

Perceived Determinants of Lecturers' Adoption of Electronic Supervision for Agricultural Education Students' Research Projects in Universities in Southeast Nigeria

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ABSTRACT

This study identified the perceived determinants of e-supervision adoption for Agricultural Education students' research projects by lecturers in public universities in Southeast Nigeria. It was guided by four research questions with corresponding research questions. A descriptive survey research design was adopted. The population of the study was 45 lecturers of Agricultural Education in six public Universities in Southeast Nigeria. A census approach was adopted, hence there was no sampling. The instrument for data collection was a structured questionnaire. The questionnaire was validated by 5 experts and pilot-tested. Analysis of data from the pilot study indicated good reliability with a Cronbach's alpha coefficient of 0.82. Data was collected from an online questionnaire designed using a Google form. A total of 38 valid responses were recorded, resulting in an 84.44% survey response rate. Data collected was analyzed using descriptive statistics such as mean and standard deviation. Findings revealed that the adoption of e-supervision for Agricultural Education research projects in universities is determined by some individual, technological, organizational, and environmental factors. Some key individual determinants found included ICT competence, interest, familiarity with digital tools, and prior experience. Technological factors found included perceived ease of use, system quality, and infrastructure, which were significant. In contrast, organizational factors like capacity-building initiatives, administrative support, and compatibility with existing academic structures played essential roles. Environmental factors, including power supply, financial considerations, and competitive pressure from colleagues, also influenced adoption. The researchers concluded that there is a need to invest in robust ICT infrastructure, provide ongoing training, and create conducive environments to encourage lecturers of Agricultural Education to adopt e-supervision. It was recommended among others that administrators and agencies of government in charge of the Universities in Southeast Nigeria should organize structured capacity-building programmes and develop user-friendly e-supervision systems.

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INTRODUCTION

Lecturers play significant roles in the supervision of Agricultural Education students' research projects in universities. Arguably, the

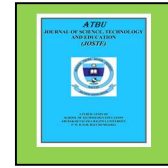
main function of a lecturer is to assist, encourage, guide and support students throughout their academic research projects (Imperial College, 2014). Therefore, this academic exercise is

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referred to as supervision of research projects. There are different definitions for the term "supervision" in literature. For instance, some authors asserted that students' research supervision is expressed as the process of Lecturers' participation in instructional dialogue in order to increase student success and improve learning and research (Vaiz *et al.*, 2021).

Traditionally, the supervision process takes place face to face. In the context of this study, supervision is the process of discussions between student and their supervisor to discuss various matters related to the research project from research planning, research process and final report of the research results (Grant, Hackney & Edgar, 2014). This mode of supervision of students of Agricultural education poses significant challenges, including delayed feedback due to lecturers' heavy workloads, physical barriers, and financial burdens on students (Onah *et al.* 2024). In an ideal educational environment, the supervision of Agricultural Education students' research projects should be efficient, flexible and capable of addressing the challenges posed by increasing student populations and academic workloads faced by Lecturers. Advancements in Information and Communication Technology (ICT) provide innovative technologies, such as electronic supervision (e-supervision), which enhances the quality of students' research project supervision in different countries of the world, including Nigeria (Osiesi *et al.*, 2023).

Some authors have defined e-supervision in the context of students' research projects differently based on their perceptions. However, in the context of this study, unanimous evidence in literature reveals that it involves the use of electronic technology in monitoring, guiding and examining Agricultural Education students' research projects. According to Djatmika *et al.* (2022), e-supervision involves the use of technological devices such as computers, email, and various social media applications, providing flexibility due to technological advancements, This supervision technology facilitates timely feedback, improves document management, detects plagiarism, and reduces financial and logistical

burdens for students (Onah *et al.*, 2024). Thus, by adopting these technologies, Agricultural Education Lecturers can align with global best practices, which would help in ensuring the effective mentorship of students and fostering higher academic standards.

The adoption of e-supervision for students' research projects by Lecturers of Agricultural Education in Universities in Southeast Nigeria has become increasingly important in current global educational practices. Adoption of e-supervision is the process by which Lecturers accept and integrate the digital platforms, communication tools, and electronic resources in overseeing, guiding and supporting students' research activities remotely (Rahmat, 2022). This method leverages ICT to facilitate a more flexible and efficient supervision process, accommodating the growing demand for distance education and addressing the challenges posed by geographical barriers and limited physical interactions (Awodiji, Ayanwale & Oyedoyin, 2022).

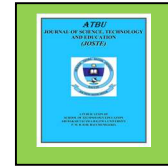
Additionally, it could be deduced from the findings of a related study by Osiesi, *et al.*, (2023) that the adoption of e-supervision for Agricultural Education students' research projects by Lecturers in Universities in Southeast Nigeria can be determined by various factors, ranging from individual, technological, organizational to environmental context (competitive pressure). In agreement with this assertion, an investigation by Ansong *et al.*, (2017) indicated that the adoption of electronic technology, including e-supervision, in Universities is influenced by various variables, including technological, organizational, and environmental factors. Based on the observations of Hadullo *et al.*, (2018), the significance of ICT infrastructure, ICT competence, competitive pressure (external factors that compel organizations to adopt electronic technology to remain competitive) and computer self-efficacy (belief in one's ability to use computer) among Lecturers are crucial determinants of technology adoption (e-supervision). Thus, based on the TOE framework, and also the findings of Ansong *et al.*, (2017) and Hadullo *et al.*, (2018), the researcher asserts that availability of ICT infrastructure, Lecturers' ICT competence, computer self-

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efficacy, competitive pressure, and also the nature of students' research projects can predict the adoption of electronic supervision for Agricultural Education students' research projects by Lecturers in Universities in South-East Nigeria.

Theoretically, the Technology Acceptance Model 1 (TAM 1) has been widely used to explain the behaviour of individuals that may determine technology adoption (Moakofhi *et al.*, 2019). Studies reveal that the key determinants of technology adoption based on TAM include perceived ease of use (the degree to which individuals believe that using a particular system would be free from effort) and perceived usefulness (the perceived benefits individuals believe will result from using electronic technology) (Wahyudi, 2023; Raphael & Mtebe, 2017). Similarly, the findings of the study by Mbazu, Oladokun and Mohammed (2023) indicate that the likelihood of adopting electronic technologies, including e-supervision, is influenced by effort expectancy (perceived ease of use), as also observed by Wahyudi (2023) and Raphael and Mtebe (2017). Thus, based on the tenets of TAM 1 and evidence provided by the investigations of Wahyudi (2023), Raphael and Mtebe (2017) and Mbazu, Oladokun and Mohammed (2023), the study hypothesizes that perceived ease of use and perceived usefulness or benefits can predict or determine Lecturers' adoption of e-supervision for Agricultural Education students' research projects in Universities in Southeast Nigeria.

Furthermore, Technology-Organization-Environment (TOE) theory proposed by Tornatzky and Fleischer in 1990 also reveals other determinants of technology adoption. The TOE framework emphasizes that technological, organizational and environmental conditions determine the adoption of technologies (Tornatzky & Fleischer, 1990). Based on this theory, the researchers hypothesize that technological, organizational and environmental contexts may determine Lecturers' adoption of e-supervision in Universities in Southeast Nigeria.

Generally, the adoption of electronic technologies, including e-supervision, appears to be influenced by users' perceptions, shaped by

their gender (Wu & Xu, 2022). In the context of this study, Vance *et al.* (2017) argued that critical feedback from Lecturers (users) is essential for sustainable and effective implementation of e-supervision, hence the study seeks to investigate the perceptions of both male and female Agricultural Education Lecturers on adoption of e-supervision for students' research projects. Black in Osiesi, *et al.*, (2023) describes perception as a subjective mental process, varying from person to person, even when considering the same subject. In the context of this study, it involves how male and female Lecturers of Agricultural Education in Universities in Southeast Nigeria can construct personal understanding of the realities of e-supervision adoption for students' research projects.

Despite the potential benefits of adopting electronic supervision (e-supervision) in enhancing research project oversight, its adoption by Agricultural Education lecturers in Southeast Nigerian universities remains very poor. Most lecturers rely on the physical approach to supervision which is currently not the global best approach to supervising students' research projects in Universities. Moreso, some of the factors that may influence or determine the adoption of e-supervision by lecturers of Agricultural Education in Universities in Southeast Nigeria have not yet been fully explored by literature, especially the individual, technological, organizational, and environmental determinants which align with theories such as Technology Acceptance Model and Technology-Organization-Environment Framework. Arguably, understanding these factors is important for promoting more efficient and sustainable research supervision practices. To address this gap, this study identified the perceived determinants of lecturers' adoption of e-supervision for Agricultural Education students' research projects in Universities in Southeast Nigeria.

Specific Objectives

The study was specifically conducted to identify the:

1. individual factors that can determine lecturers' adoption of e-supervision for

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1. Agricultural Education students' research projects,
2. technological factors that can determine lecturers' adoption of e-supervision for Agricultural Education students' research projects,
3. organizational factors that can determine lecturers' adoption of e-supervision for Agricultural Education students' research projects and
4. environmental factors that can determine lecturers' adoption of e-supervision for Agricultural Education students' research projects.

4. What are the perceived environmental factors that can determine lecturers' adoption of e-supervision for Agricultural Education students' research projects?

Theoretical Frameworks

This study was suitably supported by two theoretical frameworks; Technology Acceptance Model 1 and Technology-Organization-Environment (TOE) Framework. These frameworks reveal some factors that could determine lecturers' adoption of e-supervision for Agricultural education students' research projects in Universities in Southeast Nigeria.

Research Questions

The following research questions were posed and answered by the study.

1. What are the perceived individual factors that can determine lecturers' adoption of e-supervision for Agricultural Education students' research projects?
2. What are the perceived technological factors that can determine lecturers' adoption of e-supervision for Agricultural Education students' research projects?
3. What are the perceived organizational factors that can determine lecturers' adoption of e-supervision for Agricultural Education students' research projects?

The Technology Acceptance Model 1 (TAM 1)

The Technology Acceptance Model 1 (TAM 1) was proposed by **Fred D. Davis** in **1989**. This model posits that two variables, which are "the perceived usefulness and perceived ease of use" influence the user's attitude towards using the technology, which then affects their behavioral intention to use it, ultimately determining actual system use. According to this theory, perceived usefulness refers to the degree to which an individual believes that using a particular system would enhance their job performance, while perceived ease of use refers to the degree to which an individual believes that using a particular system would be free of effort (Davis, 1989). This theory is illustrated in *Figure 1* below

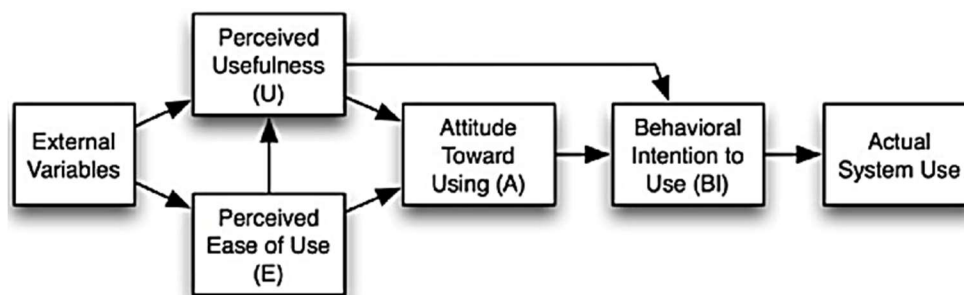


Fig 1: Technology Acceptance Model (Davis, 1989).

In the context of this study, the TAM 1 reveals that Lecturers are likely to embrace electronic supervision if they perceive it as a valuable tool that enhances the efficiency and outcomes of their supervisory responsibilities. On the other hand, perceived ease of use is integral to Lecturers' willingness to adopt electronic supervision. Lecturers may resist the adoption of electronic supervision if they perceive the technology as cumbersome or if its adoption disrupts established workflows. The ease with which Lecturers can incorporate this technology into their existing practices is pivotal in shaping their attitudes toward its adoption.

Technology-Organization-Environment (TOE) Framework

The Technology-Organization-Environment (TOE) framework was introduced by Tornatzky and Fleischer in 1990. This framework is grounded in the understanding that the successful adoption of any technology results from a dynamic interplay of technological, organizational, and environmental factors. The technological factors within the TOE framework include an analysis of the innovation's characteristics, such as its complexity,

compatibility with existing systems, and trialability. Additionally, the tenet of TOE framework holds that the level of knowledge and experience held by individuals within the organization regarding the technology plays a pivotal role in its adoption. Moving to organizational factors, the TOE framework considers elements like organizational structure, encompassing the formal arrangement of roles and relationships, as well as decision-making processes within the organization.

The prevailing organizational culture, defined by shared values and norms, is also recognized as a crucial determinant in shaping the organization's approach to technological change. In the environmental domain, the TOE framework underscores the significance of evaluating the competitive environment, encompassing external market pressures that may influence the organization's decision-making regarding technology adoption. Furthermore, the regulatory and legal environment, along with societal and cultural factors, are acknowledged as external influences that can impact the organization's response to technological change. The Technology-Organization-Environment (TOE) framework illustrated in Figure 2 below,

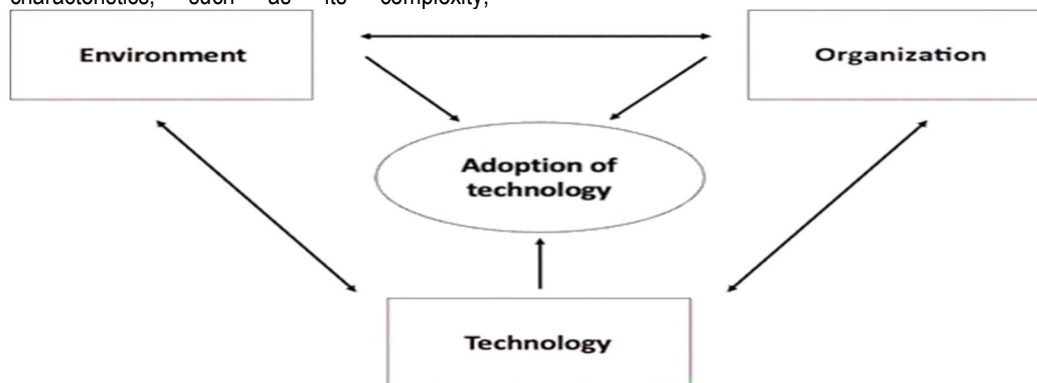


Fig 2: TOE Framework (Zhuankhan & Renken, 2023)

In relation to the study, the TOE framework explains how technological, organizational, and environmental factors determine Lecturers' adoption of e-supervision for Agricultural Education students' research projects in Southeast Nigerian Universities. Specifically, it reveals that technological factors such as

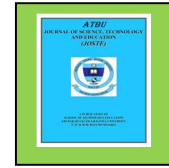
compatibility, ease of use and trialability of e-supervision, along with lecturers' familiarity with the technology could determine the extent to which Lecturers would adopt e-supervision for Agricultural Education students' projects. Moreso, organizational factors, such as institutional structures, decision-making processes, and a

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culture that supports innovation, also can play a crucial role in influencing Lecturers' adoption of e-supervision for Agricultural Education students' projects. Finally, environmental factors, like government policies and competition among scholars and Universities, may also drive the adoption e-supervision for students' research projects. Therefore, the researchers argue that by addressing these interconnected factors, the TOE framework offers a comprehensive approach to understanding the adoption of e-supervision.

METHODOLOGY

The researchers adopted a Descriptive Survey Research Design (DSRD). This design was suitable as it allowed for structured data collection from lecturers of Agricultural Education in public Universities in Southeast Nigeria using a questionnaire. A census approach with a total population of 45 lecturers (22 males and 23 females). The instrument for data collection was a structured online questionnaire titled "Electronic Supervision Adoption Questionnaire (ESAQ), which was designed by the researchers using Google forms. The instrument was designed using the constructs of the theoretical frameworks that support this study and also evidence from related literature. It consisted of 21-items. Eight (8) items measured the individual factors, 4-items measured technological factors, 4-items measured organizational factors and 5-items measured environmental factors. These items were structured on a 4-point scale (Strongly Disagree-1, Disagree-2, Agree-3 and Strongly Agree-4). Afterwards, the instrument was face

validated by 5 experts in the field of Agricultural Education. Afterwards, a pilot study was conducted with 10 lecturers of Agricultural Education in South-south Nigeria. Data collected from the pilot study was analyzed using Cronbach alpha coefficient. The result of the test showed an average reliability coefficient of 0.82 alpha (α). This Cronbach's alpha value is between 0.80 and 0.90 α , thus indicating that the scale has good reliability based on the recommendations of Bonett and Wright (2015).

An online questionnaire was shared by the researchers to the target respondents through private and departmental WhatsApp platforms, in order to elicit data. The online survey yielded 38 responses, resulting to a survey response rate (SRR) of 84.44% response rate. Data gathered were analyzed using descriptive statistics such as mean and standard deviation to answer the research questions, while hypotheses were tested using the Mann-Whitney U test at a 0.05 significance level. Decisions were made based on the mean of the 4-point scale. A mean of 2.50 and above indicated "perceived or agreement", while a mean below 2.50 suggested "not perceived or disagreement". Researchers used SPSS version 26 for the statistical analysis, while ensuring respondents' confidentiality throughout the process.

RESULTS

Research Question 1

The data for answering research question 1 are presented in Table 1 below.

Table 1: Mean and Standard Deviation of the Responses of Respondents on Individual Factors that Determine e-Supervision Adoption for Agricultural Education Students' Research Projects in Universities in Southeast Nigeria

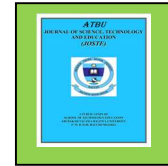
S/N	Item Statements	\bar{X}	S	Remarks
1.	My ability or competence in using ICT or computer-based tools for e-supervision.	3.13	.844	A
2.	Previous experience with technology makes me more likely to adopt e-supervision systems.	2.97	.854	A
3.	Positive attitude towards using new technologies for supervision.	3.18	.801	A
4.	My level of interest in e-supervision may affect the use	3.18	.652	A
5.	My awareness level affects the adoption of e-supervision technologies.	3.26	.795	A

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S/N	Item Statements	\bar{X}	S	Remarks
6.	Awareness levels of students affect the use of e-supervision technologies.	3.18	.766	A
7.	Self-computer efficacy will affect my use of e-supervision	3.03	.822	A
8.	Familiarity with computer may influence my adoption of e-supervision	3.18	.896	A

\bar{x} = mean, **S** = Standard deviation, **A**= Agree, **D** = Disagree, **n** = number of respondents, **n**=38

Results in Table 1 indicate that the mean ratings of all the 8 items range from 2.97 to 3.26, which are above 2.50 on a 4-point scale. This means that the respondents perceived that the variables represented by the items are individual factors that determine the adoption of e-supervision for Agricultural Education students' research projects in Universities in Southeast Nigeria. Precisely, these include competence in ICT (\bar{X} =3.13), positive attitude towards technology (\bar{X} =3.18), interest in e-supervision (\bar{X} =3.18), awareness level of Lecturers (\bar{X} =3.26) and students (\bar{X} =3.18), familiarity with computer

(\bar{X} =3.18), self-computer efficacy (\bar{X} = 3.03) and prior experience with technology (\bar{X} =2.97). Furthermore, the standard deviations for all the 8 data points range from 0.652 to 0.896, which are small. This indicates that respondents' answers were closely clustered around the mean and were similar to each other in their levels of response.

Research Question 2

The data for answering research question 2 are presented in Table 2 below.

Table 2: Mean and Standard Deviation of the Responses of Respondents on Technological Determinants of e-Supervision Adoption for Agricultural Education Students' Research Projects in Universities in Southeast Nigeria

S/N	Item Statements	\bar{X}	S	Remarks
1.	ICT infrastructure at my university will help me to adopt e-supervision.	3.05	.928	A
2.	The perceived benefits of e-supervision system will enable me to use it.	3.24	.786	A
3.	The quality of the e-supervision system influences my decision to adopt it.	3.13	.875	A
4.	The perceived ease of use of e-supervision determines my decision to adopt it	3.42	.642	A

\bar{x} = mean, **S** = Standard deviation, **A**= Agree, **D** = Disagree, **n** = number of respondents, **n**=38

Results in Table 2 reveal that the mean ratings of all the 4 data points range from 3.13 to 3.24, which are above 2.50 on a 4-point scale. This means that the respondents perceived that the variables represented by the items are technological factors that determine the adoption of e-supervision for Agricultural Education students' research projects in Universities in Southeast Nigeria. Specifically, Lecturers agreed that perceived ease of use (\bar{X} =3.42), quality of the e-supervision system (\bar{X} =3.13), perceived benefits (\bar{X} =3.24) and ICT infrastructure at Universities (\bar{X} =3.05) determine the adoption of e-

supervision for Agricultural Education research students' research projects. Moreover, the standard deviations for all four data points fall between 0.642 and 0.928, indicating minimal variation. This suggests that respondents' answers were tightly grouped around the mean, reflecting a high level of consistency in their responses.

Research Question 3

The data for answering research question 3 are presented in Table 3 below.

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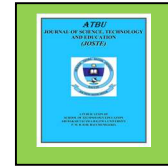


Table 3: Mean and Standard Deviation of the Responses of Respondents on Organizational Determinants of e-Supervision Adoption for Agricultural Education Students' Research Projects in Universities in Southeast Nigeria

S/N	Item Statements	\bar{X}	S	Remarks
1.	Sufficient support and resources by my University will determine my adoption of the e-supervision systems.	3.16	.823	A
2.	Strong encouragement from my institution to use e-supervision technologies.	3.24	.751	A
3.	The alignment of the e-supervision system with my existing organizational practices and workflows affects my willingness to use them (Organizational compatibility)	3.13	.875	A
4.	Capacity-building programmes by my University can help me effectively use e-supervision systems.	3.37	.675	A

\bar{x} = mean, **S** = Standard deviation, **A**= Agree, **D** = Disagree, **n** = number of respondents, $n=38$

Results in Table 3 reveal that the mean ratings of all the 4 data points range from 3.13 to 3.24, which are above 2.50 on a 4-point scale. This means that the respondents perceived that the variables represented by the items are organizational factors that determine the adoption of e-supervision for Agricultural Education students' research projects in Universities in Southeast Nigeria. Specifically, respondents agreed that organizational factors such as capacity-building programmes (\bar{X} =3.37), institutional encouragement (\bar{X} =3.24), resource support (\bar{X} =3.16), organizational compatibility

with e-supervision workflows (\bar{X} =3.13) determine the adoption of e-supervision for Agricultural Education research students' research projects. Additionally, the standard deviations for the four data points range from 0.675 to 0.875, indicating low variability. This shows that respondents' answers were closely aligned with the mean, demonstrating similar response patterns.

Research Question 4

The data for answering research question 4 are presented in Table 4 below.

Table 4: Mean and Standard Deviation of the Responses of Respondents on Environmental Determinants of e-Supervision Adoption for Agricultural Education Students' Research Projects in Universities in Southeast Nigeria

S/N	Item Statements	\bar{X}	S	Remarks
1.	The competitive pressure from colleagues in other institutions influences my adoption of e-supervision technologies.	3.16	.638	A
2.	Collaboration with educational partners may motivates me to adopt e-supervision systems.	3.32	.702	A
3.	The availability of power supply will determine my use of the e-supervision.	3.21	.935	A
4.	Compliance with regulatory standards is important for the adoption of e-supervision technologies.	3.21	.777	A
5.	Financial considerations, including costs and funding, influence the adoption of e-supervision systems.	3.18	.766	A

\bar{x} = mean, **S** = Standard deviation, **A**= Agree, **D** = Disagree, **n** = number of respondents, $n=38$

Table 4 shows that the mean ratings for the 5 data points range from 3.16 to 3.32, exceeding the 2.50 benchmark on a 4-point scale.

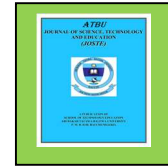
This indicates that respondents perceived the variables as environmental factors influencing the adoption of e-supervision for Agricultural

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Education students' research projects in universities across Southeast Nigeria. Specifically, environmental factors that determine the adoption of e-supervision for Agricultural Education research students' research projects as agreed by respondents include collaboration with educational partners (\bar{X} =3.32), competitive pressure from colleagues in other institutions (\bar{X} = 3.16), power supply (\bar{X} = 3.21) and regulatory compliance (\bar{X} =3.21), financial considerations, including cost and funding (\bar{X} = 3.18). Moreover, the standard deviations for the eight data points, ranging from 0.638 to 0.935, are relatively low. This suggests that respondents' answers were tightly clustered around the mean, reflecting a high level of consistency in their responses.

DISCUSSION OF FINDINGS

The findings of this study reveal that lecturers' adoption of e-supervision for Agricultural Education students' research project in Universities in Southeast Nigeria is determined by individual, technological, organizational and environmental variables. In agreement with these findings Ansong *et al.* (2017) stated that successful adoption of electronic technologies is often influenced by technological, organizational, and individual factors. These findings are consistent with the tenets of the two theoretical frameworks adopted by the study, which are Technology Acceptance Model I by Davis in 1986 and Technology-Organization-Environment (TOE) framework was introduced by Tornatzky and Fleischer in 1990 (see chapter 2). Thus, the researcher argues that Southeast Nigerian Universities may need to improve infrastructure, provide targeted training, and foster a supportive environment to encourage consistent adoption of e-supervision among Lecturers.

One critical determinant for e-supervision adoption found by the study was ICT competence among Lecturers. In line with this finding, Ansong *et al.* (2017) asserted that the ability to adopt ICT platforms is fundamental for e-supervision, since it allows Lecturers to manage remote supervisory activities effectively. The researcher argues that this aligns with the need for positive attitudes toward technology; Lecturers

who see technology as beneficial are often more willing to incorporate it into their practices. Osiesi *et al.* (2023) explained that Lecturers with favorable skills on technology are more likely to adopt digital tools, as they associate these tools with increased efficiency and improved e-supervision outcomes. The study also found that the level of interest of Lecturers determines the adoption of e-supervision for Agricultural Education students' research projects in Universities in Southeast Nigeria. Al Lily *et al.* (2018) suggest that Lecturers who are genuinely interested in the benefits of digital tools are more likely to integrate them into their workflows, driven by a desire to explore and utilize new methods for research supervision.

Similarly, the level of awareness of e-supervision tools and their benefits is essential for adoption. As Ezeugo *et al.* (2022) note, limited awareness can hinder adoption, as Lecturers who are unfamiliar with these tools may lack both the motivation and knowledge to use them effectively. Two other determinants found by the study is familiarity with computers and self-efficacy (confidence in one's digital skills). In line with this finding, Hadullo *et al.* (2018) reported that Lecturers who are familiar with computer systems and believe in their own digital abilities are more inclined to try new technologies, including e-supervision, with reduced apprehension. Moreover, the study found that prior experience with technology can facilitate this transition. In agreement with the findings of the study by Mbazu, Oladokun, and Mohammed (2023), Lecturers accustomed to digital tools find it easier to incorporate new e-supervision systems.

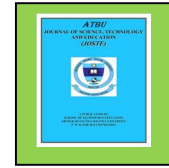
Another determinant for adoption of e-supervision for Agricultural Education students' research project found by the study is perceived ease of use. This finding is consistent with the tenet of the Technology Acceptance Model (TAM), which reveals that perceived ease of use is vital for technology adoption (Davis, 1986). In agreement with this finding and TAM, Wahyudi (2023) argued that tools that are seen as user-friendly are more readily adopted, as complex systems may deter Lecturers who perceive them as difficult or cumbersome to integrate into

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existing practices. Similarly, the study found that the quality of the e-supervision system is a determinant for adoption of e-supervision in Universities in Southeast Nigeria. In line with this finding, Opoku (2020) stated that a high-quality system with reliable functionality and accessibility positively influences Lecturers' satisfaction and sustained use, as they trust the system to support effective supervision.

The findings the study further revealed that perceived benefits is a determinant for adoption of e-supervision for Agricultural Education students' research projects in Universities in Southeast Nigeria. This finding aligns with Wahyudi (2023) who found that when Lecturers perceive a tool as beneficial, offering advantages such as improved communication and flexibility, they are more likely to embrace it. However, the study found that presence of robust ICT infrastructure at Universities is a determinant for the adoption of e-supervision. This observation is consistent with the assertion of Ansong *et al.* (2017), that without sufficient infrastructure, adoption of electronic technologies will be limited, as unreliable access or connectivity issues can disrupt the e-supervision process and discourage usage.

The study also found that capacity-building programmes can determine the adoption of e-supervision for Agricultural Education students' research projects by Lecturers in Universities in Southeast Nigeria. The researcher argues that this is possible because equipping Lecturers with the skills and knowledge to use e-supervision tools effectively will motivate them to adopt it. This, in agreement with this finding, Ezeugo *et al.* (2022) recommended regular training to increase digital competencies among Lecturers, thereby enhancing their confidence and encouraging engagement with these tools. Also, institutional encouragement and resource support was found to be a determinant of e-supervision adoption for Agricultural Education students' research projects. To corroborate this finding, Hadullo *et al.* (2018) emphasized that support from university administration, through resources or policies, fosters a positive environment for technology adoption.

Furthermore, the study found that compatibility of e-supervision workflows with existing organizational structures is another determining factor for e-supervision adoption. In line with this finding, Ansong *et al.* (2017) found that when digital tools align with current academic processes, their integration is smoother, as Lecturers can incorporate them without major disruptions to their usual practices. Additionally, the study found that collaboration with educational partners is another determinant factor for e-supervision adoption. The researcher argues that collaboration provides opportunities for knowledge-sharing and resource access, which encourages Lecturers to adopt e-supervision tools as they benefit from the shared expertise and experiences of their peers.

Another determinant for e-supervision adoption found by the study is competitive pressure from colleagues. In tandem with this finding, Mbazu *et al.* (2023) explained that when peers use digital tools successfully, it creates a constructive pressure that encourages others to follow suit. However, the study also found that power supply is another determinant for adoption of e-supervision for Agricultural Education students' research projects in Universities in Southeast Nigeria. The observation of Awodiji *et al.* (2022) corroborated this finding, as the authors noted that unreliable electricity in Nigeria is a barrier to consistent e-supervision, as power disruptions can halt access to online platforms, discouraging adoption. Moreover, it was found that regulatory compliance can also determine e-supervision adoption.

To support this finding, Ansong *et al.* (2017) argued that adherence to institutional or national policies reinforces e-supervision adoption, as it gives Lecturers a mandate to incorporate technology in their supervisory roles. Finally, the study further revealed that financial considerations impact the adoption of e-supervision. This is because costs related to equipment, internet access, and maintenance may restrict the use of e-supervision tools. In tune with this finding and argument, Fasasi *et al.* (2016) stated that financial constraints is a common barrier in Nigerian Universities, limiting the ability

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of institutions and Lecturers to fully invest in digital supervision.

CONCLUSION

The adoption of e-supervision for Agricultural Education students' research projects in universities in Southeast Nigeria is determined by various factors, including individual, technological, organizational, and environmental variables. Some key individual determinants include ICT competence, interest, familiarity with digital tools, and prior experience, while technological factors such as perceived ease of use, system quality, and infrastructure play significant roles. Furthermore, organizational support, capacity-building initiatives, compatibility with existing academic structures and regulatory compliance are important for adoption of e-supervision for Agricultural Education students' research projects in Universities in Southeast. Moreso, environmental factors such as power supply, financial considerations, and competitive pressure from colleagues also influence the adoption process.

The alignment of these findings with established theories, including the Technology Acceptance Model (TAM) and the Technology-Organization-Environment (TOE) framework, reveals the complexity of adopting e-supervision by lecturers. Researchers argue that to foster widespread adoption of this technology for efficient and effective supervision of Agricultural Education students' research projects, it is important for universities to invest in robust ICT infrastructure, provide ongoing training, and create supportive environments that encourage lecturers to embrace e-supervision. Addressing these determinants can significantly enhance the effectiveness and sustainability of e-supervision systems, ultimately improving research project supervision outcomes.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations were made.

1. University administrators (Vice Chancellor, Heads of Department and Deans of Colleges) should implement

structured capacity-building programmes to improve Agricultural Education lecturers' ICT competence and confidence in using e-supervision for students' research projects in Universities in Southeast. The training should focus on developing their familiarity with e-supervision platforms and fostering positive attitudes towards its adoption.

2. University administrators and Government through educational agencies should invest in the development and maintenance of reliable, user-friendly e-supervision systems, which aligns with Agricultural Education lecturers' supervisory needs in order to encourage adoption and sustained use.
3. University administrators and Government through agencies should create a supportive environment by formulating policies that encourage e-supervision adoption among lecturers of Agricultural Education.
4. University administrators should collaborate with external partners, including technology providers and government agencies, to ensure the availability of robust ICT infrastructure and alternative power solutions such as solar energy.

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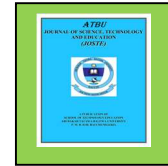
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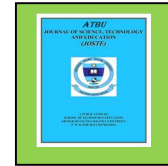
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