

# FACTORS INFLUENCING ACCESS TO AND USAGE OF E-RESOURCES AT NKUMBA UNIVERSITY, UGANDA

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## Abstract

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

**Keywords:** e-resources; accessibility; usage; adoption; Nkumba University Library; 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



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information management dimensions, academic libraries, students and researchers in general cannot afford to ignore the importance of e-resources (Dukić and Strišković, 2015; Edwards 1997; Mudave 2016; Okello-Obura and Ikoja-Odongo 2010; Shuling 2007). Consequently, libraries spend a lot of money to access e-resources that contain up-to-date, peer-reviewed information which therefore has comparatively good quality and authenticity. E-resources, which mainly include e-journals, e-books, full-text databases, and online accessible library resources (OPACs), are used for purposes of teaching, learning, research, dissertation or thesis writing and many other information needs in academic institutions. The Nkumba University Library (NUL) subscribes to a number of e-journals but like in many developing countries, these are not adequately utilised owing to underdeveloped information and communication technology (ICT) infrastructure, and low financial and human resource capacities, among other reasons (Mutula 2005; Ndung'u 2018; Williams, Mayer, and Minges 2011).

A study undertaken by Anandarajan, Igbaria and Anakwe (2002) on information technology acceptance in developing countries indicates that most of the technologies are underutilised resulting in a minimal contribution to improving an organisation'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 2004; Makgahlela and Bopape 2014; Mezick 2007). This may be caused by referencing outdated 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 keep abreast with the current research endeavours 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 (Adeogun 2003; Ajegbomogun 2007; Gbaje 2005; Lee and Chung 2011; Ndung'u 2018; Sangowusu 2003; Thong, Hong, and Tam 2002). This study explored both the supply (interventions and context) and demand side (individuals' characteristics, perceptions) in a bid to understand key factors affecting access to and usage of e-resources at the NUL.

## BACKGROUND

The study location was the Nkumba University Library (NUL) within the main campus of Nkumba University. The main objective of the 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. A total of 340 users can be accommodated at any one time. Working space is distributed over the seven floors

of the library. In order to promote access to e-resources through ICTs, the NUL joined the Consortium of Uganda University Libraries (CUUL) through which subscriptions to databases and e-journals are realised. These include EBSCOhost, Emerald, Springer, Gale, Sage, Oxford University Press, and many others. In addition, there are a number of Open Access resources accessible free of charge.

With a commitment to ensuring that its students and researchers access current information, the NUL embarked on library automation seven years ago beginning with the computerisation of the cataloguing process using CDS/ISIS, a UNESCO library management system. Due to some problems, the system failed. In 2009, Koha, an open source library management system was installed to manage library information. Presently, the cataloguing is fully automated. The library OPAC can only be accessed locally as it is yet to be linked to the university website. The library has a computer laboratory of 25 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 issue desks operate from personal computers. Through its membership to the CUUL, the NUL has access to numerous databases (such as Annual Reviews, Cambridge University Press, Duke University Press, EBSCOhost, Emerald, Oxford University Press, Springer, Gale, Sage, JSTOR) and e-journals which can be accessed online (Kinengyere 2007). Given this information environment, it can be posited that there is a chance to ensure that e-resources are accessed globally to positively impact on the teaching and research endeavours.

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-emphasised. The adoption of e-resources is two-phased: 1) understanding and recognising 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-resource adoption: awareness (Bar-Ilan, Peritz, and Wolman 2003; Doraswamy 2008; Ibrahim 2004; Kinengyere 2007; Nicholson 2004; Tyagi 2011); information retrieval skills or computer self-efficacy – the ability to use technology as e-resource enabling platform (Badu and Markwei 2005; Majid and Abazova 1999; Okello-Obura and Ikoja-Odongo 2010; Tella et al. 2007; Thong, Hong, and Tam 2002); ICT infrastructure (Adeogun 2003; Ajegbomogun 2007; Gbaje 2005; Sangowusu 2003; Thong, Hong, and Tam 2002); and benefits or relevancy (Bar-Ilan, Peritz, and Wolman 2003; Baruschon-Arbib and Short 2002; Dukić and Strišković 2015; Mudave 2016; Thong, Hong, and Tam 2002). Despite the general factors articulated by the different studies above, it was important to investigate contextual factors that may apply to the case of the NUL.

## THE PROBLEM

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

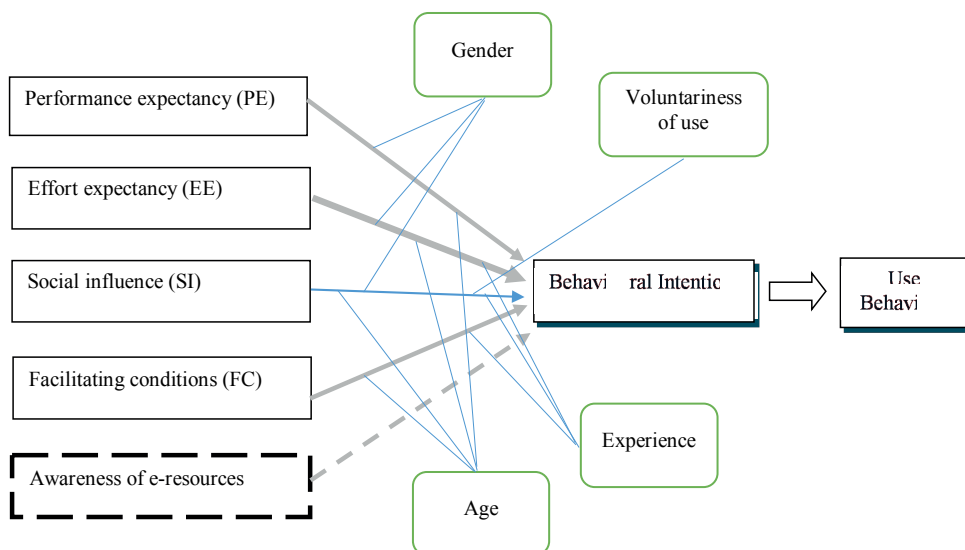
Although a number of studies have examined the usage of e-resources elsewhere in the world, including Uganda (Bar-Ilan, Peritz and Wolman 2003; Gbaje 2005; Ibrahim 2004; Majid and Tan 2002; Kinengyere 2007; Okello-Obura and Ikoja-Odongo 2010; Tibenderana and Ogao 2008), none of them has focused on Nkumba University. The review of the literature thus indicates that the use of e-resources at the NUL had never been investigated and therefore this research sought to fill this gap.

The major objective of the study was to investigate factors influencing users' behavioural intentions and the likelihood that they would continue accessing and utilising e-resources. Understanding contextual aspects influencing users' intention was investigated using the unified theory of acceptance and use of technology (UTAUT) model as a guiding lens. This research was motivated by the need for an empirical study investigating factors influencing e-resource adoption.

## RESEARCH MODEL

This study considered many technology acceptance models such as the Theory of Reasoned Action (TRA), the Theory of Planned Behavior (TPB), the Diffusion of Innovative Theory (DIT), the Technology Acceptance Model (TAM), and the UTAUT (Ajzen 1991; Fishbein and Ajzen 1975; Rogers 1995; Venkatesh et al. 2003). These technology models and frameworks have been widely used in similar studies (Imre et al. 2016; Mathieson 1991; Peslak, Ceccucci, and Sendall 2012; Salim 2012; Taylor and Todd 1995; Thong, Hong, and Tam 2002; Tibenderana and Ogao 2008). 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 the adoption and utilisation 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 (Alawadhi and Morris 2008; Bagozzi 2007; Lai 2016; Lai and Zainal 2015; Sharma and Mishra 2014; Vakilzavareh, Lashgarara, and Mirdamadi 2014).

This study utilises a modified version of the UTAUT, which is a combination of eight other technology adoption models (Rahman, Jamaludin, and Mahmud 2011; Tibenderana and Ogao 2008; Venkatesh et. al. 2003), to understand accessibility and usage of e-resources at the NUL. 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 2008; 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. The original UTAUT constructs (performance expectancy, effort expectancy, social influence and facilitating conditions) shown in Figure 1 were used as constructs for this study. See the appendix. “Awareness” was added as a new construct because, according to several studies (Doraswamy 2008; Dukić and Strišković 2015; Kinengyere 2007; Nicholson 2004), it is an important factor that influences adoption of new technologies. Figure 1 shows the modified UTAUT model considering the contextual characteristics of the study.



**Figure 1:** Modified UTAUT model

The different moderating factors were embedded into the data collection instruments to check if there is any appreciable influence on the different factors for adoption and usage of e-resources (Zha, Li, and Yan 2013).

“Awareness”, also known as knowledge status (Nicholson 2004), and which is an additional construct to the modified UTAUT model as stated above, is considered 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 the 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 behavioural intention to use new technologies. "Performance expectancy" is defined as the extent to which a person believes using an information system or 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 as a significant determinant of behavioural intention to adopt technologies. Facilitating conditions such as ICT infrastructure and the organisational environment play a big role in the adoption and use of technologies. Social influences 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/she should use the system. This suggests that individuals can be influenced to use a technology depending on the behaviours of other people (Yan, Zha, and Xiao 2013).

## 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 and this therefore made the study not truly representative of the student population. Thus, the results from this study are for indicative purposes only. Further, the third-year students were better informed to effectively provide needed information for this research owing to their knowledge of the context of the 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 and Mouton 2001). Using purposive sampling, four library 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 using questionnaires, interviews and observations was conducted between December 2012 and February 2013. Based on the 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 the appendix). Research participants were chosen based on their level of study. The participants responded to questions with a five-point Likert scale where a five represents strongly agree and a one represents strongly disagree. Although some qualitative approaches were used, this study is mainly quantitative. The

data collection instruments were subjected to reliability and validity testing (refer to Tables 1 to 3 and the testing reported below) (Kline 1998). Pretesting was done before pilot-testing using 10 respondents drawn from students selected for the purpose. Their responses were analysed to enable the refinement of the questionnaire items. Faculty members were approached to critically analyse the questionnaire items, towards refining the questionnaire for survey purposes.

One-on-one interviews conducted by the researcher were necessary to gain further insight into the research objectives. 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, and Thornhill 2003). The respondents interviewed were the director of Nkumba University Information and Communication Technology Services, 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 and content matters.

To complement information obtained by the questionnaire and interviews, the study further utilised 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 (Tewell, Mullins, and Tomlin 2017). The observation checklist included the ICT infrastructure, technologies in place, staff and users' retrieval skills, frequency of e-resources use, and any available documentation.

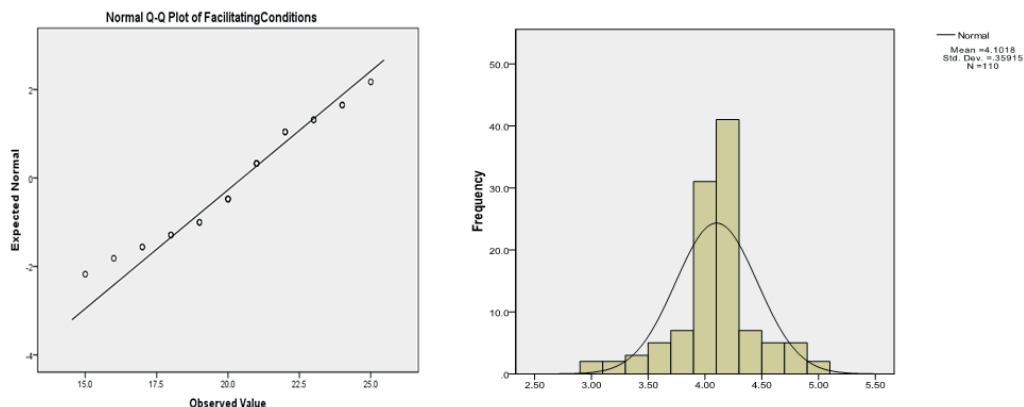
## FINDINGS

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

### Normality of Constructs

Some of the instruments used in the testing for reliability, validity and normality included histograms, quantile-quantile (Q-Q) plots to show the linearity of the dataset, the Kolmogorov-Smirnov test (KS test) and the Shapiro-Wilk test performed to validate whether the dataset under study followed a normal distribution. Figure 2 shows the Q-Q

plot and histogram that were used to check the 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 might negatively influence the results. The dataset plotted shows a near linear distribution indicating desired linearity and normal distribution. Further tests such as the KS test and the Shapiro-Wilk test were performed on the dataset to ensure normality. The normality of the dataset enabled it to be subjected to a 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 KS and the Shapiro-Wilk test for normality showed adequate significance,  $p < 0.05$ . The data, therefore, were 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 the 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. Tables 2 and 3 show the results.

**Table 2:** Inter-item correlation

	<b>Performance expectancy</b>	<b>Effort expectancy</b>	<b>Social influence</b>	<b>Facilitating conditions</b>	<b>Awareness</b>
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 conditions	.012	.159	-.002	1.000	.241
Awareness	.048	.063	-.085	.241	1.000

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

**Table 3:** KMO and Bartlett's test

<b>Kaiser-Meyer-Olkin Bartlett's sphericity test</b>	<b>Measure of sampling adequacy</b>	<b>0.6466</b>
	Approx. chi-square	891.496
	df	378
	Sig.	.000

The result of the KMO test is 0.6466 which, statistically, shows that the sample is adequate and acceptable (albeit with mediocre intercorrelations) 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 were extracted with account for a fair variance of the investigated phenomenon but not substantial. The Bartlett's sphericity test is highly significant and determined that the data variables are highly correlated. The results of the KMO test are 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.

## STUDY RESULTS

Out of the 216 questionnaires distributed to the sampled third-year students of Nkumba University, 110 completed questionnaires were collected, representing a response rate of 50.9 per cent. The data were captured from the paper-based questionnaires with the help of research assistants who did the screening of the data and final entry into the SPSS statistics software. The School of Law, Commercial Art and Design and the School of Sciences recorded the lowest response at 11 (10.0%). The School of Business Administration recorded the highest at 45 (40.9%) and was followed by the School of Social Sciences at 18 (16.4%) and Science, Education and Humanities at 14 (12.7%). The study involved participants from different schools, age groups ranging from 20 to 40 years inclusive, and a gender balance was observed.

On **performance expectancy**, an analysis of the responses in this study revealed 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%). Owing 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/her to attain gains in job performance.

On **effort expectancy**, the findings revealed that the majority of respondents (95%) did not have trouble accessing e-resources as they had sufficient 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 the TAM and “ease of use” in the 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 the 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 Nkumba University were influenced by lecturers (85.1%) who actively use e-resources, peers (51%), library orientation (96.3%), and the university (90.9%) which promotes and sensitises students to use e-resources.

**Facilitating conditions**, especially ICT infrastructure, are one of the determinants of information systems’ behavioural intentions and usage behaviour (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 Nkumba University facilitated conditions that would encourage the adoption and use of e-resources by students. Results revealed that the majority of respondents find the facilitating conditions at Nkumba University lacking. A total of 91.8 per cent agree that the Internet is slow, 95.5 per cent agree that there is a need to have more networked computers, while 91.9 per cent agree

that the constant power outages affect Internet connectivity and use. These findings are consistent with the conclusion from Alemneh and Hastings' (2006) study which posited that an enabling ICT infrastructure is still lacking in Africa and that most universities do not have sufficient infrastructure to utilise digital resources. This study reveals that there is a paucity of ICT infrastructure at Nkumba University.

The study results have shown that moderating factors such as gender and age have a negligible impact on the different factors which influence behavioural intentions to utilise e-resources in pursuit of information. Further, "voluntariness of use" was not one of the key factors that influenced behavioural 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 expectancy" and negligible impact on "social influence" and "facilitating conditions". It is shown that most students who had more experience with working on different technology platforms had higher levels of self-efficacy and were therefore endowed with a better capacity with regard to accessing e-resources. Most of the younger generation are technologically savvy and therefore it is not a requirement that training in accessing e-resources be conducted.

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%) of the respondents are aware of the availability of e-resources at Nkumba University, 13 (11.8 %) are non-committal and 2 (1.8 %) were not aware of the availability of e-resources. 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%) of the respondents, while 4 (3.6%) disagree and 9 (8.2%) are non-committal. On whether students knew more about print-based resources than e-resources, the majority of the respondents 100 (90.9%) indicated that they had a greater awareness of printed resources than e-resources. However, 10 (9.1%) disagreed. In the context of Uganda, many of the would-be users of the e-resources are aware of the availability of e-resources at the NUL although they often choose to ignore accessing e-resources.

## 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 and use e-resources easily, users at the NUL should possess adequate computer skills. This study explores users' computer skills in order to recognise their competencies. The study posits that if the users' computer skills are adequate, this will impact positively on their behavioural intention to use e-resources. Interpersonal social influences or subjective norms are known to influence the intention to use new technologies. This study investigates the relationship between

social influence and behavioural intention in the adoption and usage of e-resources at the NUL. Facilitating conditions, especially ICT infrastructure, are believed to influence behavioural intention to use technologies as this study explored the capability of the infrastructure in sustaining e-resources at the NUL. Adequate facilities entail that the organisation (the NUL) has conditions that encourage the adoption of e-resources and the individuals who use them. The study also intended to find the relationship between awareness of availability of resources and behavioural intention to use e-resources at the NUL.

These five research questions were tested using a multivariate regression analysis as shown in Tables 4 to 6.

**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)*

*BI = behaviour intention, PE = perceived expectancy, EE = effort expectancy, SI = social influence, FC = facilitating conditions, 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 the NUL so that it is clear what degree of variance is contributed by each of the identified factors. A regression coefficient analysis for all the factors was used to determine the R-squared 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 <sup>2</sup>	Adjusted R <sup>2</sup>	Standard error of the estimate	R2 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

PE = perceived expectancy, EE = effort expectancy, SI = social influence, FC = facilitating conditions, A = awareness

Table 6 shows the  $R^2$  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 <sup>2</sup>	Independent variable	Beta	t	Sig.
Behavioural 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 behavioural intention to use e-resources at the NUL ( $R^2 = 0.036$ ), while effort expectancy had the lowest ( $R^2 = 0.016$ ). Findings show that all the constructs had some impact on behavioural intention to use e-resources. Social influence was statistically significant to determine the behavioural intention to use e-resources in the e-resources' model for the NUL. Performance expectancy has some impact but the findings show that there is a minimal relationship with the rest of the factors.

## PROPOSED CONCEPTUAL E-RESOURCES FRAMEWORK

The linear regression, goodness of fit, is an equation used to minimise 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 factor was measured and the summative total was obtained as the total regression percentage caused by the identified factors. From the UTAUT, "use behaviour" is directly influenced by "behavioural intention" which is also influenced by different constructs. 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;

$\beta$  = unstandardised regression coefficient;

x = value of the predictor; and

$\mu$  = unpredictable random disturbance term (taken as negligible in this study).

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;

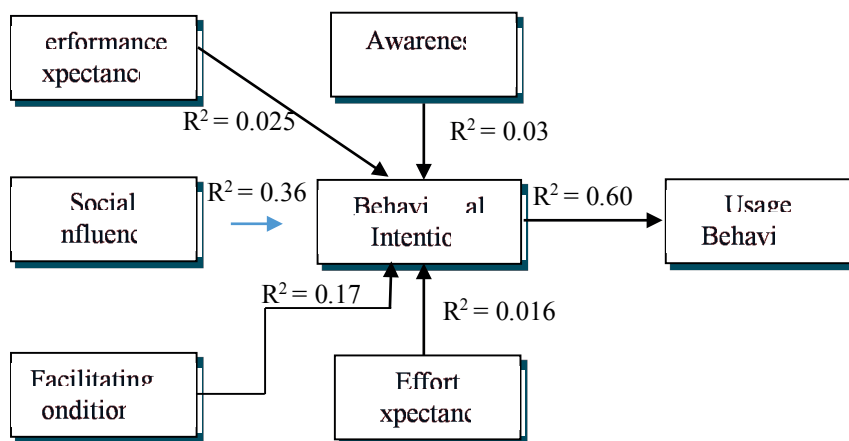
$x_2$  = effort expectancy;

$x_3$  = social influence;

$x_4$  = facilitating conditions; and

$x_5$  = awareness.

Based on the above equation, the conceptual e-resources adoption framework for Nkumba University is given below. The factors included in the framework do not have a high statistical significance but they are believed to have some impact on the use of e-resources. Awareness has been left out as its  $R^2$  is very low. The overall R-squared value of 0.601 predicts 60 per cent of the variance of users' acceptance and use of e-resources. This indicates that 11.2 per cent of users acknowledge that behavioural intention influences adoption and usage of e-resources at Nkumba University. The low predictor values show that the behaviour of humans who are at the centre of adoption and usage of e-resources is difficult to predict or ascertain beforehand. The low predicted value shows that there are other factors contributing to influencing adoption and usage of e-resources at Nkumba University. The conceptual e-resource adoption framework for Nkumba University is shown in Figure 3.



**Figure 3:** Factors contribution to variance on e-resources adoption framework for Nkumba University

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

## CONCLUSION

Findings show that social influence and performance expectancy have a significant impact on behavioural intention to adopt and use e-resources at Nkumba University. This is based on the indication by the majority of participants that they realise 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 the availability of e-resources have a minor impact on the adoption of new technologies. Participants at Nkumba University have computer skills but nonetheless most of them (83%) still found it easier to use printed material. This shows that users at Nkumba University prefer using a system which is free of effort. The study has shown the paucity of ICT infrastructure at Nkumba University and this has negatively impacted on the adoption of e-resources. Although 97 per cent of participants

were aware of the availability of e-resources, the study results show that 100 per cent of them were aware of the availability of print-based material and this indicated that they still had a choice of what access mode to use to access potentially vital information.

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 with the KMO value of 0.65 as a mediocre value. 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 population at Nkumba University. The study included only 216 third-year undergraduate students of Nkumba University and excluded the rest of the school community. For reliable results, the study should have included representatives from all levels of the six schools at Nkumba University 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

<b>Construct</b>	<b>Questionnaire item</b>
Performance expectancy	Enabling access to wider range of information Academic work suffers owing to lack of current information Access to e-resource improve academic performance by accessing quality information Access to e-resources such as Emerald, Sage, EBSCOhost, Springer, are relevant to my coursework or research
Effort expectancy	Computer skills to access e-resources Difficulty with which information for coursework or research is accessed from the Internet Ease with which information from printed resources is accessed against e-resources Access of e-resources at Nkumba University
Social influence	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	Need for Nkumba University to subscribe to e-resources Need for more networked computers Intermittent power outages have a negative effect on the adoption and use of e-resources Individuals' own personal computer and Internet connectivity encourage adoption and use of e-resources
Awareness	Individuals' awareness of e-resources 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
Behavioural intention	Intention to use e-resources at least three times a week for academic research Intention of final-year students to regularly use e-resources
Use behaviour	Use of e-resources for all research needs Use of e-resources for coursework
Interview pointers (interviewees: director of IT, computing assistants, assistant librarian)	Level of availability and accessibility of the Internet by the students Students' general awareness of e-resources Technology platforms and tools available at Nkumba University to ensure constant accessibility to e-resources (e.g. the library website) Interventions to encourage e-resources access and usage (e.g. student training programmes on e-resources) Challenges for implementing interventions to improve e-resources access Ways to improve e-resources accessibility and usage