EFFECTS OF ELECTRONIC MEDIA TECHNOLOGY INTEGRATION ON STUDENTS' ACADEMIC PERFORMANCE IN AGRICULTURE

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Abstract

The study assessed the impact of technology integration in the agricultural education of students of Adeyemi Federal University of Education. Specifically, the study examined the socio-economic characteristics of the students, technology integration on students' engagement and motivation in agricultural education, and the challenges facing technology integration in agricultural education. A simple random sampling technique was used to sample 125 respondents for the study. Data were collected with the aid of a structured questionnaire, and the data collected were analyzed using descriptive statistics of frequency counts and percentages. Results of analysis showed that technology integration in agricultural education among students in the study area helps to facilitate teaching and learning, promotes understanding of concepts, enhances interactions and collaboration and helps to reach out to a larger audience. More than 75% of the students indicated that technology integration in teaching and learning of agricultural education increases students' understanding of agricultural concepts and skills acquisition. Findings also showed that the effects of technology integration in agricultural education cannot be undermined in the development of agriculture. It promotes skill acquisition and development among the students. The result showed that despite the prospect of technology integration in agricultural education, finance, irregular power supply and poor technology infrastructure posed major challenges that may hinder its effective implementation. It could therefore be suggested that electronic media technology integration will enhance students' performance when employed in agricultural education.

Keywords: academic performance, agriculture, electronics media, technology integration

Introduction

The agricultural sector is a vital component of the global economy, contributing significantly to food security, employment, and overall economic growth. As the world continues to evolve, technology plays an increasingly crucial role in improving agricultural practices, enhancing productivity, and promoting sustainable development. In the context of agricultural education, technology integration offers opportunities to enhance teaching and learning processes, enabling students to acquire relevant knowledge and skills for the digital age (Al-Emran et al, 2016). Agricultural education is a fundamental part of the competitiveness of farming systems worldwide. To maintain this competitiveness, agricultural education must integrate educational technologies into curriculum development and delivery. Technology integration in agricultural science education has become increasingly important in today's digital age. With the advent of new technologies, educators have found innovative ways to enhance teaching and learning in the field of agriculture.

The role of technology in education has been widely acknowledged, with numerous studies highlighting its potential to enhance teaching and learning processes (Al-Emran et al., 2016; Tamim et al., 2015). Technology integration in education refers to the seamless incorporation of digital tools and resources into the learning environment to promote active engagement, collaboration, and critical thinking among students (Ertmer & Ottenbreit-Leftwich, 2013). Enhanced Learning opportunity is one of the key benefits of technology integration in agricultural science education. With the use of interactive simulations, virtual labs, and online resources, students can gain a deeper understanding of complex agricultural concepts. Technology also allows for collaborative learning experiences, where students can work together on projects and share information in real-time. Improved Access to Information Technology has also improved access to information for students in agricultural science education.

With the internet and digital tools, students can access a wide range of resources, research papers, and data sets to supplement their learning. This has greatly expanded the scope of knowledge available to students, allowing them to explore new ideas and concepts in agriculture. Real-world application Technology integration in agricultural science education has also facilitated the real-world application of concepts learned in the classroom. With the use of sensors, drones, and other technological tools, students can collect data from actual agricultural settings and analyze it to make informed decisions (Odeyemi 2018). This hands-on approach to learning enhances students' critical thinking and problem-solving skills, preparing them for careers in the field of agriculture. Professional Development Technology integration in agricultural science education has also provided opportunities for professional development for educators. By incorporating new technologies into their teaching methods, educators can stay up to date with the latest trends in agricultural science education and improve their instructional practices.

In today's digital age, technological advancements continue to shape various aspects of society, including education. As such, educational institutions are increasingly adopting technology to enhance teaching and learning processes and equip students with the necessary skills to navigate the complex challenges of the 21st century (Spector, 2014; Voogt et al., 2013). This trend is particularly important in the context of agricultural education, given the need to develop sustainable agricultural practices to address global issues such as food security, climate change, and environmental degradation (Pretty, 2018; Ricketts et al., 2016). Technology integration in agricultural education can take various forms, including the use of mobile apps, simulations, online resources, and digital tools to facilitate hands-on learning, promote critical thinking, and enable students to engage in problem-solving activities (Bakar et al., 2019; Fanchon & Rutt, 2018). These technologies can provide students with instant access to information on farming techniques, crop management, market prices, and other relevant data, enabling them to make informed decisions and gain practical experience in real-world agricultural scenarios (Mendoza et al., 2017; Wang et al., 2019). Despite the potential benefits of technology integration in agricultural education, several challenges may hinder its effective implementation. These include limited access to technology, insufficient teacher training, inadequate funding, and lack of technical support (Asongu & Odhiambo, 2020; Latif et al., 2019). Furthermore, students' and teachers' perceptions of technology

and its relevance to agricultural education may influence its adoption and utilization (Bakar et al., 2019; Fanchon & Rutt, 2018).

In the Agricultural Education context, technology integration offers unique opportunities for students to acquire relevant knowledge and skills, and engage in hands-on learning experiences (Fanchon & Rutt, 2018; Wang et al., 2019). For instance, the use of mobile applications can provide instant access to information on farming techniques, crop management, and market prices, facilitating informed decision-making among students and farmers alike (Mendoza et al., 2017). Similarly, simulations can offer immersive learning experiences, enabling students to understand complex agricultural concepts and develop problem-solving skills in a risk-free environment (Achmad & Ghazali, 2020). Despite the potential benefits of technology integration in agricultural education, limited empirical evidence exists on its influence on learning outcomes, engagement, and motivation among students (Bakar et al., 2019; Latif et al., 2019). Moreover, there is a need to understand the perceptions of students and teachers on the benefits and challenges of incorporating technology into agricultural education (Asongu & Odhiambo, 2020). Addressing these gaps in knowledge can inform the design and implementation of technology-based interventions to enhance agricultural education and promote sustainable development. Hence, the objective of this research was to assess the effects of electronic media technology integration on agricultural students' engagement and motivation in agriculture.

Research Questions

The following research questions were formulated to guide this study.

1. What are the socio-economic characteristics of the students?
2. What are the various technology integrations influencing students' engagement and motivation in agricultural education?
3. What is the effect of technology integration on students' engagement and motivation in agricultural education?
4. What are the challenges facing technology integration in agricultural education?

Methodology

A descriptive research design was adopted for this study. The target population included students from the Department of Agricultural Science at Adeyemi Federal University of Education. A simple random sampling technique was employed to select a sample of 125 students from this department. The research instrument utilized was a self-designed structured questionnaire titled "The Impact of Technology Integration in Agricultural Education." This questionnaire was divided into two sections: Section A focused on the demographic characteristics of the respondents, while Section B included 20 statement items aimed at addressing the research questions. Questionnaires were distributed randomly among students across various academic levels in the Department of Agriculture at Adeyemi Federal University of Education, Ondo. The collected data were analyzed using frequency counts, simple percentages, and standard deviation.

Results

Research Question 1: What are the socio-economic characteristics of the students?

Table 1: *Socio-demographic characteristics of the students, n = 125*

Variables	Frequency	Percentage (%)
Age		
<16	3	2.4
16 – 19	28	22.4
20 – 23	73	58.4
>23	21	16.8
Mean±(SD)		21.1±2.5
Sex		
Male	73	57.6
Female	52	42.4
Level of Education		
NCE	46	36.8
Degree	79	63.2
Socio-economic Status		
Educated Parents	56	44.0
Not Educated	33	26.4
Adult Literacy	37	29.6

Table 1 shows the socio-demographic characteristics of the students, with a mean age of 21.1 ± 2.5 years. The gender distribution indicates that 57.6% of the students are male and 42.4% are female. Regarding the socio-economic status of the parents, the majority of students come from literate backgrounds, while only a small percentage have uneducated parents.

Research Question 2: What are the various technology integrations influencing students' engagement and motivation in agricultural education?

Table 2: *Various Technologies Integrated in Agricultural Education n = 125*

Technology Integrated	Frequency	Percentage (%)
Radio	91	72.8
Television	100	80.0
Projector	112	89.6
Closed-Circuit Television (CCTV)	114	91.2
Print Media	115	92.0
Edpuzzle	116	92.8
Adobe Captivate	115	92.0
Android Phones/Tablets	112	89.6

Table 2 illustrates the various technologies integrated into agricultural education among undergraduates in the study area. The results revealed that 72.8% of respondents indicated the use of radio for educating and disseminating information to the public. Furthermore, the integration of other technologies, such as television, projectors, CCTV, and print media, accounted for 80.0%, 89.6%, 91.2%, and 92.0%, respectively. EduPuzzle and radio were noted as having the lowest integration percentages, while other technologies showed higher adoption rates.

Research Question 3: What is the effect of technology integration on students' engagement and motivation in agricultural education?

Table 3: *Students' perception of the benefits of Technology Integration in Agricultural Education*

Item Statement	SA	A	D	SD	Mean	SD*	Remark
TI makes teaching and learning interactive	97(77.8)	21(16.8)	-	7(5.6)	3.664	0.751	SA
TI promotes agricultural development	118(94.4)	5(4.0)	-	2(1.6)	3.912	0.422	SA
With TI, students far away could be reached and educated	65(52.0)	22(17.6)	38(30.4)	-	3.216	0.885	A
TI can be used in the local language to teach the students	78(62.4)	9(7.2)	33(26.4)	5(4.0)	3.280	0.989	A
TI helps to individualize or personalize instruction	99(79.2)	21(16.8)	4(3.2)	1(0.8)	3.744	0.552	SA
With TI teacher can carry out teaching anytime	70(56.0)	51(40.8)	3(2.4)	1(0.8)	3.520	0.590	SA
TI enables students to learn at their own pace	100(80.0)	24(19.2)	1(0.8)	-	3.824	0.476	SA
With TI, teaching and learning can be revisited	116(92.8)	3(2.4)	6(4.8)	-	3.880	0.452	SA
TI helps to modernize the teaching of agriculture	48(38.4)	67(53.6)	9(7.2)	1(0.8)	3.296	0.635	A

The findings presented in Table 3 illustrate students' perceptions of the benefits of technology integration in agricultural education. The results indicate that students strongly agreed with statements 1, 2, 5, 6, 7, and 8. Additionally, they agreed with statements 3, 4, and 9, as shown in the table.

Research Question 4: What are the challenges facing technology integration in agricultural education?

Table 4: *Challenges facing Technology Integration in Agricultural Education n = 125*

Item Statement	SA	A	D	SD	Mean	SD*	Remark
TI is faced with a lack of finance	95(76.0)	26(20.8)	4(3.2)	-	3.728	0.514	SA
TI is confronted with inadequate technical knowledge	101(80.8)	16(12.8)	7(5.6)	1(0.8)	3.736	0.598	SA
TI is hindered by an obsolete technology curriculum	67(53.6)	42(33.6)	11(8.8)	5(4.0)	3.668	0.651	SA
TI is faced with students' apathy towards agriculture	66(52.8)	23(18.4)	36(28.8)	-	3.240	0.874	A
TI is hampered by poor technology infrastructure	97(77.6)	21(16.8)	-	7(5.6)	3.664	0.751	SA
TI inadequate indigenous technology in agriculture	118(94.4)	5(4.0)		2(1.6)	3.912	0.422	SA
Inconsistent government policy	67(53.6)	22(17.6)	36(28.8)	-	3.248	0.877	A

Table 4 shows the challenges of technology integration in agricultural education in the study area. Major challenges identified include financial constraints, inadequate technical skills, poor technological infrastructure, and a lack of indigenous technology in agriculture.

Discussion

The results in Table 1 revealed that the mean age of the students was 21.1±2.5 years, indicating that the students were still within the acceptable age as undergraduates. This could help them in their academic work because they are very young and dynamic to identify the relevance of the technology integration in agricultural education. This is in agreement with Johansson (2020), who reported 21.6±3.8 years as the average age of most undergraduate students in the tertiary institutions in Nigeria. He stressed further that this age bracket is versatile in the adoption of ICT applications. The result also revealed that 57.6% of the undergraduate students were male while 42.4% were female. This implies that a larger percentage of the student population (57.6%) is male. This is in line with findings by Job and Ojekale (2015) who reported more male undergraduate students than female participation in technology adoption in yam production in Imo state, Nigeria.

The levels of education of students who took part in the study showed that 63.2% were Degree students compared with 36.8 in % NCE programme. This implies that there were more Degree students in the study when compared with NCE students. The effects of the socio-economic status of the students revealed that 44.0% had educated parents, which could be attributed to their awareness about technology integration in agriculture, while 29.6% and 26.4% had adult literacy education and no education, respectively. This reveals that parental educational background could help the students with hands-on learning on the adoption of technology integration in any activity. This concurs with Kimaro et al. (2015) that education influences the adoption of technology and diffusion of innovation among the farmers.

Table 2 shows the various technologies integrated in agricultural education among undergraduate students in the study area. The result revealed that 72,8% indicated the integration of radio in the education and dissemination of information to the populace. Furthermore, the integration of television, projector, CCTV and print media accounted for 80.0, 89.6, 91.2 and 92.0% respectively. The students opined that they are good sources of information for teaching and learning. It was also reported that these gadgets could be used for a large audience.

The use of edpuzzle and Adobe Captivate as integrated technology accounted for 92.8% and 92.0%, respectively. This is in line with Madojutimi (2024) that edpuzzle and Adobe Captivate are used mostly in a flipped classroom for teaching and learning. Moreover, both edpuzzle and Adobe Captivate are used for content preparation and sharing and help to prepare videos for lessons more effectively and beneficially. The gadgets are used to prepare interactive e-learning content. The use of Android phones/tablets accounted for 89.6% suggesting that it is a vital technology integrated in teaching and learning among students. It was also reported that androids/tablets are useful in getting vital information about climate, agricultural prices/information, e-transactions and market information in agriculture.

Results in Table 3 showed the perception of students on the benefits of technology integration in agricultural education. Respondents were strongly aware of technology integration or adoption in agricultural education. The results showed that students strongly agreed with item statements 1, 2,

5, 6, 7 and 8; they also agreed with item statements 3, 4 and 9 as shown in the table. This implies that students are quite aware of the benefits of technology integration or adoption; however, the challenges of the process of integration may be the major hindrances facing the integration in agricultural education and in agriculture in general.

Table 4 shows the challenges facing technology integration in agricultural education in the study area. The analysis revealed that the respondents strongly agreed that technology integration is faced with financial challenges, inadequate experts/technical know-how, use of obsolete curriculum, students' apathy towards agriculture and inconsistent government policy on technology adoption or integration, among others in the study area.

Conclusion

The findings from this research indicate that there is a higher proportion of male students compared to female students in the tested population. The majority of these students possess an understanding of and have been exposed to technology integration in agricultural education. A significant percentage of the population identified financial constraints, lack of technological expertise, and inconsistent power supply as major barriers to successfully utilising electronic media in agricultural education. Consequently, it can be concluded that the integration of electronic media technology in agricultural education significantly facilitates teaching and learning, enhances comprehension of key concepts, promotes interaction and collaboration, and expands outreach to a broader audience. It has improved students' understanding and skill acquisition in agricultural production, thus playing a vital role in the advancement of agriculture. Although students recognize these benefits, financial limitations remain the primary obstacle to their adoption.

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