EFFECTS OF A-TUTOR PLATFORM AND STUDENTS' ACADEMIC ACHIEVEMENT IN AGRICULTURAL SCIENCE IN NSIT IBOM LOCAL GOVERNMENT AREA, AKWA IBOM STATE

Johnson Nsima Johnson, Dr Anthony A. Offiong and Emmanuel Okon Ebong
Department of Agricultural Education
Faculty of Vocational Education, Library and Information Science
University of Uyo
Email: drtonyoffiong@yahoo.com, jjnsima@gmail.com

Abstract
The study determined the effects of A-Tutor and traditional lecture method on students' academic achievement in Animal husbandry and crop production in Nsit Ibom Local Government Area, Akwa Ibom State. Two research questions guided the study and two hypotheses were tested at 0.05 level of significance. Quasi-experimental design was adopted for the study. The population of the study was 180 Senior Secondary two (SS2) students offering Agricultural Science in 2024/2025 academic session in Nsit Ibom Local Government Area. Sample size was 120 students in four selected private schools using purposive sampling technique. The instrument for data collection was Agricultural Science Achievement Test (ASAT) with 20 multiple choice questions validated by three experts. The reliability of ASAT was established using Spearman Brown formula which resulted in 0.86. The data collected were analyzed using mean, standard deviation to answer research questions and t-test statistical analysis to test the hypotheses. Results from the study showed that students taught Animal husbandry and Crop production using A-Tutor platform performed better than those taught using traditional lecture method of instruction. The study further revealed that no significant difference existed in the students' academic achievement in crop production when taught with A-Tutor platform and the traditional lecture method while there was significant difference in those taught animal husbandry. It was recommended among others that ICT facility and A-Tutor platform be installed in public and private secondary schools to enhance better academic performance and subsequent achievement.

Keywords: A-Tutor platform, Traditional method, Animal husbandry, Crop production, Academic achievement

Introduction

Traditional teaching methods have been a central approach in delivering Agricultural Science lessons in secondary schools, particularly in regions where access to advanced technology and resources may be limited. These methods typically involve teacher-centered instruction, where educators serve as the primary source of knowledge, using lectures, textbook references, and classroom discussions to impart theoretical concepts. The goal is to equip students with a solid foundation in agricultural practices, principles, and techniques. In the context of Agricultural Science, traditional methods also emphasize practical learning through hands-on activities such as farm visit, gardening, livestock care, and laboratory experiments.

These activities complement theoretical lessons by providing students with real-world exposure to farming practices, soil management, crop production and animal husbandry. Such experiences help bridge the gap between theory and practice, fostering a deeper understanding of agricultural concepts (Adeyemi, 2018).

While traditional methods have contributed significantly to the teaching and learning of Agricultural Science, they often face challenges such as lack of adequate resources, overcrowded classrooms, and limited integration of modern tools and technologies. Despite these limitations, the use of traditional approaches remains essential, especially in environments where they align with local practices and promote sustainable agricultural knowledge. This approach's relevance continues to lie in its ability to provide foundational skills while fostering an appreciation for agriculture as a vital sector, preparing students for careers in farming, agribusiness, and environmental management. Exploring ways to integrate traditional methods with modern techniques can further enhance the teaching and learning of Agricultural Science in secondary schools.

For a more proactive and valuable teaching-learning process, e-learning platforms have been introduced which has increased the need for content and learning management. Several content and learning management platforms like Edmodo, Massive Open Online Courses (MOOC) platform and cloud file hosting services such as Google Drive and Drop Box had become very popular in the past. In the same vein, the number of educational mobile platforms applications such as MOODLE, WizIQ, A-Tutor, WhatsApp, Facebooks, Adobe Connect, Blackboard, WebCT among others have been on the increase and most of these platforms are widely used for teaching and learning processes especially at higher levels of education. It was observed by Stantchev, Colomo-Palacios, Soto-Acosta and Misra (2018) that using Learning Management System (LMS) platform has provided students and teachers better approach to teaching and learning processes which is better managed when compared with traditional teaching methods.

A-Tutor is an open source, online learning environment used to develop web-based courses, author e-learning content, and present instructional materials on the internet. A-Tutor is an acronym coined from the place of development. It was developed at Adaptive King Technology Resource Centre University of Toronto and was therefore shortened to A-Tutor. It can be used to author and archive learning content with a large collection of modular tools that can be combined in different ways to adapt the system to various theoretical approaches for teaching and learning. A-Tutor is unique for providing versatile spaces open for/collaboration among students with support from the tutors especially as the students chat online. Sulisworo (2012) observed that when A-Tutor is used for assignments, it helps to foster collaborative and group interaction. It can therefore be a rewarding learning tool that develops learning skills such as problem solving, collaboration/idea sharing and employability skills such as communication, creativity, leadership and technology proficiency especially after secondary school education.

According to Gay (2018), Agricultural science is one of the courses offered at secondary school level with different options like Animal Husbandry, Crop Production as well as Agricultural Economics and Extension. The need to address agricultural training at the secondary school level is in this way, two folds: Firstly by managing student's enthusiasm and interest from encounters in primary school, secondary school and secondly by aiding students to proceed with that mind-set to tertiary level, possibly through technological and innovative lesson presentations so as to comprehend the potentials that agriculture offers.

The effects of A-Tutor platform on students' academic achievement is an area of growing interest. Achievement is really the outcome or result of student in subjects or courses at a given time. It can also be defined as outcome of a conquest, what is attained, what is accomplished, being successful and to gain recognition. Adeyemi (2018) also found out that most students have a positive attitude and interest towards A-Tutor on a particular topic, thereby enhancing better outcome in achievement. Academic achievement is the outcome of instruction. According to Lo (2021), it is the grade obtained through achievement test through which the teacher evaluates the extent to which instructional objectives have been achieved. Academic achievement is often an expression of what the students have gained from an educational programme or lesson. Students' achievement refers to performance in a school subject as designated by a score or mark obtained in an achievement test. Achievement is measured by standardized achievement test developed for school subjects. Achievement is conceived in the present study as the students score on a standardized test from a given instructional content. Achievement in the view of Stanchev *et. al*.(2018) is often time a function of how much the students are able to remember the learning material. This is because students who engage in rote learning, unlike those who indulge in meaningful learning have poor understanding and find it difficult in applying the knowledge gained in the solution to outlined agricultural science problems.

A-Tutor platforms enhance the learning experiences by providing flexible access to educational resources, promoting interactive learning and fostering self-paced study. Additionally, the integration of multimedia tools and real-time feedback mechanisms enable students to engage more deeply with course content, leading to improved comprehension and retention. By addressing diverse learning needs and reducing barriers to education, A-Tutor platform play a critical role in enhancing academic performance and overall learning outcomes.

Theoretical Framework

The theoretical framework adopted in this work is the Digital Technology- Personalized and Adaptive Learning framework developed by Adeyemi (2018), which establishes three postulates:

i. Digital technology creates a smart learning environment, enabling efficient, effective, and comfortable personalized learning.

ii. Digital technology can provide personalized and flexible learning to improve student performance.
iii. The environment greatly influences educational institutions and complements the relationship between digital technology-enabled personalized and adaptive learning and student performance.

This theory presents a valuable instrument for scrutinizing the adoption and integration of various information technology innovations. In this case, the environment (online or face-to-face modalities) enriched by A-Tutor platform could impact the student performance, this is, the test scores and final grades. On the other hand, to create an effective learning environment, it's important to continuously assess and improve the course design process. Evaluation should be done in phases to address technical challenges and immediate concerns, and subsequently learner satisfaction. In this regard, learner satisfaction is how users perceive an information system's usefulness in achieving their goals. It reflects how students feel about their learning experiences and can impact their commitment to a program. High satisfaction leads to lower drop-out rates and higher persistence.

Conceptual Framework

A-Tutor's use of interactive elements like quizzes, video tutorials, and digital simulations can make learning more engaging. This interactive learning can improve attention and motivation, making students more likely to stay focused and invest time in their studies. The platform encourages active learning, which has been shown to improve academic outcomes. For example, students who actively engage with learning tools and assessments can better internalize content and are more likely to perform well academically. According to Lo (2021), a major benefit of A-Tutor is that it provides round-the-clock access to learning materials, meaning students can study at their own convenience. This flexibility is especially useful for students with busy schedules or those who may need extra time to grasp certain concepts. The platform may offer various resources such as tutorials, practice exercises, discussion forums, and feedback systems. These tools can help students address areas where they might be struggling and enhance their understanding, leading to improved academic results.

As postulated by Gimba (2023), A-Tutor’s ability to provide instant feedback on assessments and exercises can help students recognize areas where they need improvement and take corrective measures quickly. This timely feedback loop can accelerate learning and improve academic performance. Some platforms have fora or collaboration features where students can discuss problems and solutions with peers. This peer interaction promotes deeper learning, fosters motivation, and can improve performance as students learn from one another. With A-Tutor, students have control over their learning schedule, which is beneficial for students who are self-motivated and good at managing their time. This autonomy often leads to improved academic performance as students are more accountable for their learning progress

.The ability to learn in a low-pressure environment might reduce anxiety and stress related to exams or class participation, potentially improving overall performance.

Related Empirical Studies

Sobowale, *et. al*. (2020) conducted a study to examine the effects of A-Tutor Platform on learning outcomes in Agricultural Science among university students in North-Central, Nigeria. The researcher used quasi-experimental design (pretest, posttest, non-randomized, non-equivalent experimental and control groups design). The population of the study was 4,562 students. The sample size for the study comprised 237 students from two Universities in North-Central, Nigeria drawn from the population. The research instrument was developed by the researchers and validated by two experts, from the Department of Educational Technology, Federal University of Technology, Minna. To determine the reliability of Agricultural Science Achievement Test (ASAT), Spearman Brown Coefficient was used to analyze the data that was collected from ASAT administered to the students using SPSS version 20, a reliability coefficient of 0.81 was obtained which is above the bench mark of 0.70. This shows that the instrument was reliable. To determine the reliability of Agricultural Science Satisfaction Questionnaire (ASSQ), Cronbach Alpha was used to analyze the data collected and a reliability coefficient of 0.85 was obtained, which shows that the instrument was reliable. To determine the reliability coefficient of Agricultural Science Interest Inventory (ASII), Cronbach Alpha was also used and when analyzed, a reliability coefficient of 0.75 was obtained which showed that the instrument is suitable for the categories of students in this study. Three research questions guided the study while the three hypotheses formulated were tested at 0.05 level of significance. Frequency counts, mean (X) and standard deviation (SD) were employed to answer the research questions while t-test was used to test the hypotheses. Findings showed significant difference between the students taught using A-Tutor Platform and those taught using lecture method. It was concluded that A-Tutor Platform should be employed to teach Agricultural Science. It was also recommended that A-Tutor Platform be used in teaching and learning process among others.

Izuebunam and Osuafor (2021) conducted a study to determine the effect of adaptive learning approach (ALA) on students' achievement in chemistry in Awka Education Zone. Two research questions guided the study and three hypotheses were tested at 0.05 alpha level. Quasi-experimental design was adopted for the study. The population of the study was 1, 942 senior secondary three (SS3) students offering chemistry in Awka Education Zone out of which a sample size of 109 students was drawn using purposive and random sampling techniques was involved in the study. The instrument for data collection was Chemistry Achievement Test (CAT) validated by three experts. The reliability of CAT was established using Kuder-Richardson Formula 20 to be 0.70. Research questions were answered using mean and standard deviation while analysis of covariance was used to test the null hypotheses. The result of the study showed that students taught using ALA had higher mean gain scores in achievement than those taught using conventional instructional method. The findings of the study revealed that

there was a significant difference between mean achievement scores of students taught chemistry using ALA and conventional instructional method in favour of ALA. The findings also showed that there was a significant difference between the mean achievement score of male and female students in chemistry. Adaptive learning favoured the males more than the females in their achievements. It was concluded that ALA is an effective instructional approach for improving students' achievement in chemistry. It was recommended among others that chemistry teacher should always form a pre-assessment test covering all such basic knowledge needed to understand the chemistry concept to be taught, so as to uncover areas where students need remedial instruction.

Statement of the Problem

The integration of digital learning platforms in education has gained significant attention in recent years, especially with the increased reliance on technology in teaching and learning. The A-Tutor platform, an online educational system, has been introduced as a tool to enhance students' learning experiences and academic performance. However, despite its widespread adoption in various fields, its impact on students' academic achievement in specialized subjects, such as Agricultural Science, remains unclear.

Agricultural Science, a critical discipline for understanding and advancing agricultural practices, often faces challenges in terms of student engagement, understanding of complex concepts, and access to quality instructional materials. While the A-Tutor platform offers potential solutions by providing interactive lessons, resources, and assessments, it is necessary to explore whether its use positively influence students' academic achievement in this subject. Hence, the need for this study to investigate the effects of A-Tutor platform on students' academic achievement in Agricultural Science in Nsit Ibom Local Government Area, Akwa Ibom State.

Purpose of the Study

The purpose of the study was to determine the effects of A-Tutor platforms and students' academic achievement in Agricultural Science in Nsit Ibom Local Government Area, Akwa Ibom State.

Specifically, the study sought to:

1. Determine the effect of A-tutor platform and traditional lecture teaching method on students' academic achievement in animal husbandry among secondary school students in Nsit Ibom Local Government Area.
2. Determine the effect of A-tutor platform and traditional lecture teaching method on students' academic achievement in crop production among secondary school students in Nsit Ibom Local Government Area.

Research Questions

The following research questions were posed to guide the study:

1. What is the effect of A-tutor platform and traditional lecture teaching method on students' academic achievement in animal husbandry among secondary school students in Nsit Ibom Local Government Area?
2. What is the effect of A-tutor platform and traditional lecture teaching method on students' academic achievement in crop production among secondary school students in Nsit Ibom Local Government Area?

Research Hypotheses

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

1. No significant difference exist in the mean achievement score secondary school students taught animal husbandry using A-Tutor platform and traditional lecture teaching method in Nsit Ibom Local Government Area.
2. No significant difference exist in the mean achievement score secondary school students taught crop production using A-Tutor platform and traditional lecture teaching method in Nsit Ibom Local Government Area.

The design for this study was quasi-experimental pretest-posttest non-equivalent-groups design. Structurally the design is represented thus:

O_1	X	O_2	O_1	O_3 = Experimental group (A-Tutor platform)
O_3	X	O_4	O_2	O_4 = Control group (Traditional lecture method)

This design is often used in classroom experiments when experimental and control groups are such naturally assembled groups of intact classes. The difference between the mean of the O_1 and O_2 scores and the difference between the mean of the O_3 and O_4 scores (mean difference) are tested for statistical significance. The research was carried out in Nsit Ibom Local Government Area of Akwa Ibom State. Nsit Ibom is located between latitudes 4^0 48^1 and 5^0 01^1 North and longitude 7^0 5^1 and $7^0 57^1$East. It has a landmass of 183,105sqkm. This is within the equatorial rain forest belt, which is tropical zone, that houses vegetation of green foliage of trees, shrubs and oil palm trees (The Steward, 2011). Nsit Ibom is bounded on the North by Uyo, on the south by Nsit Ubium, on the East by Ibesikpo Asutan and on the West by Etinan. The climate is characterized by two seasons, rainy and dry season. The people of Nsit Ibom speak Ibibio language. Nsit Ibom is an urban area that consist of mixed population of civil servants, traders and farmers. Educationally, eight (8) public and six (6) private secondary schools with primary and nursery schools widely spread across the study area. The study area is made up of two clans namely: Mbiaso and Asang. This area was chosen because

of proximity to the researchers and availability of e-teaching and learning platforms in private secondary schools.

The population of this study consisted of all the 180 SS2 students offering Agricultural Science (Animal husbandry and crop production) in 2024/2025 academic session in the six private secondary schools in Nsit Ibom Local Government Area. The sample size for the study was one-hundred and twenty (120) students offering Agricultural Science (Animal husbandry and crop production) in four selected private schools using purposive sampling technique. The criteria for selection were that the school must be equipped with Information and Communication Technology (ICT) facility. The four schools selected met the criteria. The intact classes were assigned to experimental and control groups using the toss of coin with head or tail selection.

The instrument used in the study was Agricultural Science Achievement Test (ASAT) on the concept of animal improvement. The instrument was divided into two sections, A and B. Section A contained students' personal information, section B contained the Agricultural Science Achievement Test on the concept of animal husbandry while section C had test items crop production concepts. The test had 20 multiple choice questions with each question having four options A, B, C and D. Each question had one correct option plus three distracters.

The Agricultural Science Achievement Test (ASAT) was face validated by three experts, two from the Department of Agricultural Education, University of Uyo who ascertained the face validity in terms of clarity of the language, content and appropriateness of the items. A-Tutor platform was validated by one expert in Computer and Robotic Education Department, University of Uyo in order to determine the appropriateness of the learning platform as well as suitability for the level of the students. Their comments and corrections were used to remodel the instrument and make it valid for data collection. Split half method was adopted in testing the reliability of the instrument. The agricultural science achievement test on animal husbandry and crop production was administered once on a group of ten (10) Senior Secondary Two (SS2) students who were part of the population but not part of the sample of the study. The script collected were marked, scored and recorded based on correct answers to odd and even number questions. Pearson Product Moment Correlation (PPMC) was used to correlate the two sets of scores obtained. Spearman Brown formula was used to test the reliability coefficient which resulted in 0.86 and showed that the instrument was considered reliable for data collection.

Research Procedures

At the commencement of the study, adequate permissions were obtained by the researchers from the principals to have contact with the students that were used for this study through the four class teachers who served as research assistance. The experimental group was taught using A-Tutor Platform where remedial instructions was done in the general class but with particular focus in each groups according to their identified knowledge deficiency. While the control group was taught using the traditional lecture method. The same content was taught but no remedial instructions were given neither did the teacher adapt instructions to meet individual student needs. Students' questions were attended to during the lesson without any further diagnostic exercise to identify and meet academic needs. The data collected were analyzed using mean and standard deviation to answer the research questions and t-test to test the null hypotheses. All hypotheses were tested at 0.05 level of significance. For test of the hypotheses, the null hypotheses were accepted if the t-calculated value were less than t-critical value and rejected if the t-calculated value were greater than the t-critical value. SPSS statistic version 2025 was used for the analysis.

Results

Research Question 1: What is the effect of A-tutor platform and traditional lecture teaching method on students' academic achievement in animal husbandry among secondary school students in Nsit Ibom Local Government Area?

Table 1: Mean difference of pre-test and post-test mean achievement score between secondary school students taught animal husbandry using A-Tutor and traditional lecture method in Nsit Ibom Local Government Area

Instructional Strategy	N	pretest $\bar{X}$	SD	posttest $\bar{X}$	SD	Mean diff	SD diff
A-Tutor Platform (Experimental Group)	68	28.20	6.20	30.50	8.42	2.30	2.22
Traditional lecture method (Control Group)	52	24.08	6.08	26.36	9.16	2.28	3.08

Table 1 showed that students who were taught animal husbandry using A-Tutor had a mean achievement score of 30.50 with a standard deviation of 8.42 at the post-test against their pre-test mean achievement scores of 28.20 and standard deviation of 6.20. While those who were taught using traditional lecture method had mean score of 26.36 with standard deviation of 9.16 as posttest mean scores. The pre-test mean score was 24.08 with standard deviation of 6.08. There was a mean difference scores of 2.30 and 2.28 for the A-Tutor and traditional lecture method platforms while their standard deviation difference was 2.22 and 3.08 for experimental and control groups respectively. This showed that the students who were exposed

to A-Tutor had higher mean achievement score than those taught using traditional lecture method.

Research Question 2: What is the effect of A-tutor platform and traditional lecture teaching method on students' academic achievement in crop production among secondary school students in Nsit Ibom Local Government Area?

Table 2: Mean difference of pre-test and post-test mean achievement score between secondary school students taught crop production using A-Tutor and traditional lecture method in Nsit Ibom Local Government Area?

Instructional Strategy	N	pretest $\bar{X}$	SD	posttest $\bar{X}$	SD	Mean diff	SD diff
A-Tutor Platform (Experimental Group)	68	22.5	6.60	68.40	8.8	45.9	2.2
Traditional lecture method (Control Group)	52	28.5	8.80	62.08	8.84	33.58	0.04

Table 2 showed that students who were taught crop production using A-Tutor had a mean achievement score of 68.40 with a standard deviation of 8.8 at the post-test against their pre-test mean achievement scores of 22.5 and standard deviation of 6.60. While those who were taught using traditional lecture method had mean score of 62.08 with standard deviation of 8.84. The pre-test mean score was 28.5 with standard deviation of 8.8. There was a mean difference scores of 45.9 and 33.58. Standard deviation difference of 2.2 and 0.04 for experimental and control groups respectively. This shows that the students who were exposed to A-Tutor had higher mean achievement score than those taught using traditional lecture method.

Null Hypothesis 1: No significant difference exist in the mean achievement score secondary school students taught animal husbandry using A-Tutor platform and traditional lecture teaching method in Nsit Ibom Local Government Area.

Table 3: t-test analysis of mean achievement score between secondary school students taught animal husbandry using A-Tutor platform and those taught using traditional lecture method in Nsit Ibom Local Government Area

Instructional Strategy	N	$\bar{X}$	SD	df	t-cal	t-crit	decision
A-Tutor Platform (Experimental Group)	68	30.50	6.42				
				118	2.57	1.96	Significant
Traditional lecture method (Control Group)	52	26.36	9.16				

Table 3 showed t-cal value of 2.57 and t-critical value of 1.96 with 118 degree of freedom at 0.05 level of significance. This showed that the calculated t-value is greater than the critical table value hence, the null hypothesis was rejected. This implies that there was significant difference in achievement of students taught using A-Tutor platform and those taught using traditional lecture method.

Null Hypothesis 2: There is no significance difference in the mean achievement score between male and female students taught using A-Tutor platform.

Table 4: t-test analysis of mean achievement score between secondary school students taught crop production using A-Tutor platform and those taught using traditional lecture method in Nsit Ibom Local Government Area

Instructional Strategy	N	$\bar{X}$	SD	df	t-cal	t-crit	decision
A-Tutor Platform (Experimental Group)	68	30.50	6.42				
				118	0.33	2.00	Significant
Traditional lecture method (Control Group)	52	26.36	9.16				

Table 4 showed calculated t-value of 0.33 while critical t-value of 2.00 with 118 degree of freedom at 0.5 level of significance. Since the critical t-value was greater than the calculated t-value, the null hypothesis was accepted. This means that there was no significant difference in the mean achievement score of students taught using A-Tutor platform and traditional lecture method.

Discussion of Findings

From the results obtained, students taught animal husbandry using A-Tutor platform recorded means score of 30.50 while those taught using traditional lecture method recorded 26.36. This showed mean difference of 2.30 in favour of A-Tutor platform instructional strategy was more effective than traditional method. Also, the calculated t-value of 2.57 was greater than the critical table value of 1.96. This showed significant difference (0.05) in achievement of students because it will help them improve on their academic achievement. The findings of the study agreed with Sobowale *et.al.* (2020) who studied the effects of A-Tutor Platform on learning outcomes in Agricultural Education among university students in North-Central, Nigeria and observed significant difference in performance of student taught with A-Tutor Platform than those taught using traditional lecture method.

Also, the study revealed no significant difference in achievement mean score of students taught crop production using A-Tutor platform and traditional lecture method. The findings of the study disagrees with the work of Izuebunam and Osuafor (2021) who conducted a study to determine the effect of adaptive learning approach (ALA) on students' achievement in chemistry in Awka Education Zone and found that there was a significant difference between mean achievement scores of students taught chemistry using Adaptive Learning Approach (ALA) and conventional instructional method in favour of Adaptive Learning Approach (ALA). This study had similarities with the present study in the sense that secondary school students were used for the study but differences lie in the location and subject area.

Conclusion

Based on the findings from this study, it can be concluded that A-Tutor Platform enhanced secondary school students' academic achievement in Agricultural Science (animal husbandry and crop production) in Nsit Ibom Local Government Area, Akwa Ibom State. It could be as a result of the flexibility that the platform offers, where resources can be easily shared among students and learning facilitators.

Recommendations

Based on the result of the study, it is therefore recommended that:

1. The state government through State Secondary Education Board should incorporate the A-Tutor Platform in secondary schools curriculum to enhance better academic performance and subsequent academic achievement in Agricultural Science.
2. The Federal and State government should increase the budgetary allocation to education to facilitate the incorporation of A-Tutor Platform in public secondary schools.
3. The state Ministry of Education should facilitate the provision of Information and Communication Technology facility in public secondary schools to enhance equal e-learning opportunities for students in both public and private schools.

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