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EFFECT OF GOOGLE CLASSROOM AND YOUTUBE VIDEO LEARNING PLATFORM ON STUDENTS' ACADEMIC PERFORMANCE IN EDUCATIONAL TECHNOLOGY COURSE IN TERTIARY INSTITUTIONS

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Abstract

This project explores using Google Classroom and Youtube Videos to influence secondary students' academic performance through the use of Educational Technology class material in Ondo State, Nigeria. The study followed a quasi-experimental research design with 120 second-year students from 2 secondary schools selected by convenience sampling. Two assessment instruments (ETCPT and GCYVP) were used to collect data and analyze using t-test. The results indicated a statistically significant difference in academic performance between students who were taught using GCYVP and those students who received traditional teaching methods. There were no statistically significant differences between the academic performance of male and female students exposed to GCYVP. Additionally, there were also no statistically significant differences in the academic performance of students from public and private secondary schools who received instruction using the GCYVP. Based on these results it is recommended that all secondary school systems adopt the instructional strategy of using Google Classroom and Youtube Video as an additional instructional pedagogy to improve academic success outcomes for all secondary school students (males and females) from all educational scenarios (public and private).

Keywords: Google classroom, YouTube videos, Educational Technology Course, Tertiary Institutions, Academic Performance

Introduction

The rapid advancement of technology has transformed the education sector, with digital learning platforms playing a pivotal role in enhancing teaching and learning experiences. These platforms facilitate personalized, interactive, and adaptable learning environments that meet students' various needs. According to Al-Marroof et al. (2023), digital learning tools such as Google Classroom and YouTube have gained widespread acceptance due to their ease of use, accessibility, and capacity to integrate multimedia content, which supports a variety of learning styles. The COVID-19 pandemic's transition to online learning additional drawn attention to how critical digital platforms are in maintaining educational continuity, emphasized their potential as integral components of modern education systems (Dhawan, 2023).

In addition to improving access to education, digital learning platforms have been shown to foster active learning and collaboration among students. Studies indicate that platforms like Google Classroom enable real-time communication and streamlined management of academic tasks, contributing to improved student engagement and academic outcomes (Marope & Zhang, 2023). Similarly, YouTube has emerged as a powerful tool for disseminating educational content, offering visual and auditory aids that enhance comprehension and retention (Kumar & Mufakhir, 2023). By

leveraging these platforms, educators can create inclusive and resource-rich learning environments that bridge gaps in traditional teaching methods and promote lifelong learning.

Educational technology courses have become a cornerstone of modern tertiary education, equipping students with the skills and knowledge necessary to navigate and utilize digital tools in diverse learning and professional environments. These courses are designed to bridge the gap between traditional pedagogical methods and the rapidly evolving demands of the digital era, emphasizing the introduction of technology into teaching and learning practices (Aderogba et al., 2023). By fostering technological competence, these courses enable students to leverage innovative tools such as learning management systems, multimedia platforms, and interactive applications to enhance both personal learning and instructional delivery. A recent study by Johnson and Adeyemi (2023) highlighted that graduates proficient in educational technology are better prepared for careers in education, corporate training, and e-learning, as they possess the expertise to design and implement tech-driven learning solutions.

Finally, educational technology courses also enhance the role of tertiary institutions through developing students' critical thinking, creativity and problem-solving abilities. This type of courses permit students to discover a number of different digital tools and analyze their usefulness and develop appropriate and targeted approaches for both teaching and learning (Okonkwo et al., 2023). For example, platforms like YouTube and Google Classroom used in the educational technology courses serve not only as examples of application but also of ways to exploit them for group work, content production and assessment. The fact that these courses are becoming increasingly important is evident from the higher demand for techno-competent instructors and trainers who are prepared to respond to the learning needs of a digital generation and tackle the various pedagogical challenges in the 21st century (Wang & Degol, 2023). In this sense, educational technology courses are considered a crucial means of directing the future of education and equipping graduates with a number of relevant competencies for the present and future.

Google Classroom has emerged as one of the most widely used virtual learning platforms, offering an intuitive and efficient way for educators and students to engage in online learning. Developed by Google in 2014, the platform facilitates collaboration, content sharing, and streamlined communication between teachers and students. It is designed to simplify the management of educational tasks, such as creating, distributing, and grading assignments, while also enabling teachers to provide real-time feedback. According to Liu et al. (2023), Google Classroom has transformed traditional teaching practices by fostering interactive and self-paced learning environments, particularly in higher education institutions. Its integration with other Google tools such as Docs, Slides, and Drive further enhances its versatility, making it a preferred choice for many educators seeking to incorporate technology into their teaching practices.

The effectiveness of Google Classroom lies in its ability to bridge the gap between face-to-face and online instruction, offering a hybrid model that supports both synchronous and asynchronous learning. For instance, studies by Ahmad and Ibrahim (2023) revealed that students using Google Classroom in tertiary institutions demonstrated improved engagement and academic performance due to the platform's user-friendly interface and accessibility. Additionally, the platform supports equity in education by providing learning opportunities for students in remote areas or with limited access to physical classrooms. Despite its advantages, however, challenges such as internet connectivity, lack of digital literacy, and platform limitations in hosting multimedia-rich activities remain significant obstacles (Olawale & Adekunle, 2023). Nevertheless, Google Classroom continues to evolve, contributing significantly to the digital transformation of education.

YouTube has emerged as a powerful supplementary learning tool, offering vast educational content across various disciplines. In the context of tertiary education, YouTube videos provide a unique opportunity for students to engage with visual and auditory learning materials that enhance their understanding of complex concepts. According to Salazar and Gomez (2023), the integration of YouTube videos into teaching strategies has been shown to improve student engagement, critical thinking, and academic performance. The availability of diverse instructional content on platforms like YouTube ensures that learners can access explanations, tutorials, and demonstrations at their own pace, thereby fostering independent learning. Additionally, YouTube facilitates collaboration and interaction through comment sections and live discussions, enabling students to engage with peers and educators globally (Ahmed & Ibrahim, 2023).

Furthermore, YouTube videos serve as a cost-effective resource for both students and educators, reducing reliance on expensive textbooks and traditional instructional methods. Studies indicate that students who use YouTube as a supplementary resource often demonstrate higher retention rates due to the multimedia format, which caters to different learning styles (Liu et al., 2023). In educational technology courses, for instance, students can benefit from step-by-step video tutorials that offer hands-on guidance for mastering software tools and techniques. The use of YouTube as a supplementary learning platform aligns with the increasing emphasis on blended and flipped classroom models, which combine traditional instruction with digital resources to create an enriched learning environment (Olawale & Adekunle, 2023).

With the current rate at which digital learning technologies like Google Classroom and YouTube are being utilized in education, it is astonishing how little empirical research is available that examines how these tools specifically affect student performance in educational technology courses. While many studies have been conducted that have documented the relative success of these technologies when used with a variety of subject areas, there is relatively little literature available concerning their impact on learning outcomes, student engagement, and overall success of students studying educational technology because the focus of these courses is primarily on developing and using digital learning tools. This deficiency in empirical research provides a gap in the existing literature that must be filled before schools can determine the true impact of these technologies on student accomplishments in the classroom. Therefore, it is critical to conduct research that will provide data related to their direct impact in this type of course based upon their expansion throughout the educational landscape.

The importance of understanding the effectiveness of Google Classroom and YouTube in educational technology courses cannot be overstated, as it would allow educators, curriculum developers, and policymakers to make informed decisions regarding their integration into academic programs. Evidence-based recommendations could significantly improve the design and delivery of these courses, ensuring that digital tools are leveraged in ways that maximize student learning. By addressing this gap in research, it becomes possible to create more targeted and effective strategies for incorporating these technologies into curricula, ultimately enhancing student performance and educational outcomes in the rapidly evolving field of educational technology.

Gender differences play a significant role in the adoption and outcomes of digital learning tools. Previous studies have shown that male and female students may interact differently with digital platforms, with varying preferences for learning styles and technological engagement (Korlat, et al., 2021). For example, male students often display a higher level of comfort with technology, leading to greater adoption and use of digital tools in learning environments (Bubou & Job, 2022). In contrast, female students, although equally capable, may encounter barriers such as a lack of

confidence in using technology, which can impact their academic performance. Understanding these gender-based differences is crucial for ensuring that digital learning platforms, like Google Classroom and YouTube, are designed and implemented in ways that cater to all students equally, fostering an environment where both genders can equally benefit from the technological resources available.

Institutional factors also play a pivotal role in the adoption and success of digital learning tools in tertiary education. Public and private institutions often experience different levels of access to digital technologies due to disparities in funding, infrastructure, and resources. Public institutions, which may have limited budgets, may struggle to provide the necessary technological infrastructure, leading to challenges in implementing digital tools effectively (Semlambo et al., 2022). On the other hand, private institutions may have better access to advanced technology and the necessary infrastructure, enhancing the learning experience for students. These institutional differences can influence how effectively platforms like Google Classroom and YouTube videos are utilized in educational technology courses, impacting students' overall academic performance. Therefore, understanding these institutional variables is key to analyzing how digital learning tools can be optimized across different educational settings.

In order to close these gaps, this study examines the effect of google classroom and YouTube videos on students' academic performance in educational technology courses in Ondo State's higher education institutions.

Statement of the Problem

Although there has been an influx of digital learning platforms used in the learning of students, empirical research that could justify their role in improving academic performance in a course, in a Nigerian tertiary institution has been lacking. With courses in educational technology playing a vital role in equipping students for the challenges of the digital world, the need for advanced instructional strategies to help them reach learning outcomes through the use of technology cannot be overemphasized. Despite Google Classroom and Youtube showing promising learning delivery methods compared to traditional ones, no research has been conducted to ascertain their contribution in improving students' performance in educational technology courses. Even further, researches conducted has not investigated if there are gender and institutional differences to be noticed in the learning outcomes derived from the use of both platforms. For example, researches have revealed that boys and girls learn in the same way as long as the instructions are technology-delivered, but sometimes female and males achieve varied performance as a result of differences in their confidence and skill with technology (Eze & Ugwu, 2023). Also, while some studies observed no difference in academic outcomes in technology-mediated classes, some have pointed to differences in results based on gender, where some argue boys outperform females and vice-versa depending on various factors that could influence learning (Olayemi, 2022). Differences in availability of technology among institutions, especially between public and private tertiary institutions further questions the equality of access in the use of these platforms. Hence, this study seeks to provide empirical evidence on the extent to which Google Classroom and Youtube video aids in the academic performance of students in educational technology courses, as well as ascertain if gender and institutional differences exists on its efficacy.

Objectives of the study

The specific objectives of the study are as follows:

Evaluate the effectiveness of Google classroom and YouTube videos as a supplementary instructional medium for enhancing educational technology course scores.

Compare the academic performance of male and female students taught with Google Classroom and YouTube Videos package in learning educational technology course.

Examine the academic performance of students in public and private tertiary institutions taught using the Google Classroom and YouTube Video package.

Research Questions

The study was guided by the following research questions:

How does academic achievement differ among learners instructed in Educational Technology using the Google Classroom and YouTube Video Package versus those who learned through traditional classroom instruction?

How does academic achievement differ between male and female learners instructed using the Google Classroom and YouTube Video Package?

How does academic achievement differ between enrolled in public and private tertiary institutions using the Google Classroom and YouTube Video Package?

Research Hypothesis

The null hypotheses listed were tested at .05 level of significance.

H01: Students taught using the Google Classroom and YouTube video package will not show significant differences in Student Achievement as compared to students taught using the conventional method of teaching Educational Technology.

H02: There will not be significant differences between the academic performance of male and female students who are taught Educational Technology using the Google Classroom and YouTube video packages.

H03: There is no significant difference in academic performance between students in public and private tertiary institutions taught educational technology using the Google Classroom and YouTube video package.

Methodology

This study employed a pretest-posttest control group quasi-experimental research design, which is suitable for determining the effect of instructional interventions on students' academic performance. All students in Ondo State's tertiary institutions made up the study's population. A sample of 120 second-year degree students was purposively selected from two institutions in the state. In each institution, two classes were assigned as the experimental and control groups.

Two instruments were used in this study: the Educational Technology Course Performance Test (ETCPT) and the Google Classroom and YouTube Videos Package (GCYVP). The ETCPT is a standardized test designed to evaluate students' understanding of selected topics in the Educational Technology course (EDT 202). The GCYVP consisted of instructional materials delivered through Google Classroom and YouTube videos, designed to supplement the course content. The package was validated by three Educational Technology experts from Ekiti State University, Ado-Ekiti, to ensure content relevance and alignment with course objectives. The reliability coefficient of the ETCPT was determined using the Cronbach Alpha method, yielding a high reliability score of 0.864. The experimental group was taught using the GCYVP, which combined interactive videos and classroom activities facilitated via the Google Classroom platform. The control group, on the other hand, was instructed using the Conventional Teaching Method (CTM), which involved conventional lecture-based instruction. The contents of selected EDT 202 topics, a compulsory first-semester course for all second-year degree students, were delivered via computer-based instruction for the experimental group. The experimental group students interacted and responded to prompts within the learning package, while the control group followed traditional teacher-led sessions. The

intervention lasted six weeks, after which posttests were administered to assess the effect of the instructional methods on students' academic performance.

RESULTS

Research Question 1: What is the difference in the academic performance of students taught with the Google classroom and YouTube videos package and those taught with conventional method?

Table 1: Academic Performance of Students Taught with the Google classroom and YouTube videos package and those with Conventional Method

Group	N	Mean	Std. D
Google Classroom and YouTube	60	64.63	9.15
Conventional Method	60	41.08	8.19

From Table 1, the mean score of students taught using the Google Classroom and YouTube videos package was 64.63, whereas the mean score for students taught using the conventional method was 41.08. This shows a significant performance gap, with students in the Google Classroom and YouTube group achieving higher scores. The smaller standard deviations in both groups indicate consistency in performance within each group.

Research Question 2: What is the difference in academic performance between male and female students taught educational technology using Google classroom and YouTube videos?

Table 2: Performance of Male and Female Pupils Exposed to the Google Classroom and YouTube Videos Package

Gender	N	Mean	Std. D
Male	26	64.50	8.01
Female	34	64.77	9.26

Table 2 Table 2 highlights the performance of male and female students exposed to the Google Classroom and YouTube videos package. Male students had a mean score of 64.50 with a standard deviation of 8.01, while female students had a slightly higher mean score of 64.77 with a standard deviation of 9.26. There is little difference in the academic performance of male and female students who use the Google Classroom and YouTube videos package, according to the close mean score. Further statistical analysis, such as an independent sample t-test, can be performed to ascertain the significance of this observed difference.

Research Question 3: What is the difference in academic performance between students in public and private tertiary institutions taught educational technology using Google classroom and YouTube videos package?

Table 3: Performance of Public and Private Students Exposed to the Google Classroom and YouTube Videos Package

School	N	Mean	Std. D
Public	30	65.47	9.94
Private	30	63.80	8.37

Table 3 presents the performance of public and private students who are taught using the Google Classroom and YouTube videos package. Public school students achieved a mean score of 65.47, while private school students recorded a slightly lower mean score of 63.80. The results indicate a marginal difference in performance, with public school students performing slightly better than their private school counterparts. These findings suggest that both public and private school students

benefit from the use of the Google Classroom and YouTube videos package, although further statistical tests, such as an independent sample t-test, would be required to determine the significance of the observed difference.

H01: There is no significant difference in academic performance between students taught using the Google Classroom and YouTube video package and those taught using the conventional teaching method in educational technology.

Table 4: Summary of T-test Showing Difference in Male and Female Educational Technology Students' Academic Performance

Grouping Variable (Group)	N	Mean	Std. D	Df	T	Sig.	Remark
Experimental	60	64.63	9.15	118	14.851	.001	Significant
Control	60	41.08	8.19				

Table 4 shows the difference in the academic performance of educational technology students taught with Google Classroom and YouTube Video package and their counterpart taught using conventional method. According to the table, students in the experimental group had an average score of 64.63, while those in the control group had an average score of 41.08. The values of the mean scores revealed an appreciable difference. As a result, students who are taught educational technology with Google Classroom and YouTube Video package performed significantly better academically than their peers who taught using the conventional teaching method ($df = 118$; $t = 14.852$; $p < 0.05$). Hence, hypothesis 1 is rejected.

H02: There is no significant difference in academic performance between male and female students taught educational technology using the Google Classroom and YouTube video package.

Table 5: Summary of T-test Showing Difference in Male and Female Educational technology Students' Academic Performance

Grouping Variable (Gender)	N	Mean	Std. D	Df	T	Sig.	Remark
Male	51	54.35	10.88	118	.961	.339	Not Significant
Female	69	51.75	16.90				

In Table 5, academic differences between male and female students that were taught using the Google Classroom and YouTube Video package was presented. From the table, the mean mean score of male students is 54.35 and for the female students is 51.75. Since $p > 0.05$, the difference between the mean mean score of male and female students taught with the Google Classroom and YouTube Video package is not significant ($df = 118$, $t = .961$, $p > .05$). Therefore, Hypothesis 2 was not accepted. This suggests that male and female students are having the same academic achievement that is affected by the Google Classroom and YouTube Video package in the topic of educational technology.

H03: There is no significant difference in academic performance between students in public and private tertiary institutions taught educational technology using the Google Classroom and YouTube video package.

Table 6: Summary of T-test Showing Difference in Public and Private Students' Academic Performance in Educational Technology

Grouping Variable (School Type)	N	Mean	Std. D	Df	T	Sig.	Remark
Public	60	53.57	14.72	118	.542	.589	Not Significant
Private	60	52.12	14.66				

Table 6 shows the academic performance differences between public and private students in educational technology courses. From the table, the mean of public students is 53.57 while that of private school students is 52.12. There is no apparent difference between the mean score values. As a result, students in public and private schools who are taught using Google Classroom and YouTube Video package do not significantly differ in their academic performance ($df = 118$; $t = .542$; $p > 0.05$). Therefore, hypothesis 3 is not rejected. The result implies that the academic performance of public and private school students in educational technology is same when taught with Google Classroom and YouTube Video.

Discussion

According to the study, students who were taught using Google Classroom and YouTube video packages performed significantly better academically than those taught through conventional methods. This finding supports the results of similar studies, such as that of Olufemi et al. (2023), who observed that students exposed to digital tools exhibited better learning outcomes, likely because digital tools support self-paced and repeated learning, enabling better assimilation. Google Classroom and YouTube videos provide continuous access to resources and enable a more interactive and visually stimulating learning experience, which may account for higher academic performance as compared to traditional methods (Ahmed, 2021).

Digital learning tools can foster an equitable learning environment, as evidenced by the finding that male and female students taught using Google Classroom and YouTube videos did not significantly differ in their academic performance. This aligns with Adeyemi and Johnson (2023), who reported that digital platforms could level the playing field by offering the same resources and opportunities to both genders, thereby reducing performance gaps typically influenced by gendered access to resources and classroom dynamics.

The study found no significant difference in the academic performance of public and private students taught with Google Classroom and YouTube videos. This result is consistent with the findings of Nnamdi and Okoro (2022), who demonstrated that digital tools could bridge the learning gap between students from diverse backgrounds by providing equal access to high-quality resources. By providing rural students with access to rich digital content, platforms like YouTube and Google Classroom help mitigate limitations in resource availability and exposure commonly experienced in rural areas, thereby promoting inclusivity (Ademola, 2023).

Conclusion

This study examined the effectiveness of Google Classroom and YouTube videos on the academic performance of tertiary institution students in educational technology course in Ondo state. The findings indicate that students hold positive attitudes toward these tools, and their use significantly improves academic performance compared to conventional teaching methods. Importantly, the study also found that gender and institutional type (public or private) do not significantly affect academic achievement, highlighting the inclusive potential of digital learning tools.

Recommendations

The following recommendations were made in light of the study's conclusion and we should,:

- 1) Educational institutions should integrate tools like Google Classroom and YouTube videos into their English language programs to enhance students' learning experiences and academic performance.
- 2) Institutions should offer professional development programs for teachers, equipping them with skills to effectively use digital platforms to teach English and other subjects.
- 3) Since digital tools have shown to be equally effective across genders, institutions should adopt these technologies as a means of promoting gender inclusivity in learning outcomes.

References

- 1) Ademola, T. O. (2023). The role of digital learning in bridging educational inequality in Nigeria. *Journal of Educational Technology*, 15(2), 122–134.
- 2) Aderogba, A. O., Adeoye, O. B., & Oladapo, T. M. (2023). Integrating technology in higher education: A pathway to improving instructional delivery. *Journal of Educational Innovation and Technology*, 15(2), 45–60.
- 3) Adeyemi, F., & Johnson, S. (2023). Gender equality in the digital classroom: Evidence from tertiary institutions in Nigeria. *African Journal of Gender and Education*, 10(1), 98–110.
- 4) Ahmad, S., & Ibrahim, A. (2023). Adoption of Google Classroom in higher education: Benefits, challenges, and solutions. *International Journal of Educational Technology*, 15(3), 45–58.
- 5) Ahmed, S., & Ibrahim, H. (2023). The role of YouTube videos in promoting collaborative learning in higher education. *International Journal of Educational Media*, 12(2), 78–95.
- 6) Ahmed, Z. (2021). Enhancing student performance through digital learning tools: A case of YouTube and Google Classroom. *International Journal of Digital Education*, 9(4), 250–263.
- 7) Al-Marouf, R. S., Salloum, S. A., & Shaalan, K. (2023). Adoption of digital learning tools in higher education: An empirical study. *Education and Information Technologies*, 28(2), 167–183.
- 8) Bubou, G. M., & Job, G. C. (2022). Individual innovativeness, self-efficacy and e-learning readiness of students of Yenagoa study centre, National Open University of Nigeria. *Journal of Research in Innovative Teaching & Learning*, 15(1), 2–22.
- 9) Dhawan, S. (2023). Online learning in the post-pandemic world: Challenges and opportunities. *Journal of Educational Technology Systems*, 51(1), 45–61.
- 10) Fatokun, A. I., et al. (2022). Student attitudes toward digital learning tools in tertiary education. *African Journal of Higher Learning*, 8(3), 207–222.
- 11) Johnson, F. A., & Adeyemi, T. K. (2023). Preparing future educators: The role of educational technology courses in teacher training programs. *International Journal of Digital Education Studies*, 12(1), 112–128.
- 12) Khasawneh, M. A. S. (2024). Exploring the influence of gender variation on the use of language learning apps in foreign language skill improvement. *Research Journal in Advanced Humanities*, 5(4), 29–40.
- 13) Korlat, S., Kollmayer, M., Holzer, J., Lüftenegger, M., Pelikan, E. R., Schober, B., & Spiel, C. (2021). Gender differences in digital learning during COVID-19: Competence beliefs, intrinsic value, learning engagement, and perceived teacher support. *Frontiers in psychology*, 12, 637776.
- 14) Kumar, V., & Mufakhir, M. (2023). The impact of YouTube as an educational resource on student engagement and learning outcomes. *Journal of Educational Media*, 48(1), 33–50.
- 15) Liu, J., Zhang, Y., & Chen, Q. (2023). Google Classroom and its impact on student engagement and performance in higher education. *Journal of Learning Technologies*, 29(2), 112–126.
- 16) Liu, J., Zhang, Y., & Chen, Q. (2023). YouTube as a supplementary tool in tertiary education: A case study on academic performance. *Journal of Learning Technologies*, 29(2), 112–126.

- 17) Marope, P. T. M., & Zhang, J. (2023). Leveraging technology for inclusive education in the 21st century. *International Journal of Educational Development*, 94, 102695.
- 18) Nnamdi, O., & Okoro, C. (2022). Impact of e-learning on rural and urban students: A comparative study in Nigerian secondary schools. *Journal of Rural Education*, 12(2), 135–149.
- 19) Okonkwo, P. E., Akande, J. T., & Yusuf, A. M. (2023). Leveraging multimedia platforms in tertiary education: A case study of educational technology programs. *Contemporary Issues in Education Research*, 10(3), 78–92.
- 20) Olawale, T., & Adekunle, K. (2023). *Digital learning in tertiary education: The role of Google Classroom in bridging learning gaps*. *Nigerian Journal of Digital Education*, 10(1), 78-90.
- 21) Olawale, T., & Adekunle, K. (2023). *Digital learning in tertiary education: The role of Google Classroom in bridging learning gaps*. *Nigerian Journal of Digital Education*, 10(1), 78-90.
- 22) Olufemi, E., et al. (2023). Digital transformation in education: Effects on academic performance among Nigerian university students. *Journal of Educational Innovation*, 18(1), 55–68.
- 23) Salazar, R., & Gomez, P. (2023). *Leveraging YouTube for educational enhancement: Benefits and challenges in higher education*. *Journal of Online Learning and Teaching*, 17(1), 45-59.
- 24) Semlambo, A., Sengati, F. and Angalia, B. (2022) Factors affecting the adoption of E-Learning systems in public higher learning institutions in Tanzania: A case of Institute of Accountancy Arusha (IAA). *Journal of Computer and Communications*, 10, 113-126. doi: 10.4236/jcc.2022.109008.
- 25) Umar, T., & Bello, Y. (2021). The role of multimedia tools in tertiary education: A focus on student engagement. *Journal of Interactive Learning*, 14(2), 134–145.
- 26) Wang, M., & Degol, J. L. (2023). Educational technology as a catalyst for innovation: Impacts on pedagogy and learning outcomes. *Technology in Higher Education Review*, 9(1), 18–33.