Use of UTAUT Model to Assess ICT Adoption in Kenyan Public Universities

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Abstract
Despite many years of study and propositions of various models understanding the adoption of new Information and Communication Technologies (ICT)has been one of the most challenging issues. Uptake of new ICT innovations involves fulfilling many requirements ranging from technical to human. This study used the Unified Theory of Acceptance and Use of Technology (UTAUT) model as an assessment framework to understand the student's behavioral intention on acceptance and use of technology. The study was conducted at Moi university which is one the public universities in Kenya. Closed and open-ended questionnaires were administered to 500 students. Staff members who were involved in the management of the targeted information systems were also interviewed. A total of 414 questionnaires were returned accounting to 82.8% response rate. The reliability yielded Cronbach's output of 0.8231. The results indicated that effort expectancy, performance expectancy and social influence factors affect the student's behavioral intention, which ultimately affects adoption of web based information system. The model explained 78.24% of the variance of the student's behavioral intention to use web based information systems. Among the moderating factors only course of study had significant effect on intention of adoption of web based information system. Notably, students who were taking ICT related courses such as Information Sciences, Engineering, Computer Science and Informatics had high adoption rate. The research findings from this study would be useful to institutions of higher learning, policy makers, researchers in the field, students and other stakeholders.
Keywords: Unified Theory of Acceptance and Use of Technology, UTAUT, ICT acceptance, Performance expectancy, Effort expectance, Social influence, Universities, Innovation

Introduction

Information and Communication Technologies (ICT) have influenced all sectors including personal life and organizational management. Their prevalence has resulted in powerful and transformative products which affect our daily life (Laudon & Laudon, 2010; Scheuermann & Pedró, 2009).The developments in ICT has resulted into varied innovations aimed at improving services and products. Organizations are engaged in innovations which are aimed at delivering new business solutions to improve effectiveness and efficiency. Universities have adopted different ICT innovations not only to improve and enhance their service delivery, but also to provide competitive and strategic advantage (Gülbahar, 2007; Scheuermann & Pedró, 2009),

Kenya has placed considerable emphasis on the importance of ICT in its Education Sector Support Programme and other endeavors as evidenced in the promulgation of the National ICT Strategy for Education and Training (Farrell, 2007). Universities in Kenya are experiencing increased use of information systems in an attempt to harness the benefits, which come with the new technologies including improved processes, services and creating strategic advantage. Kenyan university have experienced various challenges in adopting and using ICTs. These challenges include the high cost of deploying the technologies, lack of ICT institutional strategies and policies, lack of technical skills and cultural issues such as resistance to change (Chumo et al., 2011).

Success in implementation and adoption of ICT innovations in an organization depends on many factors ranging from the availability of infrastructure, the reliability of the software systems, the policies guiding and the human factors such as skills, attitude and culture. Information systems research has identified individual acceptance of ICT as a recurrent issue over decades (Bhattacherjee & Sanford, 2006,). Understanding ICT acceptance is paramount since the anticipated benefits of ICT usage, such as improved efficiency, effectiveness, productivity cannot be achieved if individual users do not accept to use these systems (Kessio et al., 2012; Afarikumah & Acheamong, 2010)

It is perceived that integrating technology in learning and teaching is very valuable asset in the process of learning and therefore it is vital to adopt ICT in education. According to Sife et al. (2007) level of ICT adoption in many developing countries is low due to socioeconomic and technological challenges including lack of a system approach to learning, awareness and attitudes towards ICTs, administrative and technical support, staff development, and lack of ownership, inadequate funds, and transforming higher education.

Information and communication technologies could be used to achieve innovative teaching and learning (White et al., 2002). Universities being institutions of higher learning are in the forefront in exploring the use of information systems to delivers their core business of teaching and learning as well as in managerial aspects such as student and staff records management (Cheon et al., 2012; Loogma et al., 2012). However just like other sectors there are numerous challenges in introduction, deployment and sustainability of the systems. For an information system to be successfully deployed the users' mindsets have to be changed to avoid resistance (Vinkashkumar, 2005; Birch & Irvine, 2009)).

This study was aimed at establishing the influence of Unified Theory of Acceptance and Use of Technology (UTAUT) factors on the adoption of web based information systems

The study was guided by the following research questions:

a) What is the impact of personal effort expectancy on adoption of web based information system?
b) How does performance expectancy affect adoption of web based information systems?
c) To what extent does social influence affect adoption of web-based information systems?
d) How does facilitating conditions affect the adoption of web based information systems?

The research used UTAUT model to evaluate the adoption of web based information systems at Moi university. The UTAUT model is based on eight technology acceptance theories and models including Theory of Reasoned Action (TRA), the Motivation Model, the Technology Acceptance Model (TAM), the Theory of Planned Behavior (TPB), the model of Personal Computer Utilization, the Social Cognitive Theory and the Innovation Diffusion Theory (Venkatesh et al., 2003). The UTAUT model is shown in figure 1.

Figure 1: The UTAUT Model adopted from Venkatesh et al., (2003)

The theory comprises of four independent variables;
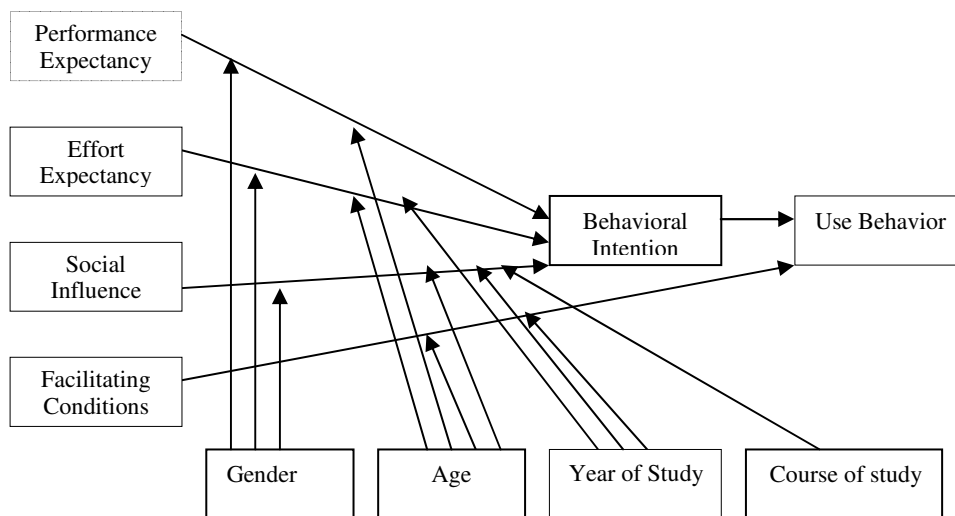
Performance Expectancy: The degree to which an individual believes that the web based information systems will help him access university services.

Effort Expectancy: The degree of ease associated with the use of the Web based information systems

Social Influence: The extent to which the individuals believe that important others believe that they should use the web based information systems.

Facilitating Conditions: The perceived extent to which the university and technical infrastructure required support the web based information systems.

The model also comprised of the following moderating variables; gender, age, year of study and course of study which affect the performance of the factors

In the UTAUT model, performance expectancy, effort expectancy and social factors variables have direct effects on the the behavioral intention which in turn impacts the use behavior. However, facilitating conditions variable has direct effect on the use behavior. The effect of facilitating conditions on behavioral intention is not

considered because it is assumed non-significant when both performance expectancy and effort expectancy have been included (Venkatesh et al., 2003; Schepers & Wetzels, 2007). These factors affect the use behavior and subsequently the adoption of web based information system that was the dependent variable in this study.

Methodology

This research adopted pragmatic philosophical view and therefore a mixed research method was employed (Creswell, 2012). The nature of research problem required an understanding of impact of UTAUT factors on web based information systems adoption in higher education institutions of learning. The research was carried out at Moi University, which is one of the public universities in Kenya. The study took place at university main campus that had a student population of over 14,000. Closed and open ended questionnaires were administered to 500 students who used the web based information system using simple random sampling. A total of 414 questionnaires were received which formed a response rate of 82.8%. Staff who managed the system were also sampled using purposive sampling and interviewed. The researchers adopted this research approach since it enabled establishment of the influence of UTAUT factors on the adoption of web based information system.

To determine the reliability and validity of the study, a pilot study was undertaken in one of the Moi University campuses located in Kitale using a sample of 30 respondents. The reliability of each of the UTAUT factors was determined using Cronbach's Alpha. The Cronbach Alpha results from the SPSS version 22 platform output obtained were 0.8231 and individual items were considered highly correlated with each other thus the researchers were highly confident in the reliability of the entire scale (Creswell, 2012). In ensuring validity of UTAUT model, the items of the questionnaire were modelled against a review of related literature in ICT adoption. To determine the convergent validity in this study, Average Variance Extracted (AVE) was loaded. Table 1 shows results of factor loadings, construct reliability and average variance extracted. There is sufficient evidence of validity and reliability as attested by factor loadings which exceed 0.5 and construct reliability which exceed the recommended level of 0.7.

Table 1: Standard item loadings, Composite Reliability and Average Variance Extracted

Construct	Indicator	Factor Loadings	Construct Reliability	Average Variance Extracted
Effort Expectancy (EE)	EE4	0.876		
	EE3	0.864		
	EE2	0.848		
	EE1	0.716	0.88	0.78
Performance Expectancy (PE)	PE4	0.724		
	PE3	0.846		
	PE1	0.783	0.86	0.68
Social Influence (SI)	SI4	0.872		
	SI3	0.702	0.79	0.64
Facilitating Conditions (FC)	FC4	0.721		
	FC1	0.701	0.64	0.48
Behavioral Intentions (BI)	BI1	0.845		
	BI2	0.794		
	BI3	0.876	0.87	0.69
Use Behavior (UB)	UB1	0.758		
	UB2	0.750		
	UB3	0.787	0.78	0.64

Results and Discussion

Performance expectancy measures the perceived degree to which students believe that using web based information systems facilitate easy and convenient access to university services. Performance expectancy had significant effect on students use of web based information systems. This was contrary to some finding such as that of Azlina et al. (2013) who contends that both age and gender had no significant correlation with performance expectancy. This was in variance with Venkatesh et al. (2003) findings and this could be attributed to the fact that majority of the respondent who are students were aged between 18 and 24 years. The interview of staff who directly participated in the use of the web based information systems showed that the students were

quick to adopt use of information systems which made it easy for them to access services at their convenient time.

Effort Expectancy focuses on the degree of ease associated with the use of the web based information systems. This factor had significant effect on student use of web based information systems and in agreement with most of the antecedent findings (Hans, 2003; Im, Hong & Kang, 2011). Three moderating factors, age, gender and year of study did not have any significant effect.

Social influence identifies whether the respondents expect other students, administrators and lecturers appreciate using web based information system. The course of study variable had significant effect on social influence variable. This is in agreement with Venkatesh's et al. (2003) findings. The other factors including age, gender and year of study did not have a significant impact on social influence. The ICT readiness and acceptance in the overall society influence the pressure and demand for the inclusion of ICT in the educational system as well as the attitudes of both teachers and students towards the use of ICT. Possible measures of this responsiveness could be the penetration of ICT in homes or in firms (Kessio et al., 2012; Scheuermann & Pedró, 2009; Government of Kenya, 2006).

Facilitating conditions is the perceived extent to which the organizational and technical infrastructure required for support of web based information systems exist in the university. Both age and year of study moderating factors did not have significant effect. This could be attributed to homogeneous age group of the respondents. This is in agreement with the studies by Nassuora (2012) & Azlina et al. (2013) that carried out similar studies by using UTAUT and established that neither age nor gender had significant effect. The interview of staff who were directly involved in the technical support of the systems as well as the user departments shown that the level of infrastructural development as well as the management of the systems affect the adoption by the users.

Conclusions

Results indicate that effort expectancy, performance expectancy and social influence affect the student's behavioral intention, which ultimately affects adoption of web based information system. The model explained 78.24% of the variance of the student's behavioral intention to use web based information systems. Though gender, age, year of study, and course of study were moderating factors to UTAUT predictors in this study, only course of study had significant effect on intention of adoption of web based information system. Notably, students who were taking ICT related courses such as Information Sciences, Engineering, Computer Science and Informatics had high efficacy for use of web based systems.

The study suggests that in order to enhance uptake of information systems in Kenyan universities, there is need to increase awareness and develop training programs to enable students and other end users to embrace. Users should be educated on the benefits of using information systems as opposed to manual for efficiency and effectiveness. These results suggest UTAUT to be a suitable framework for studying technology adoption decisions among Kenyan students in public universities.

This research contributes to knowledge in field of technology adoption and inherently portrays that the UTAUT models of technology acceptance is also applicable in higher educational institutions. The research findings from this study would be useful to institutions of higher learning, policy makers, researchers in the field, students and other stakeholders. This study focused on students in a public university and therefore the research findings cannot be generalized to all users. Further research could be done to cover all users including both public and private universities.

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