Journal of Pedagogy and Education Science (JPES)
Vol. 3, No. 02, pp. 115-125
journal.iistr.org/index.php/JPES
DOI: 10.56741/jpes.v3i02.523

Effect of the Powerpoint Presentation on Academic Achievement of Agricultural Students Taught Digestive System of Animals in Nigeria

[1]Egunsola Abraham Olawuyi Emmanuel, [1]Felix Ferdinand, [1]Isaac John Ibanga*
Corresponding Author: *isaacjohn@mau.edu.ng
[1] Modibbo Adama University, Yola, Adamawa State, Nigeria

ARTICLE INFO

Article history
Received 8 February 2024
Revised 17 March 2024
Accepted 20 March 2024

ABSTRACT

This study investigated the effect of using PowerPoint presentations (PPP) as an instructional medium on the academic achievement of agricultural students in secondary schools in Adamawa State, Nigeria. The study employed a pre-test, post-test, non-equivalent control group quasi-experimental research design, with 88 students from secondary school as the sample. The participants were divided into an experimental group taught with PPP and a control group taught using conventional methods. An achievement test on the digestive system of animals was administered before and after the intervention. The data were analyzed using mean statistics and t-tests. The findings revealed that students with PPP achieved significantly higher academic scores than those taught using conventional methods. Furthermore, the male students outperformed their female counterparts in both groups. The results highlighted the effectiveness of PPP in capturing students' interest and enhancing academic performance in agricultural science. The study's outcomes align with previous research, emphasizing the benefits of using modern educational media for instructional purposes. In conclusion, the study recommends a shift from conventional teaching methods to educational media like PPP to enhance learning outcomes in agricultural science. Incorporating PPP into teaching can engage students' senses and promote a deeper understanding of the subject matter. The results also indicate that gender plays a role in academic achievement, suggesting the need for targeted interventions to support female students in their learning journey. Overall, the study underscores the potential of technology-based instructional

approaches to improve students' academic achievements in secondary schools.

This is an open-access article under the CC–BY-SA license.

Keywords
Academic Achievement
Agricultural Students
Digestive System
PowerPoint Presentation
Secondary Schools

Introduction

Secondary education, also known as post-basic education, comprises senior secondary education (three years). Post-basic education is a priority for developing countries, including various educational activities that meet basic learning needs. The subjects in post-basic schools in Nigeria are majorly grouped as science, vocational and technical, commercial, and arts. As a secondary school subject, agricultural science seeks to teach students how to use scarce resources to produce crops and animals to feed the world's population and service other related uses. Agricultural science largely applies scientific principles for the successful production of crops and livestock and additional uses for man's benefit [1]. The teaching and learning of vocational studies and skilled-based sciences such as agricultural science have often called for educational media during content delivery to aid learners' learning pace and retention.

Ref. [2] states teaching is "helping other people to learn." This makes teaching one of the most important ways that enable students to relate to one another regarding knowledge acquisition, while Ref. {3] define learning as experience gained through modification. Meanwhile, teaching and learning require the intensive application of resources that would appeal to all the senses of perception to improve the effectiveness of instruction and maximize learning. According to Ref. [4], science teaching and learning can only be meaningful and effective if backed up by the necessary resources to enrich instruction. Ref. [5] states that instructional delivery approaches have also been known to influence students' academic achievement. No wonder Ref. [6] recommended that the teaching of agricultural science should be practical, exploratory, and experimental. It recommends using modern educational mediums to communicate science and scientific concepts to the learners. The use of PowerPoint presentations (PPP) would probably enhance students' achievement in agricultural science.

PowerPoint is an application program for presentation. It consists of slides, allowing the user to present messages [7]. Information prepared on a computer could be better

projected for a larger audience using a Liquid Crystal Display (LCD). PowerPoint presentations could be used in the classroom to support student learning by combining computers and a projector to display slides for illustrating a lesson. The potential of PowerPoint includes its ability to do spell check, allowing the user to add, correct, and make changes to the lessons, and finally, use printout materials for students' personal use [8].

PowerPoint allows the user to incorporate visual and audio aspects of the presentation. It permits a variety of manipulations by editing or text modification, removing existing slides, and adding new slides to make teaching and learning more organized and flexible. PPP can be regarded as an excellent instructional medium and a key for facilitating an effective teaching-learning process.

A. Statement of the Problem

Secondary education is an underlying solid foundation upon which other higher levels of education will be built. The task team's report for the review of the implementation of the Nigerian curriculum in Ref. [9] stipulates the use of technology and practical educational mediums. This, however, is in practice in the use of educational media by teachers that encourage the regurgitation of facts by learners, especially in agriculture science. The problem of this study was that it is not sure whether the use of PowerPoint presentation, which is relatively new and the conventional teaching method that has always been in existence, will be more effective in teaching and learning about the digestive system of animals in secondary schools in Adamawa State as the globe is drifting toward the use of educational media.

B. Purpose of the Study

The study's primary purpose was to determine the effect of PowerPoint presentations on the academic achievement of Agricultural students taught a digestive system of animals in secondary schools in Adamawa State. The study specifically sought to:

1. Determine the mean achievement score of students when taught a digestive system of animals using PowerPoint presentations and conventional teaching methods in Adamawa State secondary schools.
2. Determine the mean achievement score of students based on gender when teaching a digestive system of animals using PowerPoint presentations and conventional teaching methods in Adamawa State secondary schools.

C. Research Questions

The research work answered the following questions:

1. What are the mean achievement scores of students when taught the digestive system of animals using conventional methods of teaching and PowerPoint presentations in secondary schools in Adamawa State?

2. What are the mean achievement scores of students based on gender when taught a digestive system of animals using conventional

D. Hypothesis

Ho1. There is no significant difference in the mean achievement score of students when taught a digestive system of animals using PowerPoint presentations and conventional teaching methods in Adamawa State secondary schools.

Ho2. There is no significant difference in the mean score of students on gender when taught a digestive system of animals using PowerPoint presentations and conventional teaching methods in Adamawa State secondary schools.

Methods

The research design employed in the study is quasi-experimental, specifically a pre-test and post-test control group design. This design aims to investigate cause-and-effect relationships between variables using treatment rather than mere observation or description. The study focused on Post-basic II agricultural science students in senior secondary schools in Adamawa State, Nigeria. Intact class settings were used for equal opportunity for all students to participate. The population of the study included all 3200 students in Senior Secondary Schools Post-basic II who were offered agricultural science subjects in Adamawa State. A purposive sampling technique was used to select 263 SS II students from three post-basic schools in each educational zone. The chosen sample size consisted of intact Agricultural Science class SS II students from three Senior Secondary Schools in the three educational zones. The data collection instrument was an Agricultural Science Achievement Test (ASAT) with 25 multiple-choice objective questions. The instrument's validity and reliability were ensured through expert validation, and a reliability coefficient of 0.78 was obtained from pilot testing. Data collection was conducted by the researcher with the help of trained research assistants through administering pre-tests, treatments, and post-tests. The experimental procedure involved six weeks, with pre-tests administered to experimental and control groups in the first week. The experimental groups received treatments using PowerPoint Presentation (PPP), while the control group was taught using conventional methods. Post-tests were administered after six weeks of instruction. Extraneous variables were controlled to avoid bias and ensure the study's validity. Data analysis was conducted using descriptive statistics to answer the research questions. In contrast, t-test and Analysis of Covariance (ANCOVA) were used to test the hypotheses at a significance level of 0.05.

Results

A. Results of the Research Question

1. Research Question One

What is the mean achievement score of students when taught a digestive system of animals using conventional methods of teaching and PowerPoint presentations in secondary schools in Adamawa State?

Table 1. Pre-test and Post-test Mean Achievement Scores

	Control Group N= 76		Experimental Group N = 98	
	$\bar{x}$	Σ	$\bar{x}$	σ
Pre-Test	17.68	8.29	20.12	6.87
Post-Test	53.71	15.52	62.54	16.10

N= Number of Students, $\bar{x}$ = Means Scores, σ = Standard Deviation

Table 1 shows the pre-test and post-test mean achievement scores of the control and experimental groups taught using PowerPoint presentations and conventional methods in secondary schools in Adamawa State. The pre-test mean score of students in the control group was 17.68, with a standard deviation of 8.29, while the post-test mean achievement score for the same group was 53.71, with a standard deviation of 15.52. On the other hand, the pre-test and post-test mean achievement scores of students in the experimental group were 20.12 and 62.54, with standard deviations of 6.87 and 16.10, respectively. This indicates an increase in students' academic achievement (62.54 > 53.71) when teaching the digestive system of animals using PowerPoint presentations in secondary schools in Adamawa State.

2. Research Question Two

What is the mean achievement score of students based on gender when taught a digestive system of animals using conventional methods of teaching and PowerPoint presentations in secondary schools in Adamawa State?

Table 2. Pre-test and Post-test Mean Achievement Scores of Students Based on Gender

Test	**Control**				**Experimental Group**			
	Male N = 34		Female N = 42		Male N = 41		Female N = 57	
	$\bar{x}$	σ	$\bar{x}$	σ	$\bar{x}$	σ	$\bar{x}$	σ
Pre-Test	18.35	8.23	17.14	8.39	19.46	6.83	20.59	6.91
Post-Test	57.18	14.03	50.91	16.25	70.05	14.15	57.14	15.33

N= Number of Students, $\bar{x}$ = Means Scores, σ = Standard Deviation

Table 2 shows the pre-test and post-test mean achievement scores of the control and experimental groups taught using PowerPoint presentations and conventional teaching methods in secondary schools in Adamawa State based on gender. The pre-test mean score of male students in the control group was 18.35 with a standard deviation of 8.23, while the post-test mean achievement score for the male students in the control group was 57.18 with a standard deviation of 14.03. The pre-test mean score of female students in the control group was 17.14 with a standard deviation of 8.39, while the post-test mean

achievement score for the female students in the control group was 50.91 with a standard deviation of 16.25. The pre-test mean achievement scores of male students in the experimental group (those taught using PowerPoint Presentation) was 19.46, having a standard deviation of 6.83 and 70.05 as the mean achievement score of the male students at the post-test, with 14.15 as the standard deviation, respectively. The pre-test mean achievement score of female students in the experimental group was 20.59 with a standard deviation of 6.91, while the post-test mean achievement score for the experimental group was 57.14 with a standard deviation of 15.33. The result presented an indication that the male students have higher academic achievement than the female students when taught a digestive system of animals using PowerPoint presentations in secondary schools in Adamawa State.

B. Hypothesis Decisions

1. Hypothesis One

There is no significant difference in the mean achievement score of students when taught a digestive system of animals using PowerPoint presentations and conventional teaching methods in Adamawa State secondary schools.

Table 3. T-test Analysis of Post-test Mean Achievement Scores

Group	N	$\bar{x}$	σ	df	t	P	Remark
Experimental	98	64.58	14.49	86	5.132	0.000	Sig.
Control	76	54.26	11.70				

N= Number of Students, $\bar{x}$ = Means Scores, σ = Standard Deviation, Df = Degree of Freedom
Sig. = Significant

T-test analysis in Table 3 was carried out to measure whether a significant difference in students' achievement scores exists between those taught using the PowerPoint presentation teaching method and those taught using the conventional teaching method. The results showed that there was a significant difference in the mean achievement scores between students taught a digestive system of animals using the PowerPoint presentation teaching method and those prepared using the conventional teaching method [$t_{86,0.05}$ =5.132, $p<0.05$] courtesy of those taught using the PowerPoint presentation teaching method [64.58 > 54.26]. It was therefore concluded that the experimental group led using the PowerPoint presentation teaching method performed better

2. Hypothesis Two

There is no significant difference in the mean score of students on gender when taught a digestive system of animals using PowerPoint presentations and conventional teaching methods in Adamawa State secondary schools.

Table 4. Analysis of Covariance of Male and Female Students' Mean Achievement Score

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	4055.947[a]	5	811.189	4.686	.001	.190
Intercept	18519.242	1	18519.242	106.980	.000	.517
Gender_ANOVA	1264.585	2	632.293	3.653	.029	.068
Male	279.327	1	279.327	1.614	.207	.016
Gender_Anova * Female	577.878	2	288.939	1.669	.194	.032
Error	17310.931	100	173.109			
Total	467269.000	106				
Corrected Total	21366.877	105				
a. R Squared = .190 (Adjusted R Squared = .149)						

Table 4 shows the F-calculated value of mean achievement scores of male and female students when taught a digestive system of animals using PowerPoint Presentation and Conventional method of teaching in secondary schools of Adamawa State. The F-calculated value for the students' scores is 1.669, with a significance of F at 0.194, which is more excellent than 0.05 alpha levels. This result means there is a significant difference between the mean achievement score of male and female students taught a digestive system of animals using PowerPoint presentations and the conventional teaching method in Adamawa State secondary schools.

C. Findings of the Study

The following findings were made based on the results presented in the tables. The findings revealed that:

1. There is a higher students' academic achievement when taught the digestive system of animals using PowerPoint presentation than when the conventional method is used in secondary schools in Adamawa State
2. Male students have higher academic achievement than female students when using PowerPoint presentations in secondary schools in Adamawa State.
3. There is a significant difference in the mean achievement score of students when taught the digestive system of animals using PowerPoint presentations and the conventional teaching method in Adamawa State secondary schools.
4. There is a significant difference in the mean achievement score of male and female students when taught the digestive system of animals using PowerPoint presentations and Conventional teaching methods in Adamawa State secondary schools.

Discussion

The study's findings revealed a higher academic achievement among students who are taught the digestive system of animals using PowerPoint presentations than when the conventional method is used in secondary schools in Adamawa State. The finding agrees with

Ref. [10], who reported that the PowerPoint instructional package could capture students' interest because of its artistic designs, thereby enabling the students to have higher academic performance. To further buttress the finding, Ref. [11], while reporting the finding of the study on the interactive effect of PowerPoint instructional packages on the academic performance of Educational Technology students at the University of Calabar, said that the finding of their research revealed that there was a significant difference between the performance of students taught Educational Technology using PowerPoint instructional package and those prepared using the conventional expository method, in favor of those taught using PowerPoint instructional package. In support of the finding, Ref. [12] researched 120 students' ability to utilize PowerPoint as a tool in developing digital competence in Physics for a class. The result showed that male and female students from the five secondary schools were well acquitted with PowerPoint technology.

Based on gender, male students have higher academic achievement than female students when using PowerPoint presentations in secondary schools in Adamawa State. The finding agrees with Ref. [13], which investigated the effect of gender on the academic performance of students taught with the designed model. Ref. [13] reported that the male students' performance was higher than their female counterparts. The study's result further showed a significant gender difference in the performance of students taught using the improvised model. But the study is in contrast with Ref. [14], who investigated the influence of gender differences in pupils' achievement in primary science in two selected primary schools in Minna, Metropolis of Niger State. Ref. [14]'s results showed that male and female students perform equally; it was then recommended that videotape instructional packages be used in teaching science concepts at the primary school level.

When taught using PowerPoint Presentation and Conventional method of teaching, there is a significant difference in the mean achievement score of students in secondary schools in Adamawa State in favor of those taught using PowerPoint Presentation. The study's findings agree with Ref. [15], who reported a significant difference between the achievement mean scores of students in the experiment and control groups taught using videotape and PowerPoint. In support of the finding, Ref. [16] asserted that video instruction models were consistently better than traditional instruction in terms of achievement. Additionally, Ref. [17] reported that there was a significant difference between those taught using technology and those conducted using traditional method

The study's findings revealed a significant difference in the mean achievement score of male and female students when taught a digestive system of animals using PowerPoint presentations and conventional teaching methods in Adamawa State secondary schools. The finding agrees with Ref. [18], who stated that gender was a significant factor in students'

achievement in mathematics. Furthermore, Ref. [13] reported a significant gender difference in the performance of students taught using improvised models. Conversely, Ref. [19] said there was no significant difference in girls' and boys' achievements, but the use of video improved students' academic performance.

Conclusion and Recommendations

The study identified the need to shift from the conventional method of teaching to educational-friendly media (PowerPoint presentation) based on its benefits to students. It was observed that students exposed to PowerPoint presentations performed better than their counterparts taught with conventional teaching methods. Innovative technology using PPP seems to answer the much-awaited method of enhancing students' academic achievement. PPP effectively teaches the Digestive system of animals and is gender friendly. This could be because it commits more of the students' senses to teaching, leading to higher academic achievement.

Based on the findings of the study on the impact of instructional methods on students' academic achievement in the study of the digestive system of animals in secondary schools in Adamawa State, Nigeria, the following recommendations are proposed:

1. Given the higher academic achievement observed when using PowerPoint presentations compared to conventional teaching methods, educators should consider integrating more visual aids like PowerPoint slides into their instructional approaches. This practice can enhance students' comprehension and engagement, thereby fostering improved learning outcomes in subjects like agricultural science.
2. Recognizing the disparity in academic achievement between male and female students when using PowerPoint presentations, it is crucial to design inclusive teaching strategies that are sensitive to all genders' needs. Teachers should adopt diverse teaching methodologies that accommodate different learning styles and preferences, ensuring that both male and female students have equal opportunities for academic success.
3. Given the significant difference in achievement scores between PowerPoint presentations and conventional teaching methods, educators should receive targeted professional development to utilize technology-enhanced teaching approaches effectively. Workshops and training sessions can equip teachers with the skills to create engaging and informative PowerPoint presentations that align with the curriculum and enhance students' learning experiences.
4. To gauge the ongoing effectiveness of instructional methods, schools and educational authorities should implement regular assessments and monitoring of students'

academic achievements. This will enable educators to make informed decisions about using PowerPoint presentations and conventional methods in the classroom, ensuring a dynamic and responsive teaching environment.

Conflict of Interest

The authors declare that there is no conflict of interest.

References

[1] Onu, F. M., Ugwoke, E. O., Agboeze, M. U., & Ikehi, M. E. (2014). Utilization of the Interactive Whiteboard Technology for Instructional Delivery in Technical and Vocational Education and Training Courses in South Eastern Universities in Nigeria. *Indian Journal of Applied Research*, *4*(4), 149-151.

[2] Mayer, C. (2013). *Firm commitment: Why the corporation is failing us and how to restore trust in it*. OUP Oxford.

[3] Rischke, J., Sossalla, P., Salah, H., Fitzek, F. H., & Reisslein, M. (2020). QR-SDN: Towards reinforcement learning states, actions, and rewards for direct flow routing in software-defined networks. *IEEE Access*, *8*, 174773-174791.

[4] Unamba, E. C., John, D. A., & Nwaneri, O. M. (2020). Assessment of early childhood care education pre-service teachers' skills of improvisation and management of instructional materials for effective mathematics instruction during teaching practice. *International Journal of Advanced Academic Research (Arts, Humanities and Education), 6*(9), 24-35.

[5] Iglesias-Pradas, S., Hernández-García, Á., Chaparro-Peláez, J., & Prieto, J. L. (2021). Emergency remote teaching and students' academic performance in higher education during the COVID-19 pandemic: A case study. *Computers in human behavior*, *119*, 106713.

[6] Salau, A. A. (2023). *The Nature of Practical Work in Secondary School Agricultural Science in (Lagos State) Nigeria: A Case Study* (Doctoral dissertation, State University of New York at Buffalo).

[7] Asogwa, B. E. (2011). Digitization of archival collections in Africa for scholarly communication: Issues, strategies, and challenges. *Library philosophy and practice*, 651.

[8] Gambari, A. I., Yusuf, H. T., & Balogun, S. A. (2015). Effectiveness of PowerPoint Presentation on Students' Cognitive Achievement in Technical Drawing. *Malaysian Online Journal of Educational Technology*, *3*(4), 1-12.

[9] National Research Council, (2013). *Report of Task Team for Review of Implementation of National Curriculum*. Abuja: Department Of Education.

[10] Beulah, O. I. (2016). Comparative effect of video projection, power-point instructional package and traditional teaching methods on students' performances in Basic Science. *The International Journal of Social Sciences and Humanities Invention*, *3*(11), 3050-3057.

[11] Effiong, A. A. and Ekpo, O. E. (2016). Interactive effect of PowerPoint instructional package and academic performance of educational technology students in the University of Calabar. *Equatorial Journal of Education and Curriculum Studies, 1*(2), 57- 68.

[12] Marko, G. & Jerneja, P. (2012). PowerPoint as a tool for developing the digital competence in physics class. *Interdisciplinary Journal of Information, Knowledge, and Management, 18*(3), 1-12.

[13] Nsofor, C. C. (2010). *Effects of improvised instructional media on niger state secondary school students' achievement in selected biology concepts* (Doctoral dissertation).

[14] Zubairu, S. A.; Gambari, A. I.; Agbo, J. N.; Daramola, F. O.; Falode, O. C. (2019). Effects of computer-based concept mapping instructional strategies on performance of physics students in secondary schools in Kaduna State. Journal of Science, Technology, Mathematics, and Education (JOSTMED), *15*(2), 157-166.

[15] Pilli, O., & Aksu, M. (2013). The effects of computer-assisted instruction on the achievement, attitudes, and retention of fourth-grade mathematics students in North Cyprus. *Computers & Education*, *62*, 62-71.

[16] Rubian, T. C. (2010). *The effects of digital video instruction on EPL students English reading: graduate institute of business management*. National Kadisiving First University of Science and Technology: Taiwan.

[17] Michael, F. & Silvia, B. (2009).The impact of PowerPoint Presentations on student achievement and student attitudes. *International Global Institute, 1*(1), 1-19.

[18] Anyamene, A. N., Nwokolo, C. N., & Anyachebelu, E. F. (2012). Availability and Use of Information and Communication Technology Resources for Counseling University Students in South East States, Nigeria. *International Journal of Humanities and Social Science, 2*(7), 220-225.
[19] Ezekoka, G. K. (2010). Effect of gender on the use of computer in the teaching-learning process in Nigeria School system. Minna: *31st National Education Association and Media Technology* (MEAMT), *Annual Convention and National Conference*.

Authors



Dr. Egunsola Abraham Olawuyi Emmanuel is a dedicated educator and scholar currently serving as a lecturer in the Department of Vocational Education at Modibbo Adama University, Yola. With a passion for writing and a commitment to academic excellence, he has authored numerous articles and publications, contributing significantly to the field of vocational education. Beyond his scholarly pursuits, Dr. Egunsola has also played an active role in mentoring students and guiding their academic endeavors. His extensive experience in academia is further demonstrated through his engagement in administrative positions and his contributions to various university committees, where he continues to make valuable contributions to the academic community. (email: rregunsola2010@yahoo.com).



Felix Ferdinand is a highly accomplished individual who holds a Master of Technology (M.Tech) degree from Modibbo Adama University in Yola, with a specialization in Agricultural Technology Education. With a passion for education and agricultural technology, Felix has dedicated his career to advancing knowledge and innovation in this field. He has demonstrated exceptional skills in research, teaching, and project management, contributing significantly to the academic community. Felix's expertise and commitment to excellence make him a valuable asset in the realms of education, agriculture, and technology. (email: flxferdinand0096@gmail.com).



Isaac John Ibanga is an erudite scholar, a researcher, and a lecturer at the Sandwich Degree Programme of the Faculty of Education, Modibbo Adama University, Yola, Adamawa State, Nigeria. He specializes in electrical technology education. (email: isaacjohn@mau.edu.ng).