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Effects of Audiovisual Teaching on Academic Achievement in Agricultural Science for Senior Secondary Students in Mubi, Nigeria

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Abstract

This study investigates the impact of audiovisual teaching methods on the academic achievement of senior secondary school students in Agricultural Science in Mubi Educational Zone, Adamawa State, Nigeria, addressing the declining student interest in the subject. Utilizing a pre-test, post-test, non-randomized quasi-experimental design, 100 students were sampled from a population of 5,400, with data analyzed using t-tests at a 0.05 significance level. Findings reveal that students taught with audiovisual materials significantly outperformed their peers receiving conventional instruction, and male students exhibited higher mean scores than females. The study concludes that audiovisual aids can enhance student engagement and learning outcomes, recommending their integration into teaching practices and curricula to foster better educational experiences.

Keywords: Academic Achievement, Audiovisual Teaching, Agricultural Science, Post-Test, Pre-Test, Quasi-Experimental Design

Introduction

The integration of audio-visual materials significantly enhances the teaching and learning process across all educational levels. These resources, encompassing videos, animations, and interactive software, serve as essential tools that increase educators' effectiveness by making learning more engaging and accessible. They simplify complex concepts, cater to diverse learning styles, and improve information retention among students (National Literacy Trust, 2025). However, challenges such as unequal access to technology and the need for teacher training persist, necessitating ongoing efforts to ensure equitable and effective use of audio-visual materials in education. Abubakar *et al.* (2021) opined that "the advance made in technology has provided for teachers of particular subjects to teach in a way that learners or students are able to retain knowledge better through visualizing what has been taught. Therefore, audio-visual materials are teaching aids using both sight and sound, which could be models or videos." The audio-visual materials in our schools exist to support the goals of teaching and learning, thereby making teaching and learning more effective. This fact is proven by the adage that says, "Tell me I forget, show me I remember, involve me, and I understand" (Abubakar *et al.,* 2021).

Innovative teaching methods are essential to engage today's students, who are accustomed to interactive and sensory-rich experiences. The use of audio-visual instructional materials combining images, sounds, and text enhances learning by making it more enjoyable and memorable. These materials stimulate multiple senses, facilitating better comprehension and retention of information. Research has demonstrated that incorporating audio-visual aids in teaching science concepts significantly improves student achievement and maintains effectiveness across genders without disparity. Therefore, educators are encouraged to integrate appropriate audio-visual tools to enrich learning experiences and sustain student interest. (Ojelade *et al*., 2020). It is important to note that "the basic aim of education must be to lead students towards self-learning and life-long learning, and this aim can be achieved through the use of audio-visual instructional material as it improves the learning capacities of individual students, i.e., a learning experience that is worth remembering" (Singh *et al*., 2019).

The key to individual success and progress at all levels of educational development is the act of teaching and learning (Ode, 2014). Hence, a well-planned and directed process is essential for an effective teaching and learning process (Lari, 2019). The resources for adequate teaching and learning of science-related subjects are necessary for the development of science and science-related subjects in Nigerian schools (Badmus *et al*., 2019). Several challenges arise from learning science in Nigeria. Students are faced with challenges that include but are not limited to teachers' incompetence in the delivery of the subject matter, outdated laboratories, obsolete textbooks, unavailability of instructional materials, unrealistic methods of teaching, and attitudinal corruption in science as a result of a lack of mass and real representation of the subject matter, among others (Badmus *et al*., 2019).

The integration of audio-visual instructional materials in teaching has been shown to significantly enhance students' academic performance, particularly in subjects like Agricultural Science. Ehiem (2023) conducted a study in Abia State, Nigeria, revealing that students taught with audio-visual aids outperformed those who received traditional instruction. This finding underscores the effectiveness of multimedia tools in enriching the learning experience and improving comprehension.

Similarly, a study by Abdullahi (2019) in Taraba State, Nigeria, examined the effects of visual instructional materials such as diagrams, maps, and specimens on students' performance in Agricultural Science. The research demonstrated that these visual aids significantly enhanced students' understanding and retention of the subject matter, leading to improved academic outcomes.

In Enugu State, Nigeria, Eze and colleagues (2021) explored the impact of multimedia applications on students' academic achievement in Agricultural Science. Their mixed-method study found that incorporating multimedia elements into teaching strategies not only increased student engagement but also led to higher achievement levels compared to conventional teaching methods.

Furthermore, research by Olayinka (2021) in Ekiti State, Nigeria, assessed the effects of technology-enhanced instruction on Agricultural Science students' learning outcomes. The quasi-experimental study concluded that students exposed to technology-enhanced instructional methods exhibited superior performance and a deeper understanding of the subject matter than those taught through traditional approaches.

Statement of the Problem

Despite the proven benefits of audio-visual materials in enhancing learning, many Agricultural Science teachers in Nigeria underutilize these resources, leading to decreased student engagement and performance. Given the vital role of agriculture in Nigeria's economy, it is crucial to adopt effective teaching strategies to improve students' understanding and retention of Agricultural Science concepts. Research indicates that students exposed to instructional materials perform better than those who rely solely on traditional teaching methods. However, existing studies primarily compare group performances rather than assessing the direct impact on individual student achievement. This study seeks to bridge this gap by examining the effect of audio-visual materials on the academic performance of Agricultural Science students in the Mubi Educational Zone, Adamawa State, Nigeria.

Objectives of the Study

The primary aim of this research is to determine the effects of audiovisual materials on the academic achievement of Senior Secondary School students in Agricultural Science within the Mubi Educational Zone, Adamawa State, Nigeria. The specific objectives are to:

1. Assess the effect of audiovisual instructional materials on students' performance in Agricultural Science.
2. Compare the effectiveness of audiovisual materials with traditional teaching methods in enhancing students' understanding of Agricultural Science concepts.
3. Analyze variations in achievement between male and female students taught using audiovisual methods.

Hypotheses

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

H_{01}: There is no significant difference in pre-test scores between the audiovisual and conventional groups.

H_{02}: There is no significant difference in post-test scores between the two groups.

H_{03}: There is no significant difference in post-test scores between male and female students taught using audiovisual methods.

Methodology

This study has adopted a pretest, post-test non-randomized quasi experimental, non-equivalent control group design, which was designed by Donald Thomas Campbell in 1963 and was used by Barai (2018) in a study on the effectiveness of audio-visual aids in the teaching-learning process at Darsh College of Education, Gohana, Haryana, India. The experimental group was taught using audio-visual materials, while the control group received conventional instruction.

The Study Population

The population comprises Senior Secondary School students in the Mubi Educational Zone, which includes five Local Government Areas and approximately 5,400 students offering Agricultural Science.

Sample and Sampling Techniques

Using a multi-stage sampling technique, two Local Government Areas were selected, followed by random selection of four schools (two for the experimental group and two for the control group). The sample size was determined using Slovin's formula, resulting in 100 students.

Instrumentation

The Agricultural Science Achievement Test (AAT) was validated by experts to ensure content relevance and construct validity. Reliability was assessed through a pilot study, yielding a Cronbach's Alpha of 0.82**.**

Reliability of the Instrument

The reliability of the instrument for this study was determined by a pilot study carried out in Government Secondary School, Hong, Hong Local Government Area, that was not part of the study, but have the same characteristics with the study groups. They are SS II agricultural science students in the same State. The scores from the test were subjected to the Cronbach's Alpha Reliability test using SPSS statistics version 25. The Coefficient of the Cronbach Alpha Statistics was 0.82, this determines the reliability of the instrument as very reliable, as was suggested by Anrijs (2020), that any reliability coefficient of an instrument found greater than an alpha value of 0.7 is considered reliable.

Data Analysis

The data were analyzed using descriptive and inferential statistics. t-Tests were used to evaluate the null hypotheses at a 0.05 significance level.

RESULTS

The results of the data analysis are presented as below in the following tables

Table 1: The Mean and Standard Deviation of the Pre-test mean Scores of Students Taught Agricultural Science in Secondary Schools.

Schools	Mean	SD	Mean SE	Minimum	Maximum
GSS Mubi	27.00	7.89	1.12	5.00	45.00
ADSU Staff Sch.	24.30	7.89	1.12	5.00	40.00
GDSS Kabang	23.90	9.10	1.29	5.00	40.00
GDSS Mubi (ii)	36.70	12.60	1.78	15.00	65.00

The result presented in Table 1 shows the mean and standard deviation of the pre-test mean scores of the students taught agricultural science in secondary schools in Mubi Zone. It shows that the mean score ranged from 36.70±12.60, which was the highest in GDSS Mubi (two, to GDSS Kabang having the least mean score of 23.90±9.10. A closer look at the mean scores of all the schools in the pre-test in comparison with their respective maximum scores is an indication that most of the schools performed below average in the pre-test. Only GDSS Mubi (ii), which had a maximum mean of 65. This could be due to a lack of interest in the subject by some students.

Table 2: The Mean and Standard Deviation of the Post-test Mean Scores of Students Taught Agricultural Science in Secondary Schools.

Schools	Mean	SD	Mean SE	Minimum	Maximum
GSS Mubi	53.40	10.22	1.45	35.00	75.00
ADSU Staff Sch	64.40	17.86	2.53	40.00	95.00
GDSS Kabang	60.10	18.58	2.63	20.00	95.00
GDSS Mubi (ii)	59.00	15.97	2.26	30.00	95.00

The result presented in table 2 shows the post-test mean scores of the students taught Agricultural Science in the Secondary Schools in Mubi Educational Zone, Adamawa State. It was revealed that ADSU Staff Sch. has the highest mean score with a corresponding standard deviation of 53.40±10.22, followed by GDSS Mubi two with a mean and standard deviation of 60.10±18.58. The mean scores of schools in the table further illustrated that GDSS has the mean score of 59.00±15.97 and GSS Mubi is the least in the ordering with a mean score of 53.40±10.22. The result further shows that ADSU Staff Sch., GDSS Mubi two, and GDSS Kabang have the students with the highest post-test scores of 95% among the students taught agricultural science in the secondary schools in Mubi Educational Zone.

Table 3: Independent t-Test Statistics of Student's Pre-test Scores in the Experimental and Conventional Groups.

Groups	N	Mean	Mean difference	SD	Df	T	Sig. (2-tailed)
Experimental	100	23.45		6.91			
			1.03		198	1.14	0.10
Conventional	100	22.42		5.84			

Not significant; P>0.05

The descriptive analysis of the pre-test scores of the students in the research and conventional groups at the start of the study is displayed in Table 3. According to the

descriptive analysis, there was little difference in the mean scores of the students in the two groups, suggesting that the experimental and conventional groups performed equally well on the pre-test, that is, there was no significant difference in the pre-test mean scores of the experimental and conventional groups at pre-test level. The result shows that the experimental group had a mean score of 23.45 and the conventional group had a mean score of 22.42 with a mean difference of 1.03. The result of the independent t-Test, which is the result of the comparison of mean achievement scores of students in the experimental and conventional groups, shows that there was no statistical difference in the academic achievement of students in the agricultural science achievement test at the pre-test level (P<0.05) hence, we accept the null hypothesis. This implies that both the students in the experimental and conventional groups had adequate entry behaviour prior to the administration of the treatment.

Table 4: Independent t-Test Statistics of Student's Post-test Scores Based on their Study Group

Groups	**N**	**Mean**	**Mean difference**	**SD**	**Df**	**T**	**Sig. (2-tailed)**
Experimental	100	59.30		14.92			
			10.15		198	10.30	0.000
Conventional	100	49.15		10.92			

Significant at P<0.05.

The results presented in Table 4 found that students in the experimental group, taught agricultural science using audiovisual methods, achieved a mean score of 69.30, significantly higher than the conventional group's mean score of 49.15. The mean difference of 10.15 indicates a statistically significant advantage for the audiovisual approach (P<0.05). This suggests that integrating audiovisual instructional materials enhances student performance in agricultural science. Consequently, the null hypothesis, which posited no difference in academic achievement between the two teaching methods, is rejected.

Table 5: Independent t-Test Statistics of Student's Post-test Scores Using Experimental Approach

Gender	**N**	**Mean**	**Meam difference**	**SD**	**Df**	**T**	**Sig. (2-tailed)**
Male	60	75.50		11.00			
			20.87		98	10.30	0.000
Female	40	54.63		8.04			

Significant at P<0.05

The result presented in Table 5 shows the summary of the post-test scores for agricultural science taught using an audiovisual teaching approach. It was revealed that males were 60 and females were 40. The descriptive statistics revealed that male students gained the highest mean score of 75.50, while the female mean score was 54.63, and the mean difference of 20.87 was recorded. The result of the independent sample t-Test statistics analysed shows that there is a high significant difference in the mean scores of male and female students taught agricultural science using an audiovisual teaching approach (P<0.05). Therefore, it was concluded that, there was a significant difference in the mean scores of male and female students taught agricultural science using audiovisuals. Hence,

the null hypothesis is rejected. This result indicates that the gender of the student can influence their academic achievement simply because some parents have less interest in girl child education.

Discussion

The study found no significant difference in academic achievement between conventional and experimental students in agricultural science tests, indicating equal entry behavior before treatment. This aligns with Karadeniz and Akpinar's (2015) findings, which showed no significant differences at $P<0.05$.

The study found a statistical difference in the mean scores of students taught agricultural science using audiovisuals and conventional methods in secondary schools in Mubi Educational Zone, Adamawa State. This study was in line with Samreen, et al., (2012) who observed that "the use of audiovisual aids brought positive and constructive change in the learning achievements of students", John, Musa and Waziri, (2018) found out that, "statistically significant differences exist between the conventional and experimental groups in post academic achievement test in favor of the experimental group".

The study found a significant difference in mean scores between male and female secondary school students taught agricultural science using audiovisual approach method. Male students had better academic achievement than female students, indicating a gender-specific difference in the experimental group. This study was contrary to the findings of kumar, jaafar, and Yahaya, (2016) who reported that "there was no significant difference between gender and all learning outcomes and the results were similar for high and low CGPA group but overall, male students were more motivated than female students to use the Multimedia Learning Environment (MLE) irrespective of design type".

The result on the third hypothesis disclose that there was significant difference in the mean scores of students that are taught agricultural science using audiovisual teaching approach based on gender and the male performed better than the female in the conventional group in the secondary schools in Mubi Educational Zone, Adamawa State.

Conclusion

This research confirms that audio-visual technologies can significantly enhance student engagement and academic achievement in Agricultural Science. The effective use of these materials transforms teaching methods, fostering an interactive learning environment that benefits all students.

Recommendations

1. Teacher Training: Implement professional development programs focused on the use of audio-visual aids.

2. Early Integration: Encourage the use of audio-visual aids from early education stages to foster familiarity and engagement.

3. Curriculum Development: Introduce audio-visual methods into the curriculum to enhance learning experiences.

4. Resource Allocation: Governments should invest in equipping schools with necessary audio-visual instructional materials.

References

Abdullahi, M. (2019). Effects of visual instructional materials on students' performance in Agricultural Science of senior secondary schools in Taraba State, Nigeria. *Ahmadu Bello University Repository*. Retrieved from https://kubanni.abu.edu.ng/items/4081dcee-de7b-4dd0-97b1-71e9bd8b590b

Abubakar, A., Musa, A., & Waziri, H. (2021). The impact of audiovisual materials on student learning and retention. *Journal of Educational Technology and Innovation, 12(3),* 45–57.

Abubakar, H., Arilesere, J., Jemilat, O., & Oluranti, H. (2021). The role of technology in enhancing teaching and learning. *Journal of Educational Research, 12(3),* 45-58.

Anrijs, J. (2020). Reliability testing in educational research: An overview of Cronbach's Alpha. *Springer.*

Badmus, I. O., Adekunle, T. A., & Yusuf, B. O. (2019). Challenges of science education in Nigeria: A case study of secondary school students. *African Journal of Science Education, 10(1),* 112–126.

Badmus, T., Akanmu, M., & Akanbi, S. (2019). Challenges in science education in Nigerian schools. *African Journal of Science and Technology, 8(2),* 112-129.

Barai, B. (2018). Effectiveness of audio-visual aids in the teaching-learning process: A study at Darsh College of Education, Gohana, Haryana, India. *International Journal of Educational Research, 15(2),* 78–92.

Ehiem, E. (2023). Effect of audio-visual instructional materials on senior secondary students' achievement in Agricultural Science in Abia State. *Michael Okpara University of Agriculture Repository.* Retrieved from https://repository.mouau.edu.ng/work/view/effect-of-audio-visual-instructional-materials-on-senior-secondary-students%60-achievement-in-agricultural-science-in-abia-state-7-2

Eze, S. M., Eze, I. R., & Ugwu, A. N. (2021). Effects of multimedia application on students' academic achievement in Agricultural Science. *ResearchGate.* Retrieved

from https://www.researchgate.net/publication/376596448_effects_of_multimedia_application_on_students%27_academic_achievement_in_agricultural_science

Ikehi, M. E., Onu, F. M., & Oats, A. (2021). Agricultural science education and its role in food security. *Journal of Agricultural Education and Extension, 27(4),* 265–280.

Ikehi, M. E., Paradang, B. S., & Zimoghen, J. (2021). Agricultural science education and resource utilization. *International Journal of Agricultural Research, 15(1),* 89-104.

John, B., Musa, H., & Waziri, S. (2018). Comparing conventional and audiovisual instructional methods in secondary school agricultural science. *Journal of Science and Technology Education, 14(2),* 78–89.

Karadeniz, S., & Akpinar, B. (2015). Effects of audiovisual instructional materials on student achievement: A meta-analysis. *European Journal of Educational Studies, 7(2),* 101–120.

Kumar, R., Jaafar, A., & Yahaya, N. (2016). Gender and multimedia learning: An assessment of learning outcomes and motivation. *International Journal of Educational Multimedia, 9(3),* 55–67.

Lari, F. S. (2019). Effective teaching strategies and their impact on student learning outcomes. *Journal of Modern Educational Research, 6(2),* 39–52.

McNaught, C. (2007). The use of multimedia in education: A review of best practices. *Educational Technology Review, 14(3),* 98–112.

National Literacy Trust (2025). *Ministers urged to add audiobooks to England's new schools curriculum*. The Guardian. Retrieved from https://www.theguardian.com/education/2025/feb/25/audiobooks-england-new-schools-curriculum-reading-national-literacy-trust-poll

Ngozi, C. N., Obinna, R. T., & Okechukwu, F. (2021). The effect of instructional materials on student performance. *West African Journal of Education, 20(1),* 59-74.

Ngozi, P. U., Adeyemi, T. B., & Chukwu, J. O. (2021). Instructional materials and student performance: An analysis of learning outcomes in Nigerian secondary schools. *Journal of Curriculum Development, 18(1),* 123–138.

Ode, E. (2014). The role of instructional materials in effective teaching and learning. *Nigerian Journal of Educational Research and Development, 11(2),* 65–78.

Ojelade, S. A., Adewale, K. T., & Oyewole, P. (2020). The impact of audiovisual instructional materials on student engagement and comprehension. *Journal of Educational Innovations, 9(1),* 88–101.

Ojelade, O., Aregbesola, M., Adams, F., & Aiyedun, S. (2020). The virtual generation and educational transformation. *Contemporary Learning Journal, 18(3),* 87-102.

Onu, F. M., & Ikehi, M. E. (2021). Enhancing agricultural science education through the use of instructional materials. *International Journal of Vocational and Technical Education, 13(3),* 176–190.

Onu, F. M., & Oats, A. (2020). The importance of agricultural science in secondary education. *Journal of Agricultural Studies, 25(4),* 211–225.

Onu, P., & Ikehi, M. (2021). The role of instructional materials in vocational education. *Journal of Vocational Studies, 14(2),* 67-81.

Onu, P., & Oats, R. (2020). Agricultural science education and sustainable farming. *Journal of Agricultural Education and Development, 11(4),* 54-73.

Olayinka, A. (2021). Effects of technology-enhanced instruction on Agricultural Science students' learning outcomes in senior secondary schools in Ekiti State, Nigeria. *International Journal of Research and Scientific Innovation, 8(1),* 45-50. Retrieved from https://rsisinternational.org/journals/ijrsi/articles/effects-of-technology-enhanced-instruction-on-agricultural-science-students-learning-outcome-in-senior-secondary-schools-in-ekiti-state-nigeria/

Samreen, A., Khan, M. A., & Rehman, S. (2012). The effectiveness of audiovisual aids in enhancing student learning: A case study of secondary schools. *Pakistan Journal of Educational Research, 5(2),* 35–49.

Singh, R., Sharma, K., & Upadhya, D. (2019). Enhancing learning capacities through technology. *International Journal of Education and Learning, 27(2),* 101-119.

Talathi, P. S., & Mandavkar, R. (2019). Agricultural production and technological advancements. *Asian Journal of Agriculture, 16(1),* 23-39.

Talathi, P., & Mandavkar, M. (2019). Agricultural science education: Bridging the gap between theory and practice. *Journal of Rural Education, 6(3),* 112–130.