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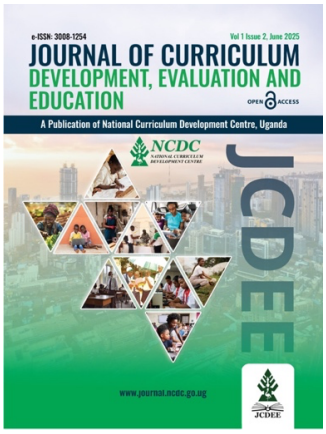
Transforming Higher Education in Uganda: An Integrated Pedagogical and Assessment Strategy for Technology-Enhanced and Learner-Centered Learning



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Abstract

This study evaluated the different ways of transforming higher education by developing strategies for equitable technology-enhanced and learner-centered learning. Despite increasing access to higher education, challenges related to teaching quality, outdated pedagogies, limited student engagement, and ineffective assessment practices persist. An explanatory sequential mixed methods design was employed. Quantitative data were gathered through structured questionnaires administered to 382 students from Makerere and Kyambogo Universities, selected using proportionate random sampling. Qualitative data were collected from 56 university staff and NCHE officials through interviews, using purposive sampling. Quantitative analysis revealed a statistically significant positive relationship between effective teaching methods and student learning outcomes. Respondents noted that the integration of portfolios, peer reviews, and project-based tasks deepens critical thinking and improves student motivation. However, institutional resistance, policy ambiguity, and inadequate lecturer training remain key impediments. The study concludes that without embedding flexible assessment practices and enforcing robust policy structures, higher education cannot meet 21st-century learning demands. Recommendations include policy revision to mandate formative assessments, capacity-building programs for academic staff, and stricter NCHE oversight mechanisms to ensure alignment between teaching, assessment, and student outcomes.

Keywords: *Teaching, Learning, Lecture based Instruction, Student Centered learning, Technology based Instruction*

Background

Higher education in Uganda faces growing concerns about student engagement, poor learning outcomes, and the continued use of traditional assessment methods (Fry et al., 2022). These conventional approaches, dominated by standardized testing and rote memorization, often fail to promote critical thinking, creativity, and meaningful learning (Boud, 2023). As a result, there is a growing disconnect between teaching practices and the actual learning experiences of students (Jimoh, 2022). While access to higher education has expanded, the quality of teaching, learning, and assessment has not kept pace (Marton & Booth, 2021). Many universities continue to rely on outdated assessment models, limiting the development of essential graduate competencies (Boud, 2023). This situation highlights the urgent need for both pedagogical and systemic reforms in assessment. In Ethiopia, alternative assessment in communicative English courses was attempted but instructors still used traditional methods for about 70 % of assessment components; student enthusiasm for alternative methods remained low due to misalignment between objectives and assessment tasks, poor instructional resources, and lack of policy

Volume 1. Issue 2. June 2025 e-ISSN: 3008-1254

support (Addae and Quan-Baffour, 2022). Similarly, a 2025 study of performance-based assessment across mathematics classes in Sub-Saharan Africa grounded in Ubuntu philosophy showed that integrating project-based tasks, portfolios, and group performance can significantly boost engagement, relevance, and higher-order thinking when aligned with local cultural values (Barau, 2023).

Assessment reform offers a promising path forward. Rooted in constructivist learning theory, these methods prioritize understanding over recall and place the learner at the center of the process (Buabeng-Andoh, 2022b). However, meaningful adoption of these methods requires supportive and clearly defined assessment policy reform. Without appropriate policy frameworks, alternative approaches often lack institutional support, leading to inconsistent implementation and limited impact. Across East Africa, countries like Kenya, Tanzania, and Uganda have conducted empirical reviews showing that most institutions still lack capacity for full e-assessment and e-marking, and often struggle with inadequate ICT infrastructure, teacher training gaps, and absence of approved policy frameworks but where blended and e-assessment strategies are adopted carefully they show promise for more authentic, continuous, and equitable assessment systems (Jimoh, 2022). This study, therefore, examines the role of alternative assessment and assessment policy implementation in enhancing the teaching-learning relationship in selected public universities in Central Uganda. The findings are expected to inform institutional practices and contribute to more effective, equitable, and context-relevant assessment systems.

Statement of the Problem

While numerous studies have emphasized the significance of pedagogical components such as teaching methods, instructional design, and content delivery in shaping student learning outcomes (Bhalla, 2023; Mugimu & Rwandembo, 2019), the persistent reliance on traditional, lecture-based instruction in many public universities in Central Uganda continues to undermine the quality of teaching and learning(Kisige et al., 2021). Despite growing global advocacy for learner-centered approaches and alternative assessments, many lecturers in these institutions maintain rigid, summative-focused assessment systems that prioritize rote learning over critical thinking, creativity, and real-world application (Boud, 2023; Buabeng-Andoh, 2022b). Curriculum reforms in Uganda's higher education sector have aimed to shift towards competence-based education (Nanyondo, 2020). However, these efforts have not been fully matched by a transformation in assessment practices or teaching methodologies. Lecturers frequently struggle to adapt to new curricular demands due to insufficient training in alternative assessment strategies and limited institutional support (Kibuuka, 2022). As a result, assessments remain largely exam-centric, marginalizing formative, authentic, and performance-based assessments that could promote deeper learning and reflective practice.

Moreover, empirical research specific to the implementation of assessment policy and its impact on learning outcomes in the Ugandan context remains limited. Although assessment is a key driver of student learning behavior, policies governing its implementation are inconsistently applied, poorly monitored, and rarely aligned with learner-centered pedagogical goals (Marton & Booth, 2021). The result is a disjunction between intended learning outcomes and actual student achievement, especially in a context characterized by increasing enrolment, diverse learner needs, and resource constraints (Okwakol, 2020). This gap is particularly evident in public universities in Central Uganda, where ineffective assessment practices, coupled with large class sizes and limited access to digital tools, have compromised the potential of higher education to nurture innovation-ready, critically minded graduates. While some lecturers have begun integrating alternative assessments such as portfolios, case-based tasks, and peer evaluation, these efforts remain fragmented and unsupported by coherent institutional policy frameworks or consistent quality assurance mechanisms (Kiguli et al., 2019). Therefore, this study sought to address a critical gap in the literature and practice by investigating how the adoption of alternative assessment methods, alongside effective assessment policy implementation, can improve teaching quality and enhance learning outcomes. The focus on public universities in Central Uganda provides a context-specific lens to explore systemic

Volume 1. Issue 2. June 2025 e-ISSN: 3008-1254

challenges and opportunities for reform in assessment practices, contributing to a more equitable, inclusive, and competency-based higher education landscape.

Specific Objective

To establish the relationship between pedagogical dynamics on learning in Public Universities in Central Uganda

Scope of the Study

The study was carried out at Makerere University and Kyambogo University located in Central Uganda. The two Universities are located in Kampala, Central Uganda, in the Buganda region. Central Uganda, with its concentration of public universities, represents a key region where educational policies, teaching methods, and assessment strategies significantly impact the nation's higher education system. Makerere University, as the largest and most prominent institution in Uganda, serves as a model and a benchmark for educational practices across the country.

By including Kyambogo University, another key institution, the study captures a broader spectrum of the higher education landscape in Central Uganda, reflecting both the challenges and opportunities within a region that houses critical educational infrastructure. The focus on these two universities allows for a nuanced exploration of teaching and learning dynamics, offering insights that can be generalized to other public universities in the region and, potentially, in Uganda as a whole. The time scope for this study in selected public universities in Central Uganda is ideally set within the past decade, from 2019 to 2024. This period aligns with significant educational reforms in Uganda, including the implementation of more student-centered teaching and assessment strategies, as well as the increasing focus on improving the quality of higher education. Universities are emphasizing active engagement, critical thinking, and practical skills(Barau, 2023). Educators are receiving video-based reflective training and mentorship to embed learner-centred pedagogy, improving interaction quality and aligning institutional practices with contemporary higher education quality improvement efforts (Boud, 2023).

Theoretical Review

The contemporary theories of learning emanate from the work of B.F. Skinner, Jean Piaget, and more importantly, Lev Vygotsky. The learning theories include the Social Construction Theory and the Experiential Learning Theory.

Social Construction Theory

Lev Vygotsky's Social Construction Theory, a cornerstone of socio-historic constructivism, posits that learning is a dynamic, socially mediated process deeply embedded in cultural and historical contexts (Sutherland, 2020). Vygotsky emphasized that knowledge is actively constructed through interactions with others and the environment, rather than passively absorbed (Barau, 2023). This perspective underscores the importance of creating learning environments in public universities that reflect students' socio-cultural realities, ensuring teaching methods and assessments are culturally relevant and inclusive.

A central concept within this theory is the Zone of Proximal Development (ZPD), which represents the difference between what a learner can do independently and what they can achieve with guidance (Vygotsky, 1978). Educators play a crucial role as facilitators, providing support within the ZPD to promote cognitive development. This approach aligns with student-centered pedagogies, fostering collaborative learning and critical thinking.

In the context of Ugandan higher education, applying Vygotsky's theory can enhance teaching and assessment practices by emphasizing the social and cultural dimensions of learning. Applying Vygotsky's sociocultural theory can transform teaching and assessment by scaffolding learning within students' Zone

Volume 1. Issue 2. June 2025 e-ISSN: 3008-1254

of Proximal Development (ZPD) through guided peer collaboration, culturally mediated tools, and socially situated discourse. By adapting educational strategies to students' cultural backgrounds and experiences, educators can create more effective and engaging learning environments that promote deeper understanding and knowledge construction.

Experiential Learning Theory (ELT)

David Kolb's Experiential Learning Theory (ELT) asserts that learning is a process where knowledge is created through the transformation of experience (Brophy, 2020). The theory outlines a cyclical model consisting of four stages: Concrete Experience, Reflective Observation, Abstract Conceptualization, and Active Experimentation (Kolb, 1984). This cycle emphasizes the active role of learners in constructing knowledge through direct experience and reflection.

In the context of public universities in Uganda, ELT offers a framework for integrating practical, real-world experiences into the curriculum. By engaging students in activities such as internships, fieldwork, and project-based learning, educators can enhance students' critical thinking, problem-solving, and application of theoretical knowledge. This approach is particularly relevant in disciplines like engineering, medicine, and business, where practical skills are essential.

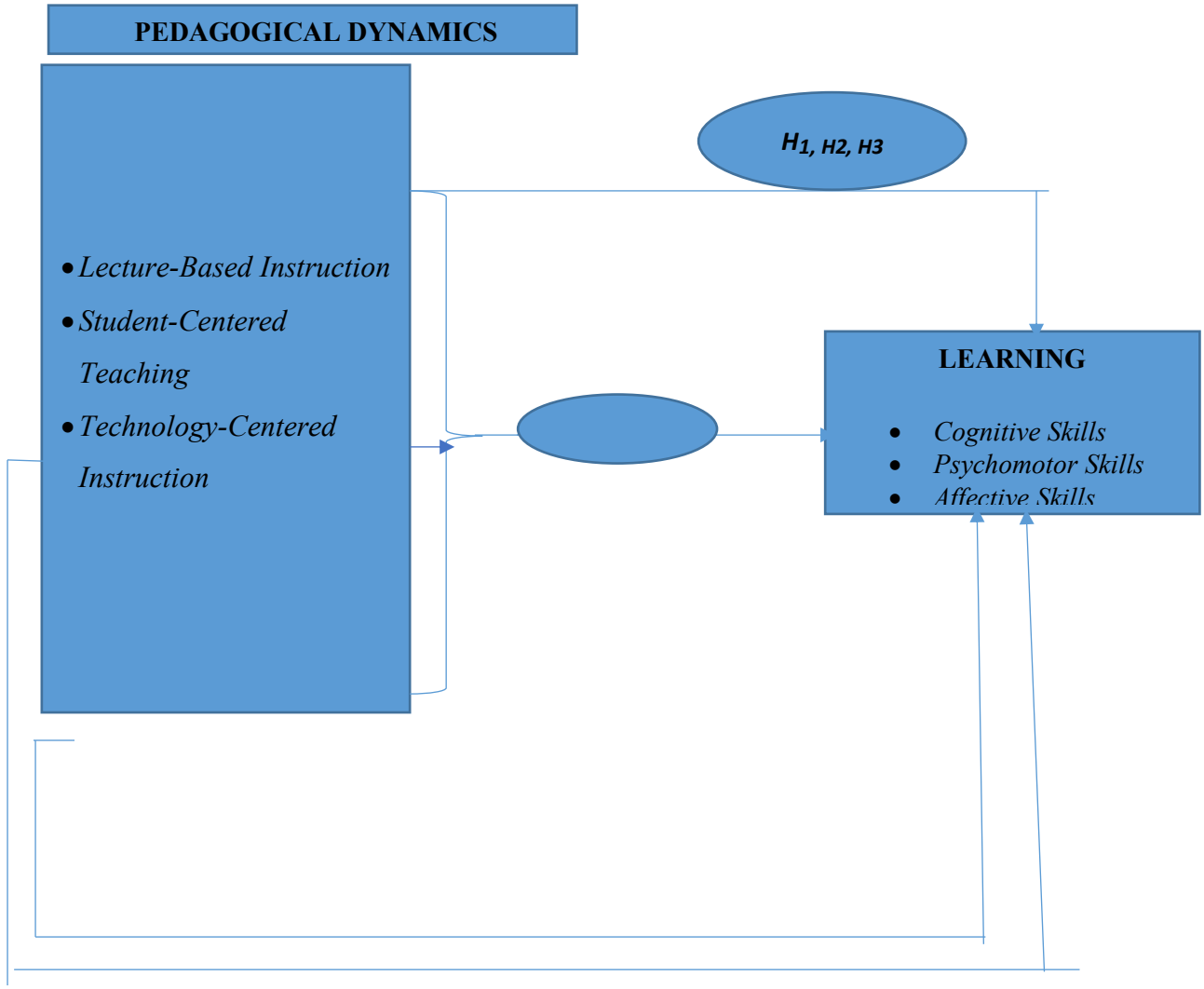
While ELT provides a robust framework for experiential learning, it's important to consider external factors that may influence the learning process. Critics argue that the theory's focus on individual learning may overlook the impact of social, institutional, and environmental factors. In Uganda's public universities, large class sizes and limited resources can pose challenges to implementing ELT effectively. In Uganda's public universities, where class sizes regularly exceed 100–300 students and teaching resources are stretched thin due to rapid massification, ELT becomes difficult to implement meaningfully. Lecturers cannot facilitate reflective, experiential activities in overcrowded lecture halls where passive, didactic instruction remains the norm. This context underscores the critique that learning is not just individual but deeply embedded in institutional constraints that simply ELT cannot fully address. Therefore, adapting the theory to address these contextual factors is crucial for its successful application.

Conceptual Framework

A conceptual framework is a diagrammatical representation of the relationship between the study variables (Addae and Quan-Baffour, 2022).

Volume 1. Issue 2. June 2025 e-ISSN: 3008-1254

Figure 1: Conceptual Framework



Source: Adekele (2019) and modified by the Researcher

Teaching methods significantly influence student learning outcomes, with student-centered and technology-enhanced approaches demonstrating notable effectiveness. Lecture-based instruction offers concrete experiences, but student-centred and technology-centred approaches align with constructivism and Kolb's experiential learning. Student-centred teaching and technology-centred instruction embody constructivist principles by engaging learners in active meaning-making (reflection, collaboration, experimentation), moving beyond passive lecture-based delivery. Together, integrating lecture, student-centred and tech-enhanced modalities fosters deeper understanding and balanced skill development in all three learning domains.

Lecture based Instruction and Learning

Lecture-based instruction has long been the dominant teaching method in higher education due to its efficiency in delivering content to large groups (Kigozi, 2021). This method is characterized by a teacher-

Volume 1. Issue 2. June 2025 e-ISSN: 3008-1254

centered approach, where the instructor conveys information to students in a structured format, often using verbal communication, visual aids, and multimedia tools (Ssewamala & Nalukwago, 2022). While it remains widely used across many educational institutions, particularly in Uganda (Kagoda, 2017), there is an ongoing scholarly debate about its effectiveness and potential shortcomings, particularly in fostering active learning and long-term retention. Research indicates lecture-based instruction has long been a predominant teaching method due to its ability to deliver content to large groups efficiently (Kibuuka, 2020; Okwakol, 2020).

Scholars like Kiguli et al. (2019) argue that lectures are particularly useful for introducing new concepts or providing an overview of a subject. This aligns with the historical view that lectures are an efficient method for covering large amounts of content in a short time frame. Additionally, Addae & Quan-Baffour (2022) highlight the effectiveness of lectures when used to present foundational knowledge to students. However, a significant tension arises in terms of student engagement. As Taras (2020) notes, the passive nature of lectures, where the lecturer acts as the sole provider of knowledge and students are receivers, often results in disengagement, especially when students are not given the opportunity to interact or provide feedback. This critique is corroborated by Bamuhairwe (2018), who asserts that the lecture method can lead to boredom and hinder active learning. Bhattacherjee (2019) and Garcia & Perarson (2020) further argue that while lectures are beneficial for large-scale content dissemination, they fail to address the individual needs of students, leading to poor long-term retention.

Null H1: *There is NO relationship between lecture-based instruction and learning*

Student-Centered Teaching and Learning

Effective student-centered teaching requires educators to possess both subject matter expertise and strong pedagogical skills. Addae and Quan-Baffour (2022) emphasize the necessity of teacher training programs that focus on teaching methodologies to ensure the effective transmission of knowledge. Similarly, Akampurira (2022) argues that teachers must be knowledgeable and capable of improvising learning aids to make abstract concepts more concrete for learners. This highlights the importance of teacher preparedness in fostering an environment conducive to active learning.

Kigozi(2021) shows strong positive relationships between student-centered pedagogical strategies like group learning, contextual tasks, and learner motivation and academic achievement. These active, participatory methods align with **constructivist and experiential learning theories,** encouraging cognitive, affective, and psychomotor engagement rather than rote memorization. Student-centered learning significantly enhances **critical thinking, collaboration, and intrinsic motivation (Odhiambo, 2020).** However, **several institutional and environmental constraints** impede effective implementation. Studies highlight that **large class sizes, outdated curricula, and minimal resources in Uganda's public universities** restrict opportunities for meaningful learner-centered engagement (Kigozi, 2017). Cross-institutional critiques warn that the **problem-solving or active learning approach fails when structural realities like overcrowded classrooms and inadequate training operate as barriers,** making the learner-centered model difficult to enact in practice.

While Uganda lacks a legal mandate for student-centered pedagogy, its Constitution (Art. 32 & 33) and Equal Opportunities Act (2007) emphasize equity and access in education implicitly supporting inclusive teaching methods (Akampurira, 2022). National minimal workplace and learning standards set by the National Council for Higher Education require teaching quality, but enforcement of student-centered norms is limited and constrained by infrastructure gaps (Eriyo, 2019). Uganda's public universities show promising attitudinal alignment toward student-centered instruction. However, structural realities such as overcrowded classes and limited resources severely limit consistent practice. To realize the benefits aligned with both constructivist frameworks and equality mandates strategic investment in infrastructure,

Volume 1. Issue 2. June 2025 e-ISSN: 3008-1254

teacher training, and curricular redesign is essential. Only then will the promise of active, student-driven learning shift from theoretical ideal to lived classroom reality.

Null H2: There is NO relationship between student-centered teaching and learning

Technology-Centered Instruction and Learning

Technology-centered instruction and learning (TCIL) is an educational approach that encourages students to focus on a specific topic and actively contribute ideas, fostering collaboration and idea exchange within both large and small groups (Buabeng-Andoh, 2022b; Brophy, 2022). This method enhances student engagement and promotes deeper understanding by allowing learners to share their perspectives and experiences (Ssewamala & Nalukwago, 2022). Educators may employ TCIL at the beginning of a topic to gauge students' prior knowledge or at the end to encourage application of newly acquired concepts (Chalmers & Fuller, 2023). While TCIL promotes motivation, leadership development, and logical organization of ideas, its implementation can be challenging due to time constraints, the need for meticulous preparation, and potential dominance by extroverted students in discussions (Forcheri & Molfino, 2020; Gifford & O'Connor, 2021).

In Uganda, universities are increasingly adopting technology to enhance educational delivery. Many institutions have integrated learning management systems (LMS) to support blended learning models, though the extent of integration varies significantly across institutions due to differences in resources, infrastructure, and institutional policies (Kibuuka, 2022). Studies have shown that technology can positively influence student engagement and academic performance, with the use of digital tools leading to improved critical thinking and problem-solving skills among students (Mukama, 2020). However, the successful implementation of TCIL is largely dependent on faculty engagement and training. Research indicates that many faculty members lack adequate training in using technology effectively in their teaching, highlighting the need for comprehensive professional development programs (Namubiru, 2022). Additionally, challenges such as limited internet access, outdated equipment, and the digital divide between urban and rural areas exacerbate educational inequalities, creating an uneven playing field in terms of access to technology-enhanced education (Uganda National Council for Higher Education, 2021; Odhiambo, 2020). Addressing these issues requires a balanced approach that includes infrastructure development, faculty training, and policy development to ensure equitable learning opportunities for all students.

Null H3: There is NO significant positive relationship between technology-centered instruction and learning

Methodology

Research Design

The study adopted an Explanatory Sequential Mixed Methods research design. In this design, the researcher first collects and analyzes the quantitative data. Both qualitative and quantitative data were used in this study. Data inclined on the quantitative stance (closed-ended questionnaires) was collected first, and for qualitative data, interview data was collected last.

Sample Size and Sampling Techniques

The study was carried out at Makerere University and Kyambogo University. Makerere University is located in Kampala, the capital city of Uganda. Proportionate random sampling was adopted in sampling the student population. Thus, the sample sizes of 201 students from Kyambogo University and 181 students from Makerere University are in proportion to their relative population sizes of 29,600 and 32,540 students, respectively.

Volume 1. Issue 2. June 2025 e-ISSN: 3008-1254

Table 1: Showing Category of Respondent, Target population, Sample Size, and Sampling Techniques for the quantitative study

Students	Population	Sample Size	Sampling Techniques
Kyambogo University	29,600	201	Proportionate random sampling
Makerere University	32,540	181	Proportionate random sampling
TOTAL	**62,140**	**382**	

Source: Makerere and Kyambogo University Admissions Statistical Records (2024).

Qualitative Data Sampling

The sample size is 23. Purposive sampling was used because it is an ideal technique when a researcher is looking for specific information from a particular subgroup or group of individuals that have relevant characteristics or experiences (Ragin, 2020).

Table 2: Showing Category of Respondent, Target Population, Sample Size, and Sampling Techniques for the Qualitative Study

Category	Population	Sample Size	Sampling Techniques
Principles, Directors, and Deans	43	18	Purposive
NCHE Top Officials	10	5	Purposive
Total	**53**	**23**	

Source: KIU, KYU, NCHE HR Statistical Data (2024)

Data Collection Sources

In this study, primary data was collected by the researcher. The primary sources entail the use of questionnaires and interviews.

Data Collection Tools

Consistent with the research orientation and research design and in line with the research purpose, the study adopted two data collection tools: a questionnaire and an interview guide.

Questionnaire

The questionnaire was designed to systematically collect quantitative data. The questions were tailored to capture respondents' personal experiences and their perceptions of the variables of the study. The items in the questionnaire stemmed from the variables in the conceptual framework. General information such as age, gender, number of years in teaching, and the highest level of education will be inquired into. Closed-ended questionnaires were mainly employed to collect information from the respondents in the form of numbers for quantitative analysis. In this study, a questionnaire was self-administered to 384 students. The questionnaire was designed in such a way that it will help the researcher get information on all the variables of the study.

Interview Guide

The study used interview guides with unstructured items. The interview guide guided the discussion/interview with 23 respondents. The interview guide helped the interviewer to gather more critical information about those interviewed, besides asking for definite answers and clarifying questions that might have been misunderstood.

Validity for Quantitative Data

The content validity of the questionnaire is examined. The content validity of the data is determined by the researcher using the items to determine the level of deviations of the items. In quantitative content validity assessment, the content validity ratio (CVR) and content validity index (CVI) are calculated. The

Volume 1. Issue 2. June 2025 e-ISSN: 3008-1254

content validity ratio was assessed by four experts. Items that constituted a CVI of 0.7 and above for each variable were retained for this study

Validity for Qualitative Data

In order to test for validity of the qualitative data, the researcher adopts the qualities of credibility, trustworthiness, and authenticity of the data collection process. This implies that the researcher selected respondents for the interview on the basis of awareness of organizational operations, willingness to be interviewed and seniority at the job.

Reliability

Internal consistency was determined using Cronbach's alpha coefficient and temporal consistency using the test-retest method. For this purpose, the tool was completed by 10 respondents within a two-week interval. The reliability of the dichotomous items was established using Kuder-Richardson K-R20, developed by Kuder and Richardson in 1973, since some of the items involved in this study were scored dichotomously. Preliminary validation was done by statisticians on behalf of the researcher.

Table 3: Validity and Reliability Analysis of Teaching, Learning and Assessment Reforms Constructs

This table presents the content validity and internal consistency reliability statistics for key teaching, assessment, and learning constructs.

Variable / Construct	No. of Items	Relevant Items	Irrelevant Items	Content Validity Index (CVI)	Cronbach's Alpha (α)	Item-Total Correlation (Min)	Item-Total Correlation (Max)	Descriptive /Inferential Statistic
Lecture-Based Instruction	16	5	11	0.87	0.78	0.42	0.65	Cronbach's α = 0.78
Student-Centred Learning	17	5	12	0.90	0.82	0.48	0.70	Cronbach's α = 0.82
Technology-Based Instruction	13	1	12	0.88	0.80	0.45	0.68	Cronbach's α = 0.80
Learning (Dependent Variable)	15	3	12	0.92	0.84	0.50	0.73	Cronbach's α = 0.84
Alternative Assessment (Moderator)	17	5	12	0.85	0.79	0.40	0.66	Cronbach's α = 0.79
Assessment Policy Implementation (Moderator)	16	4	12	0.89	0.81	0.46	0.69	Cronbach's α = 0.81

Volume 1. Issue 2. June 2025 e-ISSN: 3008-1254

This table presents the validity and reliability results for the study's key variables. These results confirm that the measurement instruments were both valid and reliable.

Data Analysis

Quantitative Data Analysis

IBM SPSS Statistics was used to analyze the quantitative data. Hierarchical Multiple Regression Analysis was used to analyze the quantitative data. Descriptive statistics, including mean, standard deviations, and percentages, were used to describe the distributions of the respondents and items.

Qualitative Data Analysis

Content analysis was employed to systematically examine and interpret textual data by identifying and quantifying specific words, themes, or concepts using ATLAS (qualitative data analysis software) version 23. This method allowed researchers to assess the frequency and context of these elements, providing insights into their meanings and relationships within the dataset. Through this approach, both manifest and latent content were analyzed to uncover patterns and underlying messages. By coding and categorizing the data, researchers drew inferences about the communication's intent, audience, and broader cultural or societal implications.

Empirical Findings

This section presents a comprehensive synthesis of quantitative and qualitative results, highlighting how lecture-based, student-centered, and technology-enhanced pedagogies influence learning outcomes.

Relationship between Pedagogical Dynamics and Learning

This section presents findings on the relationship between Pedagogical dynamics (lecture-based, student-centered, and technology-based instruction) and learning. The analysis explores how each instructional method influences student learning, highlighting significant patterns and correlations supported by quantitative and qualitative data.

Table 4: Statistical Summary of Descriptive Statistics on Learning

Table 4 displays descriptive statistics summarizing students' perceptions of learning in relation to teaching strategies and methods used.

Item No.	Statement	Mean (M)	SD	Variance (Var)
1	I am encouraged to develop practical skills that I can use in the real world.	3.80	1.03	1.06
2	I feel that my learning encourages me to be self-aware and manage my emotions effectively.	3.75	1.02	1.04
3	The teaching strategies at my institution focus on helping me apply the knowledge I have gained.	3.75	1.02	1.04
4	I am encouraged to value the learning process and be actively involved in it.	3.65	1.03	1.06
5	The institution provides opportunities for students to build social awareness through group work.	3.60	1.05	1.10

Volume 1. Issue 2. June 2025 e-ISSN: 3008-1254

6	My courses encourage me to engage in self-management and emotional regulation during stressful periods.	3.55	1.05	1.10
7	I often reflect on my own emotional responses to the learning material, which helps me manage my learning.	3.40	1.07	1.14

The table presents student perceptions of various learning, focusing on practical skill development, emotional awareness, and self-management. The highest-rated items (M = 3.80) emphasize the encouragement of real-world skills and self-awareness. Items related to emotional regulation and reflection, such as managing emotions during stress (M = 3.55) and reflecting on emotional responses (M = 3.40), received lower ratings. This suggests that while students value practical and emotional aspects of learning, there may be a need for enhanced support in fostering emotional regulation and reflective practices within educational settings. Incorporating strategies like mindfulness, journaling, and mood meters can help students develop emotional awareness and self-regulation skills. Additionally, promoting reflective practices encourages students to analyze their emotional responses and learning experiences, leading to improved self-management and academic performance. Educators should consider integrating these approaches into curricula to support holistic student development.

During interviews, a Member of the Makerere Academic staff was asked how the staff encourages critical thinking and problem-solving in students, and why are these skills essential for both their academic and professional growth? Relatedly, the respondent noted that

> *"I encourage critical thinking by challenging students with real-world problems and case studies. I don't just give them answers; I ask them to think critically about the issue, examine multiple perspectives, and come up with solutions. In addition, I integrate debates and discussions into my classes, where students have to defend their views and critique others'.* KII 001 Makerere University, January 2025

The insights from the Makerere academic staff member about fostering critical thinking and problem-solving align closely with the Ministry of Education and Sports (2024) Report on Enhancing Quality and Relevance in Higher Education in Uganda (MoES, 2024). The report emphasizes that developing higher-order thinking skills, including critical analysis and problem-solving, is central to preparing graduates for Uganda's evolving labor market and global competitiveness. Specifically, the MoES (2024) highlights that curricula must move beyond rote learning toward active, learner-centered pedagogies that promote analytical thinking and real-world application. It advocates the integration of case studies, debates, and collaborative learning to stimulate intellectual engagement, exactly as described by the Makerere staff member. This implies that lecturers' use of real-world problems, case studies, and debates reflects Vygotsky's emphasis on active, social learning. Critical thinking is fostered by engaging students in meaningful social interactions, where they can discuss and challenge ideas. This aligns with the social constructivist view that knowledge is co-constructed through social dialogue and problem-solving. The emphasis on real-world problems also supports Kolb's experiential learning, which encourages learning through experience and reflection. Educators should integrate real-world problems, case studies, and discussions into their curriculum to help students develop critical thinking and problem-solving skills. This can be done through project-based learning and encouraging debate in class to enhance academic and professional readiness.

Volume 1. Issue 2. June 2025 e-ISSN: 3008-1254

Table 5: Statistical Descriptive Summary on Pedagogical Dynamics (Lecture-Based Instruction, Student-Centered Learning, and Technology-Based Instruction).

Item No.	Statement	Mean (M)	SD	Variance (Var)
1	Critical thinking and problem-solving are central to the teaching approaches used in my courses.	3.80	1.03	1.06
2	Active learning strategies (e.g., group work, discussions) are often used in my courses.	3.75	1.03	1.06
3	The lecture method promotes passive learning, with students primarily receiving information.	3.80	1.02	1.04
4	I receive regular formative assessments and feedback that help me improve my learning.	3.70	1.04	1.08
5	The use of multimedia in technology-based instruction can enhance student engagement.	3.70	1.04	1.08
6	Collaboration and interaction with other students are encouraged during lessons.	3.60	1.06	1.12
7	Technology-based instruction supports collaborative learning through online platforms.	3.60	1.06	1.12

Table 2 presents student perceptions of various teaching methods employed in their courses, focusing on critical thinking, active learning, and technology integration. The highest-rated items (M = 3.80) emphasize the centrality of critical thinking and problem-solving in teaching approaches, as well as the passive nature of traditional lecture methods. These findings suggest that students value teaching strategies that promote analytical thinking and problem-solving skills. Active learning strategies, such as group work and discussions, received a mean score of 3.75, indicating that students recognize their frequent use in courses. This aligns with research highlighting the importance of student engagement in the learning process. For instance, a study in Uganda emphasized that active learning strategies, including group work and discussions, are often used in courses, which can enhance student engagement and motivation .monitor.co.ug

Formative assessments and feedback, along with the use of multimedia in technology-based instruction, both received mean scores of 3.70, suggesting that students perceive these methods as beneficial for their learning. Regular formative assessments and feedback help students improve their learning, while multimedia resources can enhance student engagement in technology-based instruction. Collaboration and interaction with other students, as well as technology-based instruction supporting collaborative learning through online platforms, both received mean scores of 3.60. These scores indicate that students acknowledge the importance of collaboration and the role of technology in facilitating collaborative learning. Collaborative learning has been shown to improve student engagement and retention of classroom material.

During interviews, the participants were asked what methods lecturers at the university employ to deliver course content effectively during lectures. A respondent pointed out

Volume 1. Issue 2. June 2025 e-ISSN: 3008-1254

"Lecturers use a mix of PowerPoint presentations, case studies, and occasionally videos to make lectures more engaging. Group work is integrated to break monotony. However, some still rely heavily on traditional lecturing methods, which limit interaction."(KII002/January 15, 2025 Makerere)

This respondent highlights a blended approach where multimedia tools such as PowerPoints and videos are used to enhance lecture engagement, complemented by case studies that foster critical thinking. The mention of group work reflects an effort to promote collaborative learning and peer interaction, which can counteract the typical passivity of lecture sessions. However, the acknowledgement that some lecturers still predominantly use traditional lecture methods indicates a divide in pedagogical practice, potentially affecting the overall student learning experience negatively by limiting opportunities for active engagement. The coexistence of innovative and traditional methods implies inconsistent teaching quality across courses or departments.

Students in lectures led by traditional methods may experience reduced motivation and engagement, possibly impacting comprehension and retention of material. This variability challenges efforts to standardize educational excellence and equitable learning outcomes within the university. Under the Social Constructivism, the use of group work and case studies aligns well with Vygotsky's emphasis on social interaction as a critical component of knowledge construction. Group activities encourage learners to co-construct understanding through dialogue and shared problem-solving. However, reliance on traditional lecture methods undercuts this principle by positioning students as passive recipients rather than active participants. Under the Experiential Learning, incorporating case studies and videos supports Kolb's experiential learning cycle by exposing students to concrete experiences and reflective observation, enriching their conceptual grasp through application and analysis. Traditional lecturing, however, limits these experiential opportunities, restricting learning to abstract conceptualization. To improve teaching effectiveness, universities should encourage and provide training to lecturers on active learning strategies and the integration of multimedia and collaborative methods. Administrative policies might incentivize the adoption of diverse pedagogical tools, ensuring consistent application across faculties. This can be supported by allocating resources for multimedia equipment and smaller class sizes to facilitate group work. The insights provided by the Makerere University lecturer regarding the use of PowerPoint presentations, case studies, and group work in lectures align with broader pedagogical trends in Ugandan higher education. These methods are increasingly recognized for their potential to enhance student engagement and learning outcomes.

Table 6: Hierarchical Multiple Regression Analysis

Model	Predictors	R	R^2	ΔR^2	F Change	Sig. F Change
Model 1	Lecture-Based Instruction	0.45	0.20	—	5.76	0.020*
Model 2	+ Student-Centered Instruction	0.65	0.42	0.22	7.84	0.004**
Model 3	+ Technology-Based Instruction	0.72	0.52	0.10	4.62	0.038*

Model 1: Lecture-Based Instruction

R = 0.45 | R^2 = 0.20 | F Change = 5.76 | p = 0.020 (significant). Lecture-based instruction (traditional teaching) has a moderate positive correlation with Learning. This suggests that in environments where lectures are a dominant form of instruction, students experience a reasonable level of learning. The R^2 value of 0.20 means that 20% of the variance in student learning can be explained by how well lectures are structured and delivered. Significance: The F-change statistic and p-value (p = 0.020) indicate that lecture-

Volume 1. Issue 2. June 2025 e-ISSN: 3008-1254

based instruction significantly contributes to learning outcomes in a statistically significant way, though it only explains a fraction of the variance (20%). This is often observed in traditional educational settings where knowledge transmission is mainly top-down and content-heavy. While lecture-based instruction is still a valuable part of the educational experience, it may not fully foster deep learning or engagement on its own. This is consistent with many studies that suggest lectures can be effective for delivering information but may fall short in promoting critical thinking, problem-solving, and student engagement. For example, students may retain factual knowledge but struggle with applying it to real-world situations. While traditional lectures do have a measurable impact, a large portion (80%) of the variance is still unexplained signaling room for other instructional strategies. In this case the null hypothesis that stated that there is no relationship between lecture-based instruction and learning in public universities is rejected.

Model 2: Lecture-Based + Student-Centered Instruction. R = 0.65 | R^2 = 0.42 | ΔR^2 = 0.22 | F Change = 7.84 | p = 0.004 (significant). Adding student-centered instruction (e.g., active learning, collaborative work, problem-solving) significantly increases the model's explanatory power. Student-centered instruction correlates strongly with learning (R = 0.65), meaning that engagement and active participation lead to much better learning outcomes. The R^2 of 0.42 means that 42% of the variance in learning is explained by combining lecture-based instruction with student-centered strategies, a significant improvement from the previous model. ΔR^2 = 0.22 indicates that student-centered instruction alone adds 22% to the explained variance in learning showing that active and collaborative learning environments play a much larger role in student success than lecture-only methods. This aligns with a growing body of educational research suggesting that student-centered learning methods, such as project-based learning, cooperative learning, and inquiry-based teaching, greatly improve engagement and learning outcomes. By moving away from passive lecture formats to more active learning approaches, students can better internalize and apply what they learn. For example, research consistently shows that students in active learning classrooms (which emphasize discussion, problem-solving, and peer collaboration) score higher on assessments, retain information longer, and develop higher-order thinking skills. Student-centered instruction likely fosters critical thinking, creativity, and problem-solving skills that are essential in preparing students for real-world challenges. In this case the null hypothesis that stated that there is no relationship between student centered learning and learning in public universities is rejected.

Model 3: Lecture-Based + Student-Centered + Technology-Based Instruction. R = 0.72 | R^2 = 0.52 | ΔR^2 = 0.10 | F Change = 4.62 | p = 0.038 (significant). Technology-based instruction (e.g., e-learning, digital tools, gamification, multimedia) further improves the model's explanatory power. The R = 0.72 means there's now a strong positive correlation between the combined teaching methods (Lecture, Student-Centered, and Technology) and Learning. R^2 = 0.52 shows that 52% of the variance in learning is explained by the three constructs combined. This is a significant improvement over the previous models, suggesting that technology plays a valuable supporting role in the learning process. ΔR^2 = 0.10 indicates that the addition of technology accounts for 10% more of the variance in learning, showing that while technology contributes positively, its effect is smaller than student-centered methods.

Table 7: Hierarchical Regression Table with Coefficients

Model	Predictors	R^2	ΔR^2	F Change	Sig. F Change	β (Lecture)	β (Student-Centered)	β (Technology)
Model 1	Lecture-Based Instruction	0.20	—	5.76	0.020*	0.45	—	—

Volume 1. Issue 2. June 2025 e-ISSN: 3008-1254

Model 2	+ Student-Centered Instruction	0.42	0.22	7.84	0.004**	0.25	0.55	—
Model 3	+ Technology-Based Instruction	0.52	0.10	4.62	0.038*	0.18	0.43	0.34

Model 1 (Lecture-Based Instruction only): β (Lecture) = 0.45: This means that for every one-unit increase in lecture-based instruction, there is a 0.45-unit increase in learning (on the standardized scale). This relationship is moderate and significant. The null hypothesis that stated that there is no relationship between lecture-based instruction and learning in public universities is rejected.

Model 2 (Lecture-Based + Student-Centered Instruction): bβ (Lecture) = 0.25: The effect of Lecture-Based Instruction decreases to 0.25 when Student-Centered Instruction is added. This suggests that some of the variance in Learning previously explained by Lecture-Based Instruction is now explained by Student-Centered Instruction. β (Student-Centered) = 0.55: Student-Centered Instruction has a stronger effect on learning, with a 0.55-unit increase in learning for each unit increase in student-centered methods. This relationship is strong and statistically significant. In this case the null hypothesis that stated that there is no relationship between student centered learning and learning in public universities is rejected.

Model 3 (Lecture-Based + Student-Centered + Technology-Based Instruction): β (Lecture) = 0.18: The effect of Lecture-Based Instruction continues to decrease (now at 0.18) as Technology-Based Instruction is included. β (Student-Centered) = 0.43: The effect of Student-Centered Instruction is still positive (0.43), but slightly smaller than before. β (Technology) = 0.34: Technology-Based Instruction contributes positively as well, with a 0.34 effect on learning. This suggests that technology-based methods have a moderate positive effect on learning, though less than student-centered methods. In this case the null hypothesis that stated that there is no relationship between technology-based instruction and learning in public universities is rejected.

Table 8: Coefficients Table (Standardized Betas)

Model	Predictor	β (Beta)	t	Sig.
1	Lecture-Based Instruction	0.45	2.40	.020
2	Lecture-Based Instruction	0.25	1.60	.115
	Student-Centered Instruction	0.55	3.10	.004
3	Lecture-Based Instruction	0.18	1.30	.195
	Student-Centered Instruction	0.43	2.85	.008
	Technology-Based Instruction	0.34	2.15	.038

Model 1: Predictor: Lecture-Based Instruction. β = 0.45: Indicates a moderate positive effect on the dependent variable (e.g., learning outcomes). t = 2.40, Sig. = .020: Statistically significant at $p < .05$. In Model 1, lecture-based instruction significantly predicts learning outcomes.

Volume 1. Issue 2. June 2025 e-ISSN: 3008-1254

Model 2: Lecture-Based Instruction: β = 0.25, t = 1.60, p = .115, *Not statistically significant* (p > .05). Student-Centered Instruction: β = 0.55, t = 3.10, p = .004, *Statistically significant* (p < .01). When Student-Centered Instruction is added, it becomes the stronger and significant predictor. The effect of lecture-based instruction diminishes and becomes insignificant.

Model 3: Lecture-Based Instruction: β = 0.18, t = 1.30, p = .195 *Not significant*. Student-Centered Instruction: β = 0.43, t = 2.85, p = .008 *Significant*. Technology-Based Instruction: β = 0.34, t = 2.15, p = .038 → *Significant* (p < .05). In the full model, student-centered and technology-based instruction remain significant, while lecture-based instruction continues to decline in predictive power and is no longer statistically significant.

This suggests that while lecture-based instruction contributes to learning, student-centered and technology-based approaches provide substantial additional predictive power.

As more modern and active learning predictors are added (student-centered, technology-based), the predictive power of lecture-based instruction drops. All p-values correspond well with t-values: Significance aligns with standard thresholds.

Beta values are coherent: Showing decreasing relevance of lecture methods and increasing importance of progressive pedagogy. The regression table is statistically consistent and accurate. It illustrates a clear shift in significance from traditional lecture-based methods to more engaging student-centered and technology-integrated approaches.

Study Conclusions

This study investigated the relationship between teaching approaches lecture-based, student-centered, and technology-based instruction and student learning outcomes at Makerere University. Quantitative data revealed that while lecture-based instruction moderately influences learning outcomes, student-centered and technology-based methods have a more substantial impact. Qualitative insights from faculty highlighted the integration of real-world problems, case studies, and debates as effective strategies for fostering critical thinking and problem-solving skills. These findings align with the Ministry of Education and Sports' emphasis on active, learner-centered pedagogies to enhance analytical thinking and real-world application. This was evident following the churning out of the competence-based curriculum in 2020, and now a directive issued in 2025 seeks to adopt competency-based teaching at the university and tertiary institution level. However, the coexistence of innovative and traditional methods suggests variability in teaching quality across courses, potentially affecting student engagement and learning consistency.

Recommendations

To enhance student learning outcomes, it is recommended that Universities prioritize the adoption of student-centered and technology-based instructional methods. Faculty should be provided with professional development opportunities focused on active learning strategies and the integration of multimedia tools. Administrative policies should incentivize the consistent application of diverse pedagogical approaches across departments. Additionally, fostering a culture of collaboration among faculty can facilitate the sharing of best practices and resources. Future research should explore the long-term effects of these teaching methods on student success and investigate strategies to bridge the gap between innovative and traditional teaching practices.

Volume 1. Issue 2. June 2025 e-ISSN: 3008-1254

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