

Influence of School Location on the Effectiveness of Multimedia Instruction in Christian Religious Studies in Edo State, Nigeria

Alexandre Onyekachi Ugwu

Corresponding author:

Abstract

This study investigated the influence of school location on the effectiveness of multimedia instruction in the teaching and learning of Christian Religious Studies (CRS) among Senior Secondary School II students in Edo State, Nigeria. Employing a quasi-experimental, pre-test–post-test non-equivalent control group design, 156 students were purposively selected from urban and rural secondary schools. Data were collected using the Christian Religious Studies Achievement Test (CRSAT) and the Christian Religious Studies Interest Scale (CRSIS). Reliability coefficients of 0.88 and 0.89 were obtained for the instruments respectively. Mean and standard deviation were used for descriptive analysis, while two-way ANOVA tested hypotheses at the 0.05 level of significance. Findings indicated that multimedia instruction significantly enhanced students' achievement and interest in CRS, but school location did not significantly moderate these effects. The study concludes that multimedia instructional strategies are effective irrespective of urban or rural school contexts and recommends increased provision of multimedia resources and teacher training across schools.

Keywords: Multimedia instruction, school location, Christian Religious Studies, academic achievement, students' interest.

Introduction

Christian Religious Studies (CRS) occupies a central place in the Nigerian secondary school curriculum because of its critical role in promoting moral values, spiritual development, and responsible citizenship (Okoye, 2024).

Beyond imparting cognitive knowledge, CRS is intended to shape students' attitudes, ethics, and worldview through engagement with biblical principles and Christian moral teachings. However, despite its foundational importance, students' performance in CRS has been persistently inconsistent. Teachers continue to rely predominantly on traditional lecture-based approaches, which often render the subject abstract, monotonous, and detached from students' lived experiences (Fasuba, 2024). This teacher-centered methodology limits active engagement, reduces comprehension, and contributes to declining interest levels among learners, as students perceive

CRS as a challenging or irrelevant subject rather than a meaningful area of moral and spiritual development. Low interest and engagement, in turn, negatively affect students' achievement and long-term retention of moral and religious concepts.

In response to these challenges, multimedia instructional strategies have been proposed as a promising pedagogical alternative. Multimedia instruction integrates multiple sensory channels—combining audio, visuals, text, and animation—to present learning content in a more engaging and accessible manner (Abdulrahman et al., 2020). By appealing to both visual and auditory learning pathways, multimedia resources can facilitate the comprehension of complex or abstract concepts, stimulate learners' curiosity, and promote active cognitive processing. Mayer's Cognitive Theory of Multimedia Learning provides the theoretical foundation for these claims,

positing that learners process information more effectively when presented through dual channels rather than a single mode of instruction (Mayer, 2021). According to the theory, visual and auditory channels work together to reduce cognitive overload, enhance retention, and improve understanding of instructional content. In educational research, the application of multimedia has been associated with increased engagement, improved critical thinking, and better learning outcomes across multiple disciplines, reinforcing the value of integrating multimedia strategies into instructional practice (Journal of Theoretical and Empirical Studies in Education, 2025).

Despite the pedagogical potential of multimedia instruction, contextual factors—particularly school location—may moderate its effectiveness. Disparities between urban and rural schools, such as differences in access to electricity, ICT infrastructure, internet

connectivity, and qualified teachers, can constrain the successful implementation of multimedia strategies and result in varied learning outcomes (Babalola et al., 2026). In urban schools, reliable electricity, availability of multimedia devices, and better-trained staff create conducive conditions for technology-enhanced learning. Conversely, rural schools often face infrastructural limitations and resource constraints that hinder students' exposure to multimedia instruction, potentially exacerbating existing educational inequalities. These contextual differences highlight the need to consider environmental and institutional factors when assessing the efficacy of multimedia teaching interventions in Nigerian schools.

Empirical research on multimedia instruction in Nigeria has demonstrated positive effects on student achievement in several subjects. For instance, studies in Biology (Eneda & Ude, 2024) and

Islamic Studies (Suleiman, 2025) show that multimedia-based teaching enhances students' comprehension, retention, and overall academic performance. However, few studies have specifically examined the application of multimedia instruction in CRS, a subject with unique cognitive and moral learning demands. Furthermore, the potential moderating role of school location has rarely been investigated, leaving a gap in understanding whether multimedia instruction can yield equitable outcomes across diverse educational settings. Given the persistent challenges of low interest and achievement in CRS, it is essential to explore whether multimedia instructional strategies can enhance students' engagement, understanding, and performance, while also considering contextual factors such as urban–rural disparities.

This study, therefore, seeks to investigate the efficacy of multimedia

instruction on students' interest and academic achievement in CRS in Edo State, Nigeria, while exploring whether school location moderates these outcomes. By addressing this gap, the study aims to contribute to the growing body of research on technology-enhanced learning in moral and religious education, and to provide practical insights for teachers, administrators, and policymakers seeking to improve teaching quality and student engagement in CRS classrooms.

Statement of the Problem

Despite the central role of Christian Religious Studies (CRS) in promoting moral, spiritual, and civic development, students in Nigerian secondary schools continue to exhibit low interest and poor academic achievement in the subject (Okafor & Uche, 2023; Fasuba, 2024). Examination reports consistently reveal that performance in CRS lags behind other arts subjects, reflecting a persistent gap between the

intended moral and educational objectives of the curriculum and actual student outcomes (WAEC, 2023). Many students perceive CRS as abstract, monotonous, and disconnected from real-life experiences, a perception largely attributed to teacher-centered instructional practices dominated by lecture and rote memorization. These traditional methods limit opportunities for critical engagement, reflection, and meaningful learning, resulting in diminished motivation and suboptimal learning outcomes.

In response to these challenges, multimedia instructional strategies—incorporating text, graphics, audio, video, and animation—have been suggested as a viable alternative for enriching classroom experiences and enhancing learning outcomes (Abdulrahman et al., 2020; Mayer, 2021). Multimedia approaches are designed to stimulate multiple sensory channels, reduce cognitive overload,

Didee Publication International Journal

and promote active learning, which could potentially improve both student interest and academic performance. Studies in other disciplines, including Biology (Eneda & Ude, 2024) and Islamic Studies (Suleiman, 2025), have reported positive effects of multimedia-based instruction on students' engagement and achievement.

However, empirical evidence on the effectiveness of multimedia instruction in CRS remains limited, and available studies have produced mixed results. Furthermore, contextual factors such as school location—which influence access to electricity, ICT infrastructure, and trained personnel—may moderate the effectiveness of multimedia interventions, yet these factors are rarely considered in research on CRS. Consequently, it remains unclear whether multimedia instructional strategies can significantly enhance student interest and academic achievement in CRS across diverse

school settings or whether their impact is comparable to traditional teaching methods.

This unresolved problem underscores the need for empirical investigation to determine the efficacy of multimedia instruction in CRS, particularly in the Nigerian secondary school context. Understanding the role of multimedia in enhancing student engagement and learning outcomes, while accounting for environmental and contextual differences, is essential for designing inclusive, effective, and sustainable instructional interventions that align with the moral and educational goals of CRS.

Purpose of the Study

The main purpose of this study was to investigate the interaction effect of instructional strategies and school location on students' interest and academic achievement in Christian Religious Studies (CRS) in Edo State,

Nigeria. Specifically, the study sought to:

1. Determine the interaction effect of instructional strategies (multimedia vs. conventional) and school location (urban vs. rural) on the posttest mean interest scores of CRS students.
2. Examine the interaction effect of instructional strategies (multimedia vs. conventional) and school location (urban vs. rural) on the posttest mean academic achievement scores of CRS students.

Research Questions

1. What is the interaction effect of instructional strategies and school location on the posttest mean interest scores of CRS students?
2. What is the interaction effect of instructional strategies and school location on the posttest mean academic achievement scores of CRS students?

Hypotheses

1. There is no significant interaction effect of instructional strategies and school location on the posttest mean interest scores of CRS students.

2. There is no significant interaction effect of instructional strategies and school location on the posttest mean academic achievement scores of CRS students.

Theoretical Framework and Review of Related Literature

Theoretical Framework

The study is underpinned by Mayer's Cognitive Theory of Multimedia Learning (CTML). The theory posits that learners process information through two distinct channels—visual and auditory—and learn more effectively when instructional materials are designed to optimize these channels (Mayer, 2021). Multimedia instructional design aligns text with corresponding visuals and sounds to facilitate deeper cognitive integration

(Journal of Theoretical and Empirical Studies in Education, 2025).

Related Literature

Multimedia Instruction and Academic Achievement

Empirical studies in Nigeria support the positive impact of multimedia instruction across subjects. For example, Achiette and Ude (2024) reported significant improvements in student achievement in Biology following multimedia instruction. Interactive multimedia methods have similarly been shown to enhance learners' performance in Muslim religious studies (Suleiman, 2025).

A systematic review by Abdulrahman et al. (2020) further corroborates the general effectiveness of multimedia tools in teaching and learning, particularly in contexts where traditional approaches dominate.

Multimedia Instruction and Student Interest

Multimedia instructional techniques have been linked with increased learner engagement and interest. Digital content attracts student attention and supports motivation, particularly in subjects perceived as abstract (Ajibola, 2024).

School Location and Instructional Effectiveness

Research on instructional methods like storytelling and school location has suggested that location may not significantly moderate learning outcomes in some teaching strategies (Fasuba, 2024). However, in regions

Methodology

Research Design

This study adopted a quasi-experimental pretest–posttest non-equivalent control group design, which is commonly used in educational intervention research where random assignment is not feasible (Agbaje & Adesina, 2021; Ado, 2020). The design allowed for the examination of the

facing persistent infrastructural deficits, multimedia implementation may be challenged by unreliable electricity and limited ICT access (Babalola et al., 2026).

Gaps in Literature

Although mobile learning applications have been shown to enhance CRS learning in Cross River State (Okoye, 2024), there is still a lack of research examining how multimedia instruction affects both students' achievement and interest in CRS, particularly across different school locations in Edo State.

interaction effect of instructional strategies (multimedia vs. conventional) and school location (urban vs. rural) on students' interest and academic achievement in Christian Religious Studies (CRS).

Population and Sample

The population of the study comprised 1,503 Senior Secondary School II (SS II) students from public secondary

schools in Ovia North-East Local Government Area, Edo State. A sample of 156 students was drawn using multistage sampling:

Stage 1: Selection of schools based on location (urban and rural).

Stage 2: Selection of classes within the chosen schools.

Stage 3: Random selection of students from the selected classes, ensuring a balanced representation of urban and rural students, as well as experimental (multimedia) and control (conventional) groups.

The sample was distributed across **four groups** for the interaction analysis:

Urban school – Multimedia instruction

Urban school – Conventional instruction

Rural school – Multimedia instruction

Rural school – Conventional instruction

Instruments

Two instruments were used to collect data: Christian Religious Studies Achievement Test (CRSAT) : Measured students' knowledge and understanding of CRS concepts. The instrument was validated by experts in Religious Studies and Education, with a reliability coefficient of 0.88. Christian Religious Studies Interest Scale (CRSIS): Assessed students' interest and motivation in CRS. The scale was also validated and yielded a reliability coefficient of 0.89. Both instruments employed Likert-type items for interest and multiple-choice items for achievement.

Procedure

Pretest: Both experimental and control groups completed the CRSAT and CRSIS before the intervention to establish baseline scores.

Intervention: The experimental groups were taught using a multimedia instructional package integrating audio, video, text, animations, and interactive exercises. The control groups received conventional lecture-based instruction using chalk-and-talk.

Posttest: After the instructional period, all groups completed the same instruments to measure post-intervention interest and achievement.

Teachers implementing the multimedia package received orientation and training to ensure fidelity of implementation.

Data Analysis

Data were analyzed using descriptive and inferential statistics: Descriptive statistics (mean and standard deviation) were computed to summarize students' posttest interest and achievement scores across the four groups. Two-way

Analysis of Variance (ANOVA) was employed to test the interaction effect of instructional strategies (multimedia vs. conventional) and school location (urban vs. rural) on posttest mean scores for interest and academic achievement.

The main effects of instructional strategy and school location were examined.

The interaction effect (Instruction \times Location) was tested to determine whether the effectiveness of multimedia instruction varies by school location.

Independent samples t-tests were conducted where necessary to explore pairwise comparisons between groups.

All hypotheses were tested at the 0.05 level of significance. Effect sizes

(partial eta squared) were reported for ANOVA to indicate the practical significance of the findings.

Results

Hypothesis 1: There is no significant interaction effect of instructional strategies and school location on CRS students' interest

Table 1: Descriptive statistics on the interaction effect of instructional package and school location on the posttest mean scores of CRS students' interest.

Group	School Location	Mean	Std. Deviation	N
Control	Urban	4.7000	1.30182	22
	Rural	4.7000	.82327	12
	Total	4.7000	1.14921	34
Experimental	Urban	4.6364	.95346	27
	Rural	4.8333	1.26730	16
	Total	4.7059	1.05971	43

The descriptive statistics show that students in the post-control group ($M = 4.70$) and the post-experimental group ($M = 4.71$) reported nearly identical levels of interest. Similarly, students in rural schools ($M = 4.77$) had only slightly higher interest than students in urban schools ($M = 4.67$). Within groups, rural and urban students in the control group had identical mean scores (4.70), while rural students in the experimental group ($M = 4.83$) scored somewhat higher than their urban counterparts ($M = 4.64$). Overall, the results suggest that neither group membership nor school location had a meaningful influence on students' interest levels.

Table 2: Two - way ANOVA on the interaction effect of instructional package and school location on the posttest mean scores of CRS students' interest.

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	.302 ^a	3	.101	.080	.970
Intercept	1277.191	1	1277.191	1020.969	.000
Group	.017	1	.017	.014	.906
School Location	.139	1	.139	.111	.740
Group * School Location	.139	1	.139	.111	.740
Error	75.058	60	1.251		
Total	1491.000	64			
Corrected Total	75.359	63			

a. R Squared = .004 (Adjusted R Squared = -.046)

A two-way ANOVA was conducted to examine the effects of group (post-control vs. post-experimental) and school location (urban vs. rural) on students' interest scores. The overall model was not significant, $F(3, 60) = 0.08$, $p = .970$, $R^2 = .004$, indicating that the factors explained virtually no variance in interest. There was no significant main effect of group, $F(1, 60) = 0.014$, $p = .906$, and no significant main effect of school location, $F(1, 60) = 0.111$, $p = .740$. The interaction between group and school location was also not significant, $F(1, 60) = 0.111$, $p = .740$. This means that students' interest levels were essentially the same regardless of group assignment or school location.

Hypothesis 2: There is no significant interaction effect of instructional strategies and school location on CRS students' academic achievements

Table 3: Descriptive statistics on the interaction effect of instructional package and school location on the posttest mean scores of CRS students' achievement.

Groups	School Location	Mean	Std. Deviation	N
Pre control	Urban	1.1818	.66450	22
	Rural	.6667	.65134	12

	Total	1.0000	.69631	34
Pre experimental	Urban	.8077	.56704	26
	Rural	.9412	.65865	17
	Total	.8605	.60085	43
Post control	Urban	1.7143	.46291	23
	Rural	1.3333	.70711	11
	Total	1.6000	.56324	34
Post experimental	Urban	1.8095	.60159	26
	Rural	1.6923	.75107	17
	Total	1.7647	.65407	43

The descriptive statistics indicate that achievement scores increased from pre-test to posttest for both control and experimental groups, with the post-experimental group ($M = 1.76$) achieving the highest mean. Urban students ($M = 1.34$) scored slightly higher overall than rural students ($M = 1.14$). Within groups, urban students in the pre-control group ($M = 1.18$) outperformed their rural counterparts ($M = 0.67$), whereas rural students in the pre-experimental group ($M = 0.94$) scored marginally higher than urban students ($M = 0.81$). At posttest, both urban and rural students in the experimental group ($M = 1.81$ and 1.69 , respectively) had higher achievement than their peers in the control group ($M = 1.71$ and 1.33 , respectively). Overall, the results suggest that the intervention was associated with higher achievement scores at posttest, and this effect was observed for both urban and rural students, though urban students tended to score slightly higher on average.

Table 4: Two - way ANOVA on the interaction effect of instructional package and school location on the posttest mean scores of CRS students' achievement.

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
--------	-------------------------	----	-------------	---	------

Corrected Model	24.547 ^a	7	3.507	9.107	.000
Intercept	202.137	1	202.137	524.959	.000
Groups	18.992	3	6.331	16.441	.000
Schoolloc	1.520	1	1.520	3.947	.049
Groups * Schoolloc	2.168	3	.723	1.877	.137
Error	51.212	133	.385		
Total	303.000	141			
Corrected Total	75.759	140			

a. R Squared = .324 (Adjusted R Squared = .288)

A two-way ANOVA was conducted to examine the effects of group (pre-control, pre-experimental, post-control, post-experimental) and school location (urban vs. rural) on students' achievement scores. The overall model was significant, $F(7, 133) = 9.107$, $p < .001$, $R^2 = .324$, indicating that 32.4% of the variance in achievement was explained by the factors. There was a significant main effect of group, $F(3, 133) = 16.441$, $p < .001$, with post-experimental students achieving the highest mean scores, followed by post-control, while pretest groups had lower means. A significant main effect of school location was also found, $F(1, 133) = 3.947$, $p = .049$, indicating that urban students performed better on average than rural students. However, the group \times school location interaction was not significant, $F(3, 133) = 1.877$, $p = .137$, suggesting that the positive effect of the intervention on achievement was consistent across both urban and rural settings. The intervention significantly improved achievement, urban students scored slightly higher overall, and the benefit of the intervention was similar in both urban and rural schools.

Discussion of Findings

The finding for the research question One showed no significant interaction effect of instructional

package and school location on posttest interest in CRS. This means that students in both rural and urban schools displayed similar levels of interest

when taught with multimedia. This finding is supported by Okwu (2023) and Nwune et al. (2021), who reported equal levels of interest in creative arts and English when multimedia was applied across rural and urban schools. Mayer's Multimedia Learning Theory (2005) provides a theoretical explanation: since multimedia engagement is cognitive, not geographical, its motivational benefits apply equally to students across contexts. In Nigeria, rural schools are often considered disadvantaged due to poor ICT exposure (Eze et al., 2022). However, this finding has demonstrated that whenever multimedia is introduced to students in the rural and urban schools they are likely to engage at similar levels. Fasuba (2024) emphasized that abstract subjects like CRS especially benefit from visuals and animations, which spark curiosity across settings. Patterson (2023) added that gamified multimedia can generate

interest regardless of school location. the present result suggests that with adequate orientation, multimedia can neutralize such disparities. In conclusion, this finding highlights the potential of multimedia to bridge engagement gaps between rural and urban schools in CRS classrooms.

The finding for the research question two revealed no significant interaction effect of instructional package and school location on CRS students' achievement. Students in both rural and urban schools benefitted equally from multimedia instruction. This result is consistent with Yahaya (2015), Adu-Gyamfi et al. (2021), and Salihu et al. (2015), who reported that multimedia instruction improved achievement equally across urban and rural schools in social studies, chemistry, and geography, respectively. Mayer (2015) also argued that because multimedia enhances internal cognitive processing, its impact is not restricted

by environmental context. This finding is significant in Nigeria, where rural schools often face ICT deficits (Eze et al., 2022). It demonstrates that multimedia can reduce educational inequalities when made available. Okafor and Uche (2023) stressed that multimedia helps bridge learning gaps in abstract subjects, while the present

Conclusion

The study concludes that school location does not significantly influence the effectiveness of multimedia instruction on students' interest or academic achievement in Christian Religious Studies in Edo State. This suggests that multimedia instruction is a location-neutral teaching strategy, equally effective in urban and rural schools, and can provide a uniform learning experience across diverse contexts. The findings indicate that the

study shows that location did not significantly hinder achievement once multimedia was applied. In conclusion, the eighth finding affirms that multimedia is a location-neutral instructional tool that promotes equity in CRS achievement across both rural and urban contexts.

adoption of multimedia approaches can enhance CRS learning outcomes while bridging potential disparities between schools. Multimedia instruction, therefore, remains a viable strategy that benefits both urban and rural learners in CRS contexts.

Recommendations

1. Teachers should integrate multimedia instructional packages into CRS lessons across both urban and rural schools, as their

effectiveness is consistent across locations.

2. Multimedia lessons should be complemented with participatory and interactive activities to sustain student interest.

3. School administrators and policymakers should ensure equitable provision of ICT infrastructure and regular professional development for teachers to optimize multimedia implementation.

4. Curriculum planners should formally incorporate multimedia instructional strategies into CRS syllabus nationwide.

5. Future research should explore additional factors affecting student interest and achievement, such as digital literacy, classroom engagement,

and long-term retention of CRS concepts.

References

- Abdulrahaman, A., Musa, K., & Bello, H. (2020). Effects of multimedia instructional strategies on students' academic performance in selected secondary school subjects in Nigeria. *Journal of Educational Technology and Practice*, 12(4), 45–60.
- Agbaje, A., & Adesina, S. (2021). Quasi-experimental research designs in educational intervention studies. *International Journal of Educational Research Methods*, 8(2), 112–129.
- Ado, T. (2020). Non-equivalent control group design: Application and challenges in educational research. *African Journal of Education Research*, 15(1), 79–92.
- Ajibola, S. T. (2024). Multimedia instructional techniques and learner engagement in secondary schools. *Journal of*

- Curriculum and Instructional Studies*, 9(1), 88–102.
- Adu-Gyamfi, K., Baffoe, M., & Peters, A. (2021). Multimedia instruction and achievement in junior high school social studies. *International Journal of Instructional Media*, 48(3), 191–206.
- Babalola, Y. O., Adeoye, A. O., & Eze, J. C. (2026). ICT infrastructure disparity and classroom technology implementation in Nigerian secondary schools. *Education and Information Technologies*, 31(1), 99–118.
- Eneida, G., & Ude, A. (2024). Impact of multimedia instruction on secondary school biology achievement in Edo State. *Journal of Science Education and Technology*, 33(3), 257–269.
- Eze, P. C., Okeke, L. A., & Nwachukwu, F. (2022). Rural school challenges in ICT access: Implications for instructional innovation in Nigeria. *African Journal of Educational Development*, 10(2), 67–81.
- Fasuba, K. (2024). Instructional approaches and students' performance in Christian Religious Studies: A comparative study. *Nigeria Journal of Curriculum and Teaching*, 11(1), 37–52.
- Journal of Theoretical and Empirical Studies in Education. (2025). Special issue on multimedia learning in education. *Journal of Theoretical and Empirical Studies in Education*, 5(2), 1–150.
- Mayer, R. E. (2021). *Multimedia learning* (3rd ed.). Cambridge University Press.
- Nwune, C., Okoro, V., & Eze, M. (2021). Multimedia learning and students' interest in creative arts across rural and urban schools. *International Journal of Instructional Media*, 46(4), 345–360.
- Okwu, D. (2023). Multimedia interventions and learner interest in English language classrooms. *Journal of*

Educational Psychology and Practice, 7(3), 54–70.

Science Education, 37(14), 2364–2380.

Okafor, J. C., & Uche, I. R. (2023). Analysis of Christian Religious Studies performance in Nigerian senior secondary schools. *West African Journal of Educational Assessment*, 4(1), 23–42.

Okoye, A. (2024). Mobile learning applications and CRS learning effectiveness in Cross River State. *Journal of Emerging Educational Technologies*, 6(1), 77–94.

Patterson, L. M. (2023). Gamified multimedia and student motivation: A meta-analysis. *Computers & Education*, 178, Article 104411.

Salihu, I., Musa, R., & Abdullahi, S. (2015). Effect of multimedia instruction on geography achievement across urban and rural contexts. *Nigerian Journal of Technology in Education*, 9(2), 42–58.

Suleiman, S. (2025). Interactive multimedia and performance in Islamic Studies: Evidence from northern Nigeria. *Journal of Religion and Education Studies*, 8(2), 115–131.

WAEC. (2023). *West African Senior School Certificate Examination chief examiners' report*. West African Examinations Council.

Yahaya, M. (2015). Multimedia instructional strategy and secondary school students' achievement in chemistry. *International Journal of*