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Tangible Resources and Effective E-Learning Implementation in Selected Ugandan Public Universities

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Abstract
This study assessed the influence of tangibles resources on the effective implementation of e-learning during and beyond the COVID-19 pandemic era in public universities in Uganda. The concept of tangible resources was based on Resource Based View Theory. Universities' tangible resources for e-learning were operationalized in terms of ICT teaching facilities, access to ICT facilities, e-library resources, and university ICT implementation policies. Using a cross-sectional survey design, data were collected from a sample of 312 academic staff using a questionnaire survey. Data were analysed using descriptive statistics and structural equation modeling (SEM). The findings revealed that access to ICT facilities and university ICT policy positively and significantly predicted e-learning implementation. However, ICT teaching facilities and libraries e-resources positively but insignificantly predicted e-learning implementation. The conclusions of the study were to the effect that access to ICT facilities and universities' ICT policies are imperative for the implementation of e-learning. Nevertheless, ICT teaching facilities and libraries' e-resources do not necessarily lead to the effective implementation of e-learning. The study recommended that university managers should make effort to ensure that ICT facilities are accessible to lecturers and students, and develop policies guiding the implementation of e-learning. University managers should also make university ICT resources and library e-resources more accessible to lecturers and students.

Keywords: Access, E-Library, Facilities, ICT, Implementation, Policies, RBVT, Resources, Tangibles, Teaching

1. Introduction

Fundamentally, the education landscape globally has changed since the outbreak of COVID-19 pandemic because of intermittent closures of educational institutions that denied teachers and students from on campus face to face teaching and learning. Since then it has become necessary for universities to include the online teaching mode using e-teaching and learning (Bozkurt et al. 2020; Godber & Atkins, 2021). Already, most educational institutions in the Western World and Asia had largely advanced in the adoption of e-learning. Nevertheless, in the developing countries of Africa, very few educational institutions had the readiness of using online teaching and learning to satisfactory levels (Maré & Mutezo 2021, Mugizi & Nagasha, 2023). Taking the example of Uganda, a handful of private universities before COVID-19 pandemic had effective pre-existing e-learning platforms successfully offering online education (Kabahizi, 2020). While almost all the top public universities in the country offering in-service and external programmes in the country already had the open distance education learning programs for students on those programmes, they hardly conducted remarkable online classes (Busein, 2021). In those universities, the online teaching and learning platforms existed in words as few students were using

them, had limited content, were very slow and even could not accommodate a large number of users at a single time (Shabomwe, 2021).

In Uganda, during the initial closure of educational institutions that started in March 2020 (Mugizi et al., 2021), universities that attempted to conduct online teaching and learning were blocked by the government claiming that by closure of educational institutions, it meant that every educational activity was supposed to shut down including the running of any online activity (Ahabwe, 2020; Muhwezi, 2020). Challenges cited for blocking online classes included internet costs unaffordable for teachers and students, poor internet connectivity, lack of ICT tools, and low knowledge for ICT use (Komuhangi et al., 2022). Nonetheless, after three months of educational institutions lockdown, the Government realised that COVID-19 was not about to go away. Hence, the government asked universities start online classes. The reality of the "new normal" situation dictated that educational institutions adopt online teaching and learning. Higher institutions of education were required to conduct long-distance modes of instruction using whatever technologies they could harness (Kabahizi, 2020).

While the government realised the need for online classes, implementation became problematic. At Makerere University, a section of students staged a protest against online classes claiming that the online system was ineffective and was being forced on them by the university administration (Busein, 2021). At Kyambogo University, students protested against online learning complaining that most lecturers were not involved in online classes (Shabomwe, 2021). This was despite the fact that Makerere University already had an online learning platform, the "Makerere University E-learning Environment" (MUELE), on which lecturers could upload learning content and engage students in interactive activities including discussion forums, assignments and quizzes among others (Olum et al., 2020). Similarly, Kyambogo University already had in place the Open Distance Education Learning (ODEL) Centre equipped to offer e-learning to in-service and external students. In addition, the universities already had computer laboratories, internet connectivity and e-library resources that could facilitate e-teaching and learning (Mugizi & Nagasha, 2023). With these tangible resources in place, the unanswered empirical question that emerged was how existing university e-learning resources could contribute to effective e-learning implementation.

The above unanswered empirical question emerged because it was assumed that basing on existing tangible resources, universities could have effectively implemented e-learning. The concept of tangible resources is anchored in the Resource Based Theory. The Resource-Based Theory (RBT) introduced by Penrose (1959) and developed by its proponents such as Barney (1986) explains that among essential resources of organisations are tangible resources. Tangible resources are specific assets of a tangible nature that an institution owns and uses to perform its activities. Tangible resources are necessary within the context in which institutions perform their activities and are relevant factors in generating routines (Torres-Barreto et al., 2020). Tangible resources are very vital for operations of organisations. A minimum amount of tangible resources is a requirement for successful organisational performance (Wongwilai et al., 2022). Tangible resources provide sustainable competitive advantage to organisations (Holdford, 2018). Tangible resources are utilised to provide services (Jawed & Siddiqui, 2019) and help organisations to overcome and deal with uncertainties enhancing organisational success (Kim et al., 2019). Studies reveal that tangible resources for e-learning include ICT teaching facilities (Akbulut et al. 2007), access to ICT facilities (Akbulut et al., 2007; Mugizi & Amwine, 2020) , ICT implementation policy (Akbulut et al., 2007; Isaacs et al., 2018; Anyim, 2018). This study assessed the influence of tangibles resources on effective implementation of e-learning during and beyond COVID-19 pandemic era in public universities in Uganda. Specifically, the study tested the hypotheses to the effect that;

H1: ICT facilities have a significant influence on effective e-learning implementation.
H2: Access to ICT facilities has a significant influence on effective e-learning implementation.
H3: Library e-resources have a significant influence on effective e-learning implementation.
H4: Universities ICT policies have a significant influence on effective e-learning implementation.

2. Tangible Resources and Implementation of E-learning

Tangible resources e-learning include ICT teaching facilities, access to ICT facilities, and ICT implementation policy. With respect to ICT teaching facilities, these include computers, internet, intranet, video conferencing and

broadcasting technologies among others that can facilitate instruction and the teaching and learning processes (Basak et al., 2018). ICT is an important tool for realising a new paradigm of learner centred education system due to the range of ICT options for videoconferencing and websites which can be used to meet the challenges teachers face. ICT provides more flexible and effective ways for lifelong learning for today's teachers and students (Hailye, 2020). Scholars (e.g. Akinde & Adetimirin, 2017; Asubiojo & Ajayi, 2017; Eze et al., 2018; Gupta et al., 2022; Hailye, 2020; Matviichuk et al., 2022; Ouma, 2021; Semlambo et al., 2022) have related ICT teaching facilities and e-learning implementation. The studies above revealed that ICT teaching facilities are important in the implementation of e-learning. However, while the studies pointed to the importance of ICT facilities in the implementation of e-learning, the study done at a private university in Uganda by Ouma indicated that there were limited ICT facilities. This attracted the need for this study in the context of public universities to explore whether the situation was different and how what prevailed related to effective e-learning implementation.

With respect to ICT facilities access, this is an individual's unhindered right or ability to locate and use ICT technology devices (Umukoro et al., 2021). Access to ICT resources affects e-learning implementation because e-learning thrives on the availability of ICT facilities (Adarkwah, 2021). Students who have a higher level of access to digital devices such as computer, smartphones, tablets and the Internet are likely to respond positively to e-learning delivery (Arthur-Nyarko & Kariuki, 2019). Studies (Arthur-Nyarko & Kariuki, 2019; Adarkwah, 2021; Innab & Alqahtani, 2022; Lembani et al.; 2019; Newen & Cheny, 2022; Siddiquah & Salim, 2017; Subashini et al., 2022; Yuliani & Mercuriani, 2021) have been carried out on access to ICT facilities and e-learning implementation. However, the studies revealed empirical gaps. For instance, while Adarkwah (2021), and Lembani et al. (2019) indicated that lack of access to ICT facilities hindered implementation e-learning, Arthur-Nyarko and Kariuki (2019) indicated that access to internet access did not influence preference for e-learning delivery mode and Siddiquah and Salim (2017) reported that students access to ICT was not related to their use in learning. This meant that the relationship between ICT and e-learning implementation was still shrouded in contradictions calling the need for this study.

Regarding the ICT policies, these are statements focused on making ICT a teaching and learning tool for e-learning (Aidoo et al., 2022). Therefore, an ICT policy refers to a statement stipulating practices that guide how ICT should be implemented in an institution. There are a number of scholars (Czerniewicz & Brown, 2009; De Freitas & Oliver, 2005; MacKeogh & Fox, 2009; Priatna et al., 2020; Teo et al., 2020) that have related ICT policy to e-learning implementation. Analyses of these scholars revealed that policies enhanced e-learning implementation. Nonetheless, while studies above suggest that scholars have expended effort to relate ICT policies to e-learning implementation, literature search revealed lack such studies in the context of Uganda. This thus attracted the attention of this empirical study in the context of Uganda to establish if universities have developed ICT policies and how they relate to e-learning implementation.

With regard to library e-resources, these are electronic information resources accessed on the web, on or off campus through the library (Ternenge & Kashimana, 2019). Library e-resources include such resources as e-journals, e-books, and on-line databases accessed directly or remotely (Saklani, 2020). Library e-resources help faculty members and learners to collect current teaching and research materials easily (Mwantimwa, 2017). Library e-resources also help learners to access reading materials (Rivo & Žumer, 2022). Scholars (Ajegbomogun et al., 2017; Anyim, 2021; Oladele & Modebelu, 2021; Oladele & Modebelu, 2021; Mugizi & Amwine, 2020; Odili et al., 2020; Olaniran et al., 2017). Nevertheless, while all the studies suggested that library e-resources are essential for implementation of e-learning, Olaniran et al. (2017) did not suggesting that the effect of e-library resources on e-learning implementation still needs to be explored in different contexts. In addition, none of the studies captured university contexts in Uganda where students were resisting to e-learning. Therefore, it was imperative to further assess the relationship between libraries e-resources and implementation e-learning.

3. Methodology

This section presents the methodology that was followed in carrying out the investigations of the study. The methods enabled collection and analysis of data on tangible resources and effective e-learning implementation.

3.1 Research design and Sample

The cross-sectional research design guided data collection. This was because cross-sectional studies collect data on what exists at the particular point. The design enabled analysis of a number of variables at the same time and assessing of the study problem leading to making of suggestions on how to optimise existing tangible resources for effective e-learning implementation. Since the design also enables collecting of data using a self-administered questionnaire, it was very appropriate. Fulltime academic staff of the universities of Kyambogo and Makerere provided data. The sample of 312 academic staff from a population of 1883 was studied. The respondents were drawn from a target population of 1432 academic staff from Makerere University and 451 from Kyambogo University.

3.2 Measures of the Variables

The data collection tool was a self-administered questionnaire because it enabled collecting data from a large number of respondents. The independent variables of tangible resources was measured in terms of ICTs teaching facilities (Akbulut et al., 2007; Schreurs, 2007), access to ICT (Akbulut et al., 2007; Mugizi & Amwine, 2020; university ICT implementation policy (Akbulut et al., 2007; Ngololo et a., 2012; Isaacs et al., 2018), and libraries e-resources (Anyim, 2018). E-learning effective implementation was measured in terms of student-student, student-teacher and student-content e-interaction (Downer et al., 2015; Malinovski et al., 2012; Yılmaz & Karataş, 2018). The ordinal scale where, 1 = Strongly Disagree, 2 = Disagree, 3 = Not sure, 4 = Agree and 5 = Strongly Agree was used. This was because the anchors enabled collection of data that could be analysed quantitatively.

3.3 Data Analysis Methods

Descriptive and inferential analyses were carried out. Descriptive analysis included calculation of means to establish how the respondents rated the quality of tangible resources of the universities and the effectiveness of e-learning implementation. Inferential analysis involved structural equation modelling (SEM) using SmartPLS software provided in SPSS. This helped in building models how the appropriateness of the measures and establishing how tangible resources of universities enhance implementation of e-learning.

4. Results

This section presents findings on tangible resources and effective e-learning implementation in selected Ugandan public universities. The findings include measurement and structural equation models, and Path Model estimates.

4.1 Demographic Characteristics

The demographic data characteristics revealed that the modal percentage (70.8%) was of males while the females were 29.2%. Majority percentage (68.3%) of the academic staff was 40 years and above, with those 30 to 40 years being 26.0% and the remaining 5.7% was up 30 years. The larger percentage (55.8%) of academic staff possessed masters' degrees, 40.4% had PhDs while 1.9% and another 1.9% possessed bachelors and postgraduate diplomas respectively. The results further showed that the larger percentage (50.0%) of the respondents were at the rank of assistant lecturer, 38.5% were at the rank of lecturer, 9.6% at the rank of senior lecturer and 1.9% at the rank of associate professor. This data shows that varied academic staff provided data. Therefore, results representative of views of different segments of academic staff in the universities were captured.

4.2 Measurement Models

Descriptive results specifically the means were calculated to show how the academic staff rated the tangible resources of the universities. Thereafter, measurement models were done to establish whether the data were fit for structural equation modelling. Measurement models included validity tests in terms of Average Variance Extracted (AVE) and Heterotrait–Monotrait (HTMT) assessments and reliability in terms of Cronbach's alpha [α] and Composite Reliability [CR]). Value Inflation Factor (VIF) was calculated to detect the existence or non-existence

of Collinearity or correlation between the independent variables to determine whether they were appropriate for structural equation modelling. The results follow in Tables 1 and 2.

4.2.1 Measurement Model 1

The first measurement model presents descriptive statistics specifically the means, AVE and Heterotrait Monotrait (HTMT) Discriminant Validity. The means show how the respondents rated e-learning implementation while AVE and Heterotrait Monotrait (HTMT) ratio of correlations for discriminant validity show whether the measures of the variable of universities tangible resources were convergent but differently measured the variable. The results are presented in Table 1.

Table 1: Descriptives, Means and Heterotrait-Monotrait Ratio (HTMT) for Tangible Resources

Measures	Means	AVE	ELI	SCI	SSI	STI	
ELI	3.55	1.000					
SCI	3.42	0.692	0.869				
SSI	3.54	0.550	0.758	0.502			
SSI	3.68	0.526	0.869	0.640	0.517		
Measures	Means	AVE	ACT	ITF	LE	TR	UIP
ACT	2.76	0.669					
ITF	2.38	0.631	0.679				
LE	3.53	0.537	0.394	0.500			
TR	3.03	1.000	0.812	0.872	0.794		
UIP	3.10	0.594	0.678	0.626	0.506	0.883	

ACT = Access to ICT facilities, ELI = E-learning Implementation, ITF = ICT Teaching Facilities, LE = Libraries E-resources, R = Tangible Resources, SCI = Student-Content E-Interaction, SSI = Student-Student E-Interaction, STI = Student-Teacher E-Interaction, UIP = University ICT Policy.

The results in Table 1 show that overall the lecturers rated e-learning implementation to be high (mean = 3.55). This is because the mean was close to code four which on the five point Likert scale used corresponded to “agree” or high. However, the lecturers rated student-content e-interaction when using e-learning to be moderate (mean = 3.42) because the mean was close to code three for “not sure.” three being the average, the results were thus moderate or fair. With respect to student-student e-interaction (mean = 3.54) and student-teacher e-interaction (mean = 3.68), they were rated high respectively. Therefore, while student-content e-interaction was moderate, student-student and student-teacher e-interaction were high. With respect to the independent variable of tangible resources, overall the lecturers rated them moderate (mean = 3.03). This is because the mean was close to code three which on the five point Likert scale used corresponded to “not sure” that fair or moderate. The lecturers rated access to ICT facilities (2.76), ICT teaching facilities (2.38), University ICT policy (mean = 3.10) moderate. However, libraries e-resources (Mean = 3.53) were rated high. Therefore, except for e-library resources all the other aspects of tangible resources namely ICT facilities, ICT teaching facilities, and university ICT policy were rated moderate.

The AVE results in Table 1 assessing convergent validity revealed that the various constructs measuring e-learning and tangible resources were appropriate measures. The AVE values are above the minimum level of 0.5. This implies that the indicators are appropriate measures of the constructs (Shrestha, 2021). Convergent validity is the degree of the relationship between measures of a latent variable. Convergent validity is a measure that proposes that measures of variable should be related to each other hence they measure the same concept (Sürücü & Maslakçı, 2020). Table 1 also shows that Heterotrait-Monotrait (HTMT) ratios of correlation that assess discriminant validity were calculated. These sought to determine whether the constructs studied were independent hence described the variable of e-learning implementation and tangible resources respectively independently. HTMT is a reflective test that determines whether measures of a variable in a model are independent and therefore their indicators strictly define each construct (Hair Jr, Howard & Nitzl, 2020). The Heterotrait-Monotrait ratio (HTMT) correlations for three constructs of e-learning and implementation and four constructs of tangible resources (Table 1) fulfilled the discriminant validity conditions since all the values were below the maximum level 0.90 (Hair Jr

et al., 2021). Therefore, the measures separately described the variables. This means that the data collected on the variables were appropriate for structural modelling.

4.2.2 Measurement Model 2

The second measurement model provides reliability (Cronbach's alpha [α] and composite reliability [CR]) and collinearity [VIF]) assessments. Reliability and collinearity tests were done to find out whether the data collected for the different constructs could be subjected to structural modelling. The results are indicated in Table 2.

Table 2: Construct Reliability and Validity for E-learning Implementation and Tangible Resources

Measures	α	CR	VIF
E-learning Implementation	1.000	1.000	
Student-Content E-Interaction	0.850	0.899	1.508
Student-Student E-Interaction	0.792	0.858	1.293
Student-Teacher E-Interaction	0.819	0.869	1.522
Access to ICT facilities	0.833	0.890	1.703
ICT Teaching Facilities	0.801	0.872	1.742
Libraries E-resources	0.876	0.902	1.393
University ICT Policy	0.862	0.897	1.784
Tangible Resources	1.000	1.000	

Table 2 suggests that reliability test results in terms of Cronbach's alpha (α) and composite reliability (CR) were above the threshold of 0.70 which implied that the measures of the constructs were reliable. Composite reliability was carried out since Cronbach's alpha is very sensitive because it assumes that the traits of the indicators should be the same across the population which lowers reliability values. For composite reliability, it is liberal because accommodates outer traits which helps to ensure that a higher number of indicators to become reliable (Hair et al., 2019). The test results in Table 2 also showed that there was no Collinearity (high correlation) between the variables because values for variance inflation factor (VIF) the standard metric for measuring Collinearity were less than 5 (Marcoulides & Raykov, 2019). This implied that the tangible resources variables could predict effective e-learning implementation independently.

4.3 Structural equation model for Tangible Resources and E-learning Implementation

To establish the relationship between tangible resources and e-learning implementation, a structural equation model was done. Figure 1 presents the structural equation model findings for tangible resources and e-learning implementation.

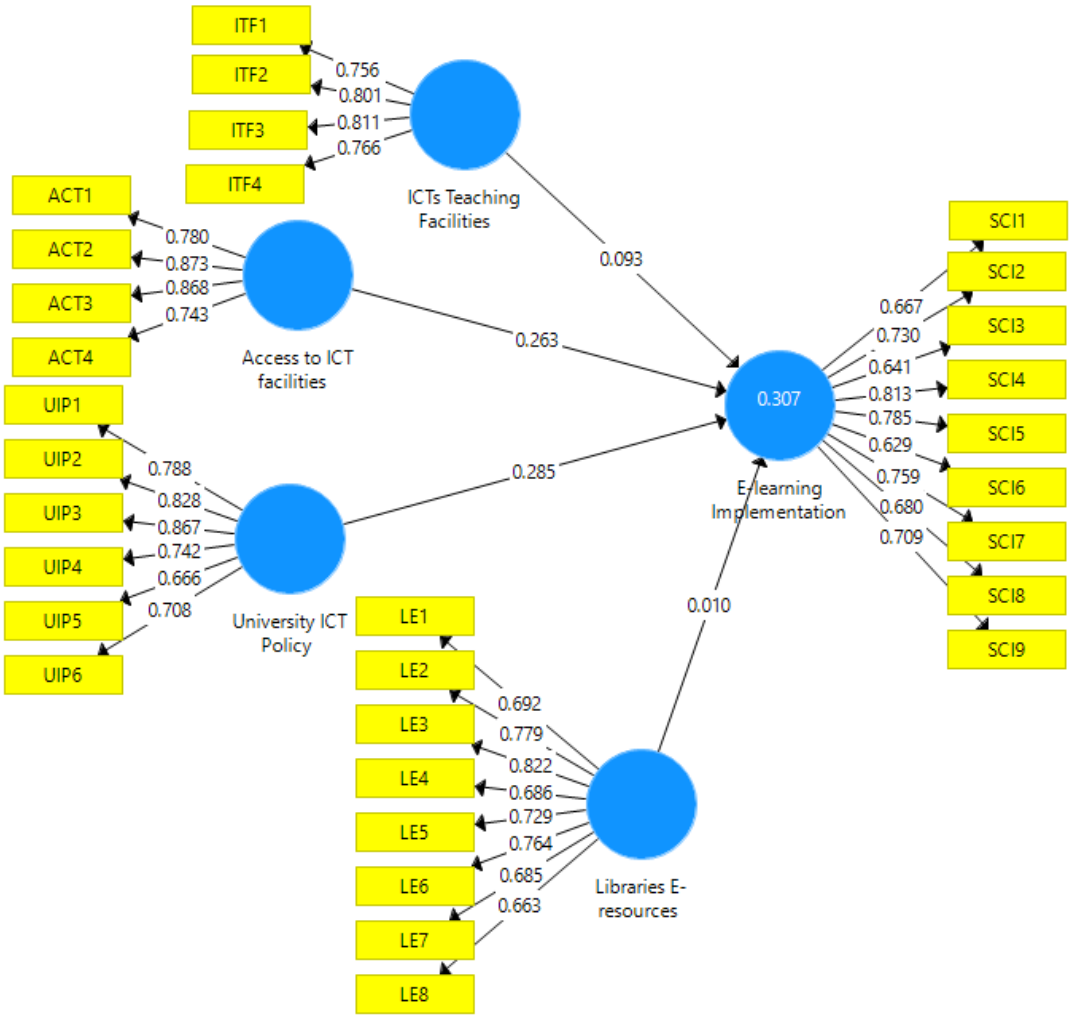

Figure 1: Structural Equation Model findings for Tangible Resources and E-Learning Implementation

The model 1 reveals that e-learning implementation was reduced only to student-content E-Interaction. This means that the remaining constructs namely student-student and student-teacher did not load in the model. The model comprises path coefficients between constructs, coefficients of determination (R^2 and adjusted R^2) and related t statistics and p-values. R^2 examined the model's predictive power. The model involved testing four sub-hypotheses under the main hypothesis (H1) to the effect that tangible resources have a significant relationship with implementation e-learning. The sub-hypotheses were to the effect that ICT facilities, access to ICT facilities, library e-resources and university ICT policy relate to e-learning implementation. Table 3 presents structural equation model estimates.

Table 3: Structural equation model estimates for Tangible Resources and E-learning Implementation

Path Coefficients		B	Mean	STD	T	P
Access to ICT facilities Implementation	→ E-learning	0.263	0.257	0.064	4.133	0.000
ICT Teaching Facilities Implementation	→ E-learning	0.093	0.103	0.053	1.745	0.082
Libraries E-resources Implementation	→ E-learning	0.010	0.020	0.070	0.146	0.884
University ICT Policy Implementation	→ E-learning	0.285	0.288	0.075	3.819	0.000
$R^2 = 0.307$						
Adjusted $R^2 = 0.298$						

The results in Figure 2 and Table 3 revealed that tangible resources namely access to ICT facilities ($\beta = 0.263$, $t = 4.133$, $p = 0.000 < 0.05$) and university ICT policy ($\beta = 0.285$, $t = 3.819$, $p = 0.000 < 0.05$) positively and significantly predicted e-learning implementation. However, ICT teaching facilities ($\beta = 0.093$, $t = 1.745$, $p = 0.082 > 0.05$) and libraries e-resources ($\beta = 0.010$, $t = 0.146$, $p = 0.884 > 0.05$) positively but insignificantly predicted e-learning implementation. R^2 suggested that tangible resources explained 30.7% ($R^2 = 0.307$) of the variation in e-learning implementation. Adjusted R^2 indicated that the two tangible resources, i.e. access to ICT facilities and university ICT Policy, explained 29.8% (adjusted $R^2 = 0.289$). The coefficient of determination (R^2) suggested that 69.3% of the variation in e-learning implementation was accounted for by factors other than tangible resources. The results implied that while Hypotheses One and four (H1 & H4) were accepted, Hypotheses Two and Three (H2 & H3) were rejected. The Beta magnitudes suggest that university ICT policy was the most significant predictor of e-learning implementation.

5. Discussion of the Findings

The findings revealed that access to ICT facilities positively and significantly predicted e-learning implementation. This finding is consistent with the findings of previous scholars. For example, Arthur-Nyarko and Kariuki (2019), Adarkwah (2021), Innab and Alqahtani, 2022; Lembani et al. (2019) Newen and Cheny (2022), Subashini et al. (2022), Yuliani and Mercuriani (2021) indicated that access to ICT facilities enhanced e-learning effective implementation. However, the finding was contrary to Siddiquah and Salim (2017) who reported that those students who had computers and internet facilities at home and universities spent more time on computers for recreational and other purposes than for academic purpose. However, with the finding consistent with the findings of previous scholars, it can be surmised that access to ICT enhances effective e-learning implementation.

The finding to the effect that university ICT Policy positively and significantly predicted e-learning implementation is also consistent with the findings of previous scholars. For instance, De Freitas and Oliver (2005) found out that that e-learning policy led to effective e-learning implementation. MacKeogh and Fox (2009) revealed that successful implementation of e-learning required ICT policy establishing institutional, development of a university strategy, institutional quality standards and a central unit to provide support to faculties. Consistently, Priatna et al. (2020) indicated that e-learning policy is a binder for the academic community to run e-learning. Similarly, Teo et al. (2020) revealed that effectiveness of e-learning was enhanced by policies including continuous standardisation efforts and sound regulatory system applying a socially appropriate online pedagogy, raising public awareness, and building e-learning communities. Therefore, for successfully implementation of e-learning policies are imperative.

The finding that universities ICT teaching facilities insignificantly predicted e-learning implementation was contrary to the findings of previous scholars. For example Akinde and Adetimirin (2017), Asubiojo and Ajayi (2017), Eze et al. (2018), Gupta et al. (2022), Hailye (2020), Matviichuk et al. (2022), Ouma (2021), and Semlambo et al. (2022) indicated that ICT teaching facilities related to e-learning implementation. Possibly, the finding was contrary to the findings of most scholars because the facilities of the universities were not accessible

to students when outside the university campus. With respect to the finding that libraries e-resources insignificantly predicted e-learning implementation, it agreed with Olaniran et al. (2017) who revealed there was low utilisation of e-learning resources in teaching. This suggested that existence of e-resources did not automatically suggest effective implementation of e-learning as teachers did not use them. However, the finding disagreed with most scholars as they indicated that libraries e-resources enhanced implementation of learning such as Ibieta et al. (2017), Mugizi and Amwine (2020), Nwigbo and Madhu (2016), Olaniran et al. (2017), and Shamim and Raihan (2016). However, the finding was contrary to what was conjectured because libraries e-resources might not be accessible to teachers and students for online learning activities during lecture time.

6. Conclusions

The discussion above led to the conclusion that access to ICT facilities and universities ICT policies were imperative for implementation of e-learning. Access to ICT facilities was imperative because when the facilities are accessible, teachers and students easily find them for use. For universities ICT policies, these provided support and were binders for the academic community to run e-learning. However, the discussion led to the conclusion that ICT teaching facilities and libraries e-resources did not necessarily lead to e-learning implementation. This is because the ICT facilities of the universities and libraries e-resources might not be accessible to teachers and students for online learning activities during lecture time. For instance, while not in touch with ICT staff of the universities, lecturers did not have rights for starting and sharing in online classes using zoom. In addition, students had the tendency to be more interested in interacting with social media than learning content.

7. Recommendations

The study recommends that university managers should make effort to make ICT facilities accessible to students and develop policies guiding implementation of e-learning. The manager can help students purchase ICT facilities at a lower cost and provide automatic rights to lecturers to use facilities such as zoom without need for support from ICT staff. The policies imperatively will standardise e-learning activities and enforce involvement in e-learning. For universities ICT resources and library e-resources should be made more accessible to lecturers and students when out of campus should be much easier. This was because universities ICT facilities and libraries e-resources were not more accessible to teachers and students outside campus.

8. Limitations

This study makes imperative contributions in showing how tangible resources can enhance e-learning implementation effectiveness. However, limitations emerged. For instance, the study assessed only one aspect of RBT Theory that is tangible resources while the other resources namely intangible resources and capabilities were not considered. Therefore, future research should consider all the aspects of RBT. In addition, the current studied considered only the quantitative approach limiting in-depth analysis. Therefore, future studies should consider the use of the qualitative approach for in-depth analysis.

Declaration

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References

Adarkwah, M. A. (2021). "I'm not against online teaching, but what about us?" ICT in Ghana post COVID-19. *Education and Information Technologies*, *26*(2), 1665-1685. https://doi.org/10.1007/s10639-020-10331-z

Ahabwe, C. (2020, March 25). PML daily coronavirus update: UCU to conduct take-home exams for Easter semester amid closure. *PML Daily*. Retrieved from: www.pmldaily. com ›

Aidoo, B., Macdonald, M. A., Vesterinen, V. M., Pétursdóttir, S., & Gísladóttir, B. (2022). Transforming teaching with ICT using the flipped classroom approach: Dealing with COVID-19 pandemic. *Education Sciences*, *12*(6), 421. https://doi.org/10.3390/educsci 12060421

Ajegbomogun, F. O., Okunlaya, R. O. A., & Alawiye, M. K. (2017). Analytical study of e-learning resources in National Open University of Nigeria. *Education and Information Technologies*, *22*(5), 2403-2415. https://doi.org/10.1007/s10639-016-9548-z

Akbulut, Y., Kesim, M., & Odabaşı, H. F. (2007). Construct validation of ICT indicators measurement scale (ICTIMS). *The International Journal of Education and Development using Information and Communication Technology (IJEDICT), 3*(3), 60-77

Akinde, T. A., & Adetimirin, A. A. (2017). Perceived usefulness as a correlate of extent of Information and Communications Technologies (ICTs) use for teaching by library educators in universities in Nigeria. *International Journal of Library and Information Science*, 9(3), 14-24. doi: 10.5897/IJLIS2016.0739

Anyim, W. O. (2021). Sustainable development goal on quality education: A review of e-learning resources and pedagogy in the university system. *Library Philosophy and Practice (e-journal)*, 5578. https://digitalcommons.unl.edu/libphilprac/5578

Anyim, W. O. (2018). E-Library resources and services: Improvement and innovation of access and retrieval for effective research activities in university e-libraries in Kogi State Nigeria. *Library Philosophy and Practice (e-journal).* 1647. https://digitalcommons. unl.edu/libphilprac/1647.

Arthur-Nyarko, E., & Kariuki, M. G., (2019). Learner access to resources for eLearning and preference for eLearning delivery mode in distance education programmes in Ghana. *International Journal of Educational Technology, 6*(2), 1-8.

Asubiojo, R. O., & Ajayi, J. A. (2017). The role of information and communication technology in enhancing instructional effectiveness in teachers' education in Nigeria. *KIU Journal of Social Sciences, 3*(2), 289-295

Barney, J. B. (1986). Strategic factor markets: Expectations, luck, and business strategy. *Management science*, *32*(10), 1231-1241. https://doi.org/10.1287/mnsc.32.10. 1231

Basak, S. K., Wotto, M., & Belanger, P. (2018). E-learning, M-learning and d-learning: conceptual definition and comparative analysis. *E-learning and Digital Media*, *15*(4), 191-216. https://doi.org/10.1177/2042753018785180

Bozkurt, A., Jung, I., Xiao, J., Vladimirschi, V., Schuwer, R., Egorov, G., ... & Paskevicius, M. (2020). A global outlook to the interruption of education due to COVID-19 pandemic: Navigating in a time of uncertainty and crisis. *Asian Journal of Distance Education*, *15*(1), 1-126. https://doi.org/10.5281/zenodo.3878572

Busein, S. (2021, February 11). Makerere University students protest "ineffective" online learning. *ChimpReports*. Retrieved from: https://chimpreports.com/makerere-university-students-protest-ineffective-online-learning/

Czerniewicz, L., & Brown, C. (2009). A study of the relationship between institutional policy, organisational culture and e-learning use in four South African universities. *Computers & Education*, *53*(1), 121-131. https://doi.org/10.1016/j.compedu.2009.01.006

De Freitas, S., & Oliver, M. (2005). Does E-learning Policy Drive Change in Higher Education?: A case study relating models of organisational change to e-learning implementation. *Journal of Higher Education Policy and Management*, *27*(1), 81-96. doi: 10.1080/13600800500046255

Downer, J. T., Stuhlman, M., Schweig, J., Martínez, J. F., & Ruzek, E. (2015). Measuring effective teacher-student interactions from a student perspective: A multi-level analysis. *The Journal of Early Adolescence*, *35*(5-6), 722-758. https://doi.org/10.1177/ 0272431614564059

Eze, S.C., Chinedu-Eze, V.C. & Bello, A.O. (2018). The utilisation of e-learning facilities in the educational delivery system of Nigeria: a study of M-University. *International Journal of Educational Technology in Higher Education* , 15, 34. https://doi.org/10.1186/s4 1239-018-0116-z

Godber, K. A., & Atkins, D. R. (2021). COVID-19 impacts on teaching and learning: A collaborative autoethnography by two higher education lecturers. *Frontiers in Education*, *6*, 647524. https://doi.org/10.3389/feduc.2021.647524

Gupta, N., Sharma, N., & Sood, S. (2022). Empirical analysis on parameters for adoption of cloud-based e-learning in indian higher education system: A user's perspective. In *Information and Communication Technology for Competitive Strategies (ICTCS 2020)* (pp. 977-991). Springer, Singapore. https://doi.org/10.1007/978-981-16-0739-4_91

Hailye, T. M. (2020). Information and communication technology usage in public and private high schools. *IJESC*, 10(5), 25976- 25986

Hair Jr, J. F., Howard, M. C., & Nitzl, C. (2020). Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *Journal of Business Research*, *109*, 101-110. https://doi.org/10.1016/j.jbusres.2019.11.069

Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). Evaluation of reflective measurement models. In *Partial Least Squares Structural Equation Modeling (PLS-SEM) Using R* (pp. 75-90). Cham: Springer. https://doi.org/10. 1007/978-3-030-80519-7

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, *31*(1), 2-24. https://doi.org/10.1108 /EBR-11-2018-0203

Holdford, D. A. (2018). Resource-based theory of competitive advantage: A framework for pharmacy practice innovation research. *Pharmacy Practice*, *16*(3), 1-11. https://doi. org/10.18549/PharmPrACT2018.03.1351

Igwebuike, O., Kujoh, J. U., & Ayuk, G. O. (2022). E-learning facilities and implementation of educational technology curriculum in collages of education in Cross River State, Nigeria. *Evaia: International Journal of Ethics and Values*, *2*(1), 13-25.

Innab, A., & Alqahtani, N. (2022). The mediating role of e-learning motivation on the relationship between technology access and satisfaction with e-learning. *Nursing Open*. https://doi.org/10.1002/nop2.1513

Isaacs, A., Kazembe, L., & Kazondovi, C. (2018). An evaluation of the National Information Communication and technology (ICT) policy at the University of Namibia in the Faculty of Education. *Higher Education for the future*, *5*(1), 104-118. https://doi.org/10.11 77/2347631117740455

Jawed, I., & Siddiqui, D. A. (2019). *What matters for firms' performance: capabilities, tangible or intangible resources? Evidence from corporate sectors on Pakistan.* Retrieved from: http://dx.doi.org/10.2139/ssrn.3510562

Kabahizi, C. B. (2020). Impacts of the COVID-19 disruptions on institutions of higher education in Uganda." *Africa Policy Centre Uganda Christian University*. Retrieved from: https://ucudir.ucu.ac.ug › bitstream › handle › Ka...

Kim, T. H., Khaltar, O., & Moon, M. J. (2019). *The Effects of Intangible and Tangible Resources on Performances of Social Enterprises: Dualities in Resources and Performances* (No. 1167). EasyChair. Retrieved from: https://easychair.org › publications › preprint_open

Komuhangi, A., Mpirirwe, H., Robert, L., Githinji, F. W., & Nanyonga, R. C. (2022). Predictors for adoption of e-learning among health professional students during the COVID-19 lockdown in a Private University in Uganda. *BMC Medical Education, 22*, 671. https://doi.org/10.1186/s12909-022-03735-7

Lembani, R., Gunter, A., Breines, M., & Dalu, M. T. (2019). The same course, different access: The digital divide between urban and rural distance education students in South Africa. *Journal of Geography in Higher Education, 44*(1), 70–84. https://doi.org/10.1080/0 3098265.2019.1694876.

MacKeogh, K., & Fox, S. (2009). Strategies for embedding e-learning in traditional universities: Drivers and barriers. *Electronic Journal of E-learning*, *7*(2), 147-154.

Malinovski, T., Lazarova, M., & Trajkovik, V. (2012). Learner-content interaction in distance learning models: students' experience while using learning management systems. *International Journal of Innovation in Education, 1*(4), 362-376.

Marcoulides, K. M., & Raykov, T. (2019). Evaluation of variance inflation factors in regression models using latent variable modelling methods. *Educational and Psychological Measurement*, *79*(5), 874-882. https://doi.org/10.1177/0013164418817803

Maré, S., & Mutezo, A. T. (2021). The effectiveness of e-tutoring in an open and distance e-learning environment: Evidence from the University of South Africa. *Open Learning: The Journal of Open, Distance and e-Learning*, *36*(2), 164-180. https://doi.org/ 10.1080/02680513.2020.1717941

Matviichuk, L., Ferilli, S., & Hnedko, N. (2022). Study of the organization and implementation of e-learning in wartime inside Ukraine. *Future Internet*, *14*(10), 295. https://doi.org/ 10.3390/fi14100295

Mugizi, W., & Amwine, C. M. (2020). Information communication technology use and job performance of teachers at a private international school in Uganda. *Creative Education, 11*, 166-181.https://doi.org/10.4236/ce.2020.112012

Mugizi, W., & Nagasha, J. I. (2023). Students' experiences using online learning during the COVID-19 pandemic: The case of Kyambogo University, Uganda. In L. Namatende-Sakwa, S. Lewinger., & C. Langsford. *COVID-19 and Education in Africa* (pp. 129-151). London: Routledge. doi: 10.4324/9781003269625

Mugizi, W., Amwine, C. M., & Rwothumio, J. (2021). Compensation management and employee wellbeing of academic staff in Ugandan private universities during COVID-19 lockdown. *Interdisciplinary Journal of Education Research, 3*(1), 1-12. https://doi.org/ 10.51986/ijer-2021.vol3.01.01

Mugizi, W., Kasule, W., Rwothumio, J., & Opit, E. (2021, April, 28-30). Learning Technologies and Changing Pedagogies during COVD 19 Pandemic Era: A case of Kyambogo University in Uganda. In, *Peak Performances: COVID-19 and the Transformation of Teaching and Learning in Higher Education conference University of Johannesburg*.

Muhwezi, M. (2020, April 2). Education ministry blocks UCU online examinations amidst coronavirus lock-down. *Redpepper*. Retrieved from: www.redpepper.co.u

Mwantimwa, K., & Elia, E. (2017). Utilisation of e-resources to support teaching and research in higher learning institutions, Tanzania. *University of Dar es Salaam Library Journal*, *12*(2), 98-123.

Newen, M. A., & Cheny, N. J. (2022). E-learning readiness in the teaching and learning of mathematics in secondary schools in Mezam Division. *Central Asian Journal of Social Sciences And History*, *3*(5), 157-166.

Ngololo, E. N., Howie, S. J., & Plomp, T. (2012). An evaluation of the implementation of the National ICT Policy for Education in Namibian rural science classrooms. *African Journal of Research in MST Education, 16*(1), 4-17.

Odili, N., Adetona, C. O., & Eneh, A. E. (2020). Online resources for e-learning in educational institutions: a case of COVID-19 era. *International Journal of Research and Review*, *7*(10), 95-102.

Oladele, E. O., & Modebelu, O. J. (2021). Perception of e-learning and facilities available in Distance Learning Institute, University of Lagos. *Pakistan Journal of Distance and Online Learning*, *7*(1), 15-32.

Olaniran, S. O., Duma, M. A. N., & Nzima, D. R. (2017). Assessing the utilisation level of e-learning resources among ODL based pre-service teacher trainees. *The Electronic Journal of e-Learning*, *15*(5), 384-394.

Olum, R., Atulinda, L., Kigozi, E., Nassozi, D. R., Mulekwa, A., Bongomin, F., & Kiguli, S. (2020). Medical education and E-learning during COVID-19 pandemic: Awareness, attitudes, preferences, and barriers among undergraduate medicine and nursing students at Makerere University, Uganda. *Journal of Medical Education and Curricular Development*, *7*, 1-9. https://doi.org/10.1177/238212052097321

Ouma, R. (2021). Beyond "carrots" and "sticks" of on-line learning during the COVID-19 pandemic: A Case of Uganda Martyrs University. *Cogent Education*, 8(1), 1974326. https://doi.org/10.1080/2331186X.2021.1974326

Penrose E. T. (1959). The theory of the growth of the firm. New York, USA: John Wiley.

Priatna, T., Maylawati, D., Sugilar, H. & Ramdhani, M. (2020). Key success factors of e-learning implementation in higher education. *International Journal of Emerging Technologies in Learning (iJET)*, *15*(17), 101-114. https://www.learntechlib.org/ p/218034/.

Rivo, K., & Žumer, M. (2022). academic libraries and use of mobile devices: Case study of Slovenia. *The Journal of Academic Librarianship*, *48*(3), 102507. https://doi.org/10.1016/ j.acalib.2022.102507

Saklani, V. K. (2020). Modernisation of libraries: Use of e-resources in the academic library. *IP Indian Journal of Library Science and Information Technology, 5*(2), 86-87 http://doi.org/10.18231/j.ijlsit.2020.019

Schreurs, J. (2007). ICT use in school: vision and performance measures. In M. Auer (Ed.), *E-portfolio and quality in e-learning* (pp. 1-12). Villach: Kassel University Press.

Semlambo, A. A., Sengati, F., & Angalia, B. (2022). Factors affecting the adoption of e-learning systems in public higher learning institutions in Tanzania: A case of Institute of Accountancy Arusha (IAA). *Journal of Computer and Communications*, *10*(9), 113-126. doi: 10.4236/jcc.2022.109008

Shabomwe, R. (2021, February 18). University online systems still frustrating students and lecturers. *Eagle Online*. Retrieved from: https://eagle.co.ug/2021/02/18/university-online-systems-still-frustrating-students-and-lecturers.html

Shrestha, N. (2021). Factor analysis as a tool for survey analysis. *American Journal of Applied Mathematics and Statistics*, *9*(1), 4-11. doi:10.12691/ajams-9-1-2

Subashini, N., Udayanga, L., De Silva, L. H. N., Edirisinghe, J. C., & Nafla, M. N. (2022). Undergraduate perceptions on transitioning into E-learning for continuation of higher education during the COVID pandemic in a developing country: a cross-sectional study from Sri Lanka. *BMC Medical Education*, *22*(1), 1-12. https://doi.org/10.1186/s12909-022-03586-2

Sürücü, L., & Maslakçı, A. (2020). Validity and reliability in quantitative research. *Business & Management Studies: An International Journal, 8*(3), 2694-2726. doi: http://dx.doi.org/ 10.15295/bmij.v8i3.1540

Teo, T. S. H., Kim, S. L., & Jiang, L. (2020). E-Learning Implementation in South Korea: Integrating Effectiveness and Legitimacy Perspectives. *Information Systems Frontiers, 22*, 511–528. https://doi.org/10.1007/s10796-018-9874-3

Ternenge, T. S., & Kashimana, F. (2019). Availability, accessibility, and use of electronic information resources for research by students in Francis Sulemanu Idachaba library university of agriculture, Makurdi. *Library Philosophy and Practice (e-journal)*, *2352*.

Torres-Barreto, M. L., Alvarez-Melgarejo, M., & Montealegre Bustos, F. (2020). Relationship between the tangible resources of companies and their capability of knowledge absorption. Revista ESPACIOS, 41(17), 23-39.

Umukoro, I. O., Omolade-Lawal, A. O., Babalola, S. O., Akinsumbo, K. S., Aligwa, R. M., & Abdul-Jeleel, B. A. (2021). Gender differences in access to and use of ICTs in Nigeria. In *Encyclopedia of Information Science and Technology, Fifth Edition* (pp. 1699-1718). IGI Global.

Wongwilai, S., Putnuan, S., Banyongpisut, A., Choopak, W., Sutikasana, C., Wongcharoensin, K., ... & Jermsittiparsert, K. (2022). The influence of tangible resources and operational performance to promote financial performance of electronic industry. *Uncertain Supply Chain Management*, *10*(2), 315-324. doi: 10.5267/j.uscm.2022.2.001

Yılmaz, A. B., & Karataş, S. (2018). Development and validation of perceptions of online interaction scale. *Interactive Learning Environments*, *26*(3), 337-354. https://doi.org/ 10.1080/10494820.2017.1333009

Appendix A: Study Instrument

Section A: Demographics		
Demographics Profiles (BP)	BP1	Sex (1 = Male, 2= Female)
	BP2	Age group (1= Up to 30; 2 = 30 but below 40; 3 = 40 and above).
	BP3	Education level (1= Diploma; 2 = Bachelor Degrees; 4 = Masters, 5 = PhD)
	BP5	Academic rank (1 = Assistant lecturer, 2= Lecturer, 3 = Senior, 4= Lecturer, 4= Associate professor, 5 = professor)
Section B: E-learning Implementation		
Student-Student E-Interaction (SSI)	SSI1	Students are able to learn from reading other students' comments posted on online platforms
	SSI2	Students read and comment on posted reports of others on the course on online platforms
	SSI3	Online comments and questions from other students help individual students to learn easily
	SSI4	Students have developed effective electronic communication skills through online Interaction
	SSI5	Interacting online increases students learning motivation
	SSI6	Students enjoy working in collaborative online activities
Student-Teacher E-Interaction (STI)	STI1	The work I do in this university gives me a sense of meaning and purpose
	STI2	I am zealous about my job in this university
	STI3	Students ask questions during online lessons
	STI4	I am able to make students share ideas during online classes
	STI5	I am able to know how students are acting during online classes
	STI6	I make students stay busy during on-line classes
	STI7	I am able to use all kinds of interesting materials in online classes
	STI8	I get to do a lot in this class, not just listen to my teacher talk
	STI9	Involve students in the learning process during online lessons
	STI10	I am able to explain content to students sufficiently when teaching online
Student-Content E-Interaction (SCT)	SCI1	The usage of the learning management system is simple and easy for students
	SCI2	The materials in the system are easily searchable and available to students
	SCI3	The online system provides sufficient instructions for successful usage
	SCI4	Course information can be easily found within the system by students
	SCI5	The system is adaptable for student interaction and group activities
	SCI6	The system interface is well organised and can be customised to users' needs
	SCI7	The students are comfortable in using web-oriented application for course preparation
	SCI8	E-learning provides students the opportunity of practicing what they learn in the lesson
	SCI9	The examples given during e-learning enable students to concretise the subject
	SCI10	E-learning materials stimulate students' interest in the course
	SCI11	The online materials in the course I teach support student learning
Section: Tangible Resources		
ICT Teaching Facilities (ITF)	ITF1	The online materials in the course I teach support student learning
	ITF2	Internet speed is sufficient at the campus of this university
	ITF3	Computers are fast enough to use for instructional activities in this university
	ITF4	The university provides sufficient internet on campus
	ITF5	This university provides me sufficient opportunities to improve my technology knowledge
	ITF6	Computer rooms or laboratories lighting, air condition and arrangement are suitable for instruction in this university
	ITF7	The computers of the university have sufficient licensed software programs such zoom
	ITF8	Offices and classes have ICT equipment
Access to ICT facilities (ACT)	ACT1	In this university there are sufficient computer laboratories
	ACT2	In this university there are sufficient computers for lecturers
	ACT3	In this university technology classrooms and laboratories are available whenever I need
	ACT4	Using the ICT facilities of the university I easily get electronic information useful for teaching and learning

University ICT Policy (UIP)	UIP1	University administrators ask lecturers their opinions on ICT innovative applications needed
	UIP2	Lectures are informed about the administration's prospective technological endeavours
	UIP3	The university has established guidelines for use of ICT in teaching and learning
	UIP4	The university has a policy in place focused on ICT implementation in teaching and learning system
	UIP5	The university ICT policy provides possibilities for use of ICT in teaching and learning
	UIP6	The university has guidelines for curriculum content uploading or delivery
Libraries E-resources (LE)	LE1	The university has online databases
	LE2	The university has an online public access catalogue
	LE3	Can access diverse electronic journals using the university portal
	LE4	Can access a variety of electronic books using the university portal
	LE5	I have been provided an email for library access
	LE6	The university library provides electronic document delivery services
	LE7	The university library e-resources interface makes it easy to access e-journals
	LE8	The library has facilities for using internet services