

User Acceptance and Usage of E-learning Technologies: A Theoretical Review

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Abstract: *The quest for higher education has prompted learning institutions to adopt e-learning technologies around the world. To support learning, institutions have shifted from the traditional methods of content delivery and started to use of information technology tools and applications such as learning management systems. E-learning technologies are tools and facilities that enable instructors and learners to interact remotely. Instructors and learners acceptance affects their usage and this critical for successful implementation of e-learning technologies. The objective this paper is to review theoretical literature on learners and instructors acceptance and use of e-learning technologies using Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Usage of Technology (UTAUT), to establish the factors that influence user acceptance and usage of information communications technology and to provide further insight of the issues encompassing acceptance of e-learning technologies by learners and lecturers. This study reveals that despite TAM being a much referred model for predicting technology acceptance factors and usage, the theory is not powerful enough. The paper also established that most of researchers' referred to UTAUT in their articles considering their end goal was to back a contention instead of utilizing the theory. Others that reported the utilization of UTAUT really employed*

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1. Introduction

According to [17] e-learning is a study technique which utilizes electronic instructional content. The education sector has turned to technological innovations to become more competitive and focused in controlling their key assets and cut down on expenses in an effort to confront expanded worldwide rivalry. The effective usage of technological tools ranging from straightforward applications, for example, word processing, desktop publishing, database access and spreadsheets, to more complex applications, for example, content management systems, require user acceptance.

The ever improving rate of Internet penetration in both developed and developing world has led to more and more universities to adopt e-learning education. According Internet World Stats (2016), Internet penetration stands at 28.6% in Africa, 44.2% in Asia, 73.9.3% in Europe and 89% in North America. Studies from Tanzania [24], Uganda [12] and Zimbabwe [22] and Nigeria [11] show there is evidence that African universities have adopted e-learning.

Learning institutions have implemented and deployed hybrid learning management systems such as MOODLE, Blackboard and WebCT in order to facilitate instructor student interactions. These systems provide assessment tools such as quizzes, forums, assignments, chats, automatic and/or manual grading, reporting among others. The advantages brought about by integrating technological tools into academics include; availability on demand, automatic grading, instant feedback, real-time chatting and video conferencing, reporting and analysis. However, information systems are characterized by has a number of disadvantages. These systems are not suitable for testing of all skills and activities, they require IT skills, and time is consumed in design and input of questions. Security is also major concern.

Despite the improved rate of adoption of e-learning technologies by universities around the globe, pertinent challenges must be addressed in order to achieve adoption success. According to a study on by [2], it is revealed that e-learning is not just use of computers and electronic gadgets in classrooms but careful planning while involving users such as teachers and students.

This argument has been supported by studies by [8]. The researcher urges that successful education is not dependent on technology only, but must be carefully planned with the teachers and students in mind. It is perceived that unless the characteristic variables of learners and instructors are regarded, capability of electronic learning would not be completely used, in this way bringing down the gains of such a venture [36].

Implementing online-based study technologies is not only difficult, but students and instructors might not use them as it is expected. Some of the challenges that might lead to limited usage of e-learning tools is minimal learner support [29]. The study revealed that instructors attributed failure to fully utilize e-learning technologies to insufficient resources, heavy workload and poor compensation.

According [30], there has been difficulties relating to instructing and testing learners in vast classes. These difficulties include powerlessness of the lecturer to become more acquainted with students, failure to diminish students sentiment of being recognized, feint and connection within classroom, overseeing tests grading and looking after rationale, electronic mail management, scheduling available time to do consultations, managing homework or instructional exercise materials, recording evaluations, and how to successfully convey the subject material.

Any effective application of technological learning tools in of e-learning technologies in academic institutions begins with

learners and instructors' acceptance, which in turn triggers students' usage of e-learning technologies in classes. A past study conducted on Kenyan universities shows that 68% of e-learning instructors had no special training on delivery of e-learning studies [25]. This kind of situation might lead to rejection of new e-learning technologies initiatives. These findings are further supported by similar studies conducted in Zimbabwe by [22] the researchers established that 97.5% of online instructors did not possess any skills through training.

Having well trained staff is key to proving quality blended learning. In their proposed model for instructor acceptance of learning management systems [3] point out that Technology Acceptance Model (TAM) they had used had not been validated empirically and thus it could not be generalized. Several theories with different determinants have been applied to measure the user acceptance of innovations which is a critical indicator of a successful or failed implementation. A portion of the outcomes from these studies are in accordance with the constructs of the models though others negate the models.

Eight theories for technology acceptance were integrated by Venkatesh to form UTAUT theory, the integrated models explain between 30-36% of users' behavioral motive to operate information systems. The remaining 60-64% variability has not been explained. Empirical validation results of UTAUT theory accounts for 70% of the variability in information systems use behavior and about 50% in actual use.

Most researchers have concentrated on adoption of e-learning innovations. Little consideration has been paid to how much understudies and teachers really utilize them. E-learning advances can possibly enhance the nature of instruction offered in higher establishments. The advantages must be acknowledged be realized if the users have access to these technologies and use them on a regular basis.

The objective of this study is to review literature on user acceptance and usage of e-learning technologies using Technology acceptance Model (TAM) and Unified Theory of Acceptance and Usage of Technology (UTAUT), to establish the factors that influence user acceptance and usage of information communications technology and to provide further insight of the issues encompassing acceptance of e-learning technologies by learners and lecturers.

2. Theoretical Framework

A. Technology Acceptance Model (TAM)

Technology Acceptance Model (TAM) is a theory used in information systems studies to predict how users come to acknowledge and utilize new technological innovations. The model proposes that when users are exposed to technological innovation, various factors impact their choice about how and when they will utilize it. TAM is a derivation of theory of reasoned action (TRA) by Ajzen and Fishbein in 1975. According to [5], TRA is the benchmark for the theories and models used in assessment of user acceptance and use of technological innovations. TRA theory suggests attitudes and

subjective norms as the two variables that have effect on user behavioral intention which turns out to be the main motivator of behavior. [37] have however criticized the theory for lack of consideration of individual's ability to control.

The TAM was derived from the generic TRA model and was made to help with clarifying technological tools utilization and to assist recognize the components which prompt client's acknowledgment or dismiss an innovation by incorporating systems viewpoints with organizational aspects [5]. The model proposes two fundamental variables which are, perceived usefulness and perceived ease of use. Using these two factors, systems builders can better user knowledge thus can foresee their behavioral aim and genuine utilization of the technology [28].

[33] extended this theory by incorporating two more determinants. These factors are; social influences and cognitive instrumental processes. The social influences include subjective norms and images. Cognitive instrumental processes includes job relevance, output quality, result demonstrability and perceived ease of use. Thus, the second Technology Acceptance Model (TAM2) keeps TAM model variable of perceived ease of use because of its strong correlation with perceived usefulness. The extra components have been acknowledged for their impact on acceptance of new technologies.

Experience and voluntariness of users have been included in the theory as moderating variables. Notably, TAM2 has excluded the user attitude construct because the construct was considered to be negligible [35]. However, in customization of TAM into TAM2, the two variable has been included [33].

[32] further modified TAM2 to provide a higher significance level to 'perceived ease of use'. The authors added four more dimensions from TAM2 to TAM3. These dimensions include PC self-efficacy, impression of outer control, PC uneasiness and PC playfulness. Two factors have been added, which are enjoyment perception and target usability. According to [9] TAM3 is built on hypothetical basis of four groupings that [33] and [32] present as a combination of previous TAM investigations. The orders are individual contrasts, system attributes, social impact and facilitating conditions.

As depicted in TAM3, the apparent convenience to use a system is controlled by system productivity, PC liveliness, PC uneasiness, and the impression of exogenous control, enjoyment perception and target ease of use. The apparent usefulness is dictated by society subjective standards, work significance, result verifiability and perspective. As demonstrated in TAM3, perceived ease of use positively influenced by computer self-efficacy, computer playfulness, computer anxiety, and perception of external control, perceived enjoyment and objective usability. Perceived usefulness is influenced by subjective norms, job relevance, result demonstrability and image.

TAM is recognized as one of the best models that predicts acceptance of technology and use; TAM has demonstrated its strength in predicting use behavior of information technology

[26]. Besides, one of the reactions to the model is that there are excessively numerous factors and an excessive number of connections between the factors. This study seeks to ascertain that claim by examining empirical studies that have been underpinned on TAM.

B. Unified Theory of Acceptance and Use of Technology (UTAUT)

This theory was modelled by [36] by condensing 32 variables of past eight theories together. These include the Theory of Reasoned Action (Fishbein and Ajzen 1975), Theory of Planned Behaviour (Ajzen 1991), Social Cognitive Theory (Bandura 1986), Technology Acceptance Model (Davis 1989), Model of PC Utilization (MPCU) (Thompson et al. 1991), Motivational Model (Davis et al., 1992), Combined-TAM-TPB (Taylor and Todd 1995) and Diffusion of Innovations Theory (Rogers 1995). The resulting UTAUT theory has four that include; performance expectancy (PE), effort expectancy (EE), social influence (SI) and facilitating conditions (FC) and four moderators that include; gender, age, experience and voluntariness of use.

Performance expectancy refers to the extent to which individual trusts that utilizing the technology will help him or her to achieve their objectives execution. Effort Expectancy refers to the level of straightforwardness concerned with the utilization of the technology. Social influence can be described as how much an individual sees that vital others trust he or she ought to utilize the new framework. Facilitating conditions are the degree of how much an individual trusts that an authoritative and specialized foundation exists to bolster utilization of the theory.

Venkatesh augmented UTAUT in 2012 in order to put into consideration user application domain. This theory added three factors of hedonic inspiration, value-based price and habit respectively to take care of consumer technology use context to the existing independent variables of UTAUT. The moderating variables of age, gender and experience are retained in UTAUT2. However, voluntariness has been ignored. UTAUT addresses how individual differences determine the behavioral use intention and utilization of technological tools.

The consideration of this theory for this study is reasonable because of the theory worldwide and integrative approach, mixing a broad assortment of illustrative factors from the principle theories created to clarify information systems reception and application.

3. Discussion

The Technology Acceptance Model (TAM), developed by Davis (1989), is an extension of social psychology model of reasoned action, the model was particularly custom fitted for predicting acceptance of technology by users. TAM employs perceived usefulness and perceived ease of use as the critical factors that determine intention to use a technology. Perceived usefulness (PU) is the degree to which an individual believes that using a technological tool will improve task performance. Perceived ease of use (PEOU) is

level to which the user perceives the technology to be free of effort.

Behavioral Intention to use (BI) is the users' behavioral goal to utilize a technology is impacted by his/her state of mind and expected convenience of the technology. The descriptive ability of TAM varies according to the cultural context. Its prediction ability in Europe stands at 45–70%, in Asia 10–35%. According to research findings, perceived usefulness is an important factor in across different groups, although subjective norm is the most significant in Asia [27].

[4] Reviewed theories of TAM, TPB, and a disintegrated TPB theory which is possibly sufficient in identified healthcare service environment in Hong Kong. The outcomes showed that TAM is superior compared to TPB in disclosing the doctors' aim to utilize telemedicine innovation. TAM has been utilized by scholars all over to comprehend the acceptance of various sorts of technological innovations. [16] employed TAM theory in studying the determinants of acceptance and use of whiteboard technology. The study results revealed PU has a significant effect on user acceptance, adoption, and UB. The output of correlation analysis revealed that there is correlation between PU and PEOU. These two factors are influential factors for 3G technology acceptance.

Both TAM and TRA models consider user attitude to be persuasive of behavioral expectation. Davis contended subjective norms influence behavioral goal to utilize a technological tool could be overlooked, thus factors of subjective norms were not included in TAM model.

However, in TAM2, [33] reconsidered subjective norms which was found to increase its explanatory power of technology acceptance by 60% up from TAMS 40%–50%.

In their longitudinal study of four distinct systems at four institutions, two concerning voluntary usage and two involving mandatory usage, the study findings reveal that social pressures and cognitive instrumental processes influence behavioral intention to use technological tools. These results extend TAM model and add to the establishment for future research and understanding user acceptance and use behavior.

UTAUT model beats the other theories by reporting an adjusted R-squared of 70% [33]. The UTAUT model utilizes key constructs of acceptance and behavioral intention (performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC)) and four moderating variables (gender, age, experience and voluntariness of use) of key relationships. In a study that was carried out to establish the uptake of online government services delivery in Kuwait utilizing UTAUT theory by [1] research results indicate that performance expectancy, and social pressure affect student's behavioral aim. Additionally, facilitating conditions and behavioral aims decide learner's utilization of e-government services.

Similarly, in their attempt to study early childhood learner-instructor's perception and behavioral use e-learning tools,

by anchoring the study on UTAUT theory [16] found that performance expectancy and effort expectancy influence and are important in studying use Behavior Intention. UTAUT explains 41% of the deviations in Behavioral Intention to use Intelligent Whiteboard technology among learner-instructor's. The remaining 59% variation explained by other factors that were not established in the research. A similar study in Saudi Arabia on learners' reception of digital learning in universities, the results reported that the four UTAUT variables, namely, PE, EE, SI and FC are significant variables in predicting Use Behavior (usage) of technological tools [23]. These study failed to test the moderation effect of gender variable on the relationships between PE, EE, SE and FC and BI respectively.

[35] researched on the significance of the UTAUT moderating variables for m-learning impact on the usage of portable gadgets and also to establish the impact of such variations on PE, EE, SI on BI and UB respectively. The regression analysis results show that SI influences BI for use mobile technology in education and the impact was higher in females as compared males. The study results do not explain the reasons for variation.

In addition, empirical studies on incentive and acknowledgement of online academic initiatives in third-world nations, results from partial least square technique show that SI impacts BI positively. However, FC had has no relationship with usage of e-learning portal. Despite the fact that majority of the studies presented noteworthy statistical figures, it can be concluded that a portion of the studies reported unimportant results. For example, UTAUT variable formulations and tested relations showed strong correlations yet PE-BI reports the most important relationship. The unreliability of the results of researches on UTAUT leaves the outcomes of the regression analysis model uncertain. This can situation can be credited to the fact that the observations sample size is not the same among studies.

4. Conclusion

Studies of technology innovations acceptance require theories to depict explain if users gain value from utilizing new the instruments. Different acceptance theories have been developed and have their own exceptional qualities. TAM and UTAUT has been the comprehensively used models to understand and clear up user acceptance of innovations and utilization. A few studies that have been done to test the models and results have been tried and dependable.

Albeit, majority of the papers reported critical findings, it is worth noting that a portion of the papers findings are not important in decision making. Majority of correlation analysis results show strong positive relationships as reported in the discussion. Studies demonstrate that in spite of the fact that TAM is a much referred model, specialists have blended insights in regard to its theoretical suppositions, and down to earth viability. It can be concluded research in TAM needs adequate meticulousness and pertinence that would make it a settled theory for study of technological tools.

This study also established that most of researchers' referred to UTAUT in their articles considering their end goal was to back a contention instead of utilizing the theory. Others that reported the utilization of UTAUT really employed it moderately although a few demonstrated utilization hypothetically. This study adds to the range of technological tools selection and dispersion investigation by demonstrating the deficiency and irregularity in the utilization and outcome of a model. This review clearly demonstrates that factors that should be taken into account to decide user's acknowledgment or usage of innovations fluctuates. Likewise, the outcomes of reviewed papers don't depict any reasonable examples of the expectations in spite of the fact that larger part of findings are in line with the first propositions of theorists of UTAUT model, [33].

The impact of external factors EE, PE, SI on internal factor BI have not been generalized across nations, within nations, and a few of studies. The fact that the impact PE, EP, SI and on BI is important, the impacts of alternate factors remain inconsequential, in various studies execution anticipation impact BI. So as to harmonize the inconsistencies of results on TAM and UTAUT we need perform a meta-analysis. This cultivates examination of relationships between the measurements of a model in general. Integrating observational findings of the model can help with prediction and interpretation of the application of TAM and UTAUT models. Hence, a dissection of the models variables with a bigger study sample sizes leads to a better study as compare to smaller samples.

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