

Effects of Video-Clip Instructional Strategy on Performance and Retention in Basic Science Concept among Upper Basic Students in Makurdi, Benue State, Nigeria

ENEMARIE, Veronica¹

Email: veraenemarie7@gmail.com

Tel: 07051713553

TAANGAHAR, Benjamin Akura¹

Email: benjamintaangahar@gmail.com

Tel: 08085158616

TARTENGER, Timothy Terungwa¹

Email: tartengertimothy@gmail.com

Tel: 07067699177

¹Department of Science and Mathematics Education, Rev.Fr. Moses Orshio Adasu University, Makurdi, Benue State, Nigeria

Abstract

This study examined the effect of video clip instructional strategy on Basic Science students' academic performance and retention in Makurdi Local Government Area, Benue State, Nigeria. Four research questions guided the study, and four corresponding hypotheses were tested. The study adopted a quasi-experimental, non-randomized pre-test, post-test design. The population comprised 1,933 upper Basic II students from 31 Universal Basic Education (UBE) schools in Makurdi, while a sample of 73 students in two intact classes was selected using a multi-stage sampling. The experimental group was exposed to video clip instructional strategy, and the control group received instruction via the demonstration method. The research instrument, the Basic Science Performance and Retention Test (BSPRT), was developed by the researchers and validated by two experts in Science Education and one expert in test and measurement in department of Science and Mathematics Education, Faculty of Education, Rev. Fr. Moses Orshio Adasu University, Makurdi. Reliability of the instrument was established using Kuder-Richardson Formula 21 (KR-21), yielding a coefficient of 0.94. Data were analyzed using mean and standard deviation to answer the research questions and Analysis of Covariance (ANCOVA) to test the hypotheses at 0.05 significance level. Findings revealed that video clip instructional strategy significantly enhanced students' academic performance compared to the demonstration method ($F(1,66) = 20.98$; $p = 0.000 < 0.05$). No significant difference was found between male and female students' performance using video clips ($F(1,34) = 0.539$; $p = 0.468 > 0.05$). Similarly, retention scores were higher for students taught using video clips than those taught via demonstration ($F(1,69) = 0.019$; $p = 0.891 < 0.05$), with no significant gender differences observed. The study recommends that Basic Science teachers employ video clip instructional strategy in teaching, as it facilitates active engagement, idea-sharing, and promotes equitable academic performance and retention across genders among others.

Keyword: Video clip, Performance, Retention and Gender

Introduction

Science is a systematic and empirical enterprise concerned with understanding and explaining natural phenomena through observation, experimentation, and logical reasoning. It plays a central role in technological advancement and national development by equipping learners with critical thinking, problem-solving skills, and scientific attitudes. Human curiosity about the natural world has continually driven scientific inquiry, making science education an indispensable component of formal education (Muhammad & Ibrahim, 2022). In Nigeria, this foundation is laid at the junior secondary school level through the teaching of Basic Science, while Biology, Chemistry, and Physics are offered as distinct subjects at the senior secondary school level. Basic Science occupies a strategic position in the Nigerian educational system, serving as the foundation upon which further scientific learning is built. It prepares learners at the upper basic level for effective engagement with core science subjects at the senior secondary school level (Olawaju, 2008, as cited in Oludipe, 2012). A strong grounding in Basic Science is therefore essential for students' successful progression in science-related disciplines. The Basic Science and Technology Curriculum (Revised, 2012) emphasizes the development of scientific literacy, interest in science and technology, acquisition of basic scientific knowledge and skills, preparation for further studies, and the application of science to everyday life. Despite the importance of Basic Science, students' academic performance in the subject has remained generally low and inconsistent. Reports from the Basic Education Certificate Examination (BECE) reveal fluctuating performance trend over ten years, suggesting persistent underachievement among



Effects of Video-Clip Instructional Strategy on Performance and Retention in ... Enemarie, V., Et. al. (2026)

learners. This trend raises concerns about the effectiveness of instructional strategies employed in Basic Science classrooms. Previous studies have attributed students' poor and inconsistent performance largely to teacher-centred instructional approaches, inadequate use of instructional materials, and limited adoption of innovative teaching strategies capable of enhancing understanding and retention (Obomanu & Adaramola, 2011; Ochu & Haruna, 2015; Agbideye, 2019). Effective teaching and learning of Basic Science require instructional approaches that connect classroom experiences with students' real-life contexts, stimulate interest, and actively engage learners. Contemporary science education advocates learner-centred strategies that promote inquiry, collaboration, visualization, and higher-order thinking skills (Ode & Eriba, 2019). However, conventional methods such as lecture and demonstration approaches continue to dominate classroom practice. These methods which are largely teacher-centred, limit students' active participation, and encourage rote memorization rather than meaningful learning, thereby reducing students' retention of scientific concepts (Ijeh & Onwu, 2012; McLeod et al., 2015). Students' academic performance is strongly associated with their level of interest and engagement during instruction. High interest promotes deeper understanding and improved achievement, whereas low interest often results in poor performance and weak retention of learned concepts (Ada et al., 2020). Retention, described as learners' ability to remember and recall previously learned information over time, is a critical indicator of meaningful learning (Safo et al., 2013). even though some empirical evidence, such as that of Ode and Tartenger (2021) and Ugbeda (2021), found that interactive instructional strategies improved retention over conventional methods, instructional strategies that do not actively engage learners and provide visual and experiential learning opportunities will not significantly enhance retention of scientific concepts (Adamu & Usman, 2023; Tartenger et al., 2024).

In the light of these challenges, science educators have increasingly advocated the integration of technology-based instructional strategies into classroom practice. One such approach is the video clip instructional strategy, which combines visual and auditory elements to facilitate understanding of abstract or inaccessible scientific phenomena. Video clips enable learners to observe processes and environments that may not be physically accessible, thereby improving comprehension and long-term retention (Vieira et al., 2014). Studies have shown that video-based instruction enhances students' motivation, engagement, collaboration, and understanding of complex scientific concepts by providing authentic and real-world learning experiences (Fuller & Yu, 2014; Akerson, 2022; Wang et al., 2023). Empirically, Achimugu, Igboegwu, Delmang, and Sunday (2022) and Olelewe, Abdullahim, and Nwangwu (2023), reported higher achievement among students exposed to video-based instruction. Certain aspects of Basic Science, particularly those involving ecological systems, microscopic organisms, or distant environments as well as crude oil and petrochemicals, are difficult to teach effectively using conventional demonstration methods alone. In such cases, video clip instructional strategy offers an effective alternative by providing learners with repeated and flexible access to visual learning resources. However, despite its proven benefits, many Basic Science teachers still rely predominantly on traditional instructional methods (Njoku & Mgbomo, 2021). Additionally, the role of gender in students' academic performance and retention in science has produced mixed findings in the literature. While some studies report gender differences in science performance, others indicate no significant difference when innovative instructional strategies are employed (Jirgba et al., 2018; Ayua & Tartenger, 2020; Osuafor & Obili, 2021 & Olelewe, Abdullahim, & Nwangwu, 2023). These inconsistencies underscore the need for further empirical investigation, particularly within the context of technology-enhanced instruction. Against this background, the present study investigates the effects of video clip instructional strategy on Basic Science students' academic performance and retention in Makurdi Local Government Area of Benue State, Nigeria.

Statement of the Research Problem

Despite the importance of Basic Science as the foundation for the study of science subjects at the senior secondary school level, students' academic performance in the subject has remained unsatisfactory. Evidence from the Benue State Examination Board showed a steady increase in the failure rate of students in Basic Science at the Basic Education Certificate Examination (BECE), rising from 3.52% in 2022 to 9.67% in 2023 and 11.15% in 2024. This trend indicates that a considerable number of students continue to experience difficulties in understanding and retaining Basic Science concepts, thereby threatening the achievement of the objectives of science education. The persistent poor performance has been attributed to the continued use of conventional instructional methods, particularly lecture and demonstration methods, which often make students passive recipients of knowledge and limit meaningful engagement with scientific concepts. As a result, students frequently develop low interest in the subject, exhibit poor academic achievement, and demonstrate weak



Effects of Video-Clip Instructional Strategy on Performance and Retention in ... Enemarie, V., Et. al. (2026)

retention of learned concepts. Although studies have reported that technology-based instructional approaches, such as video clip instructional strategy, can improve students' understanding, achievement, and retention, many Basic Science teachers still rely predominantly on traditional teaching methods. Furthermore, findings on the influence of gender on students' academic outcomes when exposed to innovative instructional strategies remain inconclusive. Therefore, there is a need to investigate the effects of video clip instructional strategy on students' academic performance and retention in Basic Science in Makurdi Local Government Area of Benue State.

The objectives of the study are to:

1. Determine the academic performance of students taught BS using video clip strategy and those taught using demonstration method.
2. Ascertain the performance of male and female students taught BS using video clip strategy.
3. Determine the retention of students taught BS using video clip strategy and those taught using demonstration method.
4. Find out the retention of male and female students taught BS using video clip strategy

Research Question

The study was guided by the following research questions:

1. What differences exist in the mean academic performance scores between students taught Basic Science using video clip instructional strategy and those taught using the demonstration method?
2. What differences exist in the mean academic performance scores between male and female students taught Basic Science using video clip instructional strategy?
3. What differences exist in the mean retention scores between students taught Basic Science using video clip instructional strategy and those taught using the demonstration method?
4. What differences exist in the mean retention scores between male and female students taught Basic Science using video clip instructional strategy?

Hypotheses

The following null hypotheses were formulated and tested at the 0.05 level of significance:

1. There is no significant difference in the mean academic performance scores between students taught Basic Science using video clip instructional strategy and those taught using the demonstration method.
2. There is no significant difference in the mean academic performance scores between male and female students taught Basic Science using video clip instructional strategy.
3. There is no significant difference in the mean retention scores between students taught Basic Science using video clip instructional strategy and those taught using the demonstration method.
4. There is no significant difference in the mean retention scores between male and female students taught Basic Science using video clip instructional strategy.

Methodology

This study used a quasi-experimental non-equivalent pretest–posttest control group design with intact classes. The study was conducted in the Makurdi Local Government Area of Benue State, Nigeria, which has several Universal Basic Education (UBE) schools but persistent reports of low and inconsistent performance in Basic Science. The population comprised 1,933 Upper Basic II students from 31 UBE schools during the 2024/2025 academic session. A sample of 73 students was selected from two intact classes using a multistage sampling technique that involved purposive selection of schools with qualified teachers and adequate facilities, followed by random assignment of classes to experimental and control groups. Data were collected using researcher-developed instruments: the Basic Science Performance Test (BSPT) and the Basic Science Retention Test (BSRT), each consisting of 30 multiple-choice items based on the topic Crude Oil and Petrochemicals. The instruments were validated by senior experts in Science Education department and Measurement and Evaluation in the faculty of education, while reliability was established through a trial test using the Kuder–Richardson Formula 21, which yielded a reliability coefficient of 0.94. Before the experiment, two Basic Science teachers were trained as research assistants on the use of the video clip instructional strategy. The BSPT was administered as a pretest to both groups, followed by a four-week instructional period in which the experimental group was taught using video clips and the control group using the demonstration method. A reshuffled version of the BSPT was administered as a posttest, while the BSRT was administered two weeks later to determine retention. Data were analyzed using mean and standard deviation to

Effects of Video-Clip Instructional Strategy on Performance and Retention in ... Enemarie, V., Et. al. (2026)

answer the research questions, while Analysis of Covariance (ANCOVA) was employed to test the hypotheses at the 0.05 level of significance, with pretest scores used as covariates to control for initial group differences.

Presentation of Results

Research Question One

What differences exist in the mean academic performance scores between students taught Basic Science using video clip instructional strategy and those taught using the demonstration method?

Table 1: Mean and Standard Deviation of Academic Performance Scores of Students taught Basic Science using Video clip strategy and those taught using Demonstration method.

S/No	Method	N	Pre-test Mean	Std. Dev.	Post-test Mean	Std. Dev.	Mean Gain	Decision
1	Video Clip Strategy	39	10.97	1.98	19.69	2.70	8.72	In favour of Video Clip Strategy
2	Demonstration Method	34	11.09	2.60	16.50	2.79	5.41	
Mean Difference					3.19		3.31	

Source: Field Work, 2026

Table 1 shows the mean and standard deviation of students' academic performance scores in Basic Science based on the instructional strategies used. Students taught using the video clip instructional strategy (n = 39) recorded a pretest mean score of 10.97 with a standard deviation of 1.98, and a posttest mean score of 19.69 with a standard deviation of 2.70, resulting in a mean gain of 8.72. Again, students taught using the demonstration method (n = 34) obtained a pretest mean score of 11.09 with a standard deviation of 2.60, and a posttest mean score of 16.50 with a standard deviation of 2.79, yielding a mean gain of 5.41. The posttest mean difference between the two groups was 3.19, while the difference in mean gain scores was 3.31, both in favour of students taught using the video clip instructional strategy.

Research Question Two

What are the mean performance scores between male and female students taught Basic science using video clip?

Table 2: Mean and Standard Deviation of Mean Performance Scores between Male and Female Students taught Basic science using Video Clip.

S/No	Gender	N	Pre-test Mean	Std. Dev.	Post-test Mean	Std. Dev.	Mean Gain	Decision
1	Male	24	10.96	1.85	19.46	2.86	8.50	In favour of Female Students
2	Female	15	11.00	2.24	20.07	2.49	9.07	
Mean Difference					0.61		0.57	

Source: Field Work, 2026

Table 2 presents the mean and standard deviation of the academic performance scores of male and female students taught Basic Science using the video clip instructional strategy. The results show that male students (n = 24) recorded a pretest mean score of 10.96 with a standard deviation of 1.85, and a posttest mean score of 19.46 with a standard deviation of 2.86, resulting in a mean gain of 8.50. Similarly, female students (n = 15) obtained a pretest mean score of 11.00 with a standard deviation of 2.24, and a posttest mean score of 20.07 with a standard deviation of 2.49, yielding a mean gain of 9.07. The difference in posttest mean scores between male and female students was 0.61, while the difference in mean gain scores was 0.57, both in favour of the female students.

Research Question Three

What are the mean retention scores between students taught Basic science using video clip strategy and those taught using demonstration method?

Table 3: Mean and Standard Deviation of Retention Scores between Students taught Basic Science using Video Clip Strategy and those Taught using Demonstration Method.

Effects of Video-Clip Instructional Strategy on Performance and Retention in ... Enemarie, V., Et. al. (2026)

S/No	Method	N	Pre-test Mean	Std. Dev.	Retention Mean	Std. Dev.	Mean Gain	Decision
1	Video Clip Strategy	39	10.97	1.98	15.59	2.29	4.62	In favour of Video Clip Strategy
2	Demonstration Method	34	11.09	2.60	13.47	2.53	2.38	
Mean Difference					2.12		2.24	

Source: Field Work, 2026

Table 3 presents the mean and standard deviation of the retention scores of students taught Basic Science using the video clip instructional strategy and those taught using the demonstration method. The results indicate that students exposed to the video clip strategy (n = 39) recorded a pretest mean score of 10.97 (SD = 1.98) and a retention mean score of 15.59 (SD = 2.29), yielding a mean gain of 4.62. In comparison, students taught using the demonstration method (n = 34) obtained a pretest mean score of 11.09 (SD = 2.60) and a retention mean score of 13.47 (SD = 2.53), resulting in a mean gain of 2.38. The difference in mean retention gain between the two groups was 2.24, in favour of students taught using the video clip instructional strategy.

Research Question Four

What are the mean retention scores between male and female students taught Basic science using video clip?

Table 4: Mean and Standard Deviation of Mean Retention Scores between Male and Female Students Taught Basic Science using Video Clip.

S/No	Gender	N	Pre-test Mean	Std. Dev.	Retention Mean	Std. Dev.	Mean Gain	Decision
1	Male	24	10.96	1.85	15.67	2.53	4.71	In favour of Male Students
2	Female	15	11.00	2.24	15.47	1.92	4.47	
Mean Difference					0.20		0.24	

Source: Field Work, 2026

Table 4 presents the mean and standard deviation of retention scores of male and female students exposed to the video clip instructional strategy. The results show that male students (n = 24) recorded a pretest mean score of 10.96 (SD = 1.85) and a retention mean score of 15.67 (SD = 2.53), resulting in a mean gain of 4.71. Similarly, female students (n = 15) obtained a pretest mean score of 11.00 (SD = 2.24) and a retention mean score of 15.47 (SD = 1.92), yielding a mean gain of 4.47. The difference in mean retention gain between male and female students was 0.24, slightly in favour of the male students.

Hypothesis One

There is no significant difference in the mean performance scores between students taught Basic science using video clip strategy and those taught using demonstration method.

Table 5: ANCOVA of Academic Performance Scores between Students taught Basic Science using Video clip Strategy and those taught using Demonstration Method.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	199.522 ^a	2	99.761	13.419	.000	.277
Intercept	743.312	1	743.312	99.985	.000	.588
Pretest	14.412	1	14.412	1.939	.168	.027
Method	187.601	1	187.601	25.235	.000	.265
Error	520.396	70	7.434			
Total	24915.000	73				
Corrected Total	719.918	72				

a. R Squared = .277 (Adjusted R Squared = .256)

Source: Field Work, 2026

The result of the Analysis of Covariance (ANCOVA) presented in Table 5 shows that the instructional method had a statistically significant effect on students' academic performance in Basic Science after controlling for pretest scores. The

Effects of Video-Clip Instructional Strategy on Performance and Retention in ... Enemarie, V., Et. al. (2026)

result revealed a significant main effect of method, $F(1, 70) = 25.24$, $p < .05$. Consequently, the null hypothesis was rejected. This finding indicates that there is a significant difference in the mean academic performance scores of students taught Basic Science using the video clip instructional strategy and those taught using the demonstration method, in favour of the video clip strategy. The partial eta squared value of 0.265 suggests that approximately 26.5% of the variance in students' academic performance can be attributed to the instructional strategy employed, reflecting a substantial effect size.

Hypothesis Two

There is no significant difference in the mean performance scores between male and female students taught Basic science using video clip strategy.

Table 6: ANCOVA of Performance Scores between Male and Female Students taught Basic science using video clip strategy.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	8.853 ^a	2	4.426	.591	.559	.032
Intercept	373.124	1	373.124	49.851	.000	.581
Pretest	5.437	1	5.437	.726	.400	.020
Gender	3.327	1	3.327	.444	.509	.012
Error	269.455	36	7.485			
Total	15402.000	39				
Corrected Total	278.308	38				

a. R Squared = .032 (Adjusted R Squared = -.022)

Source: *Field Work, 2026*

The result of the Analysis of Covariance (ANCOVA) presented in Table 6 indicates that gender had no statistically significant effect on students' academic performance in Basic Science when taught using the video clip instructional strategy after controlling for pretest scores. The analysis revealed that the main effect of gender was not significant, $F(1, 36) = 0.44$, $p > .05$. Therefore, the null hypothesis was not rejected. This finding implies that there is no significant difference in the mean academic performance scores of male and female students exposed to the video clip instructional strategy. The partial eta squared value of 0.012 indicates that only 1.2% of the variance in students' academic performance can be attributed to gender, suggesting a negligible gender influence when video clip instruction is used.

Hypothesis Three

There is no significant difference in the mean retention scores between students taught Basic science using video clip strategy and those taught using demonstration method.

Table 7: ANCOVA of Retention Scores between Students taught Basic Science using Video clip Strategy and those Taught using Demonstration method.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	111.334 ^a	2	55.667	10.251	.000	.227
Intercept	381.544	1	381.544	70.257	.000	.501
Pretest	29.761	1	29.761	5.480	.022	.073
Method	84.019	1	84.019	15.471	.000	.181
Error	380.146	70	5.431			
Total	16058.000	73				
Corrected Total	491.479	72				

a. R Squared = .227 (Adjusted R Squared = .204)

Source: *Field Work, 2026*

The Analysis of Covariance (ANCOVA) results presented in Table 7 show that instructional method had a statistically significant effect on students' retention scores in Basic Science after controlling for pretest scores. Specifically, the effect of method was significant, $F(1, 70) = 15.47$, $p < .05$. Consequently, the null hypothesis was rejected. This result indicates that there is a significant difference in the mean retention scores of students taught Basic Science using the video clip instructional strategy and those taught using the demonstration method. The partial eta squared value of 0.181 suggests that approximately 18.1% of the variance in students' retention scores can be attributed to the

Effects of Video-Clip Instructional Strategy on Performance and Retention in ... Enemarie, V., Et. al. (2026)

instructional strategies employed. This demonstrates that the video clip instructional strategy was more effective in enhancing students' retention of Basic Science concepts than the demonstration method.

Hypothesis Four

There is no significant difference in the mean retention scores between male and female students taught Basic science using video clip strategy.

Table 8: ANCOVA of Retention Scores between Male and Female Students taught Basic Science using Video Clip Strategy.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1.623 ^a	2	.812	.148	.863	.008
Intercept	253.462	1	253.462	46.128	.000	.562
Pretest	1.254	1	1.254	.228	.636	.006
Gender	.383	1	.383	.070	.793	.002
Error	197.813	36	5.495			
Total	9678.000	39				
Corrected Total	199.436	38				

a. R Squared = .008 (Adjusted R Squared = -.047)

Source: Field Work, 2026

The ANCOVA results presented in Table 8 indicate that gender had no statistically significant effect on students' retention scores when taught using the video clip instructional strategy after controlling for pretest scores. Specifically, the effect of gender was not significant, $F(1, 36) = 0.07$, $p = .793$, which is greater than the 0.05 level of significance. Consequently, the null hypothesis was retained. This finding implies that there is no significant difference in the mean retention scores of male and female students exposed to the video clip instructional strategy in Basic Science. The partial eta squared value of 0.002 further indicates that gender accounted for less than 1% of the variance in students' retention scores, suggesting a negligible gender influence. This result demonstrates that the video clip instructional strategy is gender-neutral and equally effective in enhancing retention among both male and female students.

Discussion of Findings

The findings of the present study revealed a significant difference in the mean academic performance scores of students taught Basic Science using the video clip instructional strategy and those taught using the demonstration method, with students exposed to video clips performing better. This indicates that the video clip strategy is more effective in enhancing students' academic performance in Basic Science. This finding is consistent with the studies of Achimugu, Igboegwu, Delmang, and Sunday (2022) and Olelewe, Abdullahim, and Nwangwu (2023), who reported higher achievement among students taught using video-based instructional approaches. The observed improvement may be attributed to the interactive, visual, and dynamic nature of video clips, which enable learners to observe abstract scientific concepts concretely, replay difficult processes, and actively engage in classroom discussions. These features promote deeper understanding, sustained attention, and meaningful learning, which are critical for improved academic performance. The study further found no significant difference in the academic performance of male and female students exposed to the video clip instructional strategy. This suggests that the strategy is gender-neutral and supports equitable learning outcomes. This finding aligns with those of Olelewe, Abdullahim, and Nwangwu (2023) as well as Osuafor and Obili (2021), who reported that video-based instruction benefits male and female students equally. A possible reason for this outcome is that video clips provide equal learning opportunities by engaging multiple senses, accommodating diverse learning styles, and encouraging participation from all students irrespective of gender. The collaborative learning environment created during video-based lessons may also reduce gender-related barriers to learning. In terms of retention, the findings revealed a significant difference in the mean retention scores of students taught using the video clip strategy and those taught using the demonstration method, in favour of the video clip group. This suggests that video clips are more effective in enhancing students' retention of Basic Science concepts. This result corroborates the findings of Ode and Tartenger (2021) and Ugbeda (2021), who reported improved retention among students taught using interactive and innovative instructional strategies. The improved retention observed in this study may be attributed to repeated exposure to visual and auditory representations of content, which strengthens memory encoding and facilitates easier recall of learned concepts over time.



Effects of Video-Clip Instructional Strategy on Performance and Retention in ... Enemarie, V., Et. al. (2026)

Finally, the study revealed no significant difference in the retention scores of male and female students taught using the video clip instructional strategy. This indicates that video clips are equally effective in promoting long-term retention among both genders. This finding supports the work of Osuafor and Obili (2021), who also reported gender-neutral retention outcomes with video-based instruction. The likely reason for this finding is that video clips encourage active participation, collaborative discussion, and repeated review of learning materials, thereby supporting sustained learning and retention for all students regardless of gender.

Conclusion

The study concludes that the use of the video clip instructional strategy significantly improves students' academic performance and retention in Basic Science compared to the conventional demonstration method. The strategy fosters active engagement, visual learning, and collaborative interactions, which collectively enhance conceptual understanding and long-term retention of scientific knowledge. Furthermore, video clip instruction supports gender-equitable learning, as no significant differences were observed between male and female students in both performance and retention. These findings indicate that video clips offer an effective, inclusive, and interactive teaching approach for Basic Science in Makurdi Local Government Area.

Recommendations

Based on the findings, the following recommendations are made:

1. Basic Science teachers should integrate video clip instructional strategy into their lessons to enhance students' understanding, performance, and retention.
2. Teacher training programs should include modules on designing and effectively using video-based instructional materials.
3. Schools and educational authorities should provide the necessary technological resources, including projectors, computers, and internet access, to facilitate the use of video clips in teaching.

Acknowledgements

The authors wish to express their gratitude to those whose works is cited in the study. Our sincere gratitude also goes to the research assistants employed in the course of the study, the students whom the experiment carry out on them and the validators of the instrument for their inputs. We also wish to acknowledge the editors and the editorial board of Zamfara Internal Journal of Education for vetting and improving the quality of the work.

References

- Achimugu, E. I., Igboegwu, E.N., Delmang, T.K., Luka, B.D & Sunday, M.L (2022). Effects of video and audio-taped instructions on Senior Secondary Students' achievement in Chemistry in Lokoja Metropolis. *Webology* 19(13), 104-114
- Ada, N. A., Eriba, J. O. & Toryem, M. M. (2020). Effects of multimedia and fieldtrip instructional strategies on the performance of secondary school students in ecology in Benue State; Nigeria. *BSU Journal of Science, Mathematics and Computer Education (BSU-JSMCE)*, 1(1), 58-69.
- Adaramola, M.O. & Obomanu, B. J. (2011). Factors related to underachievement in science, technology and mathematics education (STME) in secondary schools in Rivers State, Nigeria. *World Journal of Education*, 1(1), 102-109.
- Agbidye, A. (2019). Effect of problem-based learning strategy on upper basic two students' achievement in basic science in Makurdi metropolis, Benue State. *Journal of Science, Technology, Mathematics and Education*, 15(3), 41-48.
- Ayua, G.A & Tartenger, T. T. (2020). Effect of science technology society strategy on academic performance among upper-basic school students in Makurdi metropolis. *Africa Journal of Sustainable Professional Development*. 4(1), 26-33.
- Fuller, P., & Yu, G. (2014). Lessons learned: online teaching adventures and misadventures. *Journal of Social Sciences*, 10(1), 33-38
- Ijeh, S. B & Onwu G. O. M. (2012) Using PCK to deal with learner's conceptions (Misconceptions and Preconceptions) in statistics teaching, University of Africa 215 – 225
- Jirgba, C. M., Eriba, J. O. & Achor, E. A. (2018). Effect of peer collaboration learning strategy on students achievement in Basic Science in Makurdi Local Government of Benue State. *Journal of Research in Curriculum and Teaching*, 10(2), 84-97.
- Muhammad, M.I and Ibrahim, S. (2022) Impact of field trips strategy on retention and academic performance in ecology among secondary school students in Zaria Local Government Area, Kaduna State, Nigeria. *Communication in Physical Sciences*, 8(2): 196-204



- Effects of Video-Clip Instructional Strategy on Performance and Retention in ... Enemarie, V., Et. al. (2026)*
- Njoku, M.I & Mgbomo, T. (2022). Effect of field trip and demonstration methods on the achievement of secondary school students in Biology. *Rivers State University Journal of Education (RSUJOE)*, 24 (2):55-64. Retrieved from <url:www.rsujoe.com.ng>
- Ochu, N.O., & Haruna, P.F. (2015). Challenges and prospects of creativity in basic science classroom; the perception of the basic science teachers. *British Journal of Education, Society and Behavioural Sciences*, 5(2), 237-243.
- Ode, J.O & Tartenger, T.T (2021). Effects of thinking maps and role play instructional strategies on student performance and retention in basic science in Makurdi, Nigeria. *Benue State University Journal of Science, Mathematics and Computer Education*, 2(2),30- 39.
- Ode, J.O. & Eriba, J. O. (2019). Teaching and learning of Basic Science in a recessed economy. *Education Review letter* 4(9), 8 16. Retrieved from www.mindsourcing.info
- Olelewe, C. J., Dong, C., Abdullahi, M., & Nwangwu, C. E. (2023). Effects of using a video-clip instructional strategy on students' performance in a computer networking course at universities in Gombe state. *Technology, Pedagogy and Education*, 32(3), 351–365. <https://doi.org/10.1080/1475939X.2023.2201931>
- Oludipe, D. I. (2012). Gender difference in Nigerian junior secondary students' academic achievement in Basic Science. *Journal of Education and Social Research*. 2(1), 93-99
- Osuafor, A.M & Obili, M.O. (2021). Effect of digital video instructional strategy on students' achievement and retention in Basic Science. *Socialscientia Journal of the Social Sciences and Humanities*. 6(1), 65_71. Retrieved from <https://journals.aphriapub.com/index.php/SS/>
- Tartenger, T.T., Enemarie, V. & Upu, F. (2024) Effects of peer tutoring on Basic science students' performance in Makurdi Local Government Area. *Zamfara International Journal of Education (ZIJE)* 4,(1), 165 -171. Retrieved from DOI: <https://www.doi.org/10.5281/zenodo.11445740>
- Ugbede, O.G. (2021). *Effect of think pair share cooperative learning strategy on secondary school students' achievement and retention in electrochemistry in Makurdi metropolis*. Unpublished master's dissertation of Saawua Tarka University Makurdi.
- Vieira I., Lopes P.A., Soares F. (2014). The Potential Benefits of using videos in Higher Education. Accessed on 1/05/2023 from https://www.academia.edu/24250151/The_potential_benefits_of_using_videos_in_higher_education.
- Wang, J., & Li, Y. (2022). Applying cognitive load theory to improve multimedia learning in secondary science education: A meta-analysis. *Educational Technology Research and Development*, 70(1), 265-297. <https://doi.org/10.1007/s11423-021-10043-2>