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Utilisation of Artificial Intelligence Applications among Agricultural Students in Universities in River State, Nigeria

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Abstract

This study evaluated the utilization of Artificial Intelligence applications among agricultural students in universities in Rivers State, Nigeria. The study focused on awareness, frequency of use, perceived benefits, and constraints of AI utilization. Stratified random sampling technique was employed to select 180 undergraduate and postgraduate students from three universities. Structured questionnaires were employed for data collection. The study revealed high awareness of AI tools like Gemini, ChatGPT, Grammarly, Quillbot, and Google Assistant. However, overall utilization of many AI applications was low even though awareness was high. The key benefits of AI use were improved access to timely agricultural information, enhanced understanding of agricultural practices, support for research activities, and time savings in information acquisition, while major constraints limiting effective utilization identified were poor network connectivity, high cost of internet subscription, and the high cost of digital tools. The study concludes that although agricultural students recognize the value of AI, infrastructural and economic barriers significantly hinder optimal adoption. It recommends targeted AI literacy training, improved digital infrastructure, affordable internet access, and supportive institutional policies to enhance effective AI integration in agricultural education. Strengthening these areas will better prepare students for data-driven agriculture and contribute to sustainable agricultural development in Nigeria.

Key words: Artificial intelligence; agricultural students; constraints to utilization

Introduction

Artificial Intelligence (AI) is a modern technology developed to help solve problems that would ordinarily require the human brain to solve in the past. This technology has continued to gain relevance across all sectors of the economy and the agriculture sector is not left out (Amaehewule, 2025). The relevance of AI cuts across all levels of education, and lecturers in universities have continued to explore how this technology can be relevant to their educational service delivery. Yusuf et al., (2022) mentioned that there are several features that make AI beneficial to users including lecturers in

universities and this is premised on the fact that it is user-friendly, has infinite functions and can simplify complex tasks. However, the extent to which these students can benefit from this technology depends on their level of awareness of its usage as well as the belief they hold about the usefulness of this technology. So far, Usman, (2025) pointed out that AI represents the future of work and its adoption in solving educational problems cannot be undermined. Students have several educational roles that they are expected to receive from the achievement of educational goals and objectives. However, the extent to which they maximise the benefits of this technology will depend on their level of literacy in its adoption and the perceived usefulness of the technology to them. This is important to maximize this technology in the student's functions.

According to Agbo et al. (2023), the introduction of Artificial Intelligence (AI) brought about an era that witnessed technological advancement, accompanied with groundbreaking innovations and transformative potential, across various sectors, with education not left out. According to UNESCO (2022), AI covers machine learning, computer vision, natural language processing, robotics, and other advanced technologies. All these have the capacity to change traditional practices and frameworks. Globally, AI-powered tools and platforms have also reshaped how students learn, educators teach, and universities operate. World Bank (2023) noted that the use of intelligent tutoring systems, adaptive learning software, and automated administrative processes exposes how disruptive AI can be in education. It poses both opportunities and challenges for the Nigerian university students. The nation is faced with more critical issues such as inadequate infrastructure, brain drain, and high unemployment rates among graduates (Olaleye & Hassan, 2022). Consequently, it has to meet up the demands of an increasingly digitized and automated global economy. The use of AI can offer innovative solutions to the long-standing problems. It will enable universities to enhance educational delivery, and bridge the skills gap, thereby improving graduate employability (Agbo et al., 2023). According to UNESCO (2022), the effective adoption of AI in Nigerian universities depends on overcoming the numerous barriers like infrastructural deficiencies, policy gaps, and a lack of requisite expertise. Addressing these challenges requires the joint efforts of policymakers, educators, industry stakeholders, and students alike.

The effective identification and use of artificial intelligent applications are essential for getting information, learning and studying in the university. Consequently, the presence of artificial intelligence awareness and use of suitable information assure students during their learning process. The main function of artificial intelligence is to upsurge the familiarity of the operator, diminish his level of ambiguity or diminish the variabilities of adoptions accessible to the student. For artificial intelligence applications to be effective, it must be used accurately. However, agricultural students can delve into artificial intelligence applications and utilize it to make exceedingly knowledgeable choices, so the progressions of these students are making this authenticity conceivable, both this day and age and for the predictable future. Accordingly, the lack of AI literacy among agricultural students in universities in Rivers State, may hinder their ability to effectively utilize AI technologies, making it challenging for them to contribute to the transformation of the agricultural sector (Iwerima & Bupo, 2024).

This knowledge gap could also affect their readiness for an AI-driven labour market, potentially having long-term effects on both their professional growth and the advancement of the agricultural sector. Furthermore, agricultural students often lack adequate understanding of AI principles, including machine learning and deep learning, despite the importance of these technologies in supporting informed agricultural decision-making. This challenge is largely linked to insufficient awareness and comprehension of AI concepts and their practical applications (Cerny, 2024).

According to Iwerima and Bupo (2024), many students lack the skill required to effectively operate AI-based technologies, this limitation can reduce their capacity to utilize AI effectively due to inadequate technical skills and limited exposure to AI tools and applications. Moreover, agricultural students may lack the ability to critically assess AI-driven innovations or to handle the ethical issues associated with their use, a situation that could significantly affect the future of the agricultural sector. As the world prepares for an AI-driven future, it's essential that we harness its power to drive innovation, efficiency, and growth (Duckarn, 2024). This study was taken in order to know the utilization of artificial intelligence among agricultural students in universities in Rivers State.

The main objective of this study was utilization of artificial intelligence applications among agricultural students in universities in Rivers State, Nigeria. Specifically, the study

i. determined the awareness of Artificial Intelligence applications available,
ii. ascertained the frequency of utilization of AI applications among agricultural students in universities in Rivers State, Nigeria,
iii. evaluated the benefits of AI application among agricultural students in universities in Rivers State, and
iv. analyzed the constraints to utilizing AI applications.

Methodology

This study took place in Rivers State. Rivers State is located in the Niger Delta region of southern Nigeria (Old Eastern Region). Formed in 1967, when it was split from the former Eastern region, Rivers State borders Imo and Abia States to the north, Akwa Ibom State to the east, and Bayelsa and Delta states to the west. Rivers State capital, Port Harcourt, is a metropolis that is where the universities are located. Rivers State is a predominantly low-lying pluvial state in southern Nigeria, located in the eastern part of the Niger Delta on the oceanward extension of the Benue Trough. Rivers State has a total area of 11,077 km2 (4,277 sq mi), making it the 26th largest state in Nigeria. There are two major areas which are the upland and the riverine area and the universities where agriculture are studied are located in the upland area.

The population of this study comprised all agricultural students in universities in Rivers State. For the purpose of this study, agriculture students from higher institutions include University of Port Harcourt, Rivers State University and Ignatius Ajuru University of Education.

A stratified random sampling procedure was used to select sample for the study. All agricultural students in universities in the state, both undergraduate and post graduate across departments in the faculty of agriculture constituted the population. From each department, a specific number of students were randomly selected. This process yielded a total sample size of 180 respondents.

Data for this study were collected through the use of structured questionnaire. The utilization AI applications were analyze using the 4 Likert type scale with SA, A, SD AND D, frequencies, percentages, and means, was used to analyze awareness of AI applications, while 4 Likert type scale was used to analyze frequency of utilization of AI applications, evaluate the benefits of AI application and the constraints to utilizing AI applications. Based on the weight assigned, a midpoint of 2.5 was obtained. The decision rule was that item statement with mean scores of 2.5 and above implies frequent utilization or agree, while mean scores of less than 2.5 imply not frequent utilization or disagree respectively.

Results and Discussion

Awareness of Artificial Intelligence Tools by Agricultural Students

Results in Table 1 show that the major AI applications the agricultural students in Rivers State universities were aware of were ChatGPT (96%), Gemini (94%), Grammarly (93%), Quillbot (92%), consensus AI (90%), Meta AI (78%) and google assistant (69%).

Unfortunately, some of the AI applications that the agricultural students were least aware of where Starry (30%), Picnic (17%), Slides AI (12%), Write sonic (15%), and Notion AI (15%). This corroborates Shahsavar et al (2023), and Usman (2025) that AI application awareness has gain popularity among universities student because they have been using AI related applications via smartphone, ChatGPT and the others in their research work. Similarly, Hassan & Harande (2025) found that awareness of AI tools such as ChatGPT (82%) and Grammarly (78%) were also relatively high. On the contrary, Anih & Ukeh, (2024) found out that students were not aware of most of the AI tools.

Table1. Awareness of Artificial Intelligence Tools by Agricultural Students

Artificial Intelligence Application tools	Websites	Percentage%
ChatGPT	https://chatgpt.com	96.1
Gemini	https://gemini.goole.com	93.8
Grammarly	https://www.grammarly.com	93.3
Quillbot	https://quillbot.com	92.2
Consensus AI	https://consensus.app	90
Meta AI	https://www.meta.ai	77.7
Google Assistant	https://ssistant.google.com	69.4
Synthesia	https://www.synthesia.io	48.8
Lensa AI	https://lensa.app	43.8
Perplexity	https://www.perplexity.ai	41.6
Socratic	https://socraticapp.com	41.6
Pictory	https://pictory.ai	40
Microsoft Copilot	https://copilot.microsoft.com	40
Photo Room	https://www.photoroom.com	40
ElevenLabs	https://elevenlabs.io	38.3
DeepL	https://www.deepl.com	35.5
RecCloud	https://reccloud.com	35.5
MidJourney	https://www.midjourney.com	35.5
Replit	https://replit.com	35
Soundraw	https://soundraw.io	35
Fliki	https://fliki.ai	35
Starry AI	https://starryai.com	30
PicWish	https://picwish.com	16.6
SlidesAI	https://slidesai.io	11.5
Writesonic	https://writesonic.com	15
Notion AI	https://www.notion.com	15

Source: Field Survey 2025

Frequency of Utilization of AI Tools Among Agricultural Students in Universities in Rivers State

Table2 show that, the AI tools that were frequently utilized by the agricultural students in Rivers State universities were Quillbot (Mean = 3.2), Grammarly (Mean = 3.2), ChatGPT, (Mean = 3.1) Meta AI (Mean = 3.1) and Google Assistant, (Mean = 3.0). Moreover, AI tools like Microsoft Copilot (Mean = 2.4), RecCloud, (Mean = 2.3), PhotoRoom, (Mean = 2.0), ElevenLabs (Mean = 2.0), and DeepL (Mean = 2.0) were underutilized by the same agricultural students.

Murtala Aliyu et al corroborates that ChatGPT, and Grammarly were commonly utilize by the students for home work, virtual tutor, writing assistant, learning programming and source information. This revealed a positive level of satisfaction with AI applications in academic settings. This is contrary to Mohammed et al (2025) and Hassan et al (2026) whose study revealed that the agricultural students utilized all AI application more frequently.

Table 2. Frequency of Utilization of AI Tools Among Agricultural Students in Universities in Rivers State

AI Application	Mean	Standard deviation
Quillbot	3.2**	0.77
ChatGPT	3.1**	0.78
Meta AI	3.1**	0.82
Gemini	2.7**	1.05
Grammarly	3.2**	0.86
Google Assistant	3.0**	0.95
Consensus AI	2.8**	0.80
Lensa AI	2.8**	0.82
Synthesia	1.8*	0.78
Perplexity	2.8**	0.95
Socratic	2.8**	0.67
Pictory	2.8**	0.86
Microsoft Copilot	2.4*	1.14
PhotoRoom	2.0*	0.76
ElevenLabs	2.0*	0.67
DeepL	2.8**	0.05
RecCloud	2.3*	0.61
MidJourney	2.0*	0.90
Replit	1.5*	0.56
Soundraw	1.7*	0.73
Fliki	2.0*	1.12
Starry	1.9*	1.11
PicWish	1.6*	0.88
SlidesAI	1.6*	0.67
Writesonic	1.6*	0.78

Source: Field survey 2025; mean score ≥ 2.50 is high frequency of Utilization**

Benefits of Utilization of AI Tools among Agricultural Students in Universities in Rivers State

From Table 3, the major benefits of utilization of AI application tools among agricultural students were found to be that current agricultural practices(Mean = 3.4),access to timely information (Mean = 3.3), it enhances research purpose (Mean = 3.1), AI have kept me updated (Mean = 3.0), facilitates faster acquisition of agricultural knowledge (Mean = 3.0), AI enhances my understanding of agriculture(Mean = 3.0).

Other benefits include Acquiring information using AI has been impactful (Mean = 2.9), and I have become a knowledge reservoir (Mean = 2.9).

This corroborate the findings of Mohammed et al (2025) that the usefulness of the applications is the improvement in knowledge exchange (75%) and impactful. Similarly, Hassan et al, (2026) concludes that AI applications are useful in promoting learning activities. Also, Vieriu and Petrea (2025) revealed that AI improved academic outcomes,

personalized learning and enhanced student engagement. However, challenges such as over-reliance on AI, diminished critical thinking skills, data privacy risks, and academic dishonesty were also identified.

Table3. Assessment of the Benefits of Utilization of AI Application Tools among Agricultural Students in Universities in Rivers State

Factors	Mean	Standard deviation
Access to timely information	3.3	0.71
AI enhances my understanding of agriculture	3.0	0.65
Facilitates faster acquisition of agricultural knowledge	3.0	0.55
AI has been impactful	2.9	0.78
It enhances research purpose	3.1	0.88
AI have kept me updated	3.0	1.04
AI serves as knowledge reservoir	2.9	0.78
Impact of Current agricultural practices	3.4	0.92

Source: Field survey 2025; mean score ≥ 2.50 is agreement with the statement

Constraints to Utilizing AI Application Tools

From Table 4, findings show that the major constraints faced by agricultural students in accessing AI application tools was high cost of internet subscription (Mean = 4.0). poor network connection (Mean = 3.1).

Other constraints encountered by agricultural students in accessing AI application tools include High cost of digital tool (Mean = 3.0), it is time consuming (Mean = 2.8), lack of skill in using AI (Mean = 2.8), no regular update (Mean = 2.8) and it is difficult to access (Mean = 2.6),

this contradicts Akinyemi (2025) which identified poor ICT, power supply, poor network, high cost as major barriers. He revealed in his study that adequate power supply will provide easy accessibility to internet (73%). Iwighreghweta (2022) findings which showed that the constraints faced with the use of the applications was lack of basic searching skills, also Mohammed, (2025) found that power outages which accounted for (73%) of the responses was a major constraint including slow Internet services (69%) and lack of access to current applications (67%). low level of computer literacy (65%) and high cost of bandwidth (61%). This imply that if most of these barriers are worked upon, using AI applications will not be an issue since the agricultural students are aware of most of the AI applications and they are educated.

Table4. The Constraints to Utilizing AI Application Tools among Agricultural Students

Factors	Mean	Standard deviation
It is time consuming	2.8	0.86
It is difficult to access	3.0	0.84
Poor network connection	3.1	0.45
High cost of internet subscription	4.0	1.11
High cost of digital tool	3.0	0.78
Lack of skill in using AI	2.8	1.12
No regular update	2.8	0.68

Source: Field Survey, 2025; mean score > 2.50 is agreement with the statement

Conclusion and Recommendations

From the analysis and summary of findings, it could be concluded that Agricultural students in Rivers State are aware of most of the AI applications, and most of the AI applications are underutilized whereas they agreed on how they effective AI is however, they are constrained by various factors. The study therefore highlights the importance of ICT training and calls for deliberate investment in digital infrastructure to ensure that universities are provided with stable internet connectivity, up-to-date computing facilities, and constant electricity supply. Such investments should also be supported with continuous maintenance and periodic upgrades.

In addition, there is a need for capacity development programmes aimed at equipping lecturers and IT personnel with the competencies required for the effective design and implementation of AI-based tools. Students should equally be introduced to AI literacy initiatives that will enable them to apply these technologies efficiently in both academic and workplace environments. Besides, the Nigerian government should enact a exhaustive national policy on AI in education to provide clear directive on ethical usage, data security, and the proper integration of AI technologies into the educational system. This policy should also include provisions for monitoring and evaluating the impact of AI on educational outcomes.

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