INTEGRATING TECHNOLOGY INTO PEDAGOGY FOR IMPROVING STUDENTS' PERFORMANCE IN AGRICULTURAL EDUCATION PROGRAMME IN COLLEGES OF EDUCATION IN SOUTH-EAST, NIGERIA

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Abstract
The study examined integrating technology into pedagogy for improving students' performance in Agricultural Education programme in Colleges of Education in South-East, Nigeria. The study was guided by three research questions and three corresponding null hypotheses were formulated. The population of the study was 430 comprising 185 Agricultural Educators and 245 final year Agricultural Education students. The sample of the study was 205 comprising 88 Agricultural Educators and 117 final year Agricultural Education students. The sampling technique adopted was purposive sampling technique. The instrument for data collection was structured questionnaire validated by three experts. The reliability of the instrument was established using Cronbach Alpha statistic which yielded overall reliability co-efficient index of 0.84. The data collected were answered using mean and standard deviation and the null hypotheses were tested using the t-test statistic at 0.05 level of significance. The result of the data analyses revealed that to high extent Interactive Whiteboard integration, Educational Tablets and Artificial Intelligence integration into pedagogy improved Agricultural Education students' performance. Based on the findings, it was recommended that there is need for Agricultural Educators in Colleges of Education to show more concern in integration of technologies into pedagogy for improving Agricultural Education students' performance in South-East.

Keywords: Technology, Pedagogy, Students' Performance and Agricultural Education

Introduction
Globally, technological advancement has brought a positive influence on the day-to-day educational activities and this revolution in technology offers tremendous opportunities not only in educational delivery but in various sectors of the economy such as banking, business, commerce, library, and even agriculture. This has created numerous job opportunities thereby necessitating a demand for change and improvement in the training programmes of teachers including Agricultural Educationist. Technology has a profound impact on the development of agriculture around the world (Ezeaku & Uloh, 2024). This has made farming/agricultural methods to drastically change due to modern technology innovations in irrigation systems, farm machinery, crop storage, biotechnology and genetic engineering. As a result of this, the requirements for graduates in the job market is demanding and required them to

acquire relevant knowledge and adequate competencies through the helps of emerging technological integration in different educational programme including Agricultural Education in Colleges of Education (Cummings, 2019).

Agricultural Education is described as an educational programme designed for preparing or equipping learners with knowledge, skills and attitude in teaching and technical areas of agriculture to enable them to impart same to students in schools and colleges (Ezeaku & Uloh, 2024). Agricultural Education in Colleges of Education is a three-year Nigeria Certificate in Education (NCE) programme designed to prepare students for careers in teaching and related fields. Philosophically, the programme aims at producing teachers endowed with a balanced approach between principles and practice of agriculture for academic and vocational ends. In the context of this study, Agricultural Education is a programme of tertiary institutions designed with series of activities for equipping students with knowledge, skills and attitude in pedagogy and in agriculture required for effective teaching of content areas in agriculture to students in primary and secondary schools and for job creation in diverse areas of agriculture after graduation from College of Education.

However, Colleges of Education represent one of the higher tiers of Education in Nigeria and bear the responsibility of preparing students for careers as teachers. These institutions are supervised by the National Commission for Colleges of Education (NCCE) and are designed to ensure that students meet the Minimum Academic Standard (MAS) for various programmes in educational institutions. NCCE advocates that graduates from higher learning institutions should be capable of transitioning successfully into various roles, such as effective employees, independent entrepreneurs, responsible parents, devoted citizens, selfless leaders, and healthy individuals, contributing significantly to society (Ikpeama et al., 2024). According to National Commission for Colleges of Education, NCCE (2020), the objectives of Agricultural Education programme in Colleges of Education is to: prepare graduates with the right attitude to, and knowledge/ professional competence in vocational agriculture, produce teachers who will be capable of motivating students to acquire interest in aptitude for agriculture, develop in the student-teachers the appropriate communication skills for effective transmission of agricultural information, knowledge and skills to the students in the content of their environment, equip the student-teachers with adequate knowledge and ability to establish and manage a model school farm effectively; and provide a sound background to enhance further academic and professional progression of the student teachers.

The Agricultural Education programme is meant to prepare student teachers to face the global challenge of agricultural development with respect to teaching and learning by endowing on them the required psycho-productive skills, knowledge and attitude in contemporary agricultural production strategies (Oguntunde et al., 2019). To achieve the above objectives, Ugwuogo (2017) categorically stated that the old and usual traditional face-to-face and teacher-dominated classroom interaction alone can no longer maximize teaching and learning experiences. This is because many technological devices and applications such as interactive whiteboard, Artificial Intelligence and educational tablet among others have emerge which can be integrated into pedagogy for improving instructional delivery and students' performance.

Pedagogy as described by Rajendra and Sanothimi (2021) is simply the science, art and practice of teaching. It encompasses the methods, strategies, and philosophies used by educators to facilitate learning in diverse areas of instruction in schools including Agricultural Education. It also involves how instructors work with students to achieve meaningful learning outcomes. In the context of this study, pedagogy refers to the methods, strategies, and approaches used in teaching and learning of Agricultural Education. It encompasses the principles and practices of instruction and assessment within the context of Agricultural Education and practices. This implies that integration of technological devices and applications such as interactive whiteboard, Artificial Intelligence, and educational tablet among others for improving Agricultural Education students' performance cannot be undermined in that it enhances learning, improves efficiency and prepares students for modern agricultural practices.

Interactive Whiteboards (IWBs) is one of the technological tools used for enhancing instructional delivery for diverse subject areas. IWB refers to electronic technology that come with finger-touch, a user can write, draw, drag an object, manipulate a text or shape something (Nnadozie & Karanwi, 2017). It enables educators to provide authentic materials and information through text, pictures, sounds, video segments, and animation to enhances learners' engagement more than conventional chalkboard does, encourages more varied, creative and seamless use of teaching materials, allows educators to share and re-use materials, reducing workloads and enhances effective teaching and learning at the process thereby improving students' performance same as Artificial Intelligence (Olagunju & Abiona, 2018).

Artificial Intelligence in the submission of Ulaşan (2023) can be described as an intelligence demonstrated by machines in contrast to natural intelligence displayed by humans and animals. It is an artificial operating system that is generally based on human intelligence which exhibit high cognitive functions specific to human intelligence such as learning, comprehending, inferring, thinking and communicating (Bada, 2024). In addition, AI is a technology that makes it possible to find solutions to problems through imitating the way of thinking of humans based on the idea of copying human mental abilities (Sağlamtunç, 2020). Therefore, AI offer transformative potential for actualization of different tasks including integration of AI in Agricultural Education instructional task delivery. According to Edidiong and Jude (2022), utilization of AI such as: AI personal computer, search engines/Chatbots, AI audiopen and Eduaide AI lesson development tool among others facilitate instructional delivery in Agricultural Education. The authors added that through AI tools, the problem of lack of practical materials in Agricultural Education can be bypassed by AI adoption. Virtual workshop or laboratory could be used to supplement the limited workshop and laboratory equipment for Agricultural skills acquisition. These tools help tailor instruction to individual learners, providing real-time feedback and reducing educator's administrative workload (Maslej et al., 2023).

Consequently, Educational Tablet is also another technological tool used to facilitate effective instructional delivery. It is a mobile electronic tablet that comes with different features such as audio and visual tools like charts, graphs and images that facilitate teaching and learning for educators and students (Nnajiofor & Ejikeme, 2020). Educational tablets are quickly becoming a popular and powerful educational technological device for instructional delivery in the 21st century such as facilitate lesson plan and note customization, access to instructional contents and materials. Therefore, overall learning experience of the students can be improved using mobile tablets as it helps learners to learn in an interactive way. With these visual elements, learning experience becomes more engaging and fun for the students that ultimately promote active learning engagement as well as enhance students' academic performance (Ifeanyi & Chukwuere, 2018).

Students' performance in view of Okunrotifa (2019), is the knowledge, skills and attitude derived from learning in the school and it is the product and outcome of instruction in educational institution. It is also the knowledge attained or skills developed in the school subjects, usually designed by test scores or by marks assigned by the teacher or both. Students' performance according to Onunkwo (2024) is the outcome of students' evaluation in the educational process indicating to what level the students have achieved the educational goals as specified in the curriculum which is greatly influenced by internal and external classroom factors. In another perspective, Mehta (2019) defined Students performance as "the knowledge obtained, or skills developed in the school subjects which are usually represented by test scores or marks assigned by the teacher". Mehta further stated that student's performance is achievement which includes both curricular and co-curricular performance of the students indicate the learning outcomes of the students. This implies that integrating technology into pedagogy can play crucial role in enhancing students' performance by providing access to information, accelerating learning and making learning more engaging and interactive. But the extents to which these technologies are integrated into pedagogy for improving students' performance especially in Agricultural Education in Colleges of Education remain uncertain (Ngonso, 2025). Consequently, it is on this backdrop it became expedient to examine with empirical evidence integrating technology into

pedagogy for improving students' performance in Agricultural Education programme in Colleges of Education in South East, Nigeria.

Statement of the Problem

Integrating technology into Agricultural Education pedagogy in Colleges of Education is essential for effective delivery of Agricultural Education, improving students learning and performance. If technology is effectively integrated into pedagogy such as in the use of interactive whiteboard, Artificial Intelligence and Educational Tablet among others can promote students learning, accelerate, enrich, deepen, motivate and engage students to learn which in turn may contribute to students' acquisition of relevant knowledge and skills in Agricultural Education.

Unfortunately, majority of educators in public and even in private Colleges of Education in Nigeria and South-East do not seem to take advantage of technological tools into Agricultural Education pedagogy. This led to over relying on the use of conventional methods and materials like textbook and whiteboard alone where current and relevant information and materials are available on the internet and YouTube that can be used together with mobile education tablet, interactive whiteboard and goggle classroom for effective instructional delivery.

Thus, the neglect of technology by most of the educators can be attributed to inadequate training, poor technical know-how, limited knowledge on technology adoption and inadequate Government commitment to provide the need funding for procurement of necessary technological tools required by educators leading to poor performance of Agricultural Education students in Colleges of Education. This has become a worrisome issue that does not contribute to the development of education in the 21st century and as such remedial measures are required to enhance the adoption of technology for improving students' performance. Thus, it is against this background that the study is focused on integrating technology into pedagogy for improving students' performance in Agricultural Education in Colleges of Education in South-East, Nigeria.

Purpose of the Study

The study focuses on integrating technology into pedagogy for improving students' performance in Agricultural Education programme in Colleges of Education in South-East, Nigeria. Specifically, the study sought to:

1. examine the extent to which interactive whiteboard integration into pedagogy improved Agricultural Education students' performance in Colleges of Education,
2. determine the extent to which Artificial Intelligence integration into pedagogy improved Agricultural Education students' performance in Colleges of Education and
3. ascertain the extent to which educational tablet integration into pedagogy improved Agricultural Education students' performance in Colleges of Education

Research Questions

The following research questions were raised to guide the study:

1. To what extent has interactive whiteboard integration into pedagogy improved Agricultural Education students' performance in Colleges of Education?
2. To what extent has Artificial Intelligence integration into pedagogy improved Agricultural Education students' performance in Colleges of Education?
3. To what extent has educational tablet integration into pedagogy improved Agricultural Education students' performance in Colleges of Education?

Research Hypotheses

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

$H0_1$: There is no significant difference between the mean responses of agricultural educators and students on the extent interactive whiteboard integration into pedagogy improved Agricultural Education students' performance in Colleges of Education.

$H0_2$: There is no significant difference between the mean responses of agricultural educators and students on the extent Artificial Intelligence integration into pedagogy improved Agricultural Education students' performance in Colleges of Education.

$H0_3$: There is no significant difference between the mean responses of agricultural educators and students on the extent educational tablet integration into pedagogy improved Agricultural Education students' performance in Colleges of Education.

Methods

The design of the study was descriptive survey research design. According to Nworgu (2018), survey research design is the type of design which uses the sample data of an investigation to describe and explain what is in existence or the present status of a phenomenon being investigated. The study was carried out in South-East Nigeria, also referred to as the South-East geopolitical zone. The Southeast is one of the six geopolitical zones in Nigeria. It is in the southeastern part of the country and comprises five states: Abia, Anambra, Ebonyi, Enugu, and Imo. The region has a population of about 36 million people, around 18% of the total population of the country (NPC, 2006). The South East geopolitical zone of Nigeria is bounded to the north by North Central zone; to the east, it shares a border with Cameroon and the South South zone (specifically, Cross River State); to the south, it is bounded by the South South zone (specifically, Rivers and Akwa Ibom States); and to the west, it is adjacent to the South South zone (specifically, Delta and Anambra States) and the River Niger.

The population for the study was 430 comprising 185 Agricultural Educators and 245 final year Agricultural Education students in all the seven Government own Colleges of Education in South-East, Nigeria (Source: National Commission for Colleges of Education (NCCE) Database, 2025). The sample size of the study was 205 comprising 88 Agricultural Educators and 117 final year Agricultural Education students. The sample size was derived using sampling formula of (Kregcee & Morgan, 1970). The sampling technique adopted was purposive sampling technique to enable the researcher select final year Agricultural Education students and Agricultural Educators. The instrument for data collection was structured questionnaire developed by the researcher titled: "Integrating Technology into Pedagogy for Improving Students Performance in Agricultural Education Questionnaire (ITPISPAEQ). The instrument was faced validated by three experts, one from Curriculum and Instruction in the Department of Adult and Continuing Education, one from Agricultural Education unit of the Department Agricultural and Vocational Education and one expert from Educational Measurement and Evaluation unit of Science Education Department, all from College of Education, Michael Okpara University of Agriculture, Umudike. The reliability of the instrument was established using Cronbach Alpha statistic which reliability co-efficient (r) of 0.85, 0.84 and 0.84 for each cluster and overall reliability co-efficient index of 0.84 considered adequate for the study. A total of 205 copies of questionnaire were distributed by the researchers with the help of five Research Assistants and 184 copies were retrieved filled comprising 79 Agricultural Educators and 105 final year Agricultural Education students representing 90% return rate. Mean was used to answer the research questions, standard deviation was used to determine the homogeneity of the respondents' responses while t-test statistic was used to test the null hypotheses at 0.05 level of significance. The mean scale for the research questions was obtained by real limit value of numbers to answer the three research questions as Very Low Extent (VLE) 1.00 – 1.49, Low Extent (LE) 1.50 – 2.49, High Extent (HE) 2.50 – 3.49 and Very High Extent (VHE) 3.50 – 4.00. The decision rule in testing the hypotheses; the p-values were compared with the alpha level. The null hypothesis was accepted if the p-value is greater than 0.05 alpha level of significance and rejected when it is otherwise.

Results

Research Question 1: To what extent has interactive whiteboard integration into pedagogy improved Agricultural Education students' performance in Colleges of Education?

Table 1: Mean and Standard Deviation Responses of the Respondents on the Extent Interactive Whiteboard Integration into Pedagogy Improved Agricultural Education Students' Performance in Colleges of Education

n = 184

S/N	ITEM STATEMENTS	$\bar{X}_E$	SD_E	$\bar{X}_S$	SD_S	$\bar{X}_{ES}$	SD_{ES}	Rmks
	Interactive Whiteboard Integration into pedagogy:							
1.	Enhances adequate presentations of diverse agricultural concepts with multimedia content, and animations	3.12	0.89	3.02	1.06	3.07	0.97	High Extent
2.	Helps educators to break down complex agricultural concepts into smaller, more manageable parts with the help of visuals diagrams for acquisition of relevant skills	3.44	0.84	3.23	1.10	3.33	0.75	High Extent
3.	Helps to increase active participation of students during teaching and learning process in Agricultural Education	3.08	1.00	3.04	1.12	3.06	1.06	High Extent
4.	Promotes students' interest in learning activities in Agricultural Education	3.34	0.87	3.25	0.94	3.29	0.90	High Extent
5.	Makes teaching to be more interactive between educators and students in instructional activities in Agricultural Education	3.17	0.87	3.19	1.01	3.18	0.94	High Extent
6.	Facilitates students' assimilation of learning concepts in Agricultural Education demonstrated in the classroom	3.34	0.76	3.26	0.96	3.33	0.86	High Extent
7.	Makes learning more dynamic and stimulating to students in Agricultural Education classes	3.37	0.86	3.31	1.01	3.34	0.93	High Extent
8.	Foster deeper understanding of agricultural principles among students in Agricultural Education classes	3.27	0.89	3.22	1.04	3.34	0.96	High Extent
9.	Increases students' comprehension ability in learning thereby improving their academic performances	3.29	0.75	3.33	0.88	3.31	0.81	High Extent
10.	Contributes to students' development of essential agricultural skills such as problem-solving, critical thinking, and decision-making	3.32	0.90	3.31	0.96	3.24	0.93	High Extent
	Cluster Mean	**3.27**	**0.86**	**3.21**	**1.00**	**3.24**	**0.93**	High Extent

$\bar{X}E$ = Mean of Educators, SD_E = Standard deviation of Educators, $\bar{X}_S$= Mean of Students, SD_S= standard deviation of Students, $\bar{X}_{ES}$ = Aggregate Mean of Educators and students, SD_{ES}= Aggregate standard deviation of Educators and students.

The data presented in Table 1 above show that the aggregate mean scores of the respondents on items 1 to 10 ranged from 3.06 to 3.34 which are within the real limit of 2.50-3.49 indicating that the respondents to a high extent agreed that interactive whiteboard integration into pedagogy improved Agricultural Education students' performance in Colleges of Education. Meanwhile, the aggregate cluster mean of 3.24 which falls with the real limit of 2.50-3.49 and a corresponding standard deviation of 0.93 showed that agricultural educators and students agreed that interactive whiteboard integration into pedagogy improved Agricultural Education students' performance in Colleges of Education to a high extent.

Hypothesis 1: There is no significant difference between the mean responses of agricultural educators and students on the extent interactive whiteboard integration into pedagogy improved Agricultural Education students' performance in Colleges of Education.

Table 2: t-test Analysis of the Mean Responses of Agricultural Educators and Students on the Extent Interactive Whiteboard Integration into Pedagogy Improved Agricultural Education Students' Performance in Colleges of Education

Variables	X	SD	N	Df	t-calculated	p-value	Remark
Educators	3.27	0.86	79				
				184	0.43	0.13	Not Significant
Students	3.21	1.00	105				

The data presented in Table 2 show a p-value of 0.13 which is greater than the alpha level of 0.05. This indicates that there was no statistically significant difference between the mean responses of agricultural educators and students on the extent interactive whiteboard integration into pedagogy improved Agricultural Education students' performance in Colleges of Education. Therefore, the hypothesis of no significant difference between the mean responses of agricultural educators and students on the extent interactive whiteboard integration into pedagogy improved Agricultural Education students' performance in Colleges of Education was not rejected.

Research Question 2: To what extent has Artificial Intelligence integration into pedagogy improved Agricultural Education students' performance in Colleges of Education?

Table 3: Mean and Standard Deviation Responses of the Respondents on the Extent Artificial Intelligence Integration into Pedagogy Improved Agricultural Education Students' Performance in Colleges of Education

n = 184

S/N	ITEM STATEMENTS	$\bar{X}_E$	SD_E	$\bar{X}_S$	SD_S	$\bar{X}_S$	SD_{ES}	Rmks
	Artificial Intelligence integration into pedagogy:							
1.	Helps agricultural educators deliver more effective and engaging instructions	3.10	0.91	3.07	1.05	3.08	0.98	High Extent
2.	Helps to supplement the limited workshop and laboratory equipment for practical learning experience of students	3.36	0.87	3.33	0.93	3.34	0.90	High Extent
3.	Helps educators provide relevant information for improving students' performance	3.05	1.02	3.03	1.14	3.04	1.08	High Extent
4.	Enhances students' knowledge of their courses	3.30	0.72	3.22	0.96	3.26	0.84	High Extent
5.	Fosters students career preparation in	3.16	0.88	3.12	1.05	3.14	0.96	High Extent

	agriculture through AI demonstration							
6.	Promotes effective instructions for students understanding of their course by simplifying technical aspects of their courses	3.34	0.76	3.27	0.96	3.30	0.86	High Extent
7.	Helps the students to reflect on what they have been taught	3.30	0.89	3.21	1.06	3.25	0.97	High Extent
8.	Arouses the interest of students and their curiosity to learn more	3.20	0.91	3.22	1.01	3.21	0.96	High Extent
9.	Increases student's enthusiasm and mastery of subject contents in Agricultural Education	3.25	0.79	3.19	0.97	3.22	0.88	High Extent
	Cluster Mean	**3.22**	**0.86**	**3.18**	**1.01**	**3.20**	**0.93**	High Extent

$\bar{X}E$ = Mean of Educators, SD_E = Standard deviation of Educators, $\bar{X}_S$= Mean of Students, SD_S= standard deviation of Students, $\bar{X}_{ES}$ = Aggregate Mean of Educators and students, SD_{ES}= Aggregate standard deviation of Educators and students.

The data presented in Table 3 above show that the aggregate mean scores of the respondents on items 1 to 9 ranged from 3.04 to 3.34 which are within the real limit of 2.50-3.49 indicating that the respondents to a high extent agreed that Artificial Intelligence integration into pedagogy improved Agricultural Education students' performance in Colleges of Education. Meanwhile, the aggregate cluster mean of 3.20 which falls with the real limit of 2.50-3.49 and a corresponding standard deviation of 0.93 showed that agricultural educators and students agree that Artificial Intelligence integration into pedagogy improved Agricultural Education students' performance in Colleges of Education to a high extent.

Hypothesis 2: There is no significant difference between the mean responses of agricultural educators and students on the extent Artificial Intelligence integration into pedagogy improved Agricultural Education students' performance in Colleges of Education.

Table 4: t-test Analysis of the Mean Responses of Agricultural Educators and Students on the Extent Artificial Intelligence Integration into Pedagogy Improved Agricultural Education Students' Performance in Colleges of Education

Variables	X	SD	N	Df	t-calculated	p-value	Remark
Educators	3.22	0.86	79				
				184	0.28	0.12	Not Significant
Students	3.18	1.01	105				

The data presented in Table 4 show a p-value of 0.12 which is greater than the alpha level of 0.05. This indicates that there was no statistically significant difference between the mean responses of agricultural educators and students on the extent Artificial Intelligence integration into pedagogy improved Agricultural Education students' performance in Colleges of Education. Therefore, the hypothesis of no significant difference between the mean responses of agricultural educators and students on the extent Artificial Intelligence integration into pedagogy improved Agricultural Education students' performance in Colleges of Education was not rejected.

Research Question 3: To what extent has educational tablet integration into pedagogy improved Agricultural Education students' performance in Colleges of Education?

Table 5: Mean and Standard Deviation Responses of the Respondents on the Extent Educational Tablet Integration into Pedagogy Improved Agricultural Education Students' Performance in Colleges of Education

n = 184

S/N	ITEM STATEMENTS	$\bar{X}_E$	SD_E	$\bar{X}_S$	SD_S	$\bar{X}_S$	SD_{ES}	Rmks
	Educational Tablet Integration into pedagogy:							
1.	Facilitates clarification of abstract concepts in agriculture for students better understanding	3.17	0.90	3.12	0.78	3.14	0.84	High Extent
2.	Facilitates educators' demonstration of subject matter in Agricultural Education for students' optimum performance	3.45	0.82	3.33	0.74	3.39	0.78	High Extent
3.	Makes teaching of Agricultural course to be more interesting to the students through virtual demonstration	3.12	1.01	3.09	0.88	3.10	0.94	High Extent
4.	Enhances cognitive, affective and psychomotor skills among agricultural students	3.37	0.68	3.28	0.61	3.32	0.64	High Extent
5.	Enables proper mastering of concepts required for problem solving in Agricultural Education	3.24	0.86	3.18	0.75	3.21	0.80	High Extent
6.	Makes teaching of Agriculture to be more fun to Agricultural Education students	3.41	0.72	3.31	0.65	3.36	0.68	High Extent
7.	Makes learning of Agricultural Education courses less stressful to the students	3.37	0.86	3.30	0.73	3.33	0.79	High Extent
8.	Improves students' learning experiences in Agricultural Education	3.27	0.89	3.22	0.75	3.24	0.82	High Extent
9.	Increases educators' ability in making clarifications during teaching and learning for students understanding of learning concepts	3.32	0.76	3.24	0.67	3.28	0.71	High Extent
	Cluster Mean	**3.30**	**0.83**	**3.23**	**0.72**	**3.26**	**0.78**	High Extent

$\bar{X}E$ = Mean of Educators, SD_E = Standard deviation of Educators, $\bar{X}_S$= Mean of Students, SD_S= standard deviation of Students, $\bar{X}_{ES}$ = Aggregate Mean of Educators and students, SD_{ES}= Aggregate standard deviation of Educators and students.

The data presented on Table 5 revealed that the aggregate mean scores of the respondents on item 21-28 ranged from 3.10 - 3.39 which fall within the real limit of 2.50 – 3.49. This implies that the respondents agreed that to a high extent educational tablet integration into pedagogy improved Agricultural Education students' performance in Colleges of Education. Also, the aggregate standard deviation values of item 21 - 28 range from 0.64 and 0.94 which indicates that the responses of the respondents were close to one another and to the mean.

Hypothesis 3: There is no significant difference between the mean responses of agricultural educators and students on the extent Educational Tablet integration into pedagogy improved Agricultural Education students' performance in Colleges of Education.

Table .6: t-test Analysis of the Mean Responses of Agricultural Educators and Students on the Extent Educational Tablet Integration into Pedagogy Improved Agricultural Education Students' Performance in Colleges of Education

Variables	X	SD	N	Df	t-calculated	p-value	Remark
Educators	3.30	0.83	79				
				184	0.59	0.14	Not Significant

Students	3.23	0.72	105

The data presented in Table 6 show a p-value of 0.14 which is greater than the alpha level of 0.05. This indicates that there was no statistically significant difference between the mean responses of agricultural educators and students on the extent Educational Tablet integration into pedagogy improved Agricultural Education students' performance in Colleges of Education. Therefore, the hypothesis of no significant difference between the mean responses of agricultural educators and students on the extent Educational Tablet integration into pedagogy improved Agricultural Education students' performance in Colleges of Education was not rejected.

Discussion

The findings were discussed in accordance with the research questions and hypotheses that guided the study as follows:

The results of the study from research question one showed that Interactive Whiteboard Integration into pedagogy to a high extent improved Agricultural Education students' performance in Colleges of Education. Therefore, to a high extent Interactive Whiteboard Integration into pedagogy enhances adequate presentations of diverse agricultural concepts with multimedia content, and animations, helps educators to break down complex agricultural concepts into smaller, more manageable parts with the help of visuals diagrams for acquisition of relevant skills, helps to increase active participation of students during teaching and learning process in Agricultural Education, promotes students' interest in learning activities in Agricultural Education, makes teaching to be more interactive between educators and students in instructional activities in Agricultural Education, facilitates students' assimilation of learning concepts in Agricultural Education demonstrated in the classroom, makes learning more dynamic and stimulating to students in Agricultural Education classes, foster deeper understanding of agricultural principles among students in Agricultural Education classes, increases students' comprehension ability in learning thereby improving their academic performances and contributes to students development of essential agricultural skills such as problem-solving, critical thinking, and decision-making. More so, the results further showed from the corresponding hypothesis tested that there was no significant difference between the mean responses of agricultural educators and students on the extent interactive whiteboard integration into pedagogy improved Agricultural Education students' performance in Colleges of Education. This implies that both educators and students agreed that to a high extent Interactive Whiteboard Integration into pedagogy improved Agricultural Education students' performance in Colleges of Education. The findings relate to the earlier study of Abanum et al. (2022) who revealed that interactive board helped to develop cognitive dimensions, reinforcing learning, and encouraging organization of activities. The findings of the study also align with the study of Nnadozie and Karanwi (2017) who revealed that the teachers largely agreed that Interactive White Board (IWB) enhances the teaching of science and mathematics and performance of students.

It was found from the study on research question two that Artificial Intelligence integration into pedagogy to a high improved Agricultural Education students' performance in Colleges of Education. This indicates that to a high Artificial Intelligence integration into pedagogy helps agricultural educators deliver more effective and engaging instructions, helps to supplement the limited workshop and laboratory equipment for practical learning experience of students, helps educators provide relevant information for improving students' performance, helps educators provide relevant information for improving students' performance, enhances students' knowledge of their courses, fosters students career preparation in agriculture through AI demonstration, promotes effective instructions for students understanding of their course by simplifying technical aspects of their courses, promotes effective instructions for students understanding of their course by simplifying technical aspects of their courses, helps the students to reflect back on what they have been taught, helps the students to reflect back on what they have been taught, arouses the interest of students and their curiosity to learn more and increases student's enthusiasm and mastery of subject contents in Agricultural Education. The

corresponding hypotheses indicated that there was no significant difference between the mean responses of agricultural educators and students on the extent Artificial Intelligence integration into pedagogy improved Agricultural Education students' performance in Colleges of Education. This implies that both the Agricultural educators and students agreed that to a high extent Artificial Intelligence integration into pedagogy improved Agricultural Education students' performance in Colleges of Education. However, the findings relate to the study of Ngonso (2025) who revealed that AI enhances students' knowledge of their courses, improves their learning and speaking skills, and helps them to have a quick understanding of their course by way of simplifying technical aspects of their courses. The findings also oppose the earlier study of Bada (2024) who found that the Artificial Intelligence has no influence adolescents' Academic Performance,

The results of the study on research question three revealed that Educational Tablet integration into pedagogy to a high extent improved Agricultural Education students' performance in Colleges of Education. Therefore, Educational Tablet integration into pedagogy to a high extent facilitates clarification of abstract concepts in agriculture for students better understanding, facilitates educators' demonstration of subject matter in Agricultural Education for students optimum performance, makes teaching of Agricultural course to be more interesting to the students through virtual demonstration, enhances cognitive, affective and psychomotor skills among agricultural students, enables proper mastering of concepts required for problem solving in Agricultural Education, makes teaching of Agriculture to be more fun to Agricultural Education students, makes learning of Agricultural Education courses less stressful to the students and Improves students' learning experiences in Agricultural Education among others. The corresponding hypothesis tested indicated that there was no significant difference between the mean responses of agricultural educators and students on the extent educational tablet integration into pedagogy improved Agricultural Education students' performance in Colleges of Education. This implies that both the Agricultural educators and students agreed that to a high extent Educational Tablet integration into pedagogy to a high extent improved Agricultural Education students' performance. The findings relate to the study of Nnajiofor and Ejikeme (2020) that Educational Tablet integration enhance students' assimilation of learning concepts and by extension improved their performance. Also, the findings also agreed with the earlier study of Ifeanyi and Chukwuere (2018) that Educational Tablet integration improves teaching and learning process, enhance creativity, develop skills of the teachers on the use of technology, enhances learning experience of the students, facilitates interaction between teachers and students, enhance students learning of different concepts and arouse students learning interest.

Conclusion

Based on the statistical analysis carried out, there is a clear indication that integrating technology into pedagogy improved students' performance in Agricultural Education programme in Colleges of Education. As the findings of the study revealed that to a high extent interactive whiteboard, Artificial Intelligence and educational tablet integration in pedagogy improved students' performance in Agricultural Education in Colleges of Education. Hence, it was concluded that; integrating technology into pedagogy are very vital tool for the improvement of students' performance in Agricultural Education towards the effective achievement of Agricultural Education objectives and national educational goals. Therefore, Agricultural Educators should integrate technology into pedagogy for enhancing adequate presentations of diverse agricultural concepts with multimedia content, and animations as well as increases students' comprehension ability in learning thereby improving their academic performances among others.

Recommendations

Based on the findings and conclusion drawn from this study, the following recommendations were made:

1. There is need for Agricultural Educators in Colleges of Education to show more concern in integration of available technologies into pedagogy especially Interactive Whiteboard for improving Agricultural Education students' performance in South-East.
2. The National Commission for Colleges of Education should endeavor to organize training workshops to educators on Artificial Intelligence integration into pedagogy for improving Agricultural Education students' performance in South-East.
3. The administrators of Colleges of Education in South-East should ensure that Educational Tablets are provided to Educators for integration into pedagogy for improving Agricultural Education students' performance in South-East.

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