

Factors influencing access and usage of e-Resources at Nkumba University Uganda

ABSTRACT

Electronic resources (e-Resources) are now generally perceived as powerful sources of information and are regarded as indispensable scholarly reference source. With easy access, e-Resources provide synthesized information sources with regularly updated information and hyperlinks to offsite contents providing latest information and thinking on a subject. Aiming to explore access and usage of e-Resources at Nkumba University Library (NUL), this study investigated the level of accessibility and usage of subscribed e-Resources by third year undergraduate students. Understanding the level of access and usage of e-Resource is important because it gives pointers to the level of access of contemporary knowledge in the learning and research processes by the students. A positivist approach hinged on the modified Unified Theory of Acceptance and Use of Technology (UTAUT) formed the theoretical basis of the study. Data was collected using a self-administered questionnaire, interviews and observations. A 51% of encompassing 110 individuals out of 216 responded to the questionnaire. This research provides evidence and pointers that need to be considered when designing interventions to encourage usage and access of e-Resources in contextually similar environments. The study proposes a conceptual framework that depicts factors cardinal in influencing access and usage of e-Resources more especially in resource-constrained countries.

Keywords

E-Resources; accessibility; usage; adoption; NUL; Uganda

INTRODUCTION

With their ease of access, updated information and hyperlinks to offsite contents, e-Resources are indispensable sources of information (Dadzie, 2005). With changing information management dimensions, academic libraries, students and researchers in general cannot afford to ignore the importance of e-Resources (Edwards, 1997; Shuling, 2007; Okello-Obura and Ikoja-Odongo, 2010). As a result, libraries are spending substantial amounts of money subscribing to e-Resources whose information content is peer-reviewed, comparatively good quality, authentic, and authoritative as scholars and researchers expect it to be. E-Resources which mainly include e-Journals, e-Books, full text databases, Internet, and OPACs (online accessible library resources) are used for purposes of teaching, learning, research, dissertation/theses writing and many other information needs in academic institutions. The NUL subscribes to a number of e-Journals but like in many developing countries, these are not adequately utilized due to underdeveloped Information and Communication technology (ICT) infrastructure, low financial and human resources capacities, among other reasons (Mutula, 2005).

A study undertaken by Anandarajan, Igbaria and Anakwe (2002) on information technology acceptance in developing countries indicates that most of the technologies are under-utilized resulting into minimal contribution to improving organization's performance. In an academic institution, the insufficient use of e-Resources might result in the students' poor academic performance and low-quality research (Kiondo,

2002; Mezick, 2007). This may be caused by referencing out-dated sources or non-peer reviewed sources that may be reporting concepts, models or developments published way back thereby falling short of the current thinking and practice in the field. As a result, students and/or researchers may not be abreast with the current research endeavors or themes in their area of inquiry. This compromises their potential contribution to the body of knowledge or practice.

Given the aforementioned importance of e-Resources, it is imperative to understand the contextual factors influencing universal access and usage of e-Resources. Many investigations have considered interventions put in place in a given area as key influence for access and usage of e-Resources as individuals who are the main consumers of e-Resources also matter (Lee and Chung, 2011; Thong, Hong and Tam 2002; Sangowusu, 2003; Adeogun, 2003; Gbaje, 2005; Ajegbomogun, 2007). This study explored both the supply (interventions and context) and demand side (individuals' characteristics, perceptions, etc.) in understanding key factors affecting access and usage of e-Resources at NUL. The study has a bias of focusing more on individuals so as to obtain in-depth understanding of the factors influencing access and usage of e-Resources.

BACKGROUND

The study location was Nkumba University Library (NUL) within the main campus of Nkumba University. The main objective of NUL is to support teaching, learning and research activities of the university. The library has a stock collection of books, monographs and printed journals amounting to 25,000 volumes. 340 users can be accommodated at any time over the seven floors of the library. In order to promote access to e-Resources through ICTs, NUL joined the Consortium of Uganda University Libraries (CUUL) through which subscriptions to databases and e-journals are realized. These include: EBSCO, Emerald, Springer, Gale, Sage, Oxford University Press and many others. In addition, there is a number of Open Access resources accessible free-of-charge.

With commitment to ensuring that its students and researchers access current information, NUL embarked on library automation seven years ago beginning with the computerization of the cataloguing process using CDS/ISIS, a UNESCO information software. Due to some problems, the system failed. In 2009, Koha, an open source library and information system was installed to manage library information. In the same year, the International Network for the Availability of Scientific Publications (INASP) facilitated a grant of US\$ 1,000 to train library staff in the use of Koha and how to access e-Resources (INASP small grants, 2009). Presently, cataloguing is fully automated and the computerisation of the circulation process is in progress. The library OPAC can only be accessed locally as is yet to be linked to the university website. The library has a computer laboratory of twenty five computers with Internet connectivity and each of the three floors of the main library has an additional five computers which can be accessed by users. Further, it is worth noting that all the library staff at the technical workstation and at issue-desks operate from personal computers. Through its membership to the Consortium of Uganda University Libraries (Kinengyere, 2007), NUL has access to numerous databases (such as Annual Reviews, Cambridge University Press, Duke University Press, EBSCO host, Emerald, Oxford University Press, Springer, Gale, Sage, JSTOR, etc.) and e-Journals which can be accessed online. Given this information environment, it can be posited that there is a chance to ensure that e-Resources are accessed globally for the research and teaching good.

To ensure that relevancy of library materials is maintained, all the disciplines at NUL are taken into account when selecting the e-Resources. With appropriate Internet connectivity installed in 2004 and fibre optic network in 2006, NUL students and researchers can further access Open-Access e-Resources.

To overcome intermittent power outages, the university has installed a back-up generator. Despite the requisite ICT and human resource interventions, there is insufficient usage of e-Resources (CUUL, 2012). Given the foregoing, it follows that the need for a study aimed at identifying factors explaining the adoption of e-Resources cannot be over-emphasized. The adoption of e-Resources is two-phased: 1) understanding and recognizing the inherent importance of e-Resources; and 2) accepting the different technology platforms as enablers for accessing e-Resources.

Several studies investigating adoption of e-Resources have named the following as critical factors for e-Resources adoption: awareness (Nicholson, 2004; Ibrahim 2004; Kinengyere, 2007; Doraswamy 2008; Bar-Ilan, Peritz and Wolman 2004; Tyagi 2011); Information retrieval skills or computer self-efficacy – ability to use technology as e-Resource enabling platform (Okello-Obura and Ikoja-Odongo, 2010; Tella et al., 2007; Badu and Markwei, 2005; Thong, Hong and Tam, 2001; Majid and Abazova, 1998), ICT infrastructure (Thong, Hong and Tam 2002; Sangowusu, 2003; Adeogun, 2003; Gbaje, 2005; Ajegbomogun, 2007), and benefits or relevancy (Thong, Hong and Tam 2002; Baruchson-Arbib and Short 2002; Bar-Ilan, Peritz and Wolman 2004). Despite the general factors articulated by the different studies above, it was important to investigate contextual factors that may apply to the case of NUL.

The Problem

Although many universities, Nkumba University (NU) included, have substantially invested in e-Resources with a view to harness a plethora of benefits from accessing e-Resources, there has generally been low utilization of e-Resources especially in resource-constrained environments such as Africa (Manda, 2005; Okello-Obura and Ikoja-Odongo, 2010). There was need, therefore, to understand and identify the factors contributing to the under-utilization of e-Resources at NUL as indicated by a report from CUUL (2012) and find ways of enhancing e-Resources access and usage for better academic and research performance.

Although a number of studies have examined the usage of e-Resources elsewhere in the world, including Uganda, (Ibrahim, 2004; Majid and Tan, 2004; Bar-Ila, Peritz and Wolman's, 2004; Gbaje, 2007; Kinengyere, 2007; Okello-Obura and Ikoja-Odongo, 2010; Tibenderana and Ogao, 2010) none of them has focused on NU. The review of the literature thus indicates that the use of e-Resources at NUL had never been investigated and therefore this research sought to fill this void.

The major objective of the study was to investigate factors influencing users' behavioral intentions and the likelihood that they would continue accessing and utilizing e-Resources. Understanding contextual aspects influencing users' intention was investigated using the Unified Theory of Acceptance and Use of Technology Model (UTAUT) as a guiding lens. This research was ignited by the need for an empirical study investigating factors influencing e-Resources adoption.

RESEARCH MODEL

This study considered many technology acceptance models such as the Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), Diffusion of Innovative Theory (DIT), Technology Acceptance Model (TAM), and UTAUT (Fishbein and Ajzen 1975; Ajzen, 1991; Rogers 1995; 989; Venkatesh et al., 2003). These technology models and frameworks have been widely used in similar studies (Peslak, Ceccucci and Sendall, 2011; Alzahrani, 2012; Thong, Hong and Tam, 2002; Salim, 2012; Tibenderana and Ogao, 2010; Mathieson, 1991; Taylor and Todd, 1995/2001). Another famous technology acceptance model is the information systems success model (alternatively the DeLone and

McLean IS success model) which could not be used in this study because it seeks to understand the relationships of different dimensions of information system success. This study intended to understand the pertinent factors influencing adoption and utilization of e-Resources at Nkumba University by individuals. Many studies in the developing world have used the TAM as the theoretical basis for investigating technology adoption despite its theoretical and conceptual limitations (Bagozzi, 2007).

This study utilizes modified UTAUT, which is a combination of eight other technology adoption models, to understand accessibility and usage of e-Resources at NUL (Venkatesh et. al, 2003; Tibenderena and Ogao, 2010; Rahman, Jamaludin and Mahmud 2011). The UTAUT is a comprehensive model which investigates technology acceptance from multiple vantage points. The UTAUT has been widely used in studies including those from developing countries (Davis, 1989; Tibenderana and Ogao, 2010; Oye, Iahad and Rahim, 2011). Another variant of the UTAUT, the UTAUT2 could not be used in this study owing to its orientation towards consumer studies. Original UTAUT constructs (performance expectancy, effort expectancy, social influence and facilitating conditions) were used as constructs for this study. *See appendix.* ‘Awareness of availability of resources’ was added as a new construct because, according to several studies (Nicholson, 2004; Kinengyere, 2007; Doraswamy, 2008), it is an important factor that influences adoption of new technologies. Figure 1 shows the modified UTAUT model considering the study contextual characteristics.

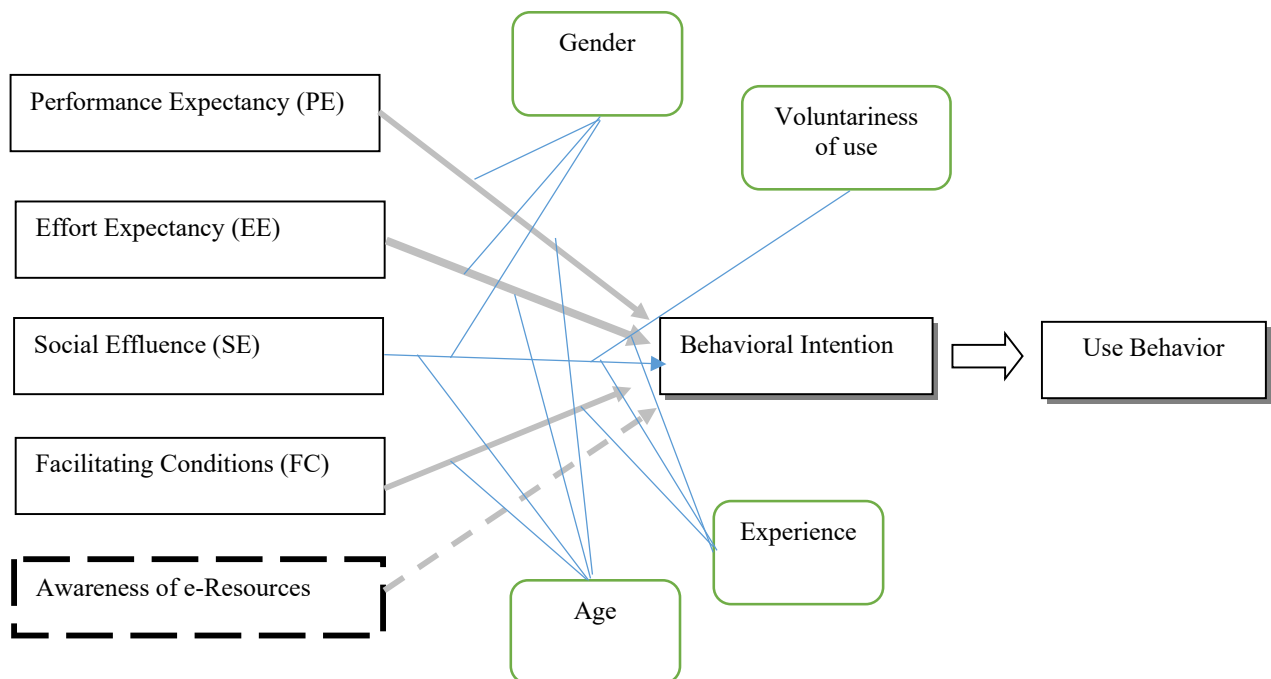


Figure 1. Modified UTAUT Model

The different moderating factors were embedded into the data collection instruments to check if there is any appreciable impact on the different factors for adoption and usage of e-Resources.

Awareness, also known as knowledge status (Nicholson, 2004), is an additional construct to the modified UTAUT Model, added because, according to several studies, it is an important factor that influences adoption of new technologies (Nicholson, 2004; Kinengyere, 2007; Doraswamy, 2008). In fact, awareness is considered as one of the prerequisites for accessing e-Resources as it is at the root of users' use of library services (Nicholson, 2004). 'Effort expectancy' is defined as the degree of ease associated with use of the system. Findings from studies made by Venkatesh et al., (2003), Rahman, Jamaludin and Mahmud (2011) and Salim (2012) revealed that effort expectancy was a determinant of behavioral intention to use new technologies. 'Performance expectancy' is defined as the extent to which a person believes using an information system/technology will assist him/her to gain benefits from job performance (Venkatesh et al., 2003: 447). Findings from studies done by Thong, Hong and Tam (2002), Donaldson (2011), Rahman, Jamaludin and Mahmud (2011) and Salim (2012) revealed that performance expectancy perceived usefulness was a significant determinant of behavioral intention to adopt technologies. Facilitating conditions such as ICT infrastructure and organizational environment play a big role in adoption and use of technologies. Social influence such as external social influences or interpersonal social influences are known to impact on technology acceptance and use. Venkatesh et al., (2003) define social influence as the degree to which an individual considers other people's perceptions on whether he or she should use the system. This suggests that individuals can be influenced to use a technology depending on the behaviors of other people.

RESEARCH METHODOLOGY

Third-year undergraduate students were the main respondents included in the study owing to the university policy that only registered students are eligible to participate in the university research, coursework, examinations and other official activities. At the time this study was conducted, third year students were the only registered students on campus. Further, the third-year students were better abreast to effectively provide needed information for this research owing to their knowledge of the context of NUL and their assumed need for current information in their final research projects. An adequate sample of 110/216 (50.9%) responded to the questionnaires (Babbie & Mouton, 2001). Using purposive sampling, four members of staff were interviewed, selected because they deal directly with IT and specifically e-Resources and are deemed to be experts in the field.

Cross-sectional data collection was conducted between December 2012 and February 2013. Based on pre-existing tool by Venkatesh et al., (2003) with modifications to include study contextual characteristics, the questionnaire had both open and closed-ended questions focusing on seven constructs (*see appendix*). The participants responded to questions with a five-point Likert scale where a five represents strongly agree and a one represents strongly disagree. Although a bit of qualitative approaches were used, this study is mainly positivist. The data collection instruments were subjected to reliability and validity testing (Kline, 1998). Pretesting was done before pilot-testing using ten respondents drawn from students selected for the purpose. Their responses were analyzed to enable the refinement of the questionnaire items. Faculty members were approached to critically analyze the questionnaire items, towards refining it for survey purpose.

One-on-one interviews conducted by the researcher were necessary to gain further insight into the research objectives principally explored using the questionnaire. The interviews assisted the researcher in finding out what the facilitators knew and thought about the phenomenon under study. The research

used face-to-face, semi-structured interviews with open-ended questions. The researcher had a list of questions or themes to be covered, but questions varied from interview to interview (Saunders, Lewis & Thornhill, 2003). The respondents interviewed were the director of NUICTS, two computing assistants and an Assistant Librarian. These respondents are directly responsible for the provision (accessibility) of e-Resources and the interviews were mainly on technical matters.

To complement information obtained by the questionnaire and interviews, the study further utilized observations. Observation was necessary to find out whether the facilities and technologies are available for the adoption of e-Resources. The facilities and technologies observed include; computers, Internet connectivity, space for users, and documents among others (rightly listed in a checklist). The onlooker (non-obtrusive) type of observation is used where the researcher is non-participatory in order to reduce any bias. The observation checklist included: the ICT infrastructure, technologies in place, staff and users retrieval skills, frequency of e-Resources use, and any available documentation.

FINDINGS

The study utilized multiple regression analysis and a number of tests were done to ensure reliability, validity and normality in the dataset. Such preliminary tests were important in order to come up with reliable data so that the objectives of the study are realized.

Normality of constructs

Some of the instruments used in testing for reliability, validity and normality included: histograms, Q-Q plots to show the linearity of the dataset, the Kormogolov-Smirnov and the Shapiro-Wilk tests performed to validate whether the dataset under study followed a normal distribution. Figure 2 shows the Q-Q plot and histogram used to check normality and linearity of the data and to indicate the outliers and skewness of the data.

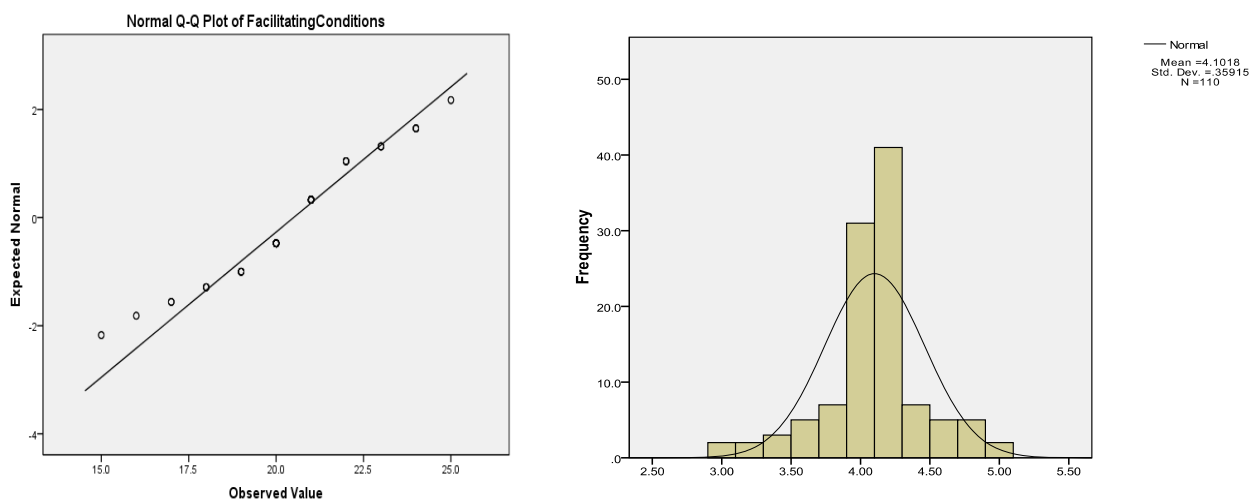


Figure 2. Data Normality: Q-Q plot and Histogram of 'facilitating conditions'

From Figure 2, there are no significant outliers which may negatively influence the results. The dataset plotted shows a near linear distribution indicating desired linearity and normal distribution. Further tests such as the Kolmogorov-Smirnov and the Shapiro-Wilk were performed on the dataset to ensure normality. The normality of the dataset enabled it to be subjected to multiple regression analysis.

Table 1. Kolmogorov-Smirnov and the Shapiro-Wilk tests

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	Df	Sig.
Performance Expectancy	.152	100	.000	.960	100	.004
Effort Expectancy	.143	100	.000	.968	100	.015
Social Influence	.170	100	.000	.919	100	.000
Facilitating Conditions	.214	100	.000	.913	100	.000
Awareness	.182	100	.000	.920	100	.000

The Kormogolov-Smirnov (KS) and the Shapiro-Wik test for normality showed adequate significance, $p < 0.05$. The data, therefore, was statistically significant and ready to be subjected to further statistical analysis.

Reliability of constructs

Inter-item correlation and the Kaiser-Meyer-Olkin (KMO) test measured sample adequacy of the population to prove reliability of the dataset. The Bartlett's test of sphericity tests whether the correlation matrix is an identity matrix. Table 2 and Table 3 show the results.

Table 2. Inter-item correlation

	Performance Expectancy	Effort Expectancy	Social Influence	Facilitating Condition	Awareness
Performance Expectancy	1.000	.305	.170	.012	.048
Effort Expectancy	.305	1.000	.389	.159	.063
Social Influence	.170	.389	1.000	-.002	-.085
Facilitating Condition	.012	.159	-.002	1.000	.241
Awareness	.048	.063	-.085	.241	1.000

The results of inter-item correlation matrix provided more evidence to prove the statistical reliability of the dataset.

Table 3. KMO and Bartlett's test

Kaiser-Meyer-Olkin	Measure of Sampling Adequacy.	0.6466
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Bartlett's Test of Sphericity	Approx. Chi-Square	891.496
	Df	378
	Sig.	.000

KMO is 0.6466 which, statistically, shows that the sample is ok (albeit mediocre inter-correlations) and that the questionnaires were answered by a statistically significant number of study participants. The expected variance obtainable from factor analysis in such a sample is that the factors extracted with account for a fair variance of the investigated phenomenon but not substantial. The Bartlett's Test of sphericity is highly significant and that the data variables are highly correlated. KMO is 0.65 and $X^2(378) = 891.496$, $P < 0.001$. Only factors with eigenvalues greater than one were included in the study as there was a high likelihood that they would contribute significantly to the total variance. In this case, only five factors were used in the analysis.

STUDY RESULTS

Out of the 216 questionnaires distributed to a sampled third year students of NU, 110 completed questionnaires were collected, representing a response rate of 50.9 percent. The School of Law (SLAW), Commercial Art and Design (SCIAD) and School of Sciences (SCOS) recorded the lowest response at 11 (10.0 percent). The School of Business Administration (SBA) recorded the highest at 45 (40.9 percent) and was followed by School of Social Sciences (SOSS) at 18 (16.4 percent) and Science, Education and Humanities (SEHS) at 14 (12.7 percent). The study involved participants from different schools, age groups ranging from 20 to 40 years inclusive and gender balance was observed.

On **performance expectancy**, analysis of the responses in this study reveals that users agree that e-Resources have benefits in terms of a wide range (80% of respondents), quality (96.3%), current information (83.6%), and relevancy to studies (69%). Due to such usefulness, the majority of respondents (96.3%) agree that e-Resources help them to perform better in their academic work. The results show consistency with the UTAUT Model (Venkatesh, et al., 2003) where an individual believes that using the system will help him or her to attain gains in job performance.

On **effort expectancy**, findings revealed that the majority of respondents (95%) did not have trouble accessing e-Resources as they had enough computer skills. However, a large number (83%) found it easier to access printed resources than e-Resources and they used them. This is consistent with the variable 'perceived ease of use' in TAM and 'ease of use' in Innovation Diffusion Theory (Rogers, 1995) where it is believed that an individual would use a system which is free of effort.

The analysis further revealed that interpersonal social influences at NUL influenced respondents to use e-Resources. According to Venkatesh et al., (2003), social influence means the degree to which an individual perceives that it is important that others believe that he/she should use the system. The students of NU were influenced by lecturers (85.1%), peers, (51%), library orientation (96.3%), and by the university (90.9%) which promotes and sensitizes students to use e-Resources.

Facilitating conditions, especially ICT infrastructure, is one of the determinants of information systems behavioral intentions and usage behavior (Venkatesh, et al., 2003). Facilitating conditions refer to when an individual believes that an organisation and technical infrastructure exist to support use of the system. The participants were required to indicate their views on the extent to which NU facilitated conditions that would encourage the adoption and use of e-Resources by students. Results reveal that the majority of respondents find the facilitating conditions at NU lacking. 91.8 % agree that the Internet is slow, 95.5 agree that there is need to have more networked computers while 91.9% agree that the constant power outages affect Internet connectivity and use. This finding is consistent with the conclusion from Alemneh and Hastings' (2006) study that in Africa, an enabling ICT infrastructure is still lacking and most universities do not have sufficient infrastructure to utilize digital resources. This study reveals that there is paucity of ICT infrastructure at NU.

The study results have shown that moderating factors such as gender and age have negligible impact on the different factors influencing behavior intention to utilize e-Resources in pursuit of information. Further, 'voluntariness of use' was not one of the key factors influencing behavior intention because students were compelled to access e-Resources for current information in the different areas of their research. However, the descriptive statistics have shown that experience has a direct impact on 'Effort Expectance' and negligible impact on 'Social Influence' and 'Facilitating Conditions'. It is shown that the most students who had more experience with working on different technology platforms had higher levels of self-efficacy and were therefore better capacity with regards to accessing e-Resources.

For students to be willing to adopt and use e-Resources for their academic work, they should be aware of their availability and appreciate their value. It was noted that 95 (86.4 per cent) of the respondents are aware of the availability of e-Resources at NU, 13 (11.8 per cent) are non-committal and 2 (1.8 per cent) were not aware. Findings also showed that the perceived use of e-Resources is determined by the level of awareness acquired by the users as indicated by 97 (88.2 percent) of the respondents, while 4 (3.6 percent) disagree and 9 (8.2 percent) are non-committal. On whether students knew more about print-based resources than e-Resources, the majority of the respondents 100 (90.9 percent) indicated that they had more awareness about printed resources than e-Resources. However, 10 (9.1 percent) disagreed. The findings show that awareness of availability of any system plays a role in its adoption and use.

Statistical Analysis of Adoption and Usage Factors

The study measures the impact of the identified factors on the adoption and usage of e-Resources at Nkumba University. In order to access e-Resources easily, users should possess adequate computer skills to make them competent in the accessibility and usage of e-

Resources at NUL. This study explores users' computer skills in order to recognize their competencies. The study posits that if the users' computer skills are adequate, this will impact positively on behavioral intention to use e-Resources. Interpersonal social influence or subjective norms are known to influence intention to use new technologies. This study investigates the relationship between social influence (SI) and BI in the adoption and usage of e-Resources at NUL. Facilitating conditions (FC) especially ICT infrastructure, are believed to influence behavioral intention to use technologies and this study explored the capability of the infrastructure in sustaining e-Resources at NUL. Adequate facilities entail that the organization (NUL) has conditions that encourage the adoption of e-Resources and individuals use them. The study also intended to find the relationship between awareness (A) of availability of resources and behavioral intention to use e-Resources at NUL. It is posited that if the users' level of awareness of availability of e-Resources is adequate, then this will positively impact on behavioral intention to use e-Resources at NUL.

These five research questions were tested using multivariate regression analysis as shown in the tables (Tables 4 - 6) below.

Table 4. Correlations between factors

		BI	PE	EE	SI	FC	A
BI	Pearson Correlation	1.000	-.159	-.126	-.190	-.132	.059
	Sig. (1- tailed)		.048	.095	.026	.017	.270
PE	Pearson Correlation	-.159	1.000				
	Sig. (1- tailed)	.048					
EE	Pearson Correlation	-.126		1.000			
	Sig. (1- tailed)	.095					
SI	Pearson Correlation	-.190			1.000		
	Sig. (1- tailed)	.026					
FC	Pearson Correlation	-.132				.0001	
	Sig. (1- tailed)	.017					
A	Pearson Correlation	.059					1.000
	Sig. (1- tailed)	.270					

Correlation is significant at the 0.001 level (1-tailed)

where BI = Behaviour Intention, PE = Perceived Expectancy, EE = Effort Expectance, SI = Social Influence, A = Awareness

Table 5 shows the relationship between the variables, Variables are said to have a perfect relationship when the correlation coefficient is either + 1.00 or -1.00. Cronbach's alpha shows a value of 0.763 showing strong correlation between factors and demonstrating equivalence reliability.

It was necessary to find the predictive value of the proposed conceptual framework for e-Resources' adoption at NUL so that it is clear what degree of variance is contributed by each of the identified factors. Regression coefficient analysis for all the factors was used to determine the R square values (R^2) – coefficient of determination. R^2 determines how much variation in one variable is due to the other variable. By analysing the R squared values, it is possible to tell how well model parameters are able to predict the model performance. Table 5 shows the model Summary.

Table 5: Model summary of variables

Variable	Model	R	R ²	Adjusted R ²	SE of the estimate	R ² change	F	df1	df2	Sig,
PE	1	.159	.025	.016	1.38701	.025	2.808	1	108	.097
EE	1	.126	.016	.007	1.39953	.016	1.733	1	107	.191
SI	1	.190	.36	.027	.68159	.036	3.892	1	104	.051
FC	1	.132	.17	.008	.69630	.017	1.920	1	108	.169
A	1	.059	.03	-.006	1.40247	.003	.379	1	108	.539

Table 6 shows the R² values of all factors which indicate or predict their model performance. The model also shows the statistical significance of the variables. In this analysis, the acceptable statistical significance is at <0.05 level. Table 6 shows a summary of the proposed adoption model.

Table 6: Proposed conceptual framework

Dependent variable	R square	Independent variable	Beta	t	Sig.
Behavioral Intention	0.025	Performance Expectancy	-.159	-1.676	.097
	0.016	Effort Expectancy	-.126	-1.316	.191
	0.36	Social Influence	-.190	-1.973	.051
	0.17	Facilitating Conditions	-.132	-1.385	.169
	0.03	Awareness	.059	.616	.539

As shown in Table 6, Social influence has the highest predictive power in explaining the variation in the behavioral intention to use e-Resources at NUL (R² = 0.036) while Effort Expectance had the lowest (R²= 0.016). Findings show that all the constructs had some impact on behavioral intention to use e-Resources. Social Influence was statistically significant to determine the behavioral intention to use e-Resources in the e-Resources' model for NLU. Performance Expectancy has some impact but the findings show that there is minimal relationship with the rest of the factors.

Proposed conceptual e-Resources Framework for Nkumba University

The linear regression, goodness-of-fit, is an equation used to minimize the distance between fitted data and actual data points (showing the position of the residue). It is expected that the proposed framework fits the data well if the observed data values and model's predicated values are small and unbiased. For Nkumba University, the amount of regression by each individual factors were measured and the summative total was obtained as the total regression percentage caused by the identified factors. From the UTAUT, 'use behavior' is directly influenced by 'behavioral intention' which is also influenced by different constructs. Based on that, Usage Behavior was regressed against the factors found to have an impact on e-

Resources' use. However, their statistical significance is low. Correlations are at 0.084 (Social Influence), -0.155 (Effort Expectancy), -0.102 (Facilitating Conditions) and -0.003 (Performance Expectancy). The linear equation given the study's dataset takes the following form:

$$Y = a + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \beta_4x_4 + \beta_5x_5 + \mu$$

where Y is the predicted dependent variable fitted against the residue; a = constant; β = unstandardized regression coefficient; μ = unpredictable random disturbance term (taken as negligible in this study), and x = value of the predictor.

The linear equation articulating the goodness-of-fit is given below:

$$Y = 4.836 - 0.159x_1 - 0.126x_2 - 0.190x_3 - 0.132x_4 + 0.59x_5$$

where x_1 = Performance Expectancy; x_2 = Effort Expectancy; x_3 = Social Influence; x_4 = Facilitating Conditions; x_5 = awareness

Based on the above equation, below is the conceptual e-Resources adoption framework for NU. The factors included in the framework do not have a high statistical significance but they are believed to have some impact on e-Resources use. Awareness has been left out as its R^2 is very low. The overall R square value of 0.601 predicts 60 % of the variance of users' acceptance and use of e-Resources. This indicates that 11.2 % of users acknowledge that behavioral intention influences adoption and usage of e-Resources at NU. The low predictor values show that the behavior of humans who are at the center of adoption and usage of e-Resources is difficult to predict or ascertain beforehand. The implication is that there are other factors that contribute to influencing adoption and usage of e-Resources at Nkumba University. The conceptual e-Resource adoption framework for NU is shown in Figure 3 below.

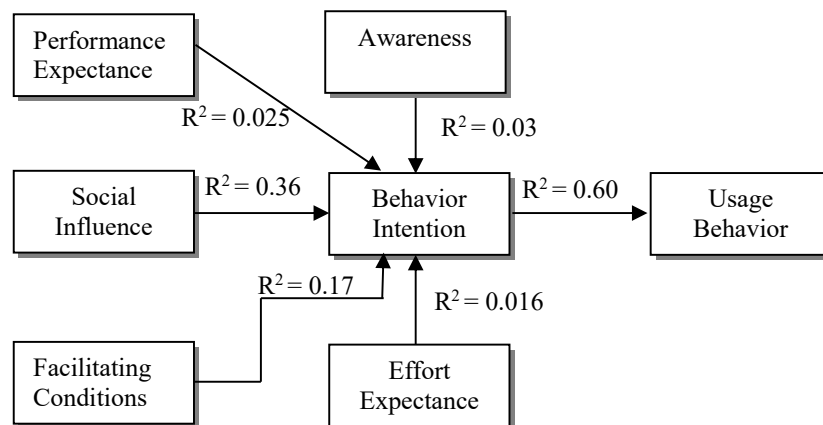


Figure 3. Factor contribution to variance on e-Resources adoption Framework for NU

Figure 3 shows to what extent each of the individual factors in the adoption Framework influence overall usage behavior of the e-Resources at NU. The factors identified are indicative and can be used as reference in other developing countries with similar contextual setting. It is worth noting that the moderating factors are not included in the final conceptual representation because their impact on overall adoption is negligible. However, despite this being the case, they need to be considered in designing interventions for e-Resources adoption and use

CONCLUSION

Findings show that social influence and performance expectancy have a significant impact on behavioral intention to adopt and use e-Resources at NU. This is based on the indication by the majority of participants that they realize and understand the academic benefits e-Resources offer. Participants conceded that their academic work would suffer without using e-Resources as they would be deprived of current information needed for research. The participants also indicated the impact social influence from peers, lecturers and the library had on the adoption of e-Resources.

On the other hand, the study shows that facilitating conditions, effort expectancy and awareness of availability of e-Resources have minor impact on the adoption of new technologies. Participants at NU have computer skills but none-the-less most of them (83%) still found it easier to use printed material. This shows that NU users prefer using a system which is free of effort. The study has shown the paucity of ICT infrastructure at NU and this has negatively impacted on the adoption of e-Resources. Although 97 % of participants were aware of the availability of e-Resources, the study results show that 100% were aware of the availability of print-based material and this indicated that the more aware users knew of a product, the more use. The results show that the intention to use e-Resources by students of NU involves the understanding that e-Resources are useful to academic work, they are easy to use, important others make them believe that he/she should use e-Resources for academic achievements and that facilitating conditions should be put in place and marketing of e-Resources should be improved.

This study found the UTAUT model valid in the context of Uganda's use of e-Resources in libraries. The regression analysis showed the degree of contribution of each factor that was used in the study investigation. The low predictive value of the proposed model (60%) aligns to the KMO value of 0.65 as a mediocre value. The low predictive capacity of the model shows that there are other inherent and contextual factors that may predict adoption of e-Resources at Nkumba University. Therefore, this research recommends further study with more variables such as culture, level and duration of preparation prior to the introduction of new technologies, to the UTAUT model. The major limitation of this study is that it is not representative of the entire NU population. The study included only 216 third year undergraduate students of NU and excluded the rest of the school community. For reliable results, the study should have included representatives from all levels of the six schools of NU in order to obtain divergent views. Future works should include students from all levels and staff in all faculties to be more representative.

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Appendix: Questionnaire and Interview Constructs

Construct	Questionnaire item
Performance Expectance	<ul style="list-style-type: none"> - Enabling access to wider range of information -Academic work suffers due to lack of current information -Access to e-Resource improve academic performance by accessing quality information - Access to e-Resources such as Emerald, Sage, EBSCO, Springer etc..., are relevant to my course work/ research.
Effort Expectance	<ul style="list-style-type: none"> - Computer skills to access e-Resources - Difficulty with which information for coursework / research is accessed from the Internet - Ease with which information from printed is accessed against e-resources -Access of e-Resources at Nkumba University
Social Influence	<ul style="list-style-type: none"> - Role of library orientation -Role of lecturers in influencing e-Resources usage - Influence of peers in using e-Resources -Initiatives by Nkumba University to encourage e-Resources access and usage
Facilitating Conditions	<ul style="list-style-type: none"> - Need for Nkumba University to subscribe to e-Resources -Need for more networked computers -Intermittent power outages have a negative effect on adoption and use of e-Resources -Individuals' own personal computer and internet connectivity encourage adoption and use of e-Resources
Awareness	<ul style="list-style-type: none"> - Individuals' awareness of e-Resource encourage their usage - Display of e-Resources in public places on campus - Library's role in marketing e-Resources - Students' awareness of print resources rather than e-Resources
Behavioral intention	<ul style="list-style-type: none"> - Intention to use e-Resources at least 3 times a week for academic research - Intention of final year students to regularly use e-Resources
Use Behavior	<ul style="list-style-type: none"> - Use of e-Resources for all research needs - Use of e-Resources for coursework
Interview pointers (Interviewees: Director of IT; Computing Assistants; Assistant Librarian (e-Resources)	<ul style="list-style-type: none"> - Level of availability and accessibility of the Internet by the students - Students' general awareness of e-Resources -Technology platforms and tools available at Nkumba to ensure constant accessibility to e-Resources (e.g. Library website, etc) - Interventions for encourage e-Resources access and usage (e.g. student training programmes on e-Resources, etc.) -Challenges for implementing interventions to improve e-Resources access - Ways to improve e-Resources accessibility and usage