

EFFECT OF WHATSAPP-VIDEO SUPPORTED LEARNING ON UNDERGRADUATE STUDENTS' PERFORMANCE AND RETENTION IN ENGINEERING DRAWING AT KADUNA POLYTECHNIC, NIGERIA.

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Abstract - This study investigated the Effect of WhatsApp-Video supported learning on Undergraduate Students' Performance and Retention in Engineering Drawing in Kaduna Polytechnic, Kaduna State, Nigeria. The study was guided by three objectives, three research questions and three hypotheses. Some of the objectives of the study are to determine the difference between posttest scores of students taught Engineering Drawing using WhatsApp-Video supported learning and those taught using conventional teaching methods in Kaduna Polytechnic, Nigeria, among others. The study employed quasi-experimental research design using pre-test, post-test and Post posttest, experimental and control groups. The population of the study comprised 460 Bachelor of Technology Education students from the Department of Technology Education, while the sample employed purposive sampling techniques comprised two intact classes of 18 students, 8 selected from Metal Work and 10 from Automobile Technology Sections. The instrument used for data collection was the Engineering Drawing Academic Performance and Retention Test (EDAPRT) developed by the researcher. The instrument was validated by three experts; the instrument was pilot tested in Electrical/Electronic Technology Section and the reliability coefficient of 0.75 was obtained. Mean and standard deviation were used to answer all research questions while inferential statistics using paired and independent sample t-test were also employed to test the null hypotheses at 0.05 alpha level of significance. The findings of the study revealed that significant difference existed between the academic performance of students taught Engineering Drawing using Experimental and Control groups in favour of Experimental group, p-value of 0.000 is less than the alpha level of significance ($\alpha = 0.05$) and the t-computed of 3.06 with 17 degree of freedom among others. Based on the findings, the study recommended among others that; lecturers should adopt WhatsApp-Video supported learning in teaching Engineering Drawing in order to improve students' academic performance and retention, among others.

Keywords: WhatsApp-video, performance, retention and engineering drawing

Introduction

The world today is experiencing unprecedented improvements in communication technology, which have significantly broadened the scope of interaction through Information and Communication Technologies Alexander, & Salas, (2022). Modern communication technologies have undoubtedly transformed the entire world into a global village, enabling real-time connectivity and interaction regardless of geographical boundaries. Though, technology, like a two-edged sword, brings both positive and negative consequences. On the positive side, it keeps people informed, enlightened, and connected with global developments, while on the negative side, it can lead to distractions, addiction, and a decline in productivity WhatsApp, which have become dominant communication channels for students and youths globally Zheng, Han, & Liu, (2025). WhatsApp platform is used for interactions with old and new friends, sharing multimedia content, and participating in group discussions. Social networking has become integrated into daily routines, with students spending significant amounts of time online. While

WhatsApp platforms have educational potential such as knowledge sharing, online collaboration, and research, they also pose challenges in terms of distraction, poor time management, and reduced study commitment. The rise of internet technology has turned WhatsApp-Video supported learning into one of the most effective mediums for communication and collaboration. Current statistics show that over two-thirds of the global internet population actively uses WhatsApp platforms daily Yang, Lee & Kamel, (2025). This increased engagement has raised concerns about its effect on academic performance and retention in higher education. WhatsApp-Video, originally designed for social interaction, is now shaping how students learn, communicate, and allocate their time, often at the expense of their academic obligations. Alexander, & Salas, (2022).

Academic performance, commonly measured through continuous assessments and examinations, remains a key determinant of educational success. Retention, on the other hand, refers to the ability of students to remain in school and complete their programs without dropping out. Both academic performance and retention are crucial indicators of institutional effectiveness and student success. But, the growing obsession with WhatsApp raises concerns about its potential to negatively impact these outcomes. Research suggests that excessive use of WhatsApp reduces students' study time, concentration, and academic engagement Vaughn, & Coyle, (2024). In the Nigerian context, where education is considered the foundation for socio-economic development, polytechnics such as Kaduna Polytechnic, Kaduna face challenges in ensuring students stay focused on their studies. WhatsApp provides opportunities for academic collaboration, but it also poses serious distractions that could lead to poor academic performance and even attrition. The problem becomes critical when students prioritize chatting, video streaming, or trending WhatsApp challenges over studying and completing assignments Vaughn, & Coyle, (2024).

Engineering drawing is a two dimensional representation of three dimensional objects. In general, it provides necessary information about the shape, size, surface quality, material, manufacturing process, etc., of the object. It is the graphic language from which a trained person can visualize objects. Many factors have been attributed to the poor performance in Engineering drawing subject, one of the factor is; teachers' competence, Learning and teaching experience in drawing are crucial to be known before deciding if a teacher should teach Engineering drawing. Teachers with 10 years of experience and above have less problems in teaching Engineering drawing. The teachers communicate instructions for acquisition of knowledge and skills to students in the teaching and learning process (Oke & Olakotan, 2017). Teacher's novelty in dishing out good instructions rely heavily on their preparation and readiness at all times.

The instructional delivery mode employed by Engineering Drawing teacher plays an important role in skills acquisition and meaningful learning. Teacher's knowledge, attitude and skills in teaching Engineering drawing that is less than excellent and in need of further enhancement (Patrick, Raymond & Samuel, 2019). Classrooms in all the Engineering Departments are dominated by chalkboard and marker boards. Also students on their parts confessed that they usually abscond classes, while some confessed that carrying drawing boards and T-squires to Engineering Drawing studio remain burdensome. Students have poor Engineering Graphic and Design Background; experienced difficulties in understanding sectional drawings; lack of understanding sectional drawing principles; lack of knowledge of 2 dimension sectional drawing as well as poor pedagogic practices (Moses & Samuel 2016). It has also transpired that students perform poorly in the spatial visualization test (Moses & Samuel, 2016).

Students spend an average of 3 to 5 hours daily on social media, often engaging in non-academic activities Zheng, Han, & Liu, (2025). This shift in focus contributes to

declining academic achievement and sometimes results in students withdrawing from programs due to poor performance. Although some scholars argue that WhatsApp can foster knowledge sharing and peer learning, its misuse, such as frequent chatting, watching entertainment content, and social comparison creates a significant academic imbalance (Okoro and James, 2024).

WhatsApp has created significant challenges for retention in tertiary institutions. Instead of serving as academic support, Vaughn, & Coyle, (2024). WhatsApp-Video supported learning often becomes a source of distraction, procrastination, and addiction. Students spend long hours scrolling through WhatsApp chats, losing valuable study time and reducing their ability to recall information taught in class Zheng, Han, & Liu, (2025). This shift in attention contributes to declining academic performance and decreased motivation to stay consistent, which ultimately weakens retention. Research suggests that when students devote more time to entertainment-based WhatsApp-Video supported learning use, their academic persistence drops and they struggle to complete assignments, revise lecture notes, or stay engaged in their coursework.

The increasing use of WhatsApp-Video supported learning among Tertiary institution students has raised serious concerns about its effect on academic performance and retention, particularly in technologically oriented departments such as Department of Technology Education in Kaduna Polytechnic, Kaduna State, Nigeria Although WhatsApp platform provide opportunities for academic communication and resource sharing, many students now engage with these platforms excessively for non-academic purposes, Santos, Rodrigues, & Fernandez, (2022). This shift in usage habits has resulted in reduced concentration during lectures, poor study discipline, procrastination, sleep deprivation, and declining academic engagement. These emerging patterns suggest that WhatsApp may be contributing significantly to poor academic performance among students in the polytechnics.

The problem becomes more critical because many students spend several hours daily on entertainment-based content, often at the expense of reading, completing assignments, or preparing for assessments. This excessive engagement undermines student's ability to retain information, participate actively in class, and stay motivated throughout the semester. The situation is worsened by addictive tendencies, where students report feeling restless without access to WhatsApp, checking phones repeatedly during lectures, or skipping academic activities to stay online. These behaviors create a learning environment where academic focus competes continuously with digital distractions Vaughn, & Coyle, (2024). Declining academic performance may result in increased failure rates, low cumulative grade point averages, reduced retention, and a higher likelihood of dropping out. At departmental and institutional levels, weakened student performance affects graduation rates, overall academic standards, and the reputation of the Tertiary institution. For the nation, declining retention among Polytechnics students undermines human capital development in critical fields that support technological and economic growth Zheng, Han, & Liu, (2025). This study, therefore, intends to address these challenges by determining how WhatsApp-Video supported learning WhatsApp improve academic performance and retention among students in the Department of Technical and Vocational Education, Kaduna Polytechnic, Kaduna State, Nigeria

Purpose of the Study

The following objectives are formulated to guide the study:

1. compare pretest and posttest academic performance of students taught Engineering Drawing using experimental group in Kaduna Polytechnic,

2. compare the difference between academic performance of students' taught Engineering Drawing using experimental and control group in Kaduna Polytechnic and
3. compare retention ability of students taught Engineering Drawing using experimental and control group in Kaduna Polytechnic.

Research Questions

The following research questions guided the study

1. What is the difference between pretest and posttest academic performance of students taught Engineering Drawing using experimental group in Kaduna Polytechnic?
2. What is the difference between academic performances of students taught Engineering Drawing using experimental and control group in Kaduna Polytechnic?
3. What is the difference between retention ability of students taught Engineering Drawing using experimental and control group in Kaduna Polytechnic?

Hypotheses

The following null hypotheses were tested at 0.05 alpha level of significance:

1. There is no significant difference between pretest and posttest academic performances of students taught Engineering Drawing using experimental group in Kaduna Polytechnic,
2. There is no significant difference between academic performances of students taught Engineering Drawing using experimental and control group in Kaduna Polytechnic,
3. There is no significant between retention ability of students taught Engineering Drawing using experimental and control group in Kaduna Polytechnic,

Methods

The study was conducted using a quasi-experimental research design involving pre-test, post-test, and post-post-test non-equivalent experimental and control groups. The experimental group were taught Engineering Drawing using WhatsApp-Video supported learning while the control group were taught the same Engineering Drawing using the conventional teaching methods for a period of five weeks each. The population of the study comprised 460 Bachelor of Technology Education students from Kaduna Polytechnic. The study was conducted in the Department of Technical and Vocational Education Kaduna Polytechnic, Kaduna, Kaduna State, Nigeria. The sample for the study comprised 18 students drawn from two intact classes 8 for experimental and 10 for control group of Bachelor of Technology Education 500-level students from Automobile Technology and Metal Work Technology Education sections respectively. The classes were purposively selected from the study population because the students were offering Engineering Drawing at 500 Level which was the course used for the instructional intervention in this study. Purposive sampling technique involves the deliberate selection of participants based on the objectives of the research Nworgu, (2015), purposive sampling allows the researcher to intentionally select participants who possess specific characteristics relevant to the study. The instrument used for data collection was the Engineering Drawing Academic Performance and retention Test (EDAPRT) developed by the researcher. The instrument consisted of 20 multiple choice items constructed from Engineering Drawing covered during the instructional period. The reliability of the instrument used in this study was determined using test retest method. The instrument was administered to three students of Electrical/Electronic Section of the same Department,

using the Pearson Product Moment Correlation Coefficient (PPMC) to determine the level of consistency between the two sets of scores. The reliability coefficient of 0.75 was obtained. Mean and standard deviation were used to answer all research questions while inferential statistics using paired and independent t-test were also employed to test the null hypotheses at 0.05 alpha level of significance.

Results

Research Question One: What is the difference between pretest and posttest academic performance of students taught Engineering Drawing using experimental group in Kaduna Polytechnic?

Table 1: Difference between pretest and posttest Academic performance of Experimental Group

Variable	N	Mean	SD	Mean Difference
Pretest	8	35.10	3.19	41.3
Posttest	8	76.40	5.22	

Table 1: presents the difference between pretest and posttest scores of students taught Engineering Drawing using WhatsApp-Video supported learning. The results show that students obtained a mean score of 35.10 at pretest with standard deviation of 3.19, while after treatment with WhatsApp-Video supported learning the mean score raised to 76.40 with a standard deviation of 5.22, The mean difference of 41.3 indicates that students exposed to WhatsApp-Video supported learning performance increased from 35.10 to 74.40 with a mean difference of 41.3 after taught Engineering Drawing using the WhatsApp-Video supported learning. This suggests that the use of WhatsApp-Video supported learning enhances students' understanding of Engineering drawing Concepts.

Research Question Two: What is the difference between academic performances of students taught Engineering Drawing using experimental and control group in Kaduna Polytechnic?

Table 2: Difference in Academic performance between Experimental and Control Groups

Group	N	Mean ($\bar{x}$)	SD	Mean Difference
Experimental	8	76.40	5.22	18.20
Control	10	58.20	6.10	

Table 2: presents the difference in academic performance between students taught Engineering Drawing using Whatsapp Video supported learning and those taught using the conventional teaching methods. The results show that students in the experimental group obtained a mean score of 76.40 with a standard deviation of 5.22, while students in the control group recorded a mean score of 58.20 with a standard deviation of 6.10. The mean difference of 18.20 indicates that students exposed to WhatsApp-Video supported learning performance is higher than those taught using the conventional teaching methods. This suggests that the use of WhatsApp-Video supported learning enhances students' performance in engineering drawing concepts.

Research Question Three: What is the difference between retention ability of students taught Engineering Drawing using experimental and control group in Kaduna Polytechnic?

Table 3: Mean of Post posttest Scores between Experimental and Control Groups

Group	N	Mean ($\bar{x}$)	SD	Mean Difference
Experimental	8	71.85	7.96	10.84
Control	10	60.74	8.82	

Table 3: shows that post posttest scores of students taught using WhatsApp-Video supported learning had a mean of 71.85, while those taught using conventional teaching methods had a mean score of 60.74. The mean difference of 10.84, this indicates that students exposed to WhatsApp-Video supported learning had higher retention rate compared to those taught using conventional teaching methods. This result confirms that WhatsApp-Video supported learning strategy promotes long-term retention through continuous engagement, repeated exposure to learning materials, and collaborative learning.

Hypotheses

H₀₁: There is no significant difference between pretest and posttest academic performances of students taught Engineering Drawing using experimental group in Kaduna Polytechnic

Table 4: Paired Sample t-test of Pretest and Posttest Scores of Experimental Group

Variables	N	Mean	SD	MD	t	df	p-value
Pretest	8	35.10	3.19	3.6	41.3	7	0.001
Posttest	8	76.40	5.22				

P = 0.001 < 0.05, t computed = 3.60 > 1.96 at df 7

Table 4: shows paired sample t-test of mean difference between pretest and posttest scores of students taught Engineering Drawing using WhatsApp-Video supported learning strategy in Kaduna Polytechnic, Kaduna. The results reveal that students exposed to WhatsApp-Video supported learning strategy at pretest obtained a mean score of 35.10 with standard deviation of 3.19 while at posttest the mean score increased to 76.40 with a standard deviation of 5.22, indicates a mean difference of 41.3 in favour of posttest. Furthermore, the calculated p-value of 0.001 is less than the alpha level of significance ($\alpha = 0.05$) and t-computed of 3.60 with 7 degree of freedom indicates that a statistically significant difference existed between the academic performance of students taught Engineering Drawing using WhatsApp-Video supported learning strategy at pretest and posttest. Therefore, the null hypothesis which states there is no significant difference between pretest and posttest scores of students taught Engineering Drawing using WhatsApp-Video supported learning in Kaduna Polytechnic is here by rejected.

H₀₂: There is no significant difference between academic performances of students taught Engineering Drawing using experimental and control group in Kaduna Polytechnic.

Table 5: Independents Sample t-test of Academic Performances between Experimental and Control Groups

Group	N	Mean	SD	MD	t	Df	p-value
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Experimental	8	76.40	5.22			
Control	10	58.20	4.30	18.2	17	0.000
				3.06		

P = 0.000 < 0.05, t computed = 3.06 > 1.96 at df 17

Table 5: shows the Independent sample t-test on the mean difference between the scores of students taught Engineering Drawing using WhatsApp-Video supported learning strategy and those taught using the conventional teaching methods. The results reveal that students exposed to WhatsApp-Video supported learning strategy obtained a mean score of 76.40 with a standard deviation of 5.22, while students taught using the conventional teaching methods obtained a mean score of 58.20 with standard deviation of 4.30. This indicates mean difference of 18.2 in favour of the experimental group. Furthermore, the calculated p-value of 0.000 is less than the alpha level of significance ($\alpha = 0.05$) and the t-computed of 3.06 with 17 degree of freedom indicates that a statistically significant difference existed between the academic performance of students taught using WhatsApp-Video supported learning strategy and those taught using the conventional teaching methods. The higher mean score obtained by the experimental group suggests that the use of WhatsApp-Video supported learning enhanced students' performance. Therefore, the null hypothesis which states that there is no significant difference in the academic performance of students taught Engineering Drawing using Whatsapp Video supported learning strategy and those taught using the conventional teaching method is hereby rejected.

H₀₃: There is no significant between retention ability of students taught Engineering Drawing using experimental and control group in Kaduna Polytechnic.

Table 6: Independent sample t-test of Retention Ability of Experimental and Control Groups

Group	N	Mean	SD	MD	t.	df	p-value
Experimental	8	71.58	7.6				
Control	10	60.74	.2	10.84	6.01	17	0.000

P = 0.000 < 0.05, t computed = 6.01 > 1.96 at df 17

Table 6: shows the independent sample t-test statistics on the difference between the retention ability of students taught Engineering Drawing using WhatsApp-Video supported learning strategy and those taught using the conventional teaching methods. The results revealed that students taught Engineering Drawing using WhatsApp-Video supported learning gained mean score of 71.85, while students taught using the conventional teaching method obtained mean score of 60.74, indicating a mean difference of 10.84 in favour of the experimental group. The calculated p-value of 0.000 is less than the alpha level of significance of 0.05, and the computed t-value of 6.01 is greater than the t-critical value of 1.96 at 17 degree of freedom. This indicates that a significant difference existed between the retention ability of students taught using WhatsApp-Video supported learning strategy and those taught using the conventional teaching methods. Therefore, the

null hypothesis which states that there is no significant between retention ability of students' taught Engineering Drawing using WhatsApp-Video supported learning supported learning and those taught using conventional teaching methods in Kaduna Polytechnic is hereby rejected.

Discussion of Findings

The finding from research question and hypothesis one, the results reveal that students exposed to WhatsApp-Video supported learning strategy at pretest obtained a mean score of 35.10 with standard deviation of 3.19 while at posttest the mean score increased to 76.40 with standard deviation of 5.22, indicates a mean difference of 41.3 in favour of posttest. Furthermore, the calculated p-value of 0.001 is less than the alpha level of significance ($\alpha = 0.05$) and t-computed of 3.60 with 7 degree of freedom indicates that a statistically significant difference existed between the academic performance of students taught Engineering Drawing using WhatsApp-Video supported learning strategy at pretest and posttest. This indicates that WhatsApp-Video supported learning increased students' performance. The finding is in consonant of Junco and Cole (2022), who reported that structured WhatsApp use significantly improves student performance. Similarly, Liu and Xingyu (2023) found that WhatsApp enhances performance among students. Furthermore, Santos, Rodrigues, & Fernandez, (2022) highlighted that students actively use WhatsApp for communication and interaction, which can be redirected toward academic activities for effective students' performance when properly structured.

The finding from research question and hypothesis two, the results reveal that students exposed to WhatsApp-Video supported learning strategy obtained a mean score of 76.40 with a standard deviation of 5.22, while students taught using the conventional teaching methods obtained a mean score of 58.20 with standard deviation of 4.30. This indicates mean difference of 18.2 in favour of the experimental group. Furthermore, the calculated p-value of 0.000 is less than the alpha level of significance ($\alpha = 0.05$) and the t-computed of 3.06 with 17 degree of freedom indicates that a statistically significant difference existed between the academic performance of students taught using WhatsApp-Video supported learning strategy and those taught using the conventional teaching methods. The higher mean score obtained by the experimental group suggests that the use of WhatsApp-Video supported learning enhanced students' performance. This finding is consistent with Musa, (2026) who emphasized learning through interaction with computer tutorials increase students' performance compared to conventional teaching methods. Empirically, the result agrees with Junco Gregory and Cole Shannon (2022), who found that academic use of WhatsApp-Video supported learning improves students' performance. It also supports the findings of Adebayo and Musa (2023), who observed that while non-academic WhatsApp-Video supported learning use reduces GPA, structured academic use of WhatsApp-Video supported learning enhances performance. Furthermore, Liu and Xingyu (2023) reported that WhatsApp platforms used for learning improve performance and academic achievement.

The finding from research question and hypothesis three showed that; the results revealed that students taught Engineering Drawing using WhatsApp-Video supported learning gained mean score of 71.85, while students taught using the conventional teaching method obtained mean score of 60.74, indicating a mean difference of 10.84 in favour of the experimental group. The calculated p-value of 0.000 is less than the alpha level of significance of 0.05, and the computed t-value of 6.01 is greater than the t-critical value of 1.96 at 17 degree of freedom. This indicates that a significant difference existed between the retention ability of students taught using WhatsApp-Video supported learning

strategy and those taught using the conventional teaching methods. This finding is in consonant with the findings of Musa, (2026) who emphasized learning through interaction with computer tutorials increase students' performance and retention compared to conventional teaching methods. Empirically, the result aligns with Ibrahim and Okafor (2023), who found that excessive WhatsApp-Video supported learning use reduces retention due to cognitive overload, but controlled academic use improves it. It also agrees with the findings of Liu and Xingyu (2023), who reported that; improved retention through repeated access to digital learning materials. In addition, Junco and Cole (2022) found that academic-focused WhatsApp use enhances persistence and reduces dropout tendencies, which is closely related to retention.

Conclusion

The following conclusions are drawn based on the findings of the study:

1. The academic performance of students taught using Whatsapp Video supported learning is higher than the pretest performance
2. The academic performance of students' taught using WhatsApp-Video supported learning is higher than those taught using conventional teaching methods.
3. The retention ability of students taught ussing WhatsApp-Video supported learning strategy is higher than those taught using the conventional teaching methods.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. Lecturers in the Department of Technical and Vocational Education, Kaduna Polytechnic and other higher institutions should adopt WhatsApp-Video supported learning strategy in teaching and encourage students' to enhance students' performance and Retention.
2. Tertiary institution management should support digital learning integration by providing clear policies and encouraging the use of WhatsApp-Video supported learning strategies in teaching Engineering Drawing and other disciplines.
3. Students should use WhatsApp-Video supported learning strategies for learning Engineering Drawing and other academic purposes by participating in structured discussion groups to share learning materials and reinforce understanding of course concepts rather than social activities.

REFERENCE

- Alexander, B., & Salas, J. (2022). Technology and education: The evolving role of digital tools in student learning. *Educational Technology Research Journal*, 45(3), 210–225. <https://doi.org/10.1080/edtech.2022.003>
- Adeyemi, T., & Musa, I. (2023). Integrating WhatsApp tools in higher education teaching and learning: Opportunities and challenges. *Journal of Educational Technology and Innovation*, 18(2), 45–59.
- Ibrahim, L., & Musa, A. (2024). Digital engagement and memory retention in technology-enhanced classrooms. *African Journal of Educational Research*, 13(1), 59–73.
- Ibrahim A. C. & Chiamaka, O. (2023). Cognitive load implications of WhatsAppmultitasking among Tertiary institution students. *African Journal of Cognitive Psychology*, 7(1), 33–50.
- Junco, R., Heiberger, G., & Loken, E. (2020). The effect of Twitter on college student engagement and grades. *Journal of Computer Assisted Learning*, 36(4), 349–356. <https://doi.org/10.1111/jcal.12427>

- Junco, R., & Cole, A. (2022). Academic uses of WhatsApp and student engagement outcomes. *Journal of Computer Assisted Learning*, 38(3), 355–370.
- Liu, Qiang., Zhang, Wenjie., & Ma, Xingyu. (2023). Blended learning enhancement through structured WhatsApp integration. *Journal of Online Learning and Educational Technology*, 11(2), 90–108.
- Moses, M. & Samuel D. K. (2016), Difficulties of student teachers in the engineering graphics and design course at South African Tertiary institution: Snapshot of Sectional Drawing Eurasia *Journal of Mathematics, Science & Technology Education*. 12(4) 609-621.
- Musa, S. (2026) Effect of Computer-Tutorial on Students Performance and Retention in Orthographic Concept of Building Engineering Drawing in Technical Colleges, Kaduna State, Nigeria. *Journal of Computer & Robotics Education Research (JOCRE)* 1 (2) 10-25
- Oke, J. O., & Olakotan, O. O. (2019). Enhancing Effectiveness in Teaching and Learning Technical Drawing for Sustainable Development in Nigerian Technical Colleges. 1, 12– 18.
- Patrick, O. U., Raymond U. & Samuel C. N. (2019), Students perception on teachers ‘knowledge, attitude and skills in the teaching of technical drawing in Edo and Delta States, Nigeria. *Journal of Trektoria Nauki Path of Science* 5(5) 5001-5007 ISSN2413-9009.
- Santos, M. E., Rodrigues, P. H. & Fernandez, C. S. (2022). Gender variations in social networking site usage and academic distraction among undergraduates. *Journal of Gender and Digital Behavior*, 5(3), 77–95.
- Vaughn, M., & Coyle, K. (2024). Motivation and emotional engagement as predictors of classroom retention. *International Journal of Learning Sciences*, 14(2), 122–137.
- Yang, M., Lee, J. & Kamel, S A. (2025). TikTok-based instructional strategies in higher education: A systematic review. *Journal of Innovative Digital Pedagogy*, 7(1), 40–62.
- Zheng, W., Han, L., & Liu, Y. (2025). WhatsApp addiction, academic stress, sleep quality, and academic performance among Tertiary institution students. *Journal of Behavioral Studies*, 19(1), 33–49.