Effects of Zoom-Teaching Strategy on Junior Secondary Two Students' Achievement in Basic Science and Technology in Jos South, Plateau State, Nigeria

[1] Esther Ephraim Gongden, [2] Micheal S. Abifarin & [3] Bernadette E. Ozoji
Department of Science and Technology Education,
Faculty of Education, University of Jos
esthergongden@gmail.com
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Abstract
This study investigated the effects of Zoom-Teaching strategy on Junior Secondary two students' achievement in Basic Science and Technology in Jos South, Plateau State, Nigeria. The study adopted a quasi-experimental research design involving a non-equivalent pre-test and post-test control group design. The study focused on Junior Secondary two students in public secondary schools in Jos South Local Government Area of Plateau State. The sample consisted of 111 male and female JSS II students from two intact classes from two public secondary schools purposively selected in Jos South Local Government Area, comprising 67 students in the experimental group and 44 students in the control group. The experimental group was taught Basic Science and Technology using Zoom-Teaching strategy, while the control group was taught using the conventional teaching method. Data were collected using the Basic Science and Technology Achievement Test (BSTAT), which was validated by three experts from University of Jos and yielded a reliability coefficient of 0.882. Two research questions and two hypotheses were formulated and used for the study. Mean and standard deviation were used to answer the research questions, while Analysis of Covariance (ANCOVA) was used to test the null hypotheses at the 0.05 level of significance. The results of the findings showed that the experimental group had a higher post-test achievement mean score than the control group. Therefore, findings indicate that Zoom-Teaching Strategy was effective in improving students' achievement in Basic Science and Technology and was equally beneficial to both male and female students in an interactive and engaging classroom. The study recommends that Basic Science and Technology teachers should adopt Zoom-Teaching Strategy as an instructional strategy to improve Junior Secondary school students' achievement in Work, Energy, Power, and Chemicals.

Keywords: *Zoom-Teaching Strategy, Students' Achievement, Gender, Work, Energy, Power, and Chemicals, Basic Science and Technology.*

Introduction

The development of a nation is strongly connected to the quality of its educational system, particularly the extent to which learners acquire scientific and technological knowledge and skills. Effective science education provides learners with the knowledge and competencies needed to understand their environment, solve problems, and contribute meaningfully to social and economic development. Consequently, improving the quality of teaching and learning at all levels remains

an important educational concern. The Junior Secondary School (JSS) level is particularly important because it provides learners with foundational knowledge that prepares them for more specialized learning at the senior secondary and tertiary levels. The learning experiences students receive at this stage can significantly influence their subsequent academic progress and participation in science-related fields. It is therefore important that effective instructional approaches are employed to improve students' learning outcomes in science subjects.

The Junior Secondary School curriculum provides a foundation for the development of scientific knowledge, reasoning abilities, and practical skills among learners. At this level, students are introduced to basic scientific concepts and processes that prepare them for more advanced studies in science and technology. Basic Science and Technology (BST) is one of the important subjects within the JSS curriculum because of its role in developing scientific literacy and preparing learners for future science- and technology-related studies. Effective learning of the subject at this stage is therefore necessary for students to acquire the foundational knowledge required for subsequent academic work. Basic Science and Technology integrate knowledge from different areas of science and technology and exposes learners to concepts that are relevant to their everyday lives The subject, BST provides opportunities for students to develop observation, experimentation, problem-solving, and other scientific skills. Its importance is further reflected in the emphasis placed on science education in Nigeria, where scientific literacy is considered necessary for national development. Gongden and Gongden (2019) noted that students' academic achievement in Basic Science and Technology is influenced by several factors, including teaching methods, teacher characteristics, availability of instructional materials, school environment, and learner-related factors. Students' achievement in Basic Science and Technology is an important indicator of the extent to which the objectives of instruction have been attained. Ani et al. (2021) described achievement in terms of the measurable extent to which learners attain specific instructional objectives within a given period. Achievement can therefore be determined through students' performance in appropriately designed tests and other academic assessments. It is influenced by the interaction of instructional, learner, school, and environmental factors. Therefore, the identification and application of instructional approaches capable of improving students' achievement remain important areas of concern in science education. In Jos South Local Government Area of Plateau State, students' achievement in Basic Science and Technology has been a concern to education stakeholders. The BECE results between 2019 and 2024 indicate considerable fluctuations and poor achievement among students in Basic Science and Technology. The percentages of students who achieved distinction in BST were 15.86% in 2019, 1.36% in 2020, 28.00% in 2021, 12.90% in 2022, 69.97% in 2023, and 7.52% in 2024. The average credit pass rate across the period was approximately 22.6%, suggesting that a relatively small proportion of students consistently attained the expected level of achievement. This situation calls for the examination of instructional approaches that may improve students' achievement in Basic Science and Technology. Gender is another variable that has received considerable attention in science education research. Studies examining gender and students' achievement in science have produced inconsistent findings. Babayemi and Robson (2020), who reported a significant gender influence on the academic performance of JSS II students in Basic Science, with female students achieving higher than their male counterparts. Similarly, Ani, Obodo, Ikwueze and Tafi (2021) reported that gender had no significant effect on students' achievement in Basic Science and Technology and found no significant interaction between treatment and gender on students' academic achievement. These variations suggest that gender differences in science achievement may depend partly on the subject, instructional strategy, and learning context.

Recent evidence has also continued to produce mixed findings regarding gender and achievement in science. Asubiojo (2023), in a study on computer-assisted instruction and students' achievement in Basic Science and Technology, found a significant difference between the experimental and control groups but reported no gender influence on students' achievement under computer-assisted instruction. In contrast, with Babayemi and Robson (2020), who reported a significant gender influence on the academic performance of JSS II students in Basic Science, with female students achieving higher than their male counterparts. The difference in findings may be attributed to variations in instructional approaches, learning environments, and contextual factors across the studies. Areo (2022), however, found no statistically significant difference between male and female secondary school students in academic achievement in science subjects. These contradictory findings indicate that gender remains an important variable requiring further investigation, particularly when new instructional approaches are introduced.

Another factor that may influence students' achievement is the instructional strategy employed by the teacher. Traditional teacher-centred approaches may provide limited opportunities for students to participate actively in the learning process. Science learning requires opportunities for learners to interact with instructional materials, observe demonstrations, solve problems, and apply scientific concepts. Where instructional delivery is predominantly based on teacher explanation and student reception, opportunities for active learning may be reduced. This creates a need for instructional approaches that can provide students with more interactive and flexible learning experiences. The development of information and communication technology (ICT) has created new possibilities for teaching and learning. ICT-supported instruction provides opportunities for teachers to present information through multimedia resources and enables students to access learning materials through digital platforms. Kundu and Dey (2018) highlighted the potential of ICT-integrated instruction to improve learning experiences and academic outcomes. Similarly, Kanthed et al. (2024) reported that electronic media can improve students' academic performance, particularly when it is appropriately integrated with conventional teaching methods. These developments suggest that technology-supported instructional approaches may provide useful alternatives or complements to conventional classroom teaching.

The use of online and electronic learning platforms became particularly prominent during and after the COVID-19 pandemic. Gongden (2021), in a study of e-learning in secondary school chemistry teaching and learning in Jos, Nigeria, reported that students used different online platforms and that online lessons were perceived to improve academic achievement. The study also identified challenges such as inadequate technological competence, limited data, internet connectivity problems, and reduced direct social interaction. Zoom-Teaching Strategy is one of the technology-supported approaches that can facilitate synchronous interaction between teachers and learners. Through features such as video conferencing, screen sharing, file sharing, and real-time communication, Zoom can provide opportunities for teachers to present scientific concepts using different forms of instructional materials. The platform can also enable students to participate in lessons beyond the physical classroom and provide opportunities for repeated access to learning resources. These features may be useful in Basic Science and Technology, where students are expected to understand concepts that can be represented through diagrams, demonstrations, videos, and other multimedia resources. The use of Zoom-Teaching Strategy may also provide a common learning environment for male and female students. Since previous studies have produced inconsistent findings regarding gender and achievement in science, it is important to determine whether male and female students respond differently to technology-supported instruction. Evidence from studies involving computer-assisted instruction has suggested that gender may not

necessarily influence students' achievement when technology-based approaches are used. Asubiojo (2023), for instance, found no gender influence on students' achievement following exposure to computer-assisted instruction in Basic Science and Technology. However, because instructional technologies differ in their design and mode of delivery, findings from computer-assisted instruction cannot automatically be generalized to Zoom-Teaching Strategy. Although previous studies have examined technology-supported instruction, achievement in Basic Science and Technology, and gender differences in science achievement, there remains a need for empirical evidence on the effect of Zoom-Teaching Strategy on Junior Secondary Two students' achievement in Basic Science and Technology in Jos South, Plateau State. The present study therefore investigates the effects of Zoom-Teaching Strategy on Junior Secondary Two students' achievement in Basic Science and Technology in Jos South, Plateau State, Nigeria, with particular attention to gender.

Statement of The Problem

Achievement in Basic Science and Technology (BST) is essential to ensuring that Junior Secondary Two students acquire the scientific and technological knowledge required for subsequent learning. However, the level of achievement of students in BST remains a concern in Jos South Local Government Area of Plateau State. Available Basic Education Certificate Examination (BECE) records indicate fluctuations and generally poor performance in the subject, suggesting that many students are yet to attain the expected level of learning outcomes. This situation raises concern about the effectiveness of the instructional approaches currently employed in teaching BST. Low achievement in BST at the JSS II level may have consequences for students' readiness to study more specialized science and technology subjects at higher levels of education. This persistent poor performance may weaken the foundation needed for students to progress into science, technology, engineering and related disciplines, with possible implications for the development of the skilled manpower required for national development.

The continued use of conventional teacher-centred approaches in teaching BST may be one of the factors contributing to students' unsatisfactory achievement observed in the area. In addition, large classes and limited laboratory resources may restrict opportunities for practical and interactive learning. The use of Zoom-Teaching Strategy may provide a technology-supported environment through which lessons can be delivered interactively using multimedia resources. Although, there is insufficient empirical evidence on its effectiveness in improving JSS II students' achievement in BST in Jos South, Plateau State. The problem of this study is to therefore answer the following question; What is the effects of Zoom-Teaching Strategy on JSS II students' achievement in Basic Science and Technology in Jos South, Plateau State, Nigeria?

Research Questions

1. What are the pre-test and post-test mean achievement scores of JSS two students taught Basic Science and Technology using Zoom teaching strategy and those taught using conventional method before and after treatment?
2. What is the post-test mean achievement scores of JSS two students taught Basic Science and Technology using Zoom teaching strategy based on gender?

Hypotheses

1. There is no significant difference between the achievement mean scores of JSS two students taught Basic Science and Technology using Zoom teaching strategy and those taught using conventional teaching method before and after treatment.
2. There is no significant difference between the post-test mean achievement scores of JSS two students taught Basic Science and Technology using Zoom teaching strategy based on gender.

Methodology

The study adopted a quasi-experimental design, specifically the non-randomized pre-test post-test control group design to determine the effect of Zoom-Teaching Strategy on Junior Secondary Two (JSS II) students' achievement in Basic Science and Technology (BST) in Jos South Local Government Area of Plateau State, Nigeria. The design is appropriate because intact class was used for the study. The population comprised 1,778 JSS II students from 20 public junior secondary schools in the study area. A sample of 111 JSS II students, comprising 50 males and 61 females, was used from the two public secondary schools selected for the study. Purposive sampling was used to identify schools with functional computer laboratories and reliable sources of power, while simple random sampling was used to select the two schools for the study. The intact classes from the selected schools were assigned to experimental and control groups.

The instrument used for data collection was the Basic Science and Technology Achievement Test (BSTAT), consisting 40 multiple choice questions which was adopted from past BECE question papers from 2010-2023. The instrument was validated by experts from University of Jos. Kendall's coefficient of concordance was used to determine agreement among the experts, yielding a coefficient of 0.788. Three research assistants who were Basic Science and Technology teachers from the selected schools was trained for five days by the researcher to assist in the treatment and administration of the instruments. The BSTAT was also trial tested in a pilot study and the reliability was established using the test-retest method, which produced a reliability coefficient of 0.882. The experimental group was taught selected BST topics using Zoom-Teaching Strategy, while the control group was taught using the conventional teaching method. Pre-test and post-test data were collected from the two groups. The data were analysed using mean and standard deviation to answer the research questions, while Analysis of Covariance (ANCOVA) was used to test the hypotheses at 0.05 level of significance.

Results

Research Question One: What are the pre-test and post-test achievement mean scores of JS two students towards Basic Science and Technology in the experimental and control groups?

The pre-test and post-test achievement mean scores of Junior Secondary Two students in both the experimental group and the control group are presented in Table 1

Table 1
Pre-test and post-test Achievement Mean Scores of Students in the Experimental and Control Groups

Group		Pre-test		Post-test		Mean Gain	Mean Gain Difference
	N	Mean	SD	Mean	SD		
Experimental	22	37.00	8.94	91.95	6.61	54.95	34.56
Control	18	31.39	10.90	51.78	12.99	20.39	

Table 1 shows the pre-test and post-test achievement mean scores of students in the experimental group (taught using Zoom teaching strategy) and the control group. At the pre-test stage, the experimental group had a mean score of 37.00 (SD = 8.94), while the control group had a mean score of 31.39 (SD = 10.90). This indicates that both groups started with relatively low and slightly different levels of achievement in Basic Science and Technology before the intervention. After the treatment, there was a marked improvement in the achievement scores of both groups. The experimental group recorded a post-test mean score of 91.95 (SD = 6.61), while the control group recorded a post-test mean score of 51.78 (SD = 12.99). This shows a much higher improvement in the experimental group compared to the control group. In terms of mean gain, the experimental group recorded a substantial gain of 54.95, while the control group recorded a gain of 20.39. The mean gain difference of 34.56 clearly shows that students taught using Zoom teaching strategy performed significantly better than those taught using the conventional method.

Hypothesis One: There is no significant difference between the pre-test and post-test achievement mean scores of JS two students in Basic Science and Technology in the experimental and control group. The post-test achievement mean scores of Junior Secondary Two students in the experimental and control groups after controlling for pre-test scores are presented in Table 2 and 3.

Table 2
ANCOVA Result on Achievement Mean Scores of Students in the Experimental and Control Groups

Source	Type III Sum of Squares	Df	Mean Square	F	P-value
Corrected Model	16009.109[a]	2	8004.554	78.868	.000
Intercept	16432.302	1	16432.302	161.905	.000
Covariate	28.799	1	28.799	.284	.597
Group	15104.204	1	15104.204	148.819	.000
Error	3755.266	37	101.494		
Total	238065.000	40			
Corrected Total	19764.375	39			

a. R Squared = .810 (Adjusted R Squared = .800

Table 3
Estimated Marginal Achievement Mean Scores of Students in the Experimental and Control Groups

Group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Experimental	92.177[a]	2.188	87.744	96.611
Control	51.506[a]	2.429	46.584	56.427

Table 2 presents the Analysis of Covariance (ANCOVA) result on the post-test achievement mean scores of junior secondary two students in the experimental and control groups. The result shows that the covariate was not significant, F (1, 37) = 0.284, p = .597, indicating that it did not have a significant influence on students' achievement scores. However, the main effect of group was statistically significant, F (1, 37) = 148.819, p = .000. Since the p-value is less than 0.05, the null hypothesis stating that there is no significant difference between the post-test achievement mean scores of students in the experimental and control groups is rejected. The model further indicates a strong explanatory power, with an R-squared value of 0.810 (adjusted R-squared = 0.800), meaning that about 81% of the variation in students' achievement scores was explained by the model. Table 3 presents the estimated marginal mean scores, which confirm the significant difference. The experimental group had a higher adjusted mean score of 92.177 (SE = 2.188; 95% CI = 87.744 to 96.611), while the control group had a lower adjusted mean score of 51.506 (SE = 2.429; 95% CI = 46.584 to 56.427). This shows a substantial difference in favour of the experimental group.

Research Question Two: What are the pre-test and post-test achievement mean scores of JS two male and female students in Basic Science and Technology in the experimental group?
The pre-test and post-test achievement mean scores of male and female Junior Secondary Two students in the experimental group are presented in Table 4.

Table 4
Pre-test and Post-test Achievement Mean Scores of Male and Female Students in BSAT in the Experimental Group

Group	Gender	Pre-test		Post-test		Mean Gain	Mean Gain Difference
		N	Mean	SD	Mean	SD		
Experimental	Male	9	37.56	9.83	91.56	7.30	54.00	1.61
	Female	13	36.62	8.68	92.23	6.38	55.61	

Table 4 shows the pre-test and post-test achievement mean scores of male and female students in Basic Science and Technology within the experimental group taught using Zoom teaching strategy. At the pre-test stage, male students had a mean score of 37.56 (SD = 9.83), while female students had a mean score of 36.62 (SD = 8.68). This indicates that both groups had similar and relatively low levels of achievement before the intervention. After the treatment, both male and female students recorded substantial improvements in their achievement scores. Male students had a post-test mean score of 91.56 (SD = 7.30), while female students had a slightly higher post-test mean score of 92.23 (SD = 6.38). This shows that both groups benefited greatly from the Zoom teaching

strategy. In terms of mean gain, male students recorded a gain of 54.00, while female students recorded a slightly higher gain of 55.61. The mean gain difference of 1.61 indicates that female students had a marginally higher improvement in achievement than male students in the experimental group. This result suggests that Zoom teaching strategy improved the achievement of both male and female students in Basic Science and Technology, with a very slight advantage in favour of female students.

Hypothesis Two: There is no significant difference between the post-test achievement mean scores of male and female students in Basic Science and Technology in the experimental group.
The post-test achievement mean scores of male and female Junior Secondary Two students in Basic Science and Technology in the experimental group are presented in Table 5 and Table 6.

Table 5
ANCOVA Result on Post-test Achievement Mean Scores of Male and Female Students in BSAT in the Experimental Group

Source	Type III Sum of Squares	Df	Mean Square	F	P-value
Corrected Model	2.570[a]	2	1.285	.027	.974
Intercept	9802.387	1	9802.387	203.684	.000
Covariate	.146	1	.146	.003	.957
Gender	2.355	1	2.355	.049	.827
Error	914.384	19	48.125		
Total	186941.000	22			
Corrected Total	916.955	21			

a. R Squared = .003 (Adjusted R Squared = -.102)

Table 6
Estimated Marginal Post-test Achievement Mean Scores of Male and Female Students in BSAT in the Experimental Group

Group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Male	91.561[a]	2.314	86.717	96.405
Female	92.227[a]	1.925	88.198	96.257

Table 5 presents the Analysis of Covariance (ANCOVA) result on the post-test achievement mean scores of male and female students in the experimental group taught using Zoom teaching strategy. The result shows that the covariate was not significant, F (1, 19) = 0.003, p = .957, indicating that it had no significant effect on students' achievement scores. More importantly, the main effect of gender was not significant, F (1, 19) = 0.049, p = .827. Since the p-value is greater than 0.05, the null hypothesis is retained. This means that there is no significant difference between the post-test achievement mean scores of male and female students in the experimental group.
The model further shows a very low explanatory power, with an R-squared value of 0.003 (adjusted R-squared = -0.102), indicating that gender and the covariate contributed negligibly to the variation in students' achievement scores. Table 6 presents the estimated marginal mean scores, which further confirm this finding. Male students had a mean score of 91.561 (SE = 2.314; 95% CI = 86.717 to 96.405), while female students had a mean score of 92.227 (SE = 1.925; 95% CI = 88.198 to 96.257). Although female students recorded a slightly higher mean score, the difference

is not statistically significant. Therefore, there is no significant difference in the post-test achievement mean scores of male and female students in the experimental group.

Discussion

The finding of the study revealed that students taught Basic Science and Technology using Zoom-Teaching Strategy achieved better than those taught using the conventional teaching method. The result showed a marked improvement in the achievement of students exposed to Zoom-Teaching Strategy compared with those in the control group. The corresponding hypothesis further established that there was a significant difference in the achievement of students in the experimental and control groups, with the difference being in favour of the students taught using Zoom-Teaching Strategy. This finding indicates that the use of Zoom-Teaching Strategy enhanced students' achievement in Basic Science and Technology. The improved achievement may be attributed to the interactive and technology-supported nature of Zoom, which allows teachers to present learning materials through multimedia, demonstrate concepts visually, communicate with learners in real time and provide immediate feedback. The finding is consistent with Kundu and Dey (2018), who reported that the integration of information and communication technology into teaching can enhance students' academic achievement by providing interactive and learner-centred learning experiences. The finding also agrees with Dhull and Sakshi (2017), who noted that online learning environments provide opportunities for interaction, multimedia presentation, communication and flexible access to learning resources. These features may have made the learning of Basic Science and Technology more accessible and meaningful to students, thereby contributing to their improved achievement. The finding therefore suggests that Zoom-Teaching Strategy can serve as an effective instructional approach for improving students' achievement in Basic Science and Technology at the Junior Secondary School level. Furthermore, the findings showed that both male and female students taught using Zoom-Teaching Strategy improved substantially in their achievement in Basic Science and Technology. Although female students demonstrated a slightly higher achievement improvement than their male counterparts, the corresponding hypothesis revealed that there was no significant difference between the achievement of male and female students exposed to the Zoom-Teaching Strategy. This implies that gender did not significantly influence students' achievement when Zoom-Teaching Strategy was used for teaching Basic Science and Technology. The finding suggests that the instructional benefits provided by Zoom-Teaching Strategy were available to both male and female students, allowing them to participate in the learning process and benefit from the instructional resources in a relatively similar manner. This finding is in line with Kundu and Dey (2018), whose work on ICT-integrated learning indicated that technology-supported instruction can enhance students' learning outcomes by creating interactive learning environments rather than restricting learning opportunities to a particular group of learners. It also supports Dhull and Sakshi (2017), who observed that online learning platforms facilitate interaction and access to learning resources, thereby providing learners with opportunities to participate actively in the learning process. The study is also consistent with Ani et al. (2021) who found that gender had no significant effect on students' achievement in Basic Science. The absence of a significant gender difference in the present study therefore suggests that Zoom-Teaching Strategy can be used to support the achievement of both male and female students in Basic Science and Technology without giving a substantial advantage to either gender.

Conclusion

The study concludes that Zoom-Teaching Strategy is an effective instructional approach for improving junior secondary two students' achievement in Basic Science and Technology in Jos South Local Government Area of Plateau State, Nigeria. Students exposed to Zoom-Teaching Strategy demonstrated substantially better achievement than those taught through the conventional teaching method, indicating the potential of the approach to enhance the teaching and learning of Basic Science and Technology. The findings further show that both male and female students benefited from the intervention, with no significant difference in achievement between them, suggesting that Zoom-Teaching Strategy can support learning equitably across gender. Therefore, greater utilisation of Zoom-Teaching Strategy is encouraged as a technology-supported instructional approach for making Basic Science and Technology teaching more effective, interactive, and responsive to the contemporary learning needs. Its integration into Basic Science and Technology instruction, particularly where appropriate digital facilities and internet connectivity are available, could contribute meaningfully to improving students' academic achievement in work, energy, power and chemical at the junior secondary school level.

Recommendations

1. It is therefore recommended that Basic Science and Technology teachers should be encouraged and supported to utilize Zoom-Teaching Strategy as a complementary instructional approach, particularly for lessons that can benefit from multimedia presentation, interactive activities, and virtual demonstrations.
2. School authorities and relevant education agencies should provide teachers with adequate training, digital facilities, and reliable internet and power support to facilitate the effective and sustained utilisation of Zoom-Teaching Strategy in Basic Science and Technology classroom instruction.

References

Ani, I. M., Obodo, C. A., Ikwueze, C. C., & Tafi, F. I. (2021). Effect of gender on Basic Science students' academic achievement in secondary schools in Enugu Education Zone, Enugu State, Nigeria. *UNIZIK Journal of Educational Research and Policy Studies, 2*(1), 9–14. https://doi.org/10.5897/UNIJERPS2021.0004

Areo, O. O. (2022). Influence of gender on secondary school students' academic achievement and attitude towards instructional strategies in science. *Nigerian Journal of Science and Educational Research, 16*(1), 89–103.

Asubiojo, R. O. (2023). Effects of computer assisted instruction (CAI) on secondary school students' achievement in Basic Science and Technology in Ekiti State. *Shodh Sari: An International Multidisciplinary Journal, 2*(2), 88–98. https://doi.org/10.59231/SARI7576

Babayemi, J. O., & Robson, B. O. (2020). Learning styles and gender differences in students' academic performance in Basic Science. *Journal of the Science Teachers Association of Nigeria, 55*(1), 23–32.

Dhull, I., & Sakshi, M. S. (2017). Online learning. *International Education & Research Journal, 3*(8), 32–34.

Gongden, E. J. (2019). Effects of computer assisted instruction on male and female students' achievement in Basic Science in Jos metropolis, Plateau State, Nigeria. *American Research Journal of Humanities Social Science, 2*(1), 27–35.

Gongden, E. J. (2021). Assessment of the impact of e-learning on secondary school chemistry teaching and learning during COVID-19 pandemic in Jos metropolis. *Lafia Journal of Education, 2*(1), 268–279.

Kanthed, B., Soni, A., Dive, K., & Sharma, A. (2024). The role of media in education: A comprehensive review. *Educational Administration: Theory and Practice, 30*(3), 2533–2536. https://doi.org/10.53555/kuey.v30i3.5361

Kundu, A., & Dey, K. N. (2018). A contemporary study on the flourishing e-learning scenarios in India. *International Journal of Creative Research Thoughts, 6*(2), 384–390. https://doi.org/10.13140/RG.2.2.14695.98725

Nwanne, S. C., & Agommoh, P. C. (2017). Effects of CAI on students' achievement in Basic Science and Technology in Kaduna State. *IOSR Journal of Research & Method in Education, 7*(3), 53–58. https://www.iosrjournals.org

Reilly, D., Neumann, D. L., & Andrews, G. (2019). Investigating gender differences in mathematics and science: Results from the 2011 Trends in Mathematics and Science Survey. *Research in Science Education, 49*(1), 25–50.