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

WILSON MUGIZI[1], JOSEPH RWOTHUMIO[2]
[1,2] *Department of Educational Planning and Management, School of Education, Kyambogo University*
P.O. Box 1 Kyambogo, Kampala, Uganda
**Corresponding author email: wmugizi@kyu.ac.ug*

Accepted: 20th May 2025, published 10th June 2025
https://doi.org/10.58653/nche.v12i2.3

Abstract

This study examined the influence of universities' intangible resources on the effective implementation of e-learning in selected Ugandan public universities during and beyond the COVID-19 pandemic period. Based on the Resource-Based Theory (RBT), universities' intangible resources for the implementation of e-learning were conceptualised as technology know-how, learning culture, organisational structure, and relationships with stakeholders. This cross-sectional study involved a sample of 312 academic staff from two public universities in Uganda's capital, Kampala. Data analysis involved calculating means and developing structural equation models (SEM). The results indicated that technology know-how and learning culture had a significant positive influence on the effective implementation of e-learning. Nonetheless, organisational structure and relationships with stakeholders had a positive but statistically insignificant influence on the effective implementation of e-learning. The study concluded that technology know-how and learning culture are essential for e-learning implementation. In addition, weak organisational structures and poor relationships with stakeholders inhibit the implementation of e-learning. Therefore, it was recommended that universities enhance the technology know-how of staff and students and promote strong learning cultures to enhance the effective implementation of e-learning. Furthermore, university managers should strengthen organisational structures and relationships with stakeholders to support sustainable e-learning.

Keywords: *E-learning; Know-how; Technology; Culture; Structure; Stakeholders.*

Introduction

Since the COVID-19 pandemic, universities worldwide have generally re-engineered their teaching and learning activities (Müller et al., 2021). Before the pandemic, e-learning was largely optional and perceived as an alternative mode of delivery, particularly for external

and in-service students who could not easily access university campuses. However, during the COVID-19 pandemic, it became the primary mode of instruction for higher education. This shift occurred because lockdowns aimed at curbing the spread of the virus rendered university campuses inaccessible (Mahyoob, 2020; Müller et al., 2021). These lockdowns forced universities to adopt and deploy technologies along with the necessary infrastructure, which, beyond the pandemic period, have become an integral part of university teaching and learning (Ogwu et al., 2022). The COVID-19 pandemic accelerated the adoption of e-learning over traditional face-to-face, on-campus education practices (Twinamasiko et al., 2021). Nevertheless, in Uganda, the implementation of e-learning during and after the lockdowns faced low readiness for adoption among lecturers and resistance from students in public universities. Only a small number of lecturers teaching at the postgraduate level adopted e-learning, whereas most undergraduate-level lecturers did not. Moreover, even among those who used e-learning technologies, many demonstrated limited knowledge in using them effectively (Mugizi & Nagasha, 2023).

Students at Kyambogo University protested the use of e-learning, stating that many lecturers refused to participate and that they lacked essential resources such as computers, smartphones, and money for internet bundles. Poor internet connectivity, especially in rural areas, and lack of electricity were also cited as major challenges, as many rural areas were not connected to the national grid (Shabomwe, 2021). At Makerere University, students opposed blended learning due to the high cost of mobile data needed for online classes. They also reported that the Makerere University E-Learning Environment (MUELE), which provided access to course materials, forums, assignments, and quizzes, was slow and difficult to use. In addition, some lecturers lacked the skills needed for effective online teaching (Olum et al., 2020). Teaching and learning require structured pedagogy, but most Ugandan institutions lacked experience with online delivery. Many lecturers did not have the strategies required for effective e-teaching (Bwire et al., 2020). Mugizi and Nagasha (2023) noted that the culture of e-learning in public universities was still emerging, with both lecturers and students favouring in-person instruction. They recommended that universities work with technology companies to provide ICT tools and advocate for lower data costs through partnerships with the government and telecom providers.

The contextual evidence above highlights key challenges that hindered effective e-learning implementation in Ugandan public universities, including limited e-learning technology know-how among lecturers and students, a weak learning culture, organisational structure and the absence of strategic partnerships to support implementation. However, an unresolved empirical question that remained was: Do these intangible resources significantly influence effective e-learning implementation? Guided by the Resource-Based Theory (RBT), this study investigated the role of universities' intangible resources in enabling successful e-learning. RBT, introduced by Penrose (1959) and later developed by scholars such as Barney (1986), emphasises the strategic value of intangible resources. These non-physical assets are crucial for organisational success because they are unique, difficult to replicate, and capable of reducing costs while improving performance (van Weele, 2019; Ocak & Fındık, 2019). Examples of such resources include technology know-how, learning culture, organisational structure, and stakeholder relationships (Ahmed et al., 2018; Sharma & Dharni, 2020). Based on RBT suggested intangible resources, the study tested the following hypotheses:

H1: Technology know-how has a significant influence on effective e-learning implementation.

H2: Learning culture has a significant influence on effective e-learning implementation.

H3: Organisational structure has a significant influence on effective e-learning implementation.

H4: Relationships with the stakeholders have a significant influence on effective e-learning implementation.

Intangible Resources and Effective Implementation of E-Learning

Intangible resources are non-physical assets that are effective only through the interaction of various factors (Suzhen & Hongyan, 2010). These resources essential for the effective implementation of e-learning include technology know-how, organisational structure, learning culture, and relationships with stakeholders (Ahmed et al., 2018; Sharma & Dharni, 2020). Technology know-how refers to the ability to operate ICT hardware, software, and related technologies such as computers, the internet, and other digital tools (Cegarra-Navarro et al., 2014; Mailizar & Fan, 2019). It can enhance engagement by enabling users to make informed decisions across various domains (Cegarra-Navarro et al., 2014). Several scholars (Adiyarta, 2018; Basantes-Andrade et al., 2020; Hatlevik & Hatlevik, 2018; Makokha & Mutisya, 2016; Mailizar & Fan, 2019; Sorochinsky, 2021; Trivedi & Patel, 2020; Twinamasiko et al., 2021) had examined the role of technology know-how in e-learning implementation and confirmed that technology know-how was critical for success. However, given the resistance to e-learning in Ugandan public universities, this study found it imperative to establish the level of technical know-how of e-learning in these universities and how it related to effective e-learning implementation.

The intangible element of learning culture refers to the collective system of assumptions, values, and norms that guide learning within an organisation. A strong learning culture fosters creativity and flexibility, and organisations that nurture this culture have the best chances of innovation (Porcu, 2020). Leufvén et al. (2015) note that a learning culture involves staff supporting one another, receiving expert feedback, accessing necessary resources, and being mentored. Such a culture is crucial for adopting e-learning. Several scholars (Ati et al., 2021; Espiritu & Budhrani, 2019; Cidral et al., 2018; Hatlevik & Hatlevik, 2018; Ho et al., 2016; Kong et al., 2017; Ünal, 2020) had explored the impact of learning culture on e-learning implementation, showing that a positive learning culture enhances e-learning effectiveness. However, a literature search showed that limited studies had been carried out on the same topic, and the available studies were skewed outside the developing countries of Africa. Therefore, the studies did not capture contextual situations in African educational institutions and Uganda in particular, hence the need for this study.

Organisational structure refers to the framework of relationships within an institution, including systems, processes, people, and groups working to achieve institutional goals (Ahmady et al., 2016). It reflects the quality of relationships between departments, including their responsibilities and powers (El Talla et al., 2018). Several studies (Drysdale, 2018; Graham et al., 2013; Kariman, 2018; Zuvic-Butorac et al., 2011;

Zhang & Duan, 2017) had explored the relationship between organisational structure and e-learning. However, the studies revealed contextual and knowledge gaps. The contextual gap was that a literature search revealed that existing studies had been done in the Western world and Asia, which had more developed e-learning levels than African countries. With respect to the knowledge gap, the literature revealed the existence of scanty studies relating to the variables. These gaps prompted this study to be carried out in the context of a developing country in Africa.

Stakeholder relationships refer to partnerships with individuals or groups involved in or affected by the project being implemented (Burke & Demirag, 2017). Plaza-Úbeda et al. (2010) state that these relationships involve engaging partners, regulators, and those impacted by the project. In the context of e-learning implementation in universities, stakeholder relationships are essential between staff, students, the government, institutions, and donors. Several scholars (Ansong et al., 2017; Ho et al., 2016; Kisanga & Ireson, 2015; Kong, 2019; Powell & Barbour, 2012; Wagner et al., 2008) highlighted the importance of these relationships for successful e-learning implementation. However, the literature review revealed limited empirical evidence on the relationship between stakeholder involvement and e-learning adoption, highlighting the need for further investigation in this area.

Methodology

This section covers the methods that were the basis for the study's investigations. The methods facilitated the collection and analysis of data on universities intangible resources and the effective implementation of e-learning.

Research design and sample

The study used a cross-sectional survey design, which was appropriate for assessing the situation at the time regarding intangible resources and e-learning implementation. Cross-sectional studies capture data at a specific point in time, making this design suitable for the study's objectives. It allowed for the collection of survey data through a self-administered questionnaire (Wang & Cheng, 2020), which facilitated the gathering of quantitative data necessary for both descriptive and inferential analyses. The participants were full-time lecturers from two public universities in Kampala, Uganda: Kyambogo and Makerere. The study sample included 312 lecturers from a total population of 1,883, with 1,432 lecturers at Makerere University and 451 at Kyambogo University.

Measures of the variables

The data collection instrument was a self-administered questionnaire, as it was effective for collecting data from a large number of participants. The measures of the independent variable, intangible resources, included technical know-how (Bhat & Bashir, 2018), learning culture (Leufvén et al., 2015), organisational structure (Mugizi et al., 2019), and stakeholder relationships (Plaza-Úbeda et al., 2010). The measures of e-learning implementation included student-student interaction, student-teacher interaction, and student-content interaction (Downer et al., 2015; Malinovski et al., 2012; Yılmaz & Karataş, 2018). The measures were rated on a five-point Likert scale: 1 = Strongly Disagree; 2 = Disagree; 3 =

Not Sure; 4 = Agree; and 5 = Strongly Agree. This scale enabled the collection of ordinal data, which was suitable for quantitative analysis.

Data analysis methods

The data analysis involved both descriptive and inferential analyses. Descriptive analysis, which showed how respondents rated the intangible resources of the universities and the effectiveness of e-learning implementation, included calculating means. Inferential analysis, which examined the influence of intangible resources on effective e-learning implementation, employed structural equation modelling (SEM) using SmartPLS software. The developed models demonstrated the appropriateness of the measures and revealed how the intangible resources of universities were associated with the effective implementation of e-learning.

Results

This segment of the study presents the results on intangible resources and the effectiveness of e-learning implementation in selected Ugandan public universities. The results include measurement, structural equation models, and path model estimates.

Demographic profiles

The demographic data showed that the majority (70.8%) of the participants were male, while females made up 29.2%. Regarding age, the largest group (68.3%) was aged 40 years and older, followed by those between 30 and 40 years (26.0%), and the smallest group (5.7%) was under 30 years. The majority of respondents (55.8%) held master's degrees, and 40.4% had PhDs. The remaining 1.9% held bachelor's degrees, and another 1.9% had postgraduate diplomas. Regarding academic rank, 50.0% were assistant lecturers, 38.5% were lecturers, 9.6% were senior lecturers, and 1.9% were associate professors. This data suggests that academic staff in various categories provided data. Thus, the data represented the various segments of academic staff at the universities.

Measurement models

The results in the measurement models (Tables 1 and 2) include the means, validity, reliability, and collinearity results. The means provide a picture of how the academic staff rated the intangible resources of the universities and the effectiveness of e-learning implementation. Validity tests include Average Variance Extracted (AVE) for convergent validity and the heterotrait-monotrait (HTMT) ratio of correlations for discriminant validity. Reliability results include Cronbach's alpha [α] and composite reliability (CR), while the collinearity results are in terms of the value inflation factor (VIF).

Measurement model 1

The results in model 1 (Table 1) are the means, AVE for convergent validity and heterotrait-monotrait (HTMT) discriminant validity. The means show how the study participants rated the intangible resources of the universities and the effectiveness of e-learning implementation. AVE and heterotrait-monotrait (HTMT) present convergent and discriminant results, respectively.

Table 1: Descriptives, means and heterotrait-monotrait ratio (HTMT) for intangible 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	IR	LC	OS	RS	TK
IR	3.12						
LC	3.07	1.844	0.887				
OS	2.86	2.413	0.913	0.727			
RS	3.05	2.154	0.867	0.622	0.791		
TK	3.18	1.221	0.639	0.469	0.386	0.291	

Key: ELI = E-learning implementation, IR = Intangible resources, LC = Learning culture, OS = Organisational structure, RS = Relations with stakeholders, SCI = Student-content interaction, SSI = Student-student interaction, STI = Student-teacher interaction, TK = Technical know-how.

The means in Table 1 show that the study participants rated e-learning implementation as high (mean = 3.55), as the mean was close to code 4, which on the scale used to measure the indicators for the various constructs corresponded to "agree", implying a high rating. However, the e-learning measure of student-content interaction was rated moderate (mean = 3.42), as it was close to code 3 (not sure), indicating an average or fair rating. The e-learning measures of student-student interaction (mean = 3.54) and student-teacher interaction (mean = 3.68) were rated high. Thus, while e-learning moderately enabled student-content interaction, it highly enabled student-student and student-teacher interaction. Learning culture (mean = 3.07), organisational structure (mean = 2.86), relations with stakeholders (mean = 3.05), and technical know-how (mean = 3.18) were rated moderate. However, library e-resources (mean = 3.53) were rated highly. Therefore, the intangible resources of the universities for e-learning were moderate to high.

Table 1 reveals that the measures for both e-learning and tangible resources met the AVE conditions, as all values were above 0.5, the minimum accepted level. Therefore, the indicators for each construct were appropriate measures of the same, as they were related to one another (Shrestha, 2021; Sürücü & Maslakçı, 2020). Table 1 also shows that the HTMT ratios of correlation revealed that the intangible resources constructs were independent of each other and could independently predict e-learning implementation effectiveness, as the HTMT ratios were below 0.90, the maximum accepted value (Hair Jr. et al., 2021). These results implied that the data collected on the variables were suitable for structural modelling.

Measurement model 2

The results in model 2 (Table 2) are reliability (Cronbach's alpha [α] and composite reliability [CR]) and collinearity [VIF]) assessments. These tests ascertained whether the data collected on the different constructs was fit for structural modelling.

Table 2: Construct reliability and validity for e-learning implementation and intangible resources

Measures	[illegible]	CR	VIF
E-learning implementation	1.000	1.000	
Student-content interaction	0.850	0.899	1.508
Student-student interaction	0.792	0.858	1.293
Student-teacher interaction	0.819	0.869	1.522
Intangible resources	1.000	1.000	
Technology know-how	0.873	0.900	1.223
Learning culture	0.859	0.892	1.888
Organisational structure	0.918	0.935	2.425
Relationship with the stakeholders	0.918	0.932	2.140

The reliability values (Cronbach's alpha [α] and composite reliability [CR]) in Table 2 were all above 0.70, indicating that the measures of the constructs were reliable. Composite reliability was included because Cronbach's alpha is sensitive and assumes the traits of indicators are the same across the population, which can lower reliability values. In contrast, composite reliability is more flexible, accommodating outer traits and making a higher number of indicators reliable (Hair et al., 2019). The variance inflation factor (VIF) test, a standard metric for linearity between independent variables, produced values under 5, the maximum accepted value (Marcoulides & Raykov, 2019). These low values indicated that the measures of intangible resources could independently predict effective e-learning implementation, as there was no collinearity (correlation) between the independent variables.

Structural equation model for intangible resources and e-learning implementation

To determine the association between intangible resources and e-learning implementation, a structural equation model was developed. Figure 1 presents the structural equation model results for intangible resources and e-learning implementation.

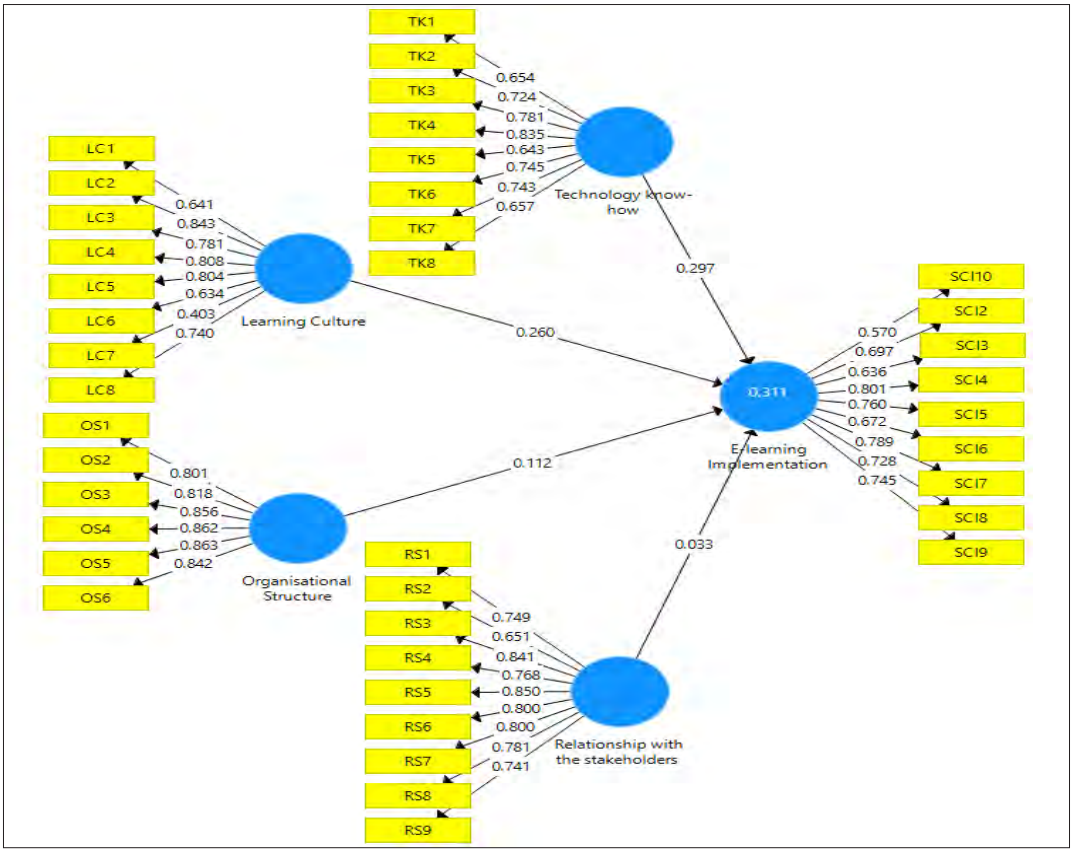

Figure 1: **Structural equation model for intangible resources and e-learning implementation**

The model (Figure 1) shows that factor analysis reduced e-learning implementation to student-content interaction only. As a result, student-student and student-teacher relationships did not load on the e-learning variable in the model. The model presents path coefficients, coefficients of determination (R^2 and adjusted R^2), t statistics, and p-values. R^2 assessed the model's predictive power. The model tested four sub-hypotheses to determine whether technology know-how, learning culture, organisational structure, and relationships with stakeholders influenced effective e-learning implementation. Structural equation model estimates are shown in Table 3.

Table 3: Structural equation model estimates for intangible resources and e-learning implementation

	B	Mean	STD	t	p
Technology know-how E-learning implementation	0.297	0.302	0.052	5.744	0.000
Learning culture E-learning implementation	0.260	0.264	0.070	3.701	0.000

Organisational structure E-learning implementation	0.112	0.098	0.083	1.346	0.179
Relationship with the stakeholders E-learning implementation	0.033	0.048	0.069	0.481	0.631
R2 = 0.311					
Adjusted2 = 0.303					

Figure 1 and Table 3 show that the hypothesis test results revealed that learning culture ($\beta = 0.260$, $t = 3.701$, $p = 0.000 < 0.05$) and technology know-how ($\beta = 0.297$, $t = 5.744$, $p = 0.000 < 0.05$) had a positive and significant influence on effective e-learning implementation. In contrast, organisational structure ($\beta = 0.112$, $t = 1.346$, $p = 0.179 > 0.05$) and relationships with stakeholders ($\beta = 0.010$, $t = 0.146$, $p = 0.884 > 0.05$) had a positive but insignificant effect. The coefficient of determination (R^2) indicated that intangible resources explained 31.1 per cent ($R^2 = 0.311$) of the variation in e-learning implementation, while the adjusted R^2 showed that learning culture and technical know-how together explained 30.3 per cent (adjusted $R^2 = 0.303$). This implies that 68.9 per cent of the variation was explained by factors other than intangible resources. The results led to the acceptance of Hypotheses One and Two (H1 and H2) and the rejection of Hypotheses Three and Four (H3 and H4). The beta values indicate that technical know-how was the strongest predictor of e-learning implementation.

Discussion

The finding that technology know-how positively and significantly influenced effective e-learning implementation aligned with earlier studies. Adiyarta (2018), Basantes-Andrade et al. (2020), Hatlevik and Hatlevik (2018), Makokha and Mutisya (2016), Mailizar and Fan (2019), Sorochinsky (2021), Trivedi and Patel (2020), and Twinamasiko et al. (2021) all found that technical know-how is essential for e-learning. This suggests that e-learning skills are critical for successful implementation. Similarly, the finding that learning culture had a positive and significant influence was supported by previous studies. Ati et al. (2021) reported a strong link between organisational e-learning culture and its implementation, while Espiritu and Budhrani (2019) found that cultivating such a culture enhances adoption. Likewise, Cidral et al. (2018), Hatlevik and Hatlevik (2018), Ho et al. (2016), Kong et al. (2017), and Ünal (2020) confirmed that collaborative learning cultures support e-learning implementation. This implies that promoting an e-learning culture and strengthening lecturers' e-skills through collaborative training and mentoring can enhance implementation success.

Nevertheless, the finding that organisational structure had an insignificant influence on e-learning implementation contrasted with previous studies. Drysdale (2018) found that organisational structure supports e-learning implementation. Similarly, Graham et al. (2013) reported that governance structures aligned with academic leadership improved adoption of blended learning. Kariman (2018) recommended establishing accessibility units in colleges to support and train faculty in implementing online courses. Likewise, Zhang and Duan (2017) emphasised the importance of organisational structure in enabling

e-learning in continuing higher education institutions. Given this inconsistency, it can be inferred that in the Ugandan university context, organisational structure had limited influence on e-learning implementation. This may be due to implementation levels being relatively high, while organisational structures remained moderate.

The finding that relationships with stakeholders had an insignificant influence on e-learning implementation contradicted previous studies. Ansong et al. (2017) and Ho et al. (2016) reported that involving stakeholders such as administrators, instructors, and school leaders improves e-learning implementation. Kisanga and Ireson (2015) emphasised the need for substantial financial support from the government and donors to implement e-learning effectively in higher education. Kong (2019) highlighted the importance of partnerships for successful implementation. Similarly, Powell and Barbour (2012) found that government policies facilitated progress in online learning. Wagner et al. (2008) noted that meeting the needs of key stakeholder groups, including accreditation bodies, institutions, technology and content providers, instructors, and students, is essential for effective implementation. In contrast, this study's findings may reflect the Ugandan context, where stakeholder relationships were rated moderate, while e-learning implementation was rated relatively high.

Conclusion

The discussion above led to the conclusion that learning culture and technology know-how are essential for effective e-learning implementation. Regarding learning culture, collaborative learning is vital, particularly when highly skilled individuals train and mentor others. In addition, the technical knowledge of various stakeholders should be enhanced through ICT training, as well as participation in relevant seminars and workshops. However, weak organisational structures and limited stakeholder relationships hinder the implementation of e-learning in universities. In terms of organisational structure, the lack of standardised ICT systems, clearly defined goals and procedures, formal documentation, and a centralised system impedes implementation. Furthermore, limited involvement of top management in e-learning decisions and low departmental autonomy also pose barriers. Concerning stakeholder relationships, weak partnerships, limited compliance with stakeholder requirements, low stakeholder engagement, failure to assess stakeholder needs, and policies that do not accommodate diverse stakeholder interests all obstruct effective e-learning implementation.

Recommendations

The conclusions above led to the recommendation that universities should leverage their learning culture and enhance the technology know-how of both staff and students to improve e-learning implementation. Learning culture can be strengthened by promoting collaborative learning, where individuals proficient in e-learning train and mentor others. Technical knowledge among stakeholders should be developed through targeted ICT training, as well as participation in seminars and workshops. In addition, university managers should improve organisational structures and relationships with stakeholders. Strengthening organisational structures should focus on establishing standardised ICT systems, clear goals and procedures, formal documentation, and a centralised governance

system. Top management must play an active role in e-learning decision-making, while departments should be granted greater autonomy. In terms of stakeholder relationships, efforts should be made to build strong partnerships, ensure compliance with stakeholder requirements, increase stakeholder engagement, assess their needs effectively, and implement policies tailored to different stakeholder groups.

Limitations

This study highlights the significance of intangible resources in the implementation of e-learning in universities. However, certain limitations remain. The study focused exclusively on one component of the Resource-Based Theory (RBT), namely intangible resources, while other key elements, such as tangible resources and organisational capabilities, were not explored. Future research should, therefore, investigate these additional aspects of RBT. Further, the study adopted a quantitative approach, which limited the depth of analysis. To address this, future scholars are encouraged to incorporate qualitative methods to enable a more comprehensive and in-depth understanding.

References

Adiyarta, K., Napitupulu, D., Rahim, R., Abdullah, D., & Setiawan, M. I. (2018, April). Analysis of e-learning implementation readiness based on integrated ELR model. *Journal of Physics: Conference Series*, *1007*(1), 012041. IOP Publishing. doi :10.1088/1742-6596/1007/1/012041

Ahmady, G. A., Mehrpour, M., & Nikooravesh, A. (2016). Organisational structure. *Procedia-Social and Behavioral Sciences*, *230*, 455–462. https://doi.org/10.1016/j.sbspro.2016. 09.057

Ahmed, A., Khuwaja, F. M., Brohi, N. A., & Othman, I. bin L. (2018). Organisational factors and organisational performance: A resource-based view and social exchange theory viewpoint. *International Journal of Academic Research in Business and Social Sciences*, *8*(3), 579-599. http://dx.doi.org/10.6007/IJARBSS/v8-i3/3951

Ansong, E., Boateng, R., Boateng, S. L., & Anderson, A. B. (2017). The nature of e-learning adoption by stakeholders of a university in Africa. *E-Learning and Digital Media*, *14*(4), 226-243. https://doi.org/10.1177/2042753017731235

Ati, S. D. M., Junus, K., Santoso, H. B., & Suhartanto, H. (2021). Assessing undergraduate students'e-learning competencies: A case study of higher education context in Indonesia. *Education Sciences*, *11*(4), 189. https://doi.org/10.3390/educsci11040189

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

Basantes-Andrade, A., Cabezas-González, M., & Casillas-Martín, S. (2020). Digital competences in e-learning. Case study: Ecuador. In *International Conference on 'Knowledge Society: Technology, Sustainability and Educational Innovation'* (pp. 85–94). Springer, Cham.

Bhat, S. A., & Bashir, M. (2018). Measuring ICT orientation: Scale development & validation. *Education and Information Technologies*, *23*(3), 1123–1143. https://doi.org/ 10.1007/s10639-017-9656-4

Burke, R., & Demirag, I. (2017, April). Risk transfer and stakeholder relationships in public private partnerships. *Accounting Forum*, *41*(1), 28–43. No longer published by Elsevier. https://doi.org/10.1016/j.accfor.2016.06.004

Bwire, F., Bagarukayo, E., & Muyinda, P. B. (2020). Online learning challenges in academia: The case of Uganda. In *IProceedings of the 12th International Conference on Computer Supported Education (CSEDU 2020) – Volume 2*(pp. 484–489).

Cegarra-Navarro, J. G., Garcia-Perez, A., & Moreno-Cegarra, J. L. (2014). Technology knowledge and governance: Empowering citizen engagement and participation. *Government Information Quarterly*, *31*(4), 660–668.

Cidral, W. A., Oliveira, T., Di Felice, M., & Aparicio, M. (2018). E-learning success determinants: Brazilian empirical study. *Computers & Education*, *122*, 273–290. https://doi.org/10.1016/j.compedu.2017.12.001

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

Drysdale, J. (2018). *The organisational structures of instructional design teams in higher education: A multiple case study* [PhD Dissertation, Abilene Christian University]. https://digitalcommons.acu.edu/etd

El Talla, S. A., Al Shobaki, M. J., Abu-Naser, S. S., & Abu Amuna, Y. M. (2018). The nature of the organisational structure in the Palestinian Governmental Universities-Al-Aqsa University as a model, *2*(5), 15–31. http://dstore.alazhar.edu.ps/xmlui/handle/12345678 9/354

Espiritu, J. L., & Budhrani, K. (2019). Cultivating an e-learning culture. *Scientia Pedagogica Experimentalis, 56*(1), 3–32

Graham, C. R., Woodfield, W., & Harrison, J. B. (2013). A framework for institutional adoption and implementation of blended learning in higher education. *Internet and Higher Education*. doi:10.1016/j.iheduc.2012.09.003

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

Hatlevik, I. K., & Hatlevik, O. E. (2018). Examining the relationship between teachers' ICT self-efficacy for educational purposes, collegial collaboration, lack of facilitation and the use of ICT in teaching practice. *Frontiers in Psychology*, *9*(935). https://doi.org/10.3389/ fpsyg.2018.00935

Ho, V. T., Nakamori, Y., Ho, T. B., & Lim, C. P. (2016). Blended learning model on hands-on approach for in-service secondary school teachers: Combination of e-learning and face-to-face discussion. *Education and Information Technologies*, *21*(1), 185–208.

Kariman, M. (2018). *College organisational structure and its impact on accessible distance learning for students with disabilities* [PhD Dissertation, Western Kentucky University] http://digitalcommons.wku.edu/diss/59

Kisanga, D., & Ireson, G. (2015). Barriers and strategies on adoption of e-learning in Tanzanian higher learning institutions: Lessons for adopters. *International Journal of Education and Development using ICT*, *11*(2), 126–137.

Kong, S. C. (2019). Partnership among schools in e-learning implementation: Implications on elements for sustainable development. *Journal of Educational Technology & Society*, *22*(1), 28–43. https://www.jstor.org/stable/26558826

Kong, S. C., Looi, C. K., Chan, T. W., & Huang, R. (2017). Teacher development in Singapore, Hong Kong, Taiwan, and Beijing for e-learning in school education. *Journal of Computers in Education*, *4*(1), 5–25. https://doi.org/10.1007/s40692-016-0062-5

Leufvén, M., Vitrakoti, R., Bergström, A., Ashish, K. C., & Målqvist, M. (2015). Dimensions of Learning Organisations Questionnaire (DLOQ) in a low-resource health care setting in Nepal. *Health Research Policy and Systems, 13*(16). https://doi.org/10.1186/1478-4505-13-6

Mahyoob, M. (2020). Challenges of e-learning during the COVID-19 pandemic experienced by EFL learners. *Arab World English Journal (AWEJ)*, *11*(4), 351–362. https://dx.doi. org/10.24093/awej/vol11no4.23

Mailizar, M., & Fan, L. (2020). Indonesian teachers' knowledge of ICT and the use of ICT in secondary mathematics teaching. *Eurasia Journal of Mathematics, Science and Technology Education*, *16*(1), 1–13. https://doi.org/10.29333/ejmste/110352\

Makokha, G. L., & Mutisya, D. N. (2016). Status of e-learning in public universities in Kenya. *International Review of Research in Open and Distributed Learning*, *17*(3), 341–359. doi: https://doi.org/10.19173/irrodl.v17i3.2235

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

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., Nuwatuhaire, B., & Turyamureeba, S. (2019). Organisational structure and employee commitment of academic staff in a private university in Uganda. *Journal of Humanities and Social Science*, *24*(4), 72–83. doi: 10.9790/0837-2404097283

Müller, A. M., Goh, C., Lim, L. Z., & Gao, X. (2021). Covid-19 emergency elearning and beyond: Experiences and perspectives of university educators. *Education Sciences*, *11*(1), 19. https://doi.org/10.3390/educsci11010019

Ocak, M., & Fındık, D. (2019). The impact of intangible assets and sub-components of intangible assets on sustainable growth and firm value: Evidence from Turkish listed firms. *Sustainability*, *11*(19), 5359. doi:10.3390/su11195359

Ogwu, E. N., Emelogu, N. U., Azor, R. O., & Okwo, F. A. (2022). Educational technology adoption in instructional delivery in the New Global reality. *Education and Information Technologies*, 1–16. https://doi.org/10.1007/s10639-022-11203-4

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

Pandey, J., Gupta, M., Behl, A., Pereira, V., Budhwar, P., Varma, A., ... & Kukreja, P. (2021). Technology-enabled knowledge management for community healthcare workers: The effects of knowledge sharing and knowledge hiding. *Journal of Business Research*, *135*, 787–799. https://doi.org/10.1016/j.jbusres.2021.07.001

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

Plaza-Úbeda, J. A., de Burgos-Jiménez, J., & Carmona-Moreno, E. (2010). Measuring stakeholder integration: Knowledge, interaction and adaptational behavior dimensions. *Journal of Business Ethics*, *93*(3), 419–442. https://doi.org/10.1007/s10551-009-0231-9

Plaza-Úbeda, J., Burgos-Jiménez, J., & Carmona-Moreno, E. (2010.) Measuring stakeholder integration: Knowledge, interaction and adaptational behavior dimensions. *Journal of Business Ethics*, 93(3), 419–442. doi: 10.1007/s10551-009-0231-9

Porcu, O. (2020). Exploring innovative learning culture in the newsroom. *Journalism*, *21*(10), 1556–1572. https://doi.org/10.1177/1464884917724596

Powell, A., & Barbour, M. (2012). Tracing international differences in online learning development: An examination of government policies in New Zealand. *Journal of Open, Flexible, and Distance Learning, 15*(1), 783–790.

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

Sorochinsky, M. A. (2021). Digital competence of teachers and students in Yakutia: Problems and prospects of e-learning during the pandemic. *Educação*, *46*(1), e99/ 1–16.

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

Suzhen, L., & Hongyan, L. (2010, May). On intangible learning resources in e-learning. In *2010 International Conference on E-Business and E-Government* (pp. 5462–5465). IEEE. doi 10.1109/ICEE.2010.1368

Trivedi, S., & Patel, N. (2020). Clustering students based on virtual learning engagement, digital skills, and e-learning infrastructure: Applications of K-means, DBSCAN, hierarchical, and affinity propagation clustering. *Sage Science Review of Educational Technology*, *3*(1), 1–13.

Twinamasiko, N., Nuwagaba, J., Maria Gwokyalya, A., Nakityo, I., Wasswa, E., & Sserunjogi, E. (2021). Drivers affecting the acceptance and use of electronic learning among Ugandan university students in the COVID-19 era: A cross-sectional survey among three universities. *SAGE Open*, *11*(3), 1–9. https://doi.org/10.1177/215824402110299

Ünal, E. (2020). Exploring the effect of collaborative learning on teacher candidates' intentions to use Web 2.0 technologies. *International Journal of Contemporary Educational Research, 7*(2), 1–14. DOI: https://doi.org/10.33200/ijcer.736876

Van Weele, M. A., van Rijnsoever, F. J., Groen, M., & Moors, E. H. (2020). Gimme shelter? Heterogeneous preferences for tangible and intangible resources when choosing an incubator. *The Journal of Technology Transfer*, *45*(4), 984–1015. 84–1015 https://doi.org/10.1007/s10961-019-09724-1

Wagner, N., Hassanein, K., & Head, M. (2008). Who is responsible for e-learning success in higher education? A stakeholders' analysis. *Educational Technology & Society*, *11* (3), 26–36.

Wang, X., & Cheng, Z. (2020). Cross-sectional studies: Strengths, weaknesses, and recommendations. *Chest*, *158*(1), S65–S71. https://doi.org/10.1016/j.chest.2020.03.012

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

Zhang, W., & Duan, C. (2017). Construction and implementation of institutional e-learning development framework in continuing higher education. *Journal of Educational Technology Development and Exchange (JETDE), 10*(1). doi: 10.18785/jetd e. 1001.02

Zuvic-Butorac, M., Nebić, Z., Nemčanin, D., Mikac, T., & Lučin, P. (2011). Establishing an institutional framework for an e-learning implementation – experiences from the University of Rijeka, Croatia. *Journal of Information Technology Education: Innovations in Practice*, *10*, 43-56. https://doi.org/10.28945/1364

Appendix A: Study Instrument

Section A: Demographics		
Demographics	BP1	Sex (1 = Male, 2= Female)
Profiles (BP)	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 Interaction	SSI1	Students are able to learn from reading other students' comments posted on online platforms
(SSI)	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 Interaction (STI)	STI1	The work I do at this university gives me a sense of purpose
	STI2	I am zealous about my job at 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 online classes
	STI7	I use a variety of interesting materials in online classes
	STI8	I get to do a lot in this class, not just listen to my teacher talk
	STI9	I involve students in the learning process during online lessons
	STI10	I am able to explain content to students sufficiently when teaching online

Student-Content Interaction (SCT)	SCI1	The learning management system is simple and easy for students
	SCI2	The materials in the system are easily searchable
	SCI3	The system provides sufficient instructions for usage
	SCI4	Course information is easy to find within the system
	SCI5	The system supports student interaction and group activities
	SCI6	The interface is well-organised and customisable
	SCI7	Students are comfortable using web-oriented applications for course preparation
	SCI8	E-learning allows students to practice what they learn
	SCI9	Examples during e-learning help students understand the subject
	SCI10	E-learning materials spark students' interest in the course
	SCI11	Online materials in the course support student learning
Section: Intangible Resources		
Technology know-how (TK)	TK1	ICT-based methodologies support teaching pedagogies
	TK2	ICT resources for teaching increase my productivity and effectiveness
	TK3	ICT-enabled teaching is better than traditional methods
	TK4	Online surfing of learning materials makes students more effective
	TK5	ICT-enabled teaching builds confidence for preparing and presenting lectures
	TK6	Communication through ICT apps, quizzes, and email is easier
	TK7	It is convenient to share assignments, notes, and materials through ICT
	TK1	ICT handles different learning preferences and styles effectively
Learning culture (LC)	LC1	Lecturers in this university help each other with ICT use
	LC2	Expert ICT staff are given time to support learning
	LC3	Lecturers receive open and honest feedback on ICT use
	LC4	Lecturers in this university share views and seek feedback on ICT use

	LC5	A system to measure e-teaching gaps has been created in this university
	LC6	Lessons learned about e-teaching are shared with all lecturers
	LC7	Lecturers are given control over resources to accomplish activities
	LC8	Lecturers are mentored and coached in ICT use
Organisational structure (OS)	OS1	In this university, ICT use in teaching is standardized
	OS2	There are standard goals for ICT use in this university
	OS3	Lecturers are required to follow ICT procedures in this university
	OS4	Formal written ICT procedures are available in this university
	OS5	I have been provided with written rules on ICT use
	OS6	E-teaching in this university is centralized
	OS7	Top management is involved in e-teaching decisions
	OS8	Different units and departments have autonomy in implementing e-teaching
	OS9	Lecturers are free to carry out e-teaching in their own way
Relationship with the stakeholders (RS)	RS1	The university has partnerships to aid in e-learning implementation
	RS2	The university management has addressed e-teaching demands of the National Council for Higher Education
	RS3	The university management has addressed e-teaching needs of lecturers and students
	RS4	The university management frequently engages lecturers and students about e-teaching
	RS5	The university consults lecturers and students on e-teaching progress
	RS6	The university promotes active engagement of lecturers and students in e-teaching
	RS7	The university assesses key requirements of lecturers and students for e-teaching
	RS8	The university has prepared information for lecturers and students on e-teaching
	RS9	E-teaching policies and priorities are adapted to lecturers and students