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PROPOSING A MODEL TO PREDICT STUDENTS' PERCEPTION TOWARDS ADOPTING AN E-ASSESSMENT SYSTEM

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ABSTRACT

Information communication technology (ICT) is the buzzword of the 21st century. The letter 'E' appears in the words e-commerce, e-learning, e-banking and etc. In essence, the said letter reflects the ICT component that is utilized in providing more 'reach' in addition to making more effective and efficient commercial transactions, information and knowledge transactions and financial transactions to name a few. An e-based system will be utilized when there are supportive factors that collectively encourage its use. The perspective of the user is an undeniably important component. E-based systems may exist in an educational environment for varied purposes. Assessments inevitably play a role in such an educational environment as one of the many ways available to measure students learning outcomes. Thus, this study was conducted to explore students' perspective on engaging in an e-assessment experience. In that sense, the first and foremost step forward would be to recognize and identify real world problems and issued students are facing in their practice. So as to reach this goal, the study moved forward with the phase of article selection which is done through well-known academic databases. In continue, selected articles went through filtering phase so the most relevant studies disclosed. Secondly, to map those identified issues with corresponding behavioral factors of adoption. As a result, this could set the stage right for future studies on resolving issues and enhancing the e-assessment practice. This study reveals that UTAUT is the most suited underlying theory, and two constructs, namely Computer Anxiety and Habit are incorporated into the model to tailor the UTAUT so it could fit the case of e-assessment adoption.

Keywords: *Electronic Assessment System, E-Assessment, Adoption, E-Assessment Adoption, E-Assessment Problems*

1. INTRODUCTION TO E-LEARNING

Recently a new trend of technology has been practiced in higher education sectors to build up electronic learning systems which present a new way of accessing online learning contents for students [51]. The concept of e-learning can be considered as one of the most significant developments of information system in recent years [53]. A fully developed e-learning system can be braked down into several sub-systems which work together in order for the whole system to function properly [32]-[44]. The functionality of these sub-systems can vary from managing library documents to producing top management level reports and handling the process of information in the body of the e-learning system. One of these primary systems which have been described as the pillar of successfully implemented e-learning system is electronic assessment system [6]-[23]-[44].

In another word, universities face an enormous challenge in terms of achieving effectiveness and at the same time acceptance of offered electronic courses and activities by their students [38]. Currently, universities look into information technology to resolve problems of security, cost and quality [38]. Introducing new technology has raised the need for the higher education sector to alter the learning methods and using e-learning as a primary tool to that end [38]. By simply preparing virtual classrooms and offering credible electronic activities to duplicate the traditional learning experience and, as a result, to satisfy student's demands may result to unforeseen failures [52].

E-assessment system serves the purpose of managing all assessment related functions and

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document in an organization. With the use of such system in the educational sector, the cost of conducting an assessment session will drastically decrease; it would be a time-saving tool for universities as well as students. Also, it will bring benefit as by preparing fast feedbacks and generating reports to streamline the decision-making process and removal of human errors involved in the process of assessment [11]-[23].

2. SIGNIFICANCE OF THE STUDY

Having an e-assessment system established will have some impacts on university lecturers, IT administrators, and manager, but the only party that the success of the whole process depends on the students. Thereby capturing their positive attention by addressing problems and issues in their regard with e-assessment system will bring numerous benefits for Managers who are in charge of the decision-making process, and also IT staff and developers [28].

The second major contribution of this study goes to academic improvement in regard to developing a model that not only have the technical factors of adoption but also captures behavioral aspects as well. It will also extend the most suitable theory to a degree that is more relevant for an adoption of e-assessment system.

3. BACKGROUND ON E-ASSESSMENT SYSTEM

Electronic Assessment system (e-assessment) in general can be described as electronic means to adequately conduct an assessing procedure remotely within any given organization [13]. In that sense, the assessing can be defined as the process of gathering empirical data in order to develop a deep understanding of participants' state of mind, knowledge or experience in any given organization [4]-[8]. One of the most suitable situations to apply e-assessment is within educational districts.

As the level of internet penetration for universities increases globally, the true potential of learning and education process are revealed more and more as lecturers and students gain the ability to navigate through the massive quantity of available information on the World Wide Web[8]. The internet-based applications can be a dynamic tool which assists the educators to boost their learning process and brings education to any students, anywhere, at any time. Many scholars have hinted on the advantages of the deployment of E-Examination [3].

According to some studies done in this area, it was concluded that larger universities, and universities that offer e-assessment frequently, were more comfortable with and positive about almost all aspects of its use than smaller universities and those who use e-assessment less frequently [22]-[32]-[57]. In addition, more than 20 college students that were interviewed, which had prior experience working with e-assessment system(s) around once a term, found all aspects of the process including operating the technology challenging or problematic [17]. Essentially this confirms the view seen over a decade of e-assessment rollout. There are many legitimate concerns from tutors, learners, and universities about all aspects of e-assessment adoption, but once services are up and running regularly, and respective universities offering a satisfactory service, e-assessment is manageable, popular and brings some significant benefits [15]-[17]-[57].

There are two basic aspects that accepting an e-assessment system can be divided to. One is the technical factors, which play an important role not only in the post implementation phases but in pre-implementation phases as well [15]. These factors are defined as constructs that in one way relates to the development of the actual system or infrastructure of system establishment [15]. In the matter of e-assessment system, most anticipated and investigated of technical factors are in regards to security, interactivity, training, software design, and so forth [16]-[24].

In addition, there are behavioral aspects to accepting technology alongside with its technical characteristics. Many researchers have been argued that since most of the technical problems in adopting any technological system drags forward from development phases, it will attract more attention from the management point of view. As a result, more researchers are focused on studying the effect of technical variables to optimize the progress of e-assessment adoption, and that will create a gap as for the further understanding of behavioral aspects of the practice [17]-[36].

According to Osang [36], "e-assessment is emerging as a major driver for e-learning for both students and staff". The study explained that on-demand testing facilitates the students to have more control over their understanding and move toward more personalized learning. However, they have argued that due to behavioral and technical issues that arise with the installment of such system, e-assessment consumers which in the context of higher education are students will reject the system

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to some degrees and in-depth studies are required to understand students' perception and intentions toward using e-assessment technology. In the past 20 years many IT related organizations applied and used e-assessment features for the purpose of evaluating or measuring the level of knowledge or experience. Organizations such as Microsoft and CISCO are well known for this practice [36], and also successful cases of applying e-assessment such as distance exams tools of MCSE or CCNA [12].

4. RESEARCH OBJECTIVES

The introduction of E-Assessment to the higher education sector happened within the context of e-learning programs, and therefore e-assessment stands as one of many sub-functions of the whole system. Thereby in order to comprehend the essence of e-assessment, this study faces three main questions which are: to identify behavioral and technical issues, to cope the identified problems with corresponding factors, and to propose a new model to address e-assessment adoption from student's perspective.

To address the research questions, the aim of this study is to prepare a summarization of literature based behavioral problems and issues that university level students are facing in their practice with an e-assessment system. In the next step, the study will attempt to map the identified problems with behavioral and technical factors, and at last, present a model for e-assessment adoption from student's point of view.

5. METHODOLOGY

For the purpose of finding and filtering articles for this study, the start point was online journal databases that give access to vast amount of indexed papers in regard to information system technology. The online databases that have been chosen for the purpose of this research are IEEE Xplore, Web of science, Scopus, and Google Scholar. Through the search engine of each of mentioned databases search has been done by using certain keywords in regard to the thesis title. Those keywords were: Electronic assessment system, E-Assessment system, Electronic test, E-test, Electronic Placement test, E-placement test.

The total number of articles in hand was roughly around 1035, after collecting all given results from the databases. The next step was to first pass filtering which, in this case, was done through eliminating duplicated articles which were the result of looking up the same keyword through different databases. Also since the focus of the study is on recent studies in the e-assessment adoption area then all articles in this first pass were filtered by the year of publication which is all from 2009 onward. Furthermore, last filtering method used in this phase was reading the abstract of the paper and judging by the context the paper was omitted in the case of focusing on the pre-implementation phase in regard to e-assessment system. By the end of this pass the total number of articles reduced to 102 papers. Figuer-1 below depicts the process of article selection conducted for this research.

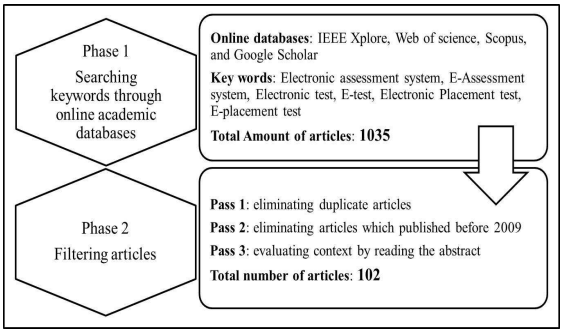

Figure 1: Article Selection Process

In addition, Figure-2 below shows the annual distribution of selected articles in regard to their main focus toward the e-assessment system.

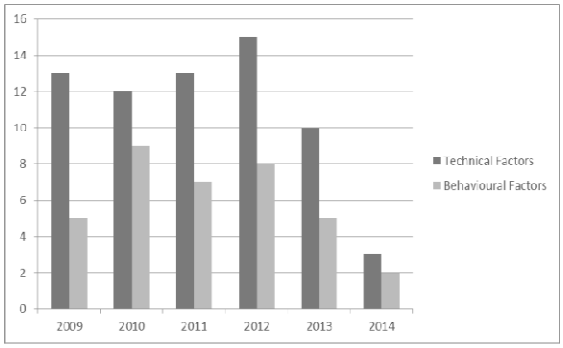

Figure 2: Article Distribution

As it has been depicted in Figure-2, the highest number of researches focusing on e-assessment system conducted in the year 2012 and from there the number starts to decline, until it reaches the minimum point in 2014. Another significant point which stands out from the figure is that, as a comparison in the field of e-assessment, the number of articles that concentrate on technical factors is always higher that the ones which takes behavioral factors into the account. This latest argument can lead us to believe that in the case of usage and acceptance of e-assessment system by students, there might be a gap where behavioral issues are involved.

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6. E-ASSESSMENT ISSUES

Despite all the benefits that an e-assessment system can potentially bring, like every other technological-based step forward, it is not without issues and problems. From literature review perspective, there are some major issues that developers, IT managers, and students are dealing with in an encounter with e-assessment system in the university level. These issues can be mostly related with security, confidentiality, and robustness, however, there are some other aspects to them that can be seen from student's perspective and they are playing a major rule in terms of adopting the system. Most notables of these problems are listed as follow:

These days' students normally type their course work and assignments and the submission process moves online [18]-[30]. Because of this, students are more in favor to type their coursework and assignments rather than traditional ways especially when it comes to examination [20]-[30]. The handwriting motor skills are shown to reduce particularly due to the fact the use of computer typing methods are increasing, which in turn will lead to students discomfort in pen and paper examination session [50]. And the complaints have been reported from students in regard to the traditional way of assessment [43]. These practices are in fact the degree of an individual's actions that perceived to be automatic [59].

It has been reported that students tend to feel more relaxed and secure using their own electronic devices, which means in high pressures situation using familiar equipment can increase the effectiveness and reduce the stress level as studies show that previous familiarity with electronic equipment can lead to choosing a keyboard rather that pen by students [11]-[30]. This mentioned problem, in a way, reflects the fact that under the normal pressure of the exam itself, students who are participating in e-assessment procedure has more reason to get flustered.

Pen and paper base assessment provide little to no opportunity for feedback and has been described as a 'feedback desert' [48]. However in light of the fact that e-assessment presents a new opportunity, here comes the issue of complexity and students' readiness to properly function with the system. It was suggested by prior studies that level of students' readiness of accepting and working with new technology should be taken into the account, also the university should maintain a streamlined process to conduct the examination in terms of software simplicity and robustness [7]-[18].

Providing a fair environment is crucial when it comes to facilitating an e-assessment session. Exam authorities practice fairness in various ways [10] from providing the same environment to all candidates to different environments to ensure accessibility to those with disabilities. Furthermore, some researchers argued that under the stressful conditions of exam noise and other external distractive variables in students' surrounding must be kept to minimal in terms of optimizing their concentration and focus [31].

Assessments at universities are of the highest stakes in terms of reliability and validity to be accepted by stakeholders [49]. If things were to go wrong with the exam process, the university would risk the loss of reputation as to their status as guardians of standards and as reliable accreditors of graduate achievements. The impact on students affected would also be significant with increased distress at a time of already high stress, which in turn the first incoming effect shows as increasing level of anxiety in students [49]. Other studies in this regard also suggest that the other downward to complications like that not only carries immediate effect on the students but also will shape their intuitions and perspective toward the whole experience, therefore existing negative impacts can lead on negativity and passed to other students causing demotivation and dissatisfaction in them even before they experience the system first hand [5].

7. MAPPING PROBLEMS WITH FACTORS OF ADOPTION

The general adoption of an e-assessment system can be divided into two main categories. First are the technical factors that are mostly related with the design and implementation of the system. In addition, these technical constructs potentially affect the users' perception of the usefulness of the finalized system. In light of that there are large numbers of researches mainly focused on the technical aspects of e-assessment adoption such as security, interface design, privacy, and so forth [1]-[16].

Secondly, prior studies have suggested that in order to thoroughly understand the process of adoption, a combination of technical and behavioral (or psychological) affection from end users is mandatory [19]-[22]. As a result there is a cumulated list of factors that are considered to have an effect of motivations for system users in terms of

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adoption, in general, are presented In continuing the most well-known adoption factors are listed and explained [2]-[9]-[27]-[33]-[51]-[56].

- Attitude: Positive or negative individuals' feeling about behavioral performance.
- Image: Degree to which usage of the system corresponds with users' social status.
- Self-Efficacy: Degree that individual believed he/she has the potential capability to perform a task.
- Control: Degree to which an individual believes that an organizational and technical infrastructure exists to support him/her in the usage of the system.
- Hedonic Motivation: Degree to which that using the system considered by individuals to be enjoyable.
- Subjective Norm / Social Influence: Degrees to which individual perceives others' believe he/she should use the new system.
- Playfulness: Degree of intellectual freedom during an interaction with the system.
- Computer Anxiety: Degree of an individual's uneasiness or fear when he/she is faced with the possibility of using computers.
- Habit: Degree to which an individual's positive or negative behavior intrigued by repetition of performing a task or having prior experience.

As it has been explained above, there are considerable numbers of factors that have a behavioral effect toward user's adoption. All those mentioned factors derived from various adoption theories and they all can play a significant rule to predict human behavior in case of interaction with electronic systems. However, there are only limited numbers of behavioral factors which successfully represent real world problems as it was explained earlier for the case of e-assessment adoption.

Furthermore, in the case of developing contemporary IS theories such as sociotechnical theories, there are lots of variables and constructs involved which in turn stands to represent a single problem or set of issues in regard to measuring student's behavior toward adopting e-assessment system. Considering a limited number of studies in this extent, there are some identified problems as was explained earlier that can be addressed by constructs that originally comes from different generation of sociotechnical theories. In Table-1, a set of generalized problems is crossed with constructs from UTAUT, TAM3, TAM2 and TAM1 in order to identify most relevant factors that can predict student's perception toward adoption of e-assessment system.

Table 1: E-Assessment Adoption Problems And Corresponding Constructs

Problem	Theory(s)	Construct(s)
Complicated interface	UTAUT TAM 1,2,3	Effort Expectancy Ease of Use
Lack of training	UTAUT TAM 1,2,3	Performance Expectancy Perceived usefulness
Distraction	UTAUT	Facilitating conditions
Fear of software malfunction	TAM 3	Computer Anxiety
Being demotivated	UTAUT TAM 2,3	Subjective Norms Social Influence
Lack of technical support	UTAUT	Facilitating conditions
Perception of automatic behavior	-	Habit

As it was depicted in Table-1, most of the issues are addressed by UTAUT model which serves as a mixture of well-known prior models of adoption, therefore for the purpose of this study, UTAUT will be selected as the underlying model which captures the majority of e-assessment related problems by students. However it has been noted that in two cases of computer anxiety and habit, UTAUT shows some limitations. Therefore as the last step toward completing the objectives of this study, UTAUT will be extended by two constructs namely computer anxiety and habit that the said model lacks, in order to propose a new model that address behavioral and technical problems in e-assessment adoption.

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In the Figure-3, the entire core constructs of the research proposed model are shown.

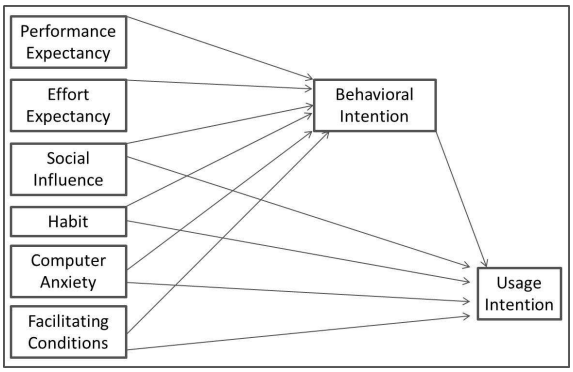

Figure 3: Proposed Model

The underlying model used in this study is UTAUT, which in the Figure-3 is shown, however there due to UTAUT limitation in the case addressing e-assessment problem, it will be extended by two new constructs which are computer anxiety and habit. A brief description of each construct from original UTAUT including the two extend constructs will be explained in continue.

Performance Expectancy is the degrees to which an individual believe that using the system will help him or her to increase job performance. In the case of e-assessment adoption there are some real world problems faced by students such as lack of sufficient training sessions for students that can influence their perception toward adopting the system, therefore considering performance Expectancy as a construct can address those identified issues [7]-[14]-[21]-[26].

Effort Expectancy can be defined as the degree of ease associated with the use of the system. A complicated interface is one of the most well-known technical issues that tend to go back and forth between end users and developers. For that matter, the effect of Effort Expectancy has been proposed by many researchers in order to identify and resolve the problem of adopting e-assessment system [7]-[22]-[26]-[48].

Social Influence is the degree to which an individual believes and intention of using an electronic system will be influenced by the degree of other's believe and understanding. Social Influence is the equivalent of the construct subjective norms in most of the socio-technical models, which serves to address issues surrounding the matter from the social perspective. In the case of e-assessment adoption, many known problems faced by students will amount to negatively demotivated them which then turn to passing the demotivation feeling to the other students in the social groups [5]-[49].

Facilitating Conditions defined as the degree to which an individual believes that an organizational resources and technical infrastructure are existed to support his or her use of the system. In the case of e-assessment adoption, the need for providing an assessing system that have a range of accessibility features available to all can be relatively challenging, which in turn can lead to dissatisfaction due to lack of technical support during the assessment session [10]-[11]-[21].

The state of anxiety can be understood from three different perspectives. Firstly, is trait anxiety which has been defined as a state of emotion that an individual experience over the course of his or her life in general. The second type would be the state of anxiety worrisome experiences and can be facultative over time. The third is concept dependent anxiety which is a mixture of trait and state anxiety [37]. The construct computer anxiety can be classified under the second type of anxiety which is the state anxiety since the feeling will emerge before or during and engagement with an information system [41].

Another definition of computer anxiety can rely upon the tendency to which an individual experience uneasiness when using computer [54]. In addition, previous studies have shown that computer anxiety has a significant impact on computer-related activities such as computer use, computing skills, attitudes toward computers, intentions to use computers or software applications, and perceived ease of use [45]. These findings showed that computer anxiety increases resistance to computer technology and represents an obstacle to an individual's involvement with computers. According to Venkatesh [54] this construct covers affecting emotional reactions and anxiousness when it comes to using a technology.

Habit was originally proposed by Wu [59] as a considerable construct in order to predict usage and attitude-intention toward actual system usage. Previous studies regarding habit distinctively define it in two ways. First it has been defined as a prior behavior [19] and secondly, it was understood to be an individual's believe the certain set of behaviors are perceived to be automatic [59]. In the context of this research, habit considered to be a construct to reflect student's prior behaviors toward same pattern repetition. Furthermore, according to [2], there is a direct and interactive impact from habit toward behavior. He described it as "situation-

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behavior sequences that are or have become automatic", the individual is usually not "conscious" of these sequences.

In the proposed model behavioral intention is the only factor that plays the role of mediator. Behavioral Intention is defined as the degree to which a person has formulated conscious plans to perform or not perform some specified future behavior.

The dependent variable is measured based on students' intention toward actual usage of e-assessment system, and the degree that they are willing to work with such system in future as well as recommending it to other friends. Usage intention in overall can be defined as positive or negative felling that leads to making decisions toward using newly introduced computer based software or rejecting it [55]-[56].

8. CONCLUSION AND SUMMARY

There are a considerable number of behavioral related problems that occurs from students' point of view in regard to e-assessment practice. Identifying said problems can bring numerous benefits for the key players and stake-holders in the higher education sector as well as building up a set for future researchers to address recognized problems accordingly. Furthermore, the negative impacts of all those issues can amount to resentment and dissatisfaction in students toward adopting new e-assessment technology, since their behaviors are shaped based on their personal experience and factors of social influences. Moreover, these identified factors are mapped with corresponding factors from many well-known adoption models which in turn led us to propose a newly presented model that has been crafted for the purpose of predicting student's behavioral perception toward adopting an e-assessment system.

Mac Callum [25] believes that in the future of electronic learning, means of conducting electronic assessing will be essential to the success of the whole process. As a result inspecting all problematic sides of electronic exam system from experienced students perspective will tell us reasons of failure, as well as vital information regarding all aspects of electronic assessment system which in turn will give us competitive edge in future when we are facing with more complex and complicated software to carry out the whole assessing process.

REFRENCES:

[1] Adebayo, O., & Abdulhamid, S. M., E-Exams System for Nigerian Universities with Emphasis on Security and Result Integrity. arXiv preprint arXiv (1402.0921), 2014.

[2] Al-Adwan, A., & Smedley, J, "Exploring students acceptance of e-learning using Technology Acceptance Model in Jordanian universities Amer Al-Adwan Applied Science University, Jordan", International Journal of Education and Development using Information and Communication Technology, 9(2), 2013, pp. 4-18.

[3] Ayo, C. K., Akinyemi, I. O., Adebiyi, A. A., & Ekong, U. O, "The prospects of e-examination implementation in Nigeria", Turkish Online Journal of Distance Education-TOJDE, 8(4), 2007, pp. 125-134.

[4] Bartley, Jeanette M. "Assessment is as Assessment Does: A Conceptual Framework." Online assessment and measurement: Foundations and challenges, 2006.

[5] Cho, J., & Eberhard, B, "When Pandora's Box Is Opened: A Qualitative Study of the Intended and Unintended Impacts of Wyoming's New Standardized Tests on Local Educators' Everyday Practices", Qualitative Report, 2013, pp.18-20.

[6] Claar, C., Dias, L. P., & Shields, R, "Student's acceptance of learning management system: A study on demographics", Issues in Information Systems, 15(1), 2014.

[7] Crisp, G, "Teacher's Handbook on e-Assessment.", Transforming Assessment-An ALTC Fellowship Activity, 18, 2011.

[8] Dermo, J, "E-Assessment and the student learning experience: A survey of student perceptions of e-assessment.", British Journal of Educational Technology, 40(2), 2009, pp. 203-214.

[9] Edmunds, R., Thorpe, M., & Conole, G, "Student attitudes towards and use of ICT in course study, work and social activity: A technology acceptance model approach", British journal of educational technology, 43(1), 2012, pp. 71-84.

[10] Fluck, A, "State wide adoption of e-assessments." In Ensuring quality and standards for e-assessments in Tertiary Education: Redefining innovative assessment in the digital age, 2012, pp. 1-9.

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ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

[11] Fluck, A., & Mogey, N, "Comparison of institutional innovation: Two universities' nurturing of computer-based examinations", In 10th IFIP World conference on computers in education, 2013, pp. 11-20.

[12] Ghaeni, E., & Abdehagh, B, "A Model for Implementing E-learning in Iranian Organizations.", Personal Reflections on the Transformation of Education, 47, 2010.

[13] Haughton, N. A., & Keil, V. L, "Engaging with faculty to develop, implement, and pilot electronic performance assessments of student teachers using mobile devices." The Teacher Educator, 44(4), 2009, pp. 275-284.

[14] Hillier, M., & Fluck, A., "Arguing again for e-exams in high stakes examinations." In 2013 Australian Society for Computers in Learning and Tertiary Education Conference, 2013, pp. 1-11.

[15] Hricko, M., & Howell, S. L, "Online Assessment and Measurement." IGI Global, 2006.

[16] Huszti, A., & Petho, A, "A secure electronic exam system.", Publicationes Mathematicae Debrecen, 77(3-4), 2010, pp. 299-312.

[17] Joshua, M. T., & Ikiroma, B, "Computer-Based testing in Nigeria's university entrants' matriculation examination: Readiness and acceptability of critical stake-holder", 2012.

[18] Karaiskos, D. C., Drossos, D. A., Tsiaousis, A. S., Giaglis, G. M., & Fouskas, K. G., "Affective and social determinants of mobile data services adoption." Behaviour & Information Technology, 31(3), 2012, pp. 209-219.

[19] Kim, S. S., & Malhotra, N. K, "A longitudinal model of continued IS use: An integrative view of four mechanisms underlying postadoption phenomena", Management science, 51(5), 2012, pp. 741-755.

[20] Kishore, K., & Sequeira, A. H, "An Empirical Observation of Age Factor's Moderating Role on Mobile Banking Adoption in Rural Karnataka.International", Journal Of Marketing, Financial Services & Management Research, ISSN, 2277-3622, 2012.

[21] Al-Qeisi, K., Dennis, C., Alamanos, E., & Jayawardhena, C., "Website design quality and usage behavior: Unified theory of acceptance and use of technology." Journal of Business Research, 67(11), 2282-2290, 2014.

[22] Lai, C., Wang, Q., & Lei, J., "What factors predict undergraduate students' use of technology for learning? A case from Hong Kong.", Computers & Education, 59(2), 2012, pp. 569-579.

[23] Larsen, K. R., Hovorka, D., West, J., Birt, J., Pfaff, J. R., Chambers, T. W., ... & Vanstone, B., "Theory Identity: A Machine-Learning Approach In System Sciences (HICSS)", 47th Hawaii International Conference, 2014 pp. 4639-4648.

[24] Levy, Y., Ramim, M. M., Furnell, S. M., & Clarke, N. L, "Comparing intentions to use university-provided vs vendor-provided multibiometric authentication in online exams." Campus-Wide Information Systems, 28(2), 2011, pp. 102-113.

[25] Mac Callum, K., & Jeffrey, L. Kinshuk, "Factors impacting teachers' adoption of mobile learning", Journal of Information Technology Education: Research, 13, 2014, pp. 141-162.

[26] Mandal, D., & McQueen, R. J, "EXTENDING UTAUT TO EXPLAIN SOCIAL MEDIA ADOPTION BY MICROBUSINESSES." International Journal of Managing Information Technology, 4(4), 2012.

[27] Mbarek, R., & Zaddem, F., "The examination of factors affecting e-learning effectiveness", International Journal of Innovation and Applied Studies,2(4), 2013, pp. 423-435.

[28] McManus, M., "New media Literacies and Personalized Learning, Key Note Address", Sixth U21 Educational Innovation Conference, 8-9 Nov 2012.

[29] Mogey, N., & Fluck, A., "Factors influencing student preference when comparing handwriting and typing for essay style examinations", British Journal of Educational Technology, 2014.

[30] Mogey, N., Paterson, J., Burk, J., & Purcell, M., "Typing compared with handwriting for essay examinations at university: letting the students choose". Research in Learning Technology, 18(1), 2010.

[31] Mogey, N., Sarab, G., Haywood, J., Van Heyningen, S., Dewhurst, D., Hounsell, D., & Neilson, R, "The end of handwriting? Using computers in traditional essay examinations." Journal of Computer Assisted Learning, 24(1), 2008, pp. 39-46.

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ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

[32] Muwanga-Zake, J., Parkes, M., & Gregory, S., "Blogging at university as a case study in instructional design: Challenges and suggestions towards professional development", International Journal of Education and Development using ICT, 6(1), 2010, 14-29.

[33] Nair, I., & Das, V. M. "Using Technology Acceptance Model to assess teachers' attitude towards use of technology as teaching tool: A SEM Approach", International Journal of Computer Applications, 42(2), 2012.

[34] Nassuora, A. B. "Students acceptance of mobile learning for higher education in Saudi Arabia", American Academic & Scholarly Research Journal, 4(2), 2012, pp. 24-30.

[35] Orenyi, Bajeh Amos, and Mustapha Mutairu Omotosho. "Computer-based Test Software System: A Review and New Features." Computer 55, no. 15, 2012.

[36] Osang, F. "Electronic Examination in Nigeria, Academic Staff Perspective—Case Study: National Open University of Nigeria (NOUN)", International Journal of Information and Education Technology, 2(4), 2012, pp. 304-307.

[37] Oye, N. D., A Iahad, N., Rahim, A., & Zairah, N. "Behavioral intention to accept and use ICT in public university: integrating quantitative and qualitative data", Journal of Emerging Trends in Computing and Information Sciences, 3(6), 2012, pp. 957-969.

[38] Park, S. Y. "An Analysis of the Technology Acceptance Model in Understanding University Students' Behavioral Intention to Use e-Learning", Educational Technology & Society, 12(3), 2009, pp. 150-162.

[39] Pedersen, C., White, R., & Smith, D. "Usefulness and reliability of online assessments: a Business Faculty's experience", International Journal of Organisational Behaviour, 17(3), 2012, pp. 33-45.

[40] Perraton, H. "Theory, evidence and practice in open and distance learning", BIS-Verlag der Carl-von-Ossietzky-Univ, 2012.

[41] Powell, A. L. "Computer anxiety: Comparison of research from the 1990s and 2000s", Computers in Human Behavior, 29(6), 2013, pp. 2337-2381.

[42] Raman, A., & Don, Y. "Preservice teachers' acceptance of Learning Management Software: An application of the UTAUT2 model", International Education Studies, 6(7), 2013, p157.

[43] Ratcliffe, R. "Exams make our hands sore, say students", The Guardian. Available at: http://www.guardian.co.uk/education/mortarboard/2012/jan/25/exams-make-our-hands-sore, 2012

[44] Riad, A. M., & El-Ghareeb, H. A. "A Service Oriented Architecture to Integrate Mobile Assessment in Learning Management Systems", Online Submission, 9(2), 2008, pp. 200-219.

[45] Saadé, R., Kira, D., & Nebebe, F. "The Challenge of Motivation in e-Learning: Role of Anxiety", In Proceedings of the Informing Science and Information Technology Education Conference, Vol. 2013, No. 1, 2013, pp. 301-308.

[46] Sam, H. K., Othman, A. E. A., & Nordin, Z. S. "Computer self-efficacy, computer anxiety, and attitudes toward the Internet: A study among undergraduates in Unimas" Educational Technology & Society, 8(4), 2013, pp. 205-219.

[47] Sarrayrih, M. A., & Ilyas, M. "Challenges of Online Exam, Performances and problems for Online University Exam", International Journal of Computer Science Issues (IJCSI), 10(1), 2013.

[48] Scoles, Jenny, Mark Huxham, and Jan McArthur. "No longer exempt from good practice: using exemplars to close the feedback gap for exams", Assessment & Evaluation in Higher Education 38, no. 6, 2013, pp. 631-645.

[49] Shroff, R. H., & Vogel, D. R. "Assessing the factors deemed to support individual student intrinsic motivation in technology supported online and face-to-face discussions", 2009.

[50] Sülzenbrück, S., & Heuer, H. "Type of visual feedback during practice influences the precision of the acquired internal model of a complex visuo-motor transformation", Ergonomics, 54(1), 2011, 34-46.

[51] Tan, Paul Juinn Bing. "Applying the UTAUT to understand factors affecting the use of English e-learning websites in Taiwan." Sage Open 3, no. 4, 2013.

[52] Tan, P. J. B. "Students' adoptions and attitudes towards electronic placement tests: A UTAUT analysis", American Journal of

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Computer Technology and Application, 1(1), 2013, pp. 14-23.

[53] Teo, T., Lee, C. B., Chai, C. S., & Choy, D. "Modelling pre-service teachers' perceived usefulness of an ICT-based student-centred learning (SCL) curriculum: A Singapore study", Asia Pacific Education Review, 10(4), 2009, pp. 535-545.

[54] Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. "User acceptance of information technology: Toward a unified view", MIS quarterly, 2003, pp. 425-478.

[55] Venkatesh, V., Thong, J. Y., Chan, F. K., Hu, P. J. H., & Brown, S. A. "Extending the two stage information systems continuance model: incorporating UTAUT predictors and the role of context", Information Systems Journal, 21(6), 2011, pp. 527-555.

[56] Venkatesh, V., Thong, J. Y., & Xu, X. "Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology", MIS quarterly, 36(1), 2012, pp. 157-178.

[57] Warburton, S. "Second Life in higher education: Assessing the potential for and the barriers to deploying virtual worlds in learning and teaching", British Journal of Educational Technology, 40(3), 2011, pp. 414-426.

[58] Whitman, M. E., & Mattord, H. J. "The enemy is still at the gates: threats to information security revisited", Information Security Curriculum Development Conference, 2010, pp. 95-96

[59] Wu, Yu-Lung, Yu-Hui Tao, and Pei-Chi Yang. "Using UTAUT to explore the behavior of 3G mobile communication users." In Industrial Engineering and Engineering Management, 2007 IEEE International Conference on, 2007, pp. 199-203.

[60] Yang, Kiseol, and Judith C. Forney. "The moderating role of consumer technology anxiety in mobile shopping adoption: Differential effects of facilitating conditions and social influences." Journal of Electronic Commerce Research 14, no. 4, 2013, p. 334.