

Influence of E-Learning Technologies on Students' Engagement in Higher Institutions in Selected Private Universities in Kampala-Uganda

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Abstract

The study investigated the impact of e-learning technologies on students' engagement in selected Uganda's private universities within Kampala, . This investigation was channeled through the subsequent specific goals; i) To investigate how e-learning management systems influence students' engagement, ii) To investigate how collaborative tools influence students' engagement, and iii) To investigate how virtual classroom tools influence students' engagement under Uganda's designated privatized universities within Kampala. A research design for cross-section was embraced focused on a quantifiable approach only. The sample size constituted of 100 students of which 50 students were selected from each selected private university. Linear regression and analysis for descriptive methodologies were utilized through an investigator to analyze the quantifiable statistics gathered. The study revealed that e-learning management systems possess a robust affirmative and statistical substantial impact on students' engagement within Uganda's designated private universities within Kampala ($\beta=.573$, $p=0.000$). The examination also disclosed that collaborative tools possesses a robust affirmative and statistical substantial impact on students' engagement within selected private universities in Kampala, Uganda ($\beta=0.670$, $p=0.000$). Further, this examination disclosed that virtual classroom tools possesses a robust optimistic and statistical substantial impact on students' engagement under Uganda's designated private universities within Kampala ($\beta=.553$, $p=.000$) at a 0.05 significance levels. Hence, this examination deduces that e-learning technologies like e-learning management systems, collaborative instruments, and virtual classroom instruments have a substantial influence on the students' engagement in Uganda's designated private universities within Kampala whereby an advancement within e-learning management systems, collaborative tools, and virtual classroom tools would definitely lead towards an advancement within students' engagement in Uganda's designated private universities in Kampala, . The study recommends that the universities should offer training workshops on using digital platforms as well as provide technical support for online learning tools for both lecturers and students as this would improve confidence and encourage students' active involvement in designated private universities within Kampala, Uganda.

Keywords: E-Learning Technologies, E-Learning Management Systems, Collaborative Tools, Virtual Classroom Tools, and Students' Engagement.

Introduction

The examination examines the impact of e-learning technologies on students' involvement within selected private universities in Kampala, Uganda.

Historical Background

Students' engagement today is not just about access, but about participation, interaction, motivation, and personalization. Technology has become integral to students' educational experiences in formal and informal learning contexts (Dunn & Kennedy, 2019). In the 1990s and early 2000s, higher education began

experimenting with web-based learning technologies such as online course pages, basic learning management systems (LMS), and distance education platforms. These early systems focused on access and delivery of content, helping students participate or engage in learning without the physical constraints of the campus environment worldwide. This era marked a shift from access to interaction and researchers began to frame engagement as involving behavioral, cognitive, and emotional dimensions in technology contexts (Lambert, Chen & Guidry, 2020). With the proliferation of mobile devices and social media in the mid-2010s-2020, a new wave of e-learning technologies emerged. Mobile and adaptive tools began to support personalized pathways, opening up self-paced learning as a key engagement mechanism through which students learn when, where, and how they prefer. This period solidified the idea that technology could facilitate deeper students' engagement, especially when pedagogy was intentionally aligned with interactive tools (Teng & Wang, 2021).

Theoretical Background

The study will be based on the Self-Determination Theory developed by Deci and Ryna in 1985. The theory is a prominent psychological framework that explains human motivation and engagement. The theory posits that individuals are most motivated and engaged when three innate psychological needs are satisfied including autonomy, competence, and relatedness (Kearsley & Dixon, 2018). According to Chiu (2021) in educational context, the theory suggests that students will demonstrate higher engagement and intrinsic motivation when learning environments support these three needs. Engagement in this sense includes behavioral participation, cognitive effort, and emotional involvement in learning activities. The author asserts that e-learning technologies such as learning management systems, video conferencing, online discussion forums, and adaptive learning platforms can significantly influence students' engagement only when they are designed to satisfy the self-determination theory needs (Chiu, 2021). Hence, this examination

endorsed this concept as it offered a link amongst e-learning technologies and students' engagement.

Contextual Background

This examination was directed at Uganda's designated private universities in Kampala, inspecting the impact of e-learning technologies on students' engagement. Additionally, private universities in Kampala district were considered because students' engagement remains a significant concern and inconsistent with a lot of identifiable gaps in many universities including private universities due to certain factors such as inadequate access to reliable internet and tools, unreliable online platforms, weak ICT infrastructures, and limited interactive content linked to reduced student willingness and ability to engage in online learning (Namazzi & Ssempala, 2024).

Conceptual Background

E-learning technologies refer to the usage of resources, platforms, and digital tools to deliver, support, and enhance teaching and learning. These technologies enable learners to access educational content, interact with instructors or peers, engage in learning activities through electronic or internet-based systems, regardless of physical location (Alavi & Leidner, 2023). The degree of focus, curiosity, desire, confidence, and passion that learners exhibit when learning or receiving instruction is referred to as e-students' engagement. This includes their degree of drive to learn and participate in educational activities (Christenson, Appleton & Reschly, 2018). In this study, e-learning technologies were measured in terms of e-learning management systems, collaborative tools, and virtual classroom tools, well as students' engagement was measured in terms of behavioral engagement, cognitive engagement, emotional engagement, and social engagement.

Statement of the problem

The Ugandan government through the National Council for Higher Education has instigated diverse strategies to integrate ICT in learning with the objective to enhance students' engagement in the different institutions of higher learning. For instance,

digital learning initiatives have been launched inspiring the integration of e-learning technologies in education such as endorsing the use of collaborative tools for academic collaboration and resource sharing among students and teachers, supporting e-learning platforms and online resources accessible via online channels, and training teachers on how to effectively use online modules as a pedagogical tool, improving students' engagement, participation, and overall performance (National Council for Higher Education, 2018).

Still, regardless of widespread adoption of e-learning technologies in higher education in Uganda, students' engagement remains a significant concern and inconsistent with a lot of identifiable gaps in many universities including private universities due to certain factors such as inadequate access to reliable internet and tools, unreliable online platforms, weak ICT infrastructures, and limited interactive content linked to reduced student willingness and ability to engage in online learning (Namazzi & Ssempala, 2024). This has consequently resulted into poor academic performance, reduced motivation to learning, poor knowledge retention and understanding, as well as poor interaction and collaboration skills among students. Therefore, it is because of this that this existing investigation investigated the impact of e-learning technologies on scholars' engagement under Uganda designated private universities within Kampala.

Study Objectives

General Objective

To investigate the influence of e-learning technologies on students' engagement in selected private universities in Kampala, Uganda.

Specific Objectives

The examination will be directed through the subsequent specific goals;

- i. To investigate how e-learning management systems influence students' engagement in selected private universities in Kampala, Uganda.

- ii. To investigate how collaborative tools influence students' engagement in selected private universities in Kampala, Uganda.
- iii. To investigate how virtual classroom tools influence students' engagement in selected private universities in Kampala, Uganda.

Study Hypotheses

The specific goals were channeled through these alternative theories;

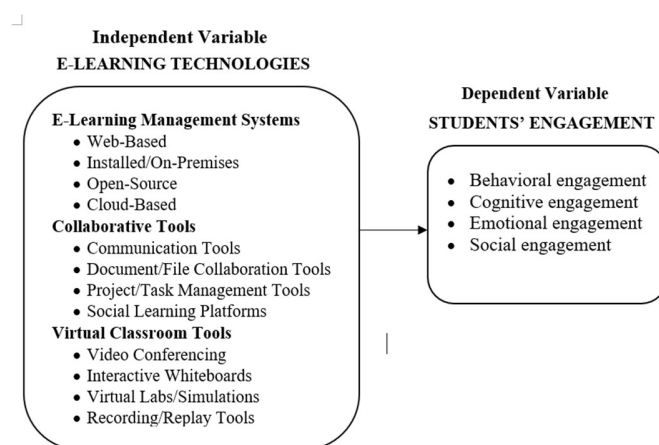
H_{a1}: E-learning management systems have a statistical substantial impact on students' engagement in Uganda's designated private universities in Kampala.

H_{a2}: Collaborative tools have a statistical substantial impact on students' engagement in selected Uganda's designated private universities in Kampala.

H_{a3}: Virtual classroom tools have a statistical substantial impact on students' engagement in Uganda's designated private universities in Kampala.

Conceptual Framework

This structure conceptually on the coalition along side E-Learning Technologies and Students' Engagement.



Literature Review

E-Learning Technologies and Students' Engagement

E-learning management systems (LMS) such as Moodle, Blackboard, Canvas, and Google Classroom have become central to higher education worldwide, especially with the rise of blended and online learning. LMS platforms provide a unified environment for delivering content, facilitating

interaction, administering assessments, and tracking performance. A key educational outcome influenced by LMS use is student engagement, which encompasses behavioral, cognitive, and emotional involvement in learning (Sun & Rueda, 2022). According to Dumford and Miller (2018) structured LMS environments with organized modules and clearly defined tasks significantly increase students' behavioral participation compared to less organized setups. The authors assert that students who regularly engage in LMS discussion boards exhibit higher overall course participation and assignment completion which influences routine engagement behaviors (Dumford & Miller, 2018).

E-learning management systems influence cognitive engagement among students through interactive assessments, adaptive pathways, and multimedia resources. LMS platforms with interactive quizzes and multimedia content enhance cognitive engagement and improve students' problem-solving abilities. When LMS incorporate adaptive or interactive learning resources, students are more likely to engage cognitively with material rather than passively consume it (Alamri, Lowell, Watson & Watson, 2020). The authors also highlighted that LMS support self-regulated learning such as planning and monitoring which is associated with deeper cognitive processing and mastery of material improving engagement (Alamri et al., 2020).

According to Manwaring, Larsen, Graham, Henrie and Halverson (2022) e-learning management systems can foster emotional engagement which includes interest, enjoyment, and sense of belonging in the learning environment by supporting community formation and enhancing instructor presence. E-learning management systems features that promote interpersonal interactions such as discussion forums and synchronous sessions positively affect emotional engagement by reducing learner isolation. Additionally, the authors assert that instructor presence in LMS through announcements and feedback increase students' satisfaction and sense of connection to the course as it creates a perceived social interaction which enhances learners' emotional commitment to online learning (Manwaring et al., 2022).

Collaborative tools which are digital platforms that allow learners to interact, communicate, and co-construct knowledge have become integral components of e-learning environments worldwide. These tools include discussion forums, shared document editors, synchronous conferencing tools, wikis, social learning apps, and project collaboration platforms. These enable students to share knowledge, develop joint solutions, and build social presence in learning environments influencing students' continued engagement (Martin & Bolliger, 2018). According to Hoi and Hang (2021) collaborative tools as a dimension of E-learning technologies influence students' engagement by fostering interaction, shared decision-making, and social learning processes.

Collaborative tools significantly enhance students' behavioral engagement by increasing opportunities for active participation, accountability, and sustained interaction. Discussion forums and chat tools prompt students to contribute responses, ask questions, and build threads, which increases frequency of participation and course involvement. Also, synchronous breakout rooms in video conferencing platforms promote real-time interaction and active involvement in group tasks (Heilporn, Lakhal & Belisle, 2021). More so, the authors posit that online participation enabled by collaborative tools forms a central component of e-learning engagement, fostering active behavioral involvement. The interactive nature of collaborative tools reduces passivity and encourages students to engage with peers and content repeatedly, instead of only accessing course content passively (Heilporn et al., 2021).

Virtual classroom tools which are a dimension of e-learning technologies such as video conferencing platforms (Zoom, Microsoft Teams, Google Meet), virtual whiteboards, live polling, and synchronous chat features integrated into LMS have become essential components of educational delivery, particularly since the rise of online and blended learning. These tools support real-time interaction between instructors and students, allowing remote learners to participate in lessons that resemble face-to-face instruction, influencing students' engagement (Hew, Lan, Tang & Jia, 2019). The authors also assert

that virtual classroom tools facilitate interaction and participation in ways that can influence the various dimensions of engagement such as behavioral, cognitive, emotional, and social, by enabling real-time communication, collaboration, and immediate feedback. Virtual classroom tools reduce barriers to student participation (e.g., physical presence), and features like chat boxes, reactions, and polls encourage students who might otherwise remain silent to engage actively (Hew et al., 2019).

Methodology

Research Design

Research designs for cross section was embraced focused on a quantitative formulation only. A research design for cross section determines an existence of given factors within a certain populace at a fixed significance timely (Kassu, 2019). Hence, this design permitted an investigator investigate if e-learning technologies have a substantial impact on scholars' engagement within designated private universities within Kampala, Uganda at a fixed locality timely. A quantitative methodology allowed an investigator to collect and analyze numerical data to generate statistical means about the given study objectives as well as test hypotheses to draw meaningful conclusions.

Target Population and Sample Size

The investigation populace constituted of students from two different private universities in Kampala district, Uganda where a sample was taken from. 100 students constituted the size of the sample of which 50 students were selected from each selected private university and these provided the quantitative data required for this investigation.

Sampling Procedure

An investigator employed random simple samples to select responders who were involved in this investigation. Random simple samples were employed to select students from diverse designated private universities in Kampala district, Uganda to take part in this examination. Simple random sample gives equivalent and independent selection chances to

every population element into this model (Elfil & Negida, 2017).

Data Collection Methods

Questionnaire Survey Method

An examination proficiency whereby structured queries were utilized to generate information from responders using structured questions is referred to as a questionnaire survey method (Mathiyazhagan, 2018). The query survey methodology was essential for collecting unvarying statistics from students which facilitated comparison and designation of trends or patterns based on written structured queries. Thus, this technique was utilized through an investigator to generate statistics from a wider group of students faster as well cost ineffectively.

Data Collection Instruments

Structured Questionnaire

A form of information gathering instrument consisting of a group of prearranged and fixed close end queries with pre-defined responses to gather comparable and quantitative statistics from different responders is referred to as Structured questionnaire (Acheung, 2019). This investigation employed structured inquiry to gather quantitative statistics from students and these contained closed end queries and pre-defined replies. The structured questionnaires were used to collect coded and statistically analytical to draw conclusions about the given objective findings.

Data Analysis

Linear regression and analysis for descriptive technique were utilized through the investigator towards analyzing the quantifiable data assembled. Descriptive investigation was make use of the summation and presentation of statistics with clear meaning utilizing frequency distribution tables particularly for the respondents' bio-data. Analysis for Linear regressions was engaged to determine the significance, strength, and direction of impact of e-learning technologies upon students' engagement. Linear regression analysis is ideal for measuring the direction, strength, and significance of the prognostic nature of the independent variable(s) on the dependent factor (Maulud & Abdulazeez, 2020).

Ethical Consideration

Before beginning this examination, the examiner attained an introduction memo of the university in order to obtain permission from university authorities at several private universities to conduct the survey on their campus.

An investigator guaranteed involution in this investigation was by choice and having an alternative to pull away at whatsoever point in time with no penalties.

An investigator also enlightened investigation participants fully regarding the objective, processes, and significances of this study.

In addition, an investigator made sure that personalized info of the respondents was held with discretion and not disclosed to any one, and as well made sure that their identification isn't attached towards their replies confirming obscurity.

Study Findings

The outcomes displayed under this subsection comprise of; descriptive enumeration upon the responders' bio demography and regression examination outcomes.

Findings on the Demographic Characteristics of Respondents

The examination assessed the demography features of responders that partook in this investigation from designated private universities under Kampala, Uganda and the outcomes are shown under Tableau 4.1;

Table 4.1: Demographic Characteristics of Respondents

Demographic Characteristics			
Category	Items	Frequency	Percentage
Gender	Male	43	43.0
	Female	57	57.0
	Total	100	100.0
Age Category	19-30 years	50	50.0
	31-40 years	32	32.0
	41-50 years	15	15.0

Level of Education	Above 50 years	3	3.0
	Total	100	100.0
	Diploma	9	9.0
	Bachelors	73	73.0
Marital Status	Masters	18	18.0
	Total	100	100.0
	Married	38	38.0
Marital Status	Single	62	62.0
	Total	100	100.0
	Married	38	38.0

Source: Field Data (2026)

The conclusions under Tableau 4.1 show that most responders 57 (57.0%) engaged within the investigation were female plus 43 (43.0%) responders were males. The investigation as well shown that utmost 50 (50.0%) responders were 19-30 ages, followed by 32 (32.0%) responders aged 31-40 ages, then 15 (15.0%) responders aged 41-50 ages, plus a few 3 (3.0%) of respondents were aged above 50 ages.

In particular, this investigation shown that most 73 (73.0%) responders were pursuing a bachelors' education, accompanied with 18 (18.0%) of responders who were pursuing a masters' education, and the lowest percentage 9 (9.0%) of respondents were pursuing a diploma education.

This examination as well shown that most 62 (62.0%) responses were single and 38 (38.0%) of respondents were married.

Findings on the Study Objectives

The subsection displays the study outcomes relative towards the specific goals of this examination.

Influence of E-Learning Management Systems on Students' Engagement in Selected Private Universities in Kampala, Uganda

This examination pursued to investigate how e-learning management systems influence students' engagement in Uganda's designated private universities within Kampala, . To determine the influence, regression analysis for simple linear was engaged and the outcomes are displayed under Tableau 4.2.

Table 4.2: Regression Findings on the Influence of E-Learning Management Systems on Students' Engagement in Selected Private Universities in Kampala, Uganda

Model Summary							
Mod el		R	R Square		Adjusted R Square	Std. Error of the Estimat e	
1		.573 ^a	.328		.321	.40460	
a. Predictors: (Constant), E-Learning Management Systems							
Coefficients ^a							
Model			Unstandar dized Coefficient s		Standa rdized Coeffi cients	Sig .	
			B	Std. Error	Beta		t
1	(Constant)		1.94 8	.341		5.7 10	.00 0
	E-Learning Management Systems		.588	.085	.573	6.9 15	.00 0
a. Dependent Variable: Students' Engagement							

Source: Field Data (2026)

Conclusions under Tableau 4.2 show that e-learning managing systems have a strong robust and statistical substantial impact on learners' engagement within Uganda's designated private universities in Kampala ($\beta=.573$, $p=.000$) at .05 significance levels. The regression values specifies that a one unit upsurge under e-learning management systems substantially leads to a 0.573 increase in the students' engagement within designated Uganda's private universities in Kampala. The results imply that in order to enhance learners' engagement, there had to be a direct improvement within the e-learning managing systems under Uganda's selected private universities within Kampala, .

The coefficient of determination ($\text{Adjusted } R^2 = 0.321$) implies that roughly 32.1% of variations under the students' engagement is explained through the e-learning management systems, while the remaining variance is assigned towards additional elements not

encompassed in the pattern under Uganda's designated private universities in Kampala. This implies that improvements in the e-learning management systems are directly associated with corresponding improvements in the students' engagement under Uganda's designated private universities within Kampala. Therefore, to strengthen the students' engagement there has to be a corresponding adjustment in the e-learning management systems under Uganda's designated private universities within Kampala.

Influence of Collaborative Tools on Students' Engagement in Selected Private Universities in Kampala, Uganda

This examination also pursued to investigate how collaborative tools influence students' engagement under Uganda designated private universities in Kampala. To determine the influence, regression analysis for simple linear was engaged and the outcomes are presented under Tableau 4.3.

Table 4.3: Regression Findings on the Influence of Collaborative Tools on Students' Engagement in Selected Private Universities in Kampala, Uganda

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.670 ^a	.449	.443	.53682		
a. Predictors: (Constant), Collaborative Tools						
Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.920	.325		2.829	.006
	Collaborative Tools	.742	.083	.670	8.938	.000
a. Dependent Variable: Students' Engagement						

Source: Field Data (2026)

Conclusions under Tableau 4.3 show that collaborative tools possesses a robust constructive

and statistically considerable influence on students' engagement in selected private universities under Kampala, Uganda ($\beta=.670$, $p=.000$) at .05 significant levels. The regression outcomes undertake that a one slight upsurge in collaborative tools substantially leads to a 0.670 increase in the students' engagement under Uganda's designated private universities in Kampala. Those findings imply that in order to improve students' engagement, there has to be a direct improvement in the collaborative tools under Uganda's designated private universities in Kampala. The coefficient of determination (Adjusted $R^2 = 0.443$) proposes that approximately 44.3% of the discrepancy in the students' involvement is described through the collaborative tools, while the remaining variance is attributed towards additional elements not inclusive within theory under Uganda's designated private universities within Kampala. This implies that improvements in the collaborative tools are directly associated with corresponding improvements in the students' engagement under Uganda's designated private universities within Kampala. Hence, to enhance the students' engagement there ought to be a corresponding tuning within the collaborative tools under Uganda's designated private universities within Kampala.

Influence of Virtual Classroom Tools on Students' Engagement in Selected Private Universities in Kampala, Uganda

This examination additional pursued to investigate how virtual classroom tools influence students' engagement under Uganda designated private universities within Kampala, . To determine the influence, regression analysis for simple linear was engaged plus the outcomes are displayed under Tableau 4.4.

Table 4.4: Regression Findings on the Influence of Virtual Classroom Tools on Students' Engagement in Selected Private Universities in Kampala, Uganda

Model Summary							
Mod el		R	R Square		Adjusted R Square	Std. Error of the Estimate	
1		.553 ^a	.306		.298	.60272	
a. Predictors: (Constant), Virtual Classroom Tools							
Coefficients ^a							
Model			Unstandar dized Coefficient s		Standa rdized Coeffi cients	t	Sig.
			B	Std. Error	Beta		
1	(Constant)		.474	.508		.934	.000
	Virtual Classroom Tools		.833	.127	.553	6.567	.000
a. Dependent Variable: Students' Engagement							

Source: Field Data (2026)

Conclusions under Tableau 4.4 show that virtual classroom tools possesses a robust optimistic and statistically substantial influence on students' engagement within selected private universities in Kampala, Uganda ($\beta=.553$, $p=.000$) at .05 significance levels. The regression conclusion suggests that a single upsurge in virtual classroom tools significantly leads to a 0.553 increase in the students' engagement under Uganda's designated private universities in Kampala. These findings imply that in order to improve students' engagement, there has to be a direct improvement in the virtual classroom tools under Uganda's designated private universities within Kampala, .

The coefficient of determination (Adjusted $R^2 = 0.298$) implies that approximately 29.8% of the variances within the students' engagement is described through the virtual classroom tools, while the remaining variance is attributed towards additional elements not inclusive in the model under Uganda's designated private universities in Kampala. This implies that improvement in the virtual classroom tools is directly associated with a

corresponding improvement in the students' engagement under Uganda's designated private universities within Kampala. Hence, to enhance the students' engagement there has to be a corresponding enhancement in the virtual classroom tools under Uganda designated private universities within Kampala.

Conclusions

This examination deduces concludes that e-learning technologies like e-learning management systems, collaborative tools, and virtual classroom tools have a substantial influence on the students' engagement under Uganda's designated private universities within Kampala, whereby an advancement in e-learning management systems, collaborative tools, and virtual classroom tools would definitely lead to an advancement within students' engagement under Uganda's designated private universities in Kampala.

Recommendations

The study recommends that universities should incorporate multimedia and digital content resources in learning such as use of instructional videos or infographics, provide recorded lectures for flexible learning, as well as integrate virtual labs and interactive simulations as this helps students understand complex concepts and maintain interest, leading to an enhancement in students' engagement under Uganda's designated private universities within Kampala.

The study also recommends that universities should promote collaborative online learning through use of group discussion forums and collaborative documents, assign online group projects, which help students interact and actively participate in the learning process, resultantly enhancing students' engagement under Uganda's designated private universities within Kampala.

This investigation additionally recommends that the universities should offer training workshops on using digital platforms as well as provide technical support for online learning tools for both lecturers and students as this would improve confidence and encourage students' active engagement in selected private universities in Kampala, Uganda.

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