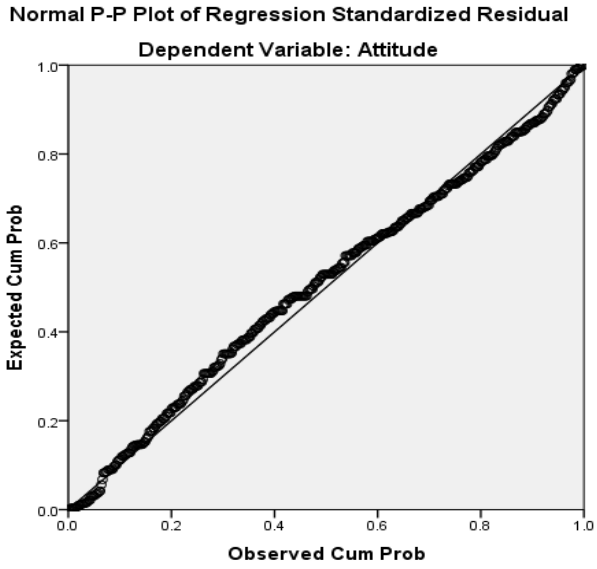


Figure J.1.3: Normal *P-P* Plot of Standardised Residuals

6. Homoscedasticity and linearity was obvious from the scatterplot of standardised predicted values (**Figure E9** below).

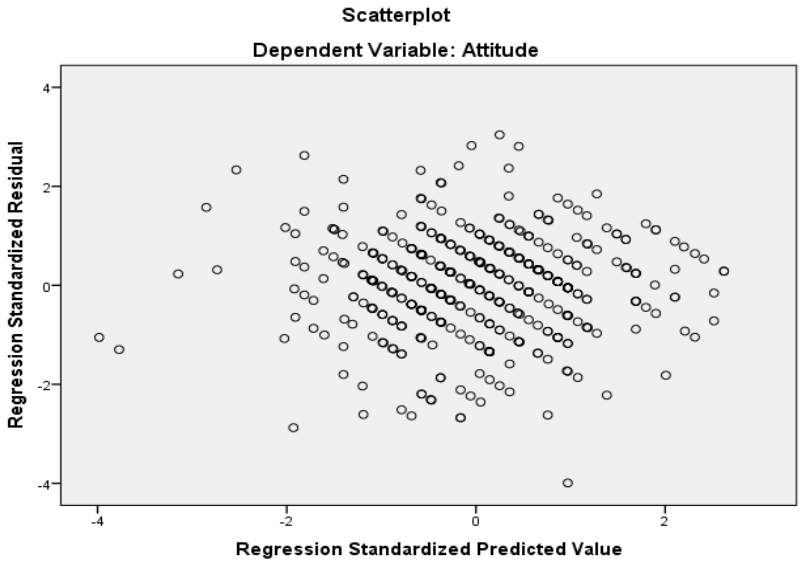


Figure J.1.3: Scatter plot of Standardised Residuals