EFFECTS OF EDUCATIONAL VIDEOS ON STUDENTS' INTEREST AND ACADEMIC ACHIEVEMENT IN SENIOR SECONDARY SCHOOL CHEMISTRY IN EBONYI STATE

By

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Abstract

This study investigated the effect of educational videos on students' interest and academic achievement in Senior Secondary School Chemistry in Onueke Education Zone of Ebonyi State. The study adopted a quasi-experimental pre-test, post-test non-equivalent control group design. Six research questions and six hypotheses guided the study. The population of the study consisted of 3,964 SS II Chemistry students in public secondary schools in Onueke Education Zone, Ebonyi State. A sample of 93 students (48 experimental and 45 control) was selected using purposive and simple random sampling techniques. The experimental group (23 males and 25 females) was taught selected Chemistry topics using educational video instructional strategy, while the control group (20 males and 25 females) was taught the same topics using the conventional lecture method for a period of four weeks. Two instruments were used for data collection: Chemistry Interest Scale (CIS) and Chemistry Achievement Test (CAT). The instruments were validated by experts in Science Education and Measurement and Evaluation. The reliability of CIS was 0.85 using Cronbach Alpha, while CAT was established using Kuder–Richardson formula 20 (KR-20) which yielded a coefficient of 0.88. Mean and standard deviation were used to answer the research questions, while Analysis of Covariance (ANCOVA) was used to test the hypotheses at 0.05 level of significance. The results revealed that students taught Chemistry using educational videos showed greater interest and achieved significantly higher than those taught using the conventional lecture method. Gender and interaction effects were not statistically significant. Based on the findings, it was recommended that Chemistry teachers should integrate educational videos into classroom instruction to enhance students' understanding, interest, and achievement in Chemistry.

Keywords: Educational Videos, Chemistry Achievement, Student Interest, Senior Secondary School.

Introduction

Education is fundamental to the intellectual and socio-economic development of individuals and nations. It equips learners with knowledge, skills, and competencies necessary for personal advancement and societal progress. In science education, Chemistry occupies a central position because of its relevance to technological advancement, environmental sustainability, medicine, agriculture, and industrial development. Reforming chemistry education will directly impact national progress and problem-solving capacity. Secondary school is the critical stage for building

scientific skills and interest. Modern chemistry education must align with digital and technological advancement in the society. Despite the recognized importance of chemistry, studies revealed a dwindling of students' interest in chemistry leading to poor academic achievement (Igboanugo, 2024).

Students' interest in Chemistry is an important factor influencing learning outcomes. Interest refers to a learner's positive response, curiosity and motivation towards a subject or learning activity. Interest plays a vital role in motivating learners to engage actively in classroom activities and sustain attention during instruction. Thus, student's academic achievement is a function of student's interest. A medium is needed to attract interest that is in line with the characteristics of the students learning (yulia, *e tal*, 2025).

Poor academic achievement in Chemistry has also been consistently reported in external examinations such as WAEC and NECO (WAEC, 2024; Igboanugo, 2024). Udu (2025), reported persistent high failure rates and underperformance in chemistry examinations among secondary school students in developing nations like Nigeria. Researchers such as Aina and Adedoja (2021) and Ogunleye (2020) attribute this persistent low achievement to the dominance of traditional lecture methods that often make abstract chemical concepts difficult for students to comprehend. Conventional teaching approaches typically emphasize teacher explanation with limited visual representation, thereby reducing students' active participation. As a result, students may struggle to understand complex topics such as chemical bonding, reactions, equilibrium, and molecular structures. These challenges suggest the need for instructional strategies that enhance clarity, visualization, and interaction in Chemistry classrooms.

Gender differences have also been examined in science education research to determine whether instructional strategies benefit male and female students differently. However, recent studies such as Okeke and Nworgu (2021) and Ogunleye and Babajide (2022) reported that when innovative and student-centered approaches like multimedia instruction are used, gender differences in achievement and interest tend to reduce or become insignificant. This suggests instructional strategies that provide equitable learning opportunities for all students regardless of gender.

Technology integration in education has emerged as a promising solution to the limitations of traditional instructional methods. Educational videos are multimedia instructional resources that combine audio, visual, and sometimes interactive elements to enhance teaching and learning processes. They are designed to present information through demonstrations, animations, simulations, narration, and visual illustrations to facilitate better understanding of academic content. Educational videos provide visual and auditory representations that make abstract scientific concepts more concrete. According to Hsin and Cigas (2013) and Kay (2019), video-based instruction improves students' comprehension because it combines narration, animation, and demonstration to enhance cognitive processing. Educational videos allow learners to observe experiments, chemical reactions, and laboratory procedures that may otherwise be difficult to demonstrate physically in resource-constrained schools.

In many secondary schools in Nigeria, including those in Onueke Education Zone of Ebonyi State, teaching resources and laboratory facilities are often inadequate. This limitation reduces opportunities for students to engage in practical experimentation, which is essential for effective

Chemistry learning. Educational videos can partially compensate for these infrastructural challenges by demonstrating laboratory experiments, industrial applications, and real-life chemical processes in a cost-effective manner. Studies by Aina (2020) and Eze and Nwafor (2022) show that multimedia instructional tools improve learning outcomes in environments where laboratory equipment and instructional materials are limited.

Educational videos represent a learner-centered strategy that integrates visual demonstrations, explanations, and real-world applications to support effective learning. Therefore, this study investigates the effects of educational videos on students' interest and academic achievement in senior secondary school Chemistry in Onueke Education Zone of Ebonyi State. The findings of this study will provide empirical evidence on the effectiveness of video-based instruction and contribute to improving Chemistry teaching practices in secondary schools.

Despite the importance of Chemistry in scientific advancement and technological development, students' interest and academic achievement in the subject at the senior secondary school level remain relatively low in many schools, including those in Onueke Education Zone of Ebonyi State. The persistent poor performance observed in external examinations and classroom assessments suggests that conventional teaching methods, which are predominantly teacher-centered, cannot adequately promote understanding of abstract Chemistry concepts or sustain students' interest in the subject. This situation calls for the exploration of more effective and engaging instructional strategies that can enhance learning outcomes.

Educational videos have emerged as a promising instructional tool capable of improving visualization, conceptual understanding, and student engagement in science education. Through the integration of audio-visual demonstrations, simulations of chemical reactions, laboratory procedures, and real-life applications, educational videos will provide clearer explanations of complex concepts and stimulate learners' curiosity. However, there is limited empirical evidence on the effectiveness of educational videos in improving students' interest and academic achievement in Chemistry within the context of Onueke Education Zone.

Furthermore, it is not clearly established whether the use of educational videos produces different effects on male and female students or whether gender interacts with instructional method to influence interest and achievement. The absence of sufficient localized research evidence creates a gap that this study seeks to address. Therefore, this study examines the effects of educational videos on students' interest and academic achievements in senior secondary school Chemistry in Onueke Education Zone of Ebonyi State, with particular attention to possible gender differences and interaction effects.

The purpose of this study is to investigate the effect of educational videos on students' interest and academic achievement in Chemistry among senior secondary school students in Onueke Education Zone of Ebonyi State, Nigeria. Specifically, the study sought to determine the:

1. Difference in the mean interest scores of students taught Chemistry using Educational Videos Instruction (EVI) and those taught using Lecture Method (LM).
2. Difference in the mean interest scores of male and female students taught Chemistry using Educational Videos Instruction (EVI) and those taught using Lecture Method (LM).

3. Difference in the mean Interaction effect of instructional methods (EVI & LM) and gender on students' interest scores in Chemistry.
4. Difference in the mean achievement scores of students taught Chemistry using Educational Videos Instruction (EVI) and those taught using Lecture Method (LM).
5. Difference in the mean achievement scores of male and female students taught Chemistry using Educational Videos Instruction (EVI) and those taught using Lecture Method (LM).
6. Difference in the mean Interaction effect of instructional methods (EVI & LM) and gender on students' academic achievement in Chemistry.

Research Questions

The study was guided by the following research questions:

1. What is the mean interest scores of students taught Chemistry using Educational Video Instruction (EVI) and those taught using Lecture Method (LM)?
2. What is the mean interest scores of male and female students taught Chemistry using Educational Video Instruction (EVI) and those taught using Lecture Method (LM)?
3. What is the interaction effects of instructional method (EVI) and (LM) and gender on mean interest scores?
4. What is the mean achievement scores of students taught Chemistry using Educational Video Instruction (EVI) and those taught using Lecture Method (LM)?
5. What is the mean achievement scores of male and female students taught Chemistry using Educational Video Instruction (EVI) and those taught using Lecture Method (LM)?
6. What is the interaction effects of instructional method (EVI) and (LM) and gender on academic achievement scores?

Hypotheses

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

HO1: There is no significant difference in the mean interest scores of students taught Chemistry using Educational Video Instruction (EVI) and those taught using Lecture Method (LM).

HO2: There is no significant difference in the mean interest scores of male and female students taught Chemistry using Educational Video Instruction (EVI) and those taught using Lecture Method (LM).

HO3: There is no interaction effect of instructional methods (EVI & LM) and gender on students' interest scores in Chemistry.

HO4: There was no significant difference in the mean achievement scores of students taught Chemistry using Educational Video Instruction (EVI) and those taught using Lecture Method (LM).

HO5: There is no significant difference in the mean achievement scores of male and female students taught Chemistry using Educational Video Instruction (EVI) and those taught using Lecture Method (LM).

HO6: There is no interaction effect of instructional methods (EVI & LM) and gender on students' academic achievement in Chemistry.

Methodology

This study employed a quasi-experimental design utilizing a pre-test post-test non-equivalent control group approach to investigate the effect of educational videos on senior secondary school students' interest and academic achievement in Chemistry. The quasi-experimental design was considered appropriate because it allowed the researcher to compare an experimental group exposed to educational video instruction with a control group taught using the conventional lecture method without random assignment of students to groups. The use of pre-test and post-test measures enabled the researcher to determine the level of students' interest and achievement before and after the treatment, thereby ensuring that the observed changes could be attributed to the instructional strategy adopted.

The population of the study consisted of all Senior Secondary School Two (SS II) Chemistry students in public secondary schools in Onueke Education Zone of Ebonyi State. The total population comprised 3,964 students distributed across the secondary schools in the zone. A sample of 93 students was selected for the study using a combination of purposive and simple random sampling techniques. Two schools were purposively selected based on accessibility, availability of Chemistry teachers, and similarity in school characteristics. One school was assigned to the experimental group while the other served as the control group. The experimental group consisted of 48 students (23 males and 25 females) who were taught using educational videos, while the control group consisted of 45 students (20 males and 25 females) who were taught using the conventional lecture method. The sampling procedure ensured adequate gender representation for examining gender-related differences in interest and achievement.

Two instruments were used for data collection: The Chemistry Interest Scale (CIS) and the Chemistry Achievement Test (CAT). The CIS was designed to assess students' level of interest and motivation towards learning Chemistry, while the CAT was developed by the researcher to measure students' cognitive understanding and achievement in selected Chemistry topic. Both instruments were validated by experts in Science Education and Measurement and Evaluation from Alex Ekwueme Federal University, Ndufu Alike Ikwo, Ebonyi state. The reliability of the CIS was established using Cronbach's Alpha with a coefficient of 0.85, while the reliability of the CAT was determined using the Kuder-Richardson Formula 20 (KR-20), which yielded a reliability coefficient of 0.88. These coefficients indicated that the instruments possessed adequate internal consistency and were suitable for the study.

The experimental group was taught selected Chemistry topic (chemical reactions) using educational video instructional strategy, which involved the use of carefully selected and curriculum-based instructional videos to illustrate chemical processes, reactions, and laboratory demonstrations. The videos were integrated with guided explanations, discussions, and follow-up activities to enhance students' understanding of abstract concepts. The control group, on the other hand, was taught the same topics using the conventional lecture method, which involved teacher explanation, note-taking, and textbook exercises. Both groups were given the pre-test before the commencement of the instructional treatment and the post-test after a four-week teaching period.

The data collected were analyzed using both descriptive and inferential statistics. Mean and standard deviation were used to answer the research questions, while Analysis of Covariance

(ANCOVA) was employed to test the null hypotheses at a 0.05 level of significance. ANCOVA was used to control for initial differences in the pre-test scores and to determine the statistical significance of the instructional method on students' interest and academic achievement in Chemistry. Gender was also included as a moderating variable to examine its interaction with instructional methods in influencing students' learning outcomes. This methodological approach provided a reliable basis for assessing the effectiveness of educational videos in improving students' interest and achievement in Chemistry.

Results

Research Question One: What is the mean interest scores of students taught Chemistry using Educational Video Instruction (EVI) and those taught using Lecture Method (LM)?

Table 1: Mean interest scores of students taught Chemistry using Educational Video Instruction (EVI) and those taught using Lecture Method (LM)

		Pre-Interest		Post-Interest		
Group	**N**	**Mean**	**SD**	**Mean**	**SD**	**Gained Mean**
Experimental	48	2.70	.20	3.18	.25	0.48
Control	45	2.63	.21	2.92	.24	0.29
Mean Diff		0.07		0.26		0.19

Table 1 reveals that students taught Chemistry using Educational Video Instruction (EVI) had a pre-interest mean score of 2.70 and a post-interest mean score of 3.18 with a gained mean interest score of 0.48, while those in the control group taught with lecture method had a pre-interest mean score of 2.63 and a post-interest mean score of 2.92 with a gained mean of 0.29. Students taught Chemistry using EVI had slightly less homogeneous scores in their post-interest (.25) than those taught using LM (.24). The difference between the gained mean interest scores of the students is 0.19 in favor of EVI.

Research Question Two: What is the mean interest scores of male and female students taught Chemistry using Educational Video Instruction (EVI) and those taught using Lecture Method (LM)?

Table 2: Mean interest scores of male and female students taught Chemistry using Educational Video Instruction (EVI) and those taught using Lecture Method (LM)

			Pre-interest		Post-Interest		
Group	**Gender**	**N**	**Mean**	**SD**	**Mean**	**SD**	**Gained Mean**
Experimental	Male	23	2.69	.20	3.19	.25	0.50
	Female	25	2.71	.21	3.17	.25	0.46
Control	Male	20	2.64	.20	2.93	.24	0.29
	Female	25	2.62	.21	2.91	.23	0.29

Table 2 reveals that the male students taught Chemistry using EVI had a pre-interest mean score of 2.69 and a post-interest mean score of 3.19 with a gain in interest scores of 0.50, while the female students had a pre-interest mean score of 2.71 and a post-interest mean score of 3.17 with a gain in interest scores of 0.46. The difference in the gained mean interest scores of male and

female students is 0.04 with male students having slightly higher interest scores than female students.

Table 2 also reveals that male students taught Chemistry using LM had a pre-interest mean score of 2.64 and a post-interest mean score of 2.93 with a gain in mean interest scores of 0.29, while the female students had a pre-interest mean score of 2.62 and a post-interest mean score of 2.91 with a gain in mean interest scores of 0.29. The difference in gained mean interest scores of the male and female students is 0.00, indicating no meaningful difference in interest between male and female students taught using the lecture method.

Research Question Four: What is the mean achievement scores of students taught Chemistry using Educational Video Instruction (EVI) and those taught using Lecture Method (LM)?

Table 3: Mean achievement scores of students taught Chemistry using Educational Video Instruction (EVI) and those taught using Lecture Method (LM)

		Pre-test		Post-test		
Group	**N**	**Mean**	**SD**	**Mean**	**SD**	**Gained Mean**
Experimental	48	36.10	8.85	72.45	7.21	36.35
Control	45	36.05	8.90	61.80	7.40	25.75
Mean Difference		0.05		10.65		10.60

Table 3 reveals that students taught Chemistry using Educational Video Instruction (EVI) had a pre-test mean achievement score of 36.10 and a post-test mean achievement score of 72.45 with a gained mean achievement score of 36.35, while those in the control group taught with lecture method had a pre-test mean achievement score of 36.05 and a post-test mean score of 61.80 with a gained mean of 25.75. Students taught Chemistry using EVI had slightly less homogeneous scores in their post-test (7.21) than those taught using LM (7.40). The difference between the gained mean achievement scores of the students is 10.60 in favor of EVI.

Research Question Five: What is the mean achievement scores of male and female students taught Chemistry using Educational Video Instruction (EVI) and those taught using Lecture Method (LM)?

Table 4: Mean achievement scores of male and female students taught Chemistry using Educational Video Instruction (EVI) and those taught using Lecture Method (LM)

			Pre-test		Post-test		
Group	**Gender**	**N**	**Mean**	**SD**	**Mean**	**SD**	**Gained Mean**
Experimental	Male	23	36.22	8.70	73.10	7.34	36.88
	Female	25	35.99	9.01	71.82	7.08	35.83
Mean Diff			0.23		1.28		1.05
Control	Male	20	36.11	8.83	62.40	7.25	26.29
	Female	25	35.98	8.95	61.20	7.54	25.22
Mean Diff			0.13		1.20		1.07

Table 4 reveals that male students taught Chemistry using EVI had a pre-test mean achievement score of 36.22 and a post-test mean achievement score of 73.10 with a gain in mean scores of 36.88, while the female students had a pre-test mean achievement score of 35.99 and a post-test mean achievement score of 71.82 with a gain in mean scores of 35.83. The difference in gained mean achievement scores of the male and female students is 1.05 with male students having slightly higher achievement scores than the female students.

Table 4 also reveals that male students taught Chemistry using LM had a pre-test mean achievement score of 36.11 and a post-test mean achievement score of 62.40 with a gain in mean scores of 26.29, while the female students had a pre-test mean achievement score of 35.98 and a post-test mean achievement score of 61.20 with a gain in mean scores of 25.22. The difference in gained mean achievement scores of the male and female students is 1.07 with male students having slightly higher achievement scores than their female counterparts.

4.2 Test of Hypotheses

Hypothesis One: There is no significant difference in the mean interest scores of students taught Chemistry using Educational Video Instruction (EVI) and those taught using Lecture Method (LM),

Hypothesis Two: There is no significant difference in the mean interest scores of male and female students taught Chemistry using Educational Video Instruction (EVI) and those taught using Lecture Method (LM).

Hypothesis Three: There is no interaction effect of teaching methods (EVI & LM) and gender on students' interest scores in Chemistry.

Table 5: ANCOVA of students' overall Mean Interest Scores by Teaching Method (EVI & LM), Gender and Interaction

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Decision
Corrected Model	3.214[a]	4	.804	13.105	.000	
Intercept	12.468	1	12.468	203.121	.000	
Pre-Interest	.060	1	.060	.978	.324	
Group	3.041	1	3.041	49.589	.000	Sig.
Gender	.008	1	.008	.130	.719	Not Sig.
Group * Gender	.001	1	.001	.010	.920	Not Sig.
Error	11.784	87	.061			
Total	1832.542	93				
Corrected Total	14.998	92				

Table 5 shows that there is a significant mean effect of Educational Video Instruction on students' interest in Chemistry **F (1, 87) = 49.589, P = 0.000 < 0.05.** Therefore, the null hypothesis was rejected, meaning that there was a significant difference between the pre-interest and post-interest

mean scores of students taught Chemistry using Educational Video Instruction (EVI) and those taught using Lecture Method (LM) in favor of EVI.

Table 5 also shows that there is no significant main influence of gender on students' interest in Chemistry **F (1, 87) = 0.130, P = 0.719 > 0.05.** Therefore, the null hypothesis was not rejected, meaning that there was no significant difference between the pre-interest and post-interest mean scores of male and female students taught Chemistry using Educational Video Instruction (EVI) and those taught using Lecture Method (LM).

Table 5 further shows that there is no interaction effect of teaching methods and gender on students' interest in Chemistry **F (1, 87) = 0.010, P = 0.920 > 0.05.** Therefore, the null hypothesis was not rejected, indicating that there was no significant interaction effect of instructional methods and gender on students' interest in Chemistry.

Hypothesis Four: There is no significant difference in the mean achievement scores of students taught Chemistry using Educational Video Instruction (EVI) and those taught using Lecture Method (LM).

Hypothesis Five: There is no significant difference in the mean achievement scores of male and female students taught Chemistry using Educational Video Instruction (EVI) and those taught using Lecture Method (LM).

Hypothesis Six: There is no interaction effect of teaching methods (EVI & LM) and gender on students' achievement in Chemistry.

Table 6: ANCOVA of students' overall Mean Achievement Scores by instructional method (EVI and LM), Gender and Interaction

Source	Sum of Squares	Df	Mean Square	F	Sig.	Decision
Corrected Model	6450.318[a]	4	1612.580	31.214	.000	
Intercept	43852.641	1	43852.641	849.572	.000	
Pre-Test	510.824	1	510.824	9.892	.002	
Group	5928.472	1	5928.472	114.812	.000	Sig.
Gender	152.137	1	152.137	2.947	.088	Not Sig.
Group * Gender	.314	1	.314	.006	.937	Not Sig.
Error	9910.204	87	51.615			
Total	925640.000	93				
Corrected Total	16360.522	92				

Table 6 shows that there is a significant mean effect of Educational Video Instruction in Chemistry **F (1, 87) = 114.812, P = 0.000 < 0.05.** Therefore, the null hypothesis was rejected, indicating that there is a significant difference between the pre-test and post-test mean achievement scores of students taught Chemistry using Educational Video Instruction (EVI) and those taught using Lecture Method (LM) in favor of EVI.

Table 6 also shows that there is no significant main influence of gender on students' achievement in Chemistry **F (1, 87) = 2.947, P = 0.088 > 0.05**. Therefore, the null hypothesis was not rejected, meaning that there was no significant difference between the pre-test and post-test mean achievement scores of male and female students taught Chemistry using Educational Video Instruction (EVI) and those taught using Lecture Method (LM).

Table 6 further shows that there is no interaction effect of teaching methods and gender on students' achievement in Chemistry **F (1, 87) = 0.006, P = 0.937 > 0.05.** Therefore, the null hypothesis was not rejected, indicating that there was no significant interaction effect of instructional methods and gender on students' academic achievement in Chemistry.

Discussion

The study revealed that the use of educational videos significantly increased students' interest in Chemistry. Students exposed to Educational Video Instruction demonstrated higher interest than those taught through the lecture method. This suggests that educational videos can stimulate curiosity, improve students' engagement, and make Chemistry lessons more attractive and enjoyable. The interactive and illustrative nature of video-based learning environments likely captured students' attention and motivated them to participate more actively during the learning process. When students observe chemical reactions, experiments, and real-life applications through video demonstrations, they are more likely to develop a positive attitude toward the subject.

This finding is in agreement with the studies of Dike (2020) and Eze and Nwafor (2022) who reported that the integration of video-based instructional materials significantly enhances students' interest and motivation in science subjects.

In addition, the study revealed that gender had no significant influence on students' interest in Chemistry. Male and female students demonstrated similar levels of interest in Chemistry when taught using educational videos. This suggests that educational videos have the potential to create inclusive and engaging learning environments that appeal equally to both genders.

This finding agrees with the work of Ezeudu and Obi (2020) who reported that multimedia instructional approaches promote equal participation and interest among male and female students in science classrooms.

The findings of this study revealed that the use of educational videos significantly improved students' academic achievement in Chemistry among senior secondary school students in Onueke Education Zone of Ebonyi State. Students who were taught using Educational Video Instruction (EVI) performed better in the Chemistry Achievement Test than those taught using the conventional lecture method. This indicates that the integration of audiovisual instructional materials enhances students' understanding of abstract Chemistry concepts, improves retention, and facilitates meaningful learning. The visual demonstrations, animations, and real-life representations provided through educational videos may have helped students to visualize complex chemical processes, thereby improving their interest, comprehension and academic performance. This finding aligns with the constructivist learning theory which emphasizes active engagement and the use of multiple representations in learning (Bruner, 1966; Mayer, 2021).

The findings also revealed that gender had no significant influence on students' academic achievement in Chemistry. Although slight differences were observed between male and female students, the differences were not statistically significant. This implies that both male and female students benefited equally from the use of educational videos in Chemistry instruction. The result suggests that video-based instructional strategies provide equal learning opportunities for all students irrespective of gender.

Furthermore, this finding supports the studies of Okeke and Nworgu (2021) and Ogunleye and Babajide (2022) who reported that gender does not significantly influence students' academic achievement in science when innovative teaching strategies are used.

Finally, the study found no significant interaction effect between instructional method and gender on students' interest and academic achievement in Chemistry. This indicates that the effectiveness of educational video instruction in improving interest and achievement in Chemistry is consistent for both male and female students. The absence of interaction effect suggests that the strategy is universally beneficial and can be adopted across different student groups.

This finding corroborates the results of Nwafor (2022) and Okafor and Eze (2023) who reported that innovative instructional strategies in science education are generally effective across gender groups. However, the finding contradicts Olatoye (2019) who reported that gender may interact with instructional methods to influence students' academic performance in science subjects.

Overall, the findings of this study demonstrate that the integration of educational videos into Chemistry instruction can significantly improve students' academic achievement and interest while providing equal learning opportunities for both male and female students. The results therefore underscore the importance of incorporating multimedia instructional strategies into secondary school Chemistry teaching to enhance students' learning outcomes.

Conclusion

Based on the findings of this study, it was concluded that the use of educational videos is an effective instructional strategy for improving students' interest and academic achievement in Chemistry at the senior secondary school level. Educational videos enhance students' understanding of abstract Chemistry concepts by providing visual demonstrations and real-life illustrations that make learning more meaningful and engaging.

The study also concluded that educational video instruction benefits both male and female students equally, as gender did not significantly influence students' interest and achievement when the strategy was used. Therefore, integrating educational videos into Chemistry teaching can create a more interactive and stimulating learning environment that promotes increased interest and better academic performance in the subject. Consequently, the adoption of educational video-based instructional strategies in secondary school Chemistry classrooms can contribute significantly to improving the quality of science education and students' learning outcomes.

Recommendations

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

1. School administrators and government agencies should provide adequate technological facilities such as projectors, computers, internet access, and multimedia equipment to support the effective use of educational videos in classroom instruction.
2. Teachers should be provided with regular training, workshops, and professional development programmes on the effective use of educational videos and other multimedia instructional tools to improve the quality of Chemistry teaching and learning.

Contributions to knowledge

1. This study provides sufficient localized research evidence for scholars, researchers, policymakers, curriculum developers, etc.
2. This study provides a position on whether Educational videos produce effects on gender, interactions, interest and academic achievement.

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