Predictors of Science Teachers' Intention to Adopt a Technology-Based Capacity Building for Higher-Order and Inclusive Instruction in Northern Nigeria.

Yaki. Akawo Angwal
Department of Science Education,
Federal University of Technology, Minna. Niger State
Correspondence: yaki.aa@futminna.edu.ng

Abstract

With the growing needs for innovative and inclusive STEM education, science educators must embrace technology-facilitated teaching and learning programs that can support the development of higher-order teaching skills. The present study explored science teachers' intention to use a technology-based capacity-building programme for higher-order and inclusive teaching in the northern region of Nigeria. The Unified Theory of Acceptance and Use of Technology (UTAUT) was the theoretical framework used for the study. The study was done using a descriptive correlational research design. The population consisted of the science teachers in selected secondary schools in Northern Nigeria, while the science teachers in Biology, Chemistry, and Physics were sampled, which consisted of 100 teachers. Data were collected using a structured questionnaire, which was validated by experts in Educational Technology, Science Education, and Measurement and Evaluation. The reliability of the instrument was determined by Cronbach's alpha, which is 0.82. The linear regression analysis was used to analyse the data at a 0.05 level of significance. The results showed that the main variable Performance Expectancy had a significant effect on teachers' Behavioural Intention to use the technology-based capacity building initiative ($\beta = .371$, $p < .05$). Likewise, Effort Expectancy significantly predicted Behavioural Intention ($\beta = .233$, $p < .05$) and Social Influence also had a significant positive influence on Behavioural Intention ($\beta = .258$, $p < .05$). This study found that perceived usefulness, ease of use and social influence were significant factors affecting teachers' intention to use technology-based capacity building for higher order and inclusive teaching. To improve the sustainable use of innovative instructional technologies in science education, the study suggested that teachers ought to engage in continuous professional development, which is supported by institutions, and have improved access to digital instructional resources.

Keywords: Technology-based capacity building, Behavioural intention, Performance expectancy, Effort expectancy, Social influence, Higher-order instruction, and Inclusive learning.

Introduction

In today's 21st-century world, the demand for high-quality science instruction has grown, leading to the need for new instructional practices that will enhance students' critical thinking, creativity, collaboration, and problem-solving skills. In the world, the education system is moving from teacher-centred learning to learner-centred and technology-based learning, which aims to foster higher-order thinking skills and inclusiveness in learning, and is increasingly being applied (Ahmad *et al.*, 2023). In many developing countries, science education is seen as a strategic instrument for national development due to the contributions in technological advancement, industrial growth, and human capital development it brings to the society, Nigeria being one of them. Yet, although policymakers have been focusing on Science, Technology, Engineering, and Mathematics (STEM) education, science learning in many secondary schools in Nigeria is still largely focused on lectures, examinations, and failure to pay due consideration to the varying needs of students.

With the rapid development of digital technology and the emergence of "Education 5.0", the teaching and learning scene around the world has changed drastically. The growing significance of technology-based instruction in boosting the effectiveness of the teaching-learning process, student engagement, and equitable access to education has gained prominence (Ahmad *et al.*, 2023). The use of contemporary instructional technologies, such as artificial intelligence tools, virtual laboratories, digital simulations, open educational resources, and collaborative learning platforms, affords science teachers the opportunity to implement inquiry and inclusive learning experiences (Okoye & Mante, 2024). In particular, those technologies play an important role in science education because they foster experimentation, conceptualization, and higher-order thinking skills of learners.

Higher-order instruction is a type of teaching that develops learners' skills of analysing, evaluating, synthesizing, and applying knowledge in real-world problems, in addition to memorizing facts. Its concept is based on the higher-order thinking model, like Bloom's Taxonomy, which focuses on advanced thinking skills required for meaningful learning. Higher-order instruction allows students to practice science reasoning, collaborative inquiry, experimentation, and problem-solving in science classrooms. Despite these advancements, numerous challenges persist with the implementation of higher-order pedagogical approaches by science teachers in Nigeria, stemming from a lack of professional development, technical skills, instruction materials, and infrastructural facilities (Ohanu *et al.*, 2024).

Modern science education pays more and more attention to the practice of equity and inclusion in learning, and promotes higher-order thinking. Inclusive instruction aims to provide equal access to opportunity for all students, including those from diverse backgrounds, genders, ability levels, language backgrounds, and students with disabilities, to enter and engage in learning activities. Equity-oriented science instruction is based on considering learners' diversity and applying adaptive teaching strategies and accessible learning technologies for all students. The need for equitable and inclusive pedagogical practices in schools has been reinforced again by the worldwide commitment to inclusive education, especially the United Nations Sustainable Development Goal 4 (SDG 4). However, there are indications that inclusive teaching practices in most classrooms in Nigeria are not well developed due to inadequate preparation and technological support of teachers to meet the needs of diverse learners.

In response to these problems, educational actors have increasingly called for technology-based capacity development programs that enhance teachers' pedagogical and technological skills. Teacher capacity building is a systematic professional development program focused on improving teachers' knowledge, teaching skills, attitudes, and classroom practices. The notion of technology-based capacity building uses digital resources, online learning platforms, collaborative professional communities, and open education resources as part of teacher preparation programs to boost instruction quality. Studies have demonstrated that the implementation of continuous professional development programmes significantly enhances teachers' preparedness to apply innovative teaching techniques and teaching technologies (Allen *et al.*, 2024). Among the innovative programs that emerged to support technology-based STEM teaching and learning is the Connected Learning Initiative (CLIx), which proved the effectiveness of technology-supported collaborative learning methods in improving teaching and learning outcomes.

Although many educational technologies and capacity-building programmes have been developed and are available, the successful adoption of technology in the classroom largely relies on teachers’ willingness and intent to adopt the technology. Teachers' behaviour intention is regarded as a strong determinant of real technology use in the educational context. Some factors that affect teachers' intention to implement technology-based innovations in instructional

practices are perceived usefulness, ease of use, institutional support, technological self-efficacy, and social influence. Therefore, appreciating teachers' perceptions and intentions is a key factor in forecasting the sustainability and scalability of school innovations.

Developed by Viswanath Venkatesh and his colleagues, the Unified Theory of Acceptance and Use of Technology (UTAUT) is one of the most popular theories used to understand individuals' acceptance and use of technology. The UTAUT model suggests that four variables: Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions, greatly influence users' behaviour and the actual adoption of technology. Performance Expectancy is the extent to which a user feels that the technology will enhance their job performance, while Effort Expectancy is related to the ease of using the technology. Social Influence is the degree to which significant others affect users' decisions about adoption, while Facilitating Conditions are related to the support of organizational and technical aspects of technology usage. Abbad (2021) has used the model widely in the field of Educational Technology research to explain the technology adoption behaviour of both teachers and students.

The UTAUT model has become a popular model used in recent research on teachers' intention in Nigeria and other African countries to use digital and artificial intelligence technologies in the teaching and learning process. In the study by Adigun *et al.* (2025), effort expectancy and social influence significantly explained pre-service teachers' intention to use AI tools in inclusive teaching in Nigerian classrooms. In the same way, research on how AI technology is adopted by teachers in Africa revealed that the perception of usefulness and readiness for technology significantly affected teachers' acceptance of innovative teaching technologies. The results indicated that teachers are more positive about the technology-enhanced teaching when they believe that these innovations are useful, easy to use, and socially supported.

Science education in Northern Nigeria is also beset by several challenges, including infrastructural lacunae, limited teacher training opportunities, limited access to digital technologies, and unequal access to education. Teachers may not be able to effectively apply innovative and inclusive pedagogy due to these challenges. While multiple government and donation-driven initiatives have been designed to enhance STEM education in the region, there has been limited empirical study on science teachers' attitudes toward implementing technology-supported capacity-building efforts to enhance the teaching and learning of higher-order and inclusive instruction.

Thus, it is imperative to explore the determinants of science teachers' intention in Northern Nigeria to undertake technology-based capacity-building programmes for higher-order and inclusive science teaching. A knowledge of these aspects will help to inform more effective science teacher professional development programmes for teachers, teacher educators, educational technology developers, and school leaders who want to engage in innovative and equitable science teaching. The present study is therefore important because of its contribution to the existing literature on the adoption of educational technology, teacher training in STEM, inclusive pedagogy, and technology-enhanced learning in the Nigerian context.

Statement of Problem

Technology has become a vital tool in 21st-century science education to enhance instruction, foster higher-order thinking, and enable inclusive learning in the classroom. Educational technologies offer opportunities for learning through inquiry, collaboration, creativity, and equitable participation for learners with a range of learning needs. Apart from the global development of technology-based teaching, teaching of science in many secondary schools in Nigeria is still mostly teacher-centred and examination-oriented, thus preventing the pupils from acquiring critical thinking and problem-solving skills (Awofala *et al.*, 2025).

Northern Nigeria is particularly affected by teacher training, the lack of digital infrastructure, access to learning technologies, and existing gender disparities. The mainstream science teaching still uses traditional teaching methods, which focus on memorizing knowledge rather than learner-centred and inclusive teaching methods. As a result, students have most often limited opportunities to participate in higher-order learning activities and collaborative scientific inquiry. Moreover, inclusive science teaching is not yet being fully realised, especially for learners from disadvantaged and diverse backgrounds, who need equitable access to quality learning experiences (Lenzer *et al.*, 2024).

To address these concerns, technology-based capacity-building efforts like CL4STEM have been introduced to enhance teachers' pedagogical and technological skills to engage in higher-order and inclusive instruction. The programs aim to provide science teachers access to digital teaching materials, collaborative learning experiences, and innovative teaching methods. However, the success and the sustainability of such efforts are highly related to teachers' willingness and intention to apply such in classroom practice. Factors like perceived usefulness, ease of use, and social influence were found to affect teachers' adoption intentions (Adigun *et al.*, 2025; Nja *et al.*, 2023).

Though the adoption of educational technology in Nigeria is surfacing in more studies, there is a dearth of empirical studies that examined the intention of science teachers to embark on capacity building programmes for higher order and inclusion in science education in Northern Nigeria through the use of technology. Thus, it is important to explore the predictors of the science teachers' willingness to integrate these programs to facilitate the effective implementation, sustainability, and scalability of innovation in science education in the region.

Research Objectives

The main objective of this study is to predict science teachers' intention to adopt a technology-based capacity-building initiative for higher-order and inclusive instruction in Northern Nigeria.

Specifically, the study seeks to:

1. Determine the influence of Performance Expectancy on science teachers' intention to adopt technology-based capacity building for higher-order and inclusive instruction in Northern Nigeria.
2. Examine the influence of Effort Expectancy on science teachers' intention to adopt technology-based capacity building for higher-order and inclusive instruction in Northern Nigeria.
3. Investigate the influence of Social Influence on science teachers' intention to adopt technology-based capacity building for higher-order and inclusive instruction in Northern Nigeria.

Research Questions

The following research questions guided the study:

1. To what extent does Performance Expectancy influence science teachers' intention to adopt technology-based capacity building for higher-order and inclusive instruction in Northern Nigeria?
2. What is the influence of Effort Expectancy on science teachers' intention to adopt technology-based capacity building for higher-order and inclusive instruction in Northern Nigeria?

3. How does Social Influence affect science teachers' intention to adopt technology-based capacity building for higher-order and inclusive instruction in Northern Nigeria?

Null Hypotheses

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

1. Performance Expectancy has no significant influence on science teachers' intention to adopt technology-based capacity building for higher-order and inclusive instruction in Northern Nigeria.
2. Effort Expectancy has no significant influence on science teachers' intention to adopt technology-based capacity building for higher-order and inclusive instruction in Northern Nigeria.
3. Social Influence has no significant influence on science teachers' intention to adopt technology-based capacity building for higher-order and inclusive instruction in Northern Nigeria.

Literature Review

Performance Expectancy (PE) and Behavioural Intention

Performance Expectancy is the extent to which people think that a specific technology will help them with their work (Venkatesh *et al.*, 2003). Based on several empirical studies the following finding indicates that Performance Expectancy is a significant factor in Behavioural Intention of using educational technologies.

Xu *et al.* (2024) examined the acceptance and the intention to use AI tools for teaching from Chinese university educators based on the UTAUT2 model. The study found 402 university educators, of whom it was determined that Performance Expectancy had a significant impact on teachers' attitudes toward Behavioural Intention to use AI technologies in teaching. Those educators who viewed AI tools as being helpful to improve their teaching effectiveness and productivity were found to have greater intentions to use them in their classrooms. Likewise, Nja *et al.* (2023) studied the use of Artificial Intelligence in science education amongst science teachers in Africa. The results indicated that the teachers' perception of the usefulness of the AI technologies significantly predicted their Behavioural Intention to use AI technologies in science teaching. Collaborating with teachers, the research agenda explored how AI tools could enhance students' engagement, understanding of the concepts, and learning outcomes.

Adigun *et al.* (2025) in another study, examined the intention of pre-service teachers to use artificial intelligence in inclusive classrooms in Nigeria. As a result of the study, it was concluded that pre-service teachers' BE (Behavioural Intention) was significantly affected by the study variable, namely Performance Expectancy. Those who believed that AI technologies could enhance inclusive instructional practices were more likely to be interested in using them for future instruction.

These research findings indicate that teachers are more likely to implement technology-integrated instructional practices when they believe these practices will enhance instruction and student learning.

Effort Expectancy (EE) and Behavioural Intention.

Effort Expectancy is the ease of using a technology system (Venkatesh et al, 2003). Simple and easy-to-use technologies are more likely to be accepted and adopted by teachers. In their study, Effort Expectancy was found to have a significant impact on the Behavioural Intention to

use AI technologies in university teaching by Xu *et al.* (2024). The study revealed that teachers would like technologies that are easy to use, easy to understand, and easy to implement in their teaching. Teachers who saw AI tools as less complex were more likely to express their intention to adopt these.

Similarly, Du and Liang (2024) studied the sustained adoption of virtual reality (VR) technologies in schools by teachers. The result of the study indicated that Effort Expectancy had a positive and significant impact on teachers' Behavioural Intention to continue using VR technologies for instruction. Those teachers who felt they were easy to operate and learn were more willing to continue to use VR in their classrooms. Also, Abubakar and Yunusa (2024) examined academic staff members' preparedness and willingness to use mobile devices in the teaching-learning process in tertiary institutions of Sokoto State, Nigeria. The results revealed that ease of use was a significant factor that affected lecturers' Behavioural Intention about mobile technologies integration in teaching.

Based on the reviewed studies, therefore, teachers' perception of the simplicity and ease of operation of the educational technologies and innovative pedagogical approaches are seen to significantly influence teachers' intention to use them.

Social influence (SI) and behavioural intention.

Social Influence is the degree to which significant others feel the technology should be used (Venkatesh *et al.*, 2003). Teachers' decisions about adoption in educational contexts may be influenced by colleagues, administrators, and expectations. The study by Xu *et al.* (2024) indicated that educators' Behavioural Intention to use AI technologies in higher education was significantly predicted by Social Influence. Likewise, Adigun *et al.* (2025) noted that the Social Influence significantly impacted pre-service teachers' intention to embrace the use of AI technologies in Nigerian inclusive classrooms. The study has found that the support from the lecturers, peers, and educational institutions positively influenced teachers' decisions in adopting technology.

In another study, Du and Liang (2024) discovered that Social Influence was a significant factor in the teachers' continued intention to implement virtual reality technologies in schools. Colleagues, administrators, and professional learning communities were positively related to teachers' adoption and sustainability of instructional technologies. The results suggest that positive institutional culture and peer support, along with professional encouragement, are factors to consider for teachers' Behavioural Intention to embrace instruction innovations with technology intervention.

Research Methodology

This study adopted a descriptive correlational research design. The design was considered appropriate because it enabled the researcher to examine the predictive relationships between the independent variables, Performance Expectancy (PE), Effort Expectancy (EE), and Social Influence (SI), and the dependent variable, Behavioural Intention (BI) toward adopting technology-based capacity building for higher-order and inclusive instruction among science teachers in Northern Nigeria. The correlational design was also suitable because the study did not involve manipulation of variables but rather sought to determine the extent of the relationship and prediction among the variables under investigation.

The study population comprised all science teachers in selected secondary schools in Northern Nigeria. Specifically, the population included teachers of Mathematics, Biology, Chemistry, and Physics in public secondary schools across selected states in the region. A sample size of 100 science teachers was selected for the study. The respondents consisted of Biology, Chemistry,

and Physics teachers drawn from selected secondary schools in Northern Nigeria. A multistage sampling procedure was adopted in selecting the participants. First, purposive sampling was used to select states that had exposure to technology-based instructional initiatives and teacher capacity-building programmes. Secondly, a stratified sampling technique was employed to categorize teachers based on subject specialization. Finally, a simple random sampling technique was used to select the respondents from each category to ensure equal representation and reduce sampling bias.

The instrument used for data collection in this study was a structured questionnaire titled *Science Teachers' Technology-Based Capacity Building Adoption Questionnaire (STTBCBAQ)*. The researcher developed the questionnaire based on constructs adapted from the Unified Theory of Acceptance and Use of Technology. The instrument was designed to measure science teachers' perceptions and intentions regarding the adoption of a technology-based capacity-building initiative aimed at enhancing higher-order and inclusive instruction in Northern Nigeria.

The questionnaire consisted of two main sections. Section A gathered respondents' demographic information: gender, teaching experience, academic qualification, and subject area (Biology, Chemistry, or Physics). Section B contained items structured to measure the key variables of the study, namely Performance Expectancy, Effort Expectancy, Social Influence, and Behavioural Intention. Each item in Section B was rated on a four-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (4). The items were carefully worded to capture teachers' perceptions of the usefulness, ease of use, social encouragement, and their intention to adopt the technology-based capacity-building initiative in their instructional practices.

The reliability of the instrument was established through a pilot study conducted outside the actual study sample. Twenty science teachers with similar characteristics to the target respondents participated in the pilot testing. The responses obtained were subjected to internal consistency analysis using Cronbach's Alpha reliability coefficient. The results of the reliability test showed that the instrument had acceptable levels of internal consistency across all constructs. Specifically, Performance Expectancy yielded a reliability coefficient of 0.82, Effort Expectancy recorded 0.79, Social Influence had 0.81, and Behavioural Intention recorded 0.84. The overall Cronbach's Alpha value for the entire instrument was 0.82, indicating a high level of internal consistency. Based on these results, the instrument was considered reliable for use in the main study. The high reliability coefficients suggest that the items consistently measured the constructs they were designed to assess, thereby ensuring the dependability of the data collected for statistical analysis and interpretation.

The researcher obtained permission from relevant school authorities before administering the questionnaire to the respondents. The questionnaires were administered directly to the science teachers with the assistance of research assistants. Respondents were informed about the purpose of the study and assured of the confidentiality and anonymity of their responses. The completed questionnaires were retrieved immediately after completion to ensure a high return rate. Data collected for the study were coded and analysed using the Statistical Package for Social Sciences (SPSS) version 26. Descriptive statistics such as frequency counts, percentages, mean, and standard deviation were used to analyse respondents' demographic information and research questions. Linear regression analysis was employed to test the null hypotheses at 0.05 level of significance. Regression analysis was considered appropriate because the study sought to determine the predictive influence of Performance Expectancy, Effort Expectancy, and Social Influence on science teachers' Behavioural Intention toward adopting technology-based capacity building for higher-order and inclusive instruction.

Results

Influence of science and mathematics teachers' performance expectancy on their behavioural intention to use CL4STEM technology-based OERS modules to enhance HOTIE . Linear regression was used, and the results are presented in Table 1

Table 1a: Regression Model Summary of the Influence of Performance Expectancy on Behavioural Intention to use CL4STEM technology-based OERS modules

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.371[a]	.138	.129	4.140

a. Predictors: (Constant), PETot

b. Dependent Variable: TITot

Table 1a shows the regression coefficient for the independent (predictor) variable, performance expectancy of CL4STEM technology-based OERS modules, while the dependent or criterion variable is behavioural intention. The result shows r(100) = .371, r^2 = .138. Indicating that 13.8% of the variance in behavioural intention to use CL4STEM technology-based OERS modules for capacity training can be explained by the performance expectancy of CL4STEM technology-based OERS modules for capacity training among science and mathematics teachers in Northern Nigeria. To determine whether the model was a good predictor, the regression ANOVA results are presented in Table 1b

Table 1b: Regression ANOVA on the Influence of Performance Expectancy on Behavioural intention to use CL4STEM technology-based OERS modules

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	268.901	1	268.901	15.690	.000[b]
	Residual	1679.609	98	17.139		
	Total	1948.510	99			

a. Dependent Variable: TITot

b. Predictors: (Constant), PETot

Table 1b displays ANOVA results. The findings show that there is a significant difference between the predictors (performance expectancy) and the dependent variable (behavioural intention), $F(1,99) = 15.69$, p(0.00) <0.05. This indicates that the model is a good predictor of the relationship between respondents' performance expectancy and behavioural intention to use CL4STEM technology-based OERS modules. This implies that the model fits the data better than using the means. The regression coefficient is presented in Table 1c

Table 1c: Linear Regression Coefficient between Performance Expectancy and Behavioural Intention to Use CL4STEM technology-based OERS modules

Model		Unstandardized Coefficients Beta	Std. Error	Standardized Coefficients Beta	T	Sig.
1	(Constant)	26.369	4.614		5.715	.000
	PETot	.404	.102	.371	3.961	.000

a. Dependent Variable: TITot

Table 1c shows the regression coefficient of teachers' performance expectancy on Behavioural intention to use CL4STEM technology based OERS modules. The result shows performance expectancy is a significant predictor of behavioural intention to use CL4STEM innovation. (B = .371, t = 3.96, p(0.00) < 0.05). The findings indicate that the standardised Beta coefficient for the perceived usefulness of assistive technology is positive and statistically significant. Therefore, the hypothesis is rejected. The regression coefficient indicates that any increase in one unit of performance expectancy of CL4STEM technology-based OERS modules will cause an increase of 0.40 units of Behavioural intention to use OERS modules. (where all other factors remain constant) among science and mathematics teachers

Null Hypothesis Two: There is no significant influence of science and mathematics teachers' effort expectancy on their behavioural intention to use CL4STEM technology-based OERS modules for HOTIE.

Table 2a: Regression Model Summary of the Influence of Effort Expectancy on Behavioural Intention to use CL4STEM technology-based OERS modules

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.233[a]	.054	.044	4.337

a. Predictors: (Constant), EETot
b. Dependent Variable: TITot

Table 2a shows the regression coefficient for the independent (predictor) variable, effort expectancy of CL4STEM technology-based OERS modules, while the dependent or criterion variable is behavioural intention. The result shows r(1, 98) = .233, r^2 = .054. Indicating that 5.4% of the variance in behavioural intention to use CL4STEM technology-based OERS modules by science and mathematics teachers in Northern Nigeria. To determine whether the model was a good predictor, the regression ANOVA results are presented in Table 2b

Table 2b: Regression ANOVA on the Influence of Effort Expectancy on Behavioural intention to use CL4STEM technology based OERS modules

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	105.357	1	105.357	5.602	.020[b]
	Residual	1843.153	98	18.808		
	Total	1948.510	99			

a. Dependent Variable: TITot
b. Predictors: (Constant), EETot

Table 2b displays ANOVA results. The findings show that there is a significant difference between the predictors (effort expectancy) and the dependent variable (behavioural intention), $F(1,98) = 5.60$, p(0.02) <0.05. This indicates that the model is a good predictor of the relationship between respondents' effort expectancy and behavioural intention to use CL4STEM technology-based OERS modules. This implies that the model fits the data better. The regression coefficient is presented in Table 2C

Table 2C: Linear Regression Coefficient between Performance Expectancy and Behavioural Intention to Use CL4STEM technology based OERS modules

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		

	(Constant)	32.477	5.128		6.334	.000
1	Effort Expectancy	.279	.118	.233	2.367	.020

a. Dependent Variable: Behavioural Intention

Table 2c shows the regression coefficient of teachers' effort expectancy on Behavioural intention to use CL4STEM technology-based OERS modules. The result shows (B = .233, t = 2.37, p (0.02) < 0.05). The findings indicate that the standardised Beta coefficient for the perceived usefulness of assistive technology is positive and statistically significant. Therefore, the hypothesis is rejected. The regression coefficient indicates that any increase in one unit of effort expectancy of CL4STEM technology-based OERS modules will cause an increase of 0.28 units of Behavioural intention to use CL4STEM innovation. (when all other factors are constant) among science and mathematics teachers

Null Hypothesis Three: The significant influence of science and mathematics teachers' Social Influence on their behavioural intention to use CL4STEM technology-based OERS modules for capacity training to enhance HOTIE

Table 3a: Regression Model Summary of the Influence of Performance Expectancy on Behavioural Intention to use CL4STEM technology-based OERS modules

Model	R	R Square	Adjusted R-Square	Std. Error of the Estimate
1	.258[a]	.066	.057	4.309

a. Predictors: (Constant), SITot
b. Dependent Variable: TITot

Table 3a shows the regression coefficient for the predictor variable, Social Influence of CL4STEM technology-based OERS modules, while the dependent or criterion variable, behavioural intention. The result shows r(1,99) = .258, r^2 = .066. Indicating that 6.6% of the variance in behavioural intention to use CL4STEM technology-based OERS modules for capacity training can be explained by the social influence among science and mathematics teachers in Northern, Nigeria. To determine whether the model was a good predictor, the regression ANOVA results presented in Table 3b

Table 3b: Regression ANOVA on the Influence of Performance Expectancy on Behavioural intention to use CL4STEM technology-based OERS modules

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	129.212	1	129.212	6.960	.010[b]
1	Residual	1819.298	98	18.564		
	Total	1948.510	99			

a. Dependent Variable: TITot
b. Predictors: (Constant), SITot

Table 3b displays ANOVA results. The findings show that there is a significant difference between the predictors (performance expectancy) and the dependent variable (behavioural intention), $F(1,99) = 6.96$, p(0.01) <0.05. This indicates that the model is a good predictor of the relationship between respondents' social influence and behavioural intention to use CL4STEM technology-based OERS modules. This implies that the model fits the data better. The regression coefficient is presented in Table 3c

Table 3c: Linear Regression Coefficient between Performance Expectancy and Behavioural Intention to Use CL4STEM technology-based OERS modules

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	27.456	6.501		4.223	.000
	SITot	.381	.145	.258	2.638	.010

a. Dependent Variable: TITot

Table 3c shows the regression coefficient of teachers' social influence on Behavioural intention to use CL4STEM innovation. The result shows performance expectancy is a significant predictor of behavioural intention to use CL4STEM technology-based OERS modules (B = .258, t = 2.64, p(0.01) < 0.05). The findings indicate that the standardised Beta coefficient for the social influence was positive and statistically significant. Therefore, the hypothesis is rejected. The regression coefficient indicates that any increase in one unit of social Influence of CL4STEM technology-based OERS modules, CL4STEM innovation, will cause an increase of 0.38 units of Behavioural intention to use CL4STEM technology-based OERS modules (when all other factors are constant) among science and mathematics teachers

Discussion of Results

This study adopted the Unified Theory of Acceptance and Use of Technology (UTAUT) to understand Science and Mathematics teachers' intention toward adopting CL4STEM technology-based OERS modules for capacity training to enhance higher-order thinking Equity and Inclusion (HOTIE) in some selected northern States, Nigeria. The finding shows that perceived performance expectancy of CL4STEM technology-based OERS modules significantly influences secondary school science and mathematics teachers' intention to use the innovation for capacity training. This result concurs with the findings of Ayele Xu *et al.* (2024), Nja *et al.* (2023), and Adigun *et al.* (2025), who reported separately that Performance Expectancy has a significant association with the BI's willingness to adopt a system or technology, or both. This finding could be attributed to teachers' perception of the innovative nature of the CL4STEM technology-based OERS modules through the orientation they receive at the launch of the project and their engagement in the project pilot.

The finding also shows that science and mathematics teachers' effort expectancy has a positive and significant association with their intention to adopt the CL4STEM OERs curated innovative modules. This finding is supported by Du and Liang (2024) and Abubakar and Yunusa (2024), who reported that Effort Expectancy has a positive relationship with Behavioural Intention to use a system or technology. This result could be attributed to the fact that the teachers at the point of this data collection were faced with initial ICT access and technical challenges in using the curated Open Educational Resources (OERs) online.

The finding also shows that science and mathematics teachers' social influence significantly influences secondary school science and mathematics teachers' intention to use the CL4STEM OER modules. The result concurs with other researchers also reported a significant positive relationship between perceived social influence and behavioural intention to adopt an innovative technology (Adigun *et al.*, 2025; Du & Liang, 2024).

Conclusion

This study revealed science and Mathematics teachers' intention toward adopting CL4STEM technology-based OERS modules to enhance higher-order thinking, Equity and Inclusion (HOTIE). Based on the UTAUT technology adoption model, the PE, EE, and SI were found to have a positive association with science and mathematics teachers' intention to use the CL4STEM technology-based OERS modules. Indicating that their intention to adopt the initiative was influenced by their perceived usefulness, ease of use, and social influence. The implication of the findings of this study is the assurance for scaling of the CL4STEM project and using the OER subject modules to promote higher-order teaching with equity and inclusion in science and

mathematics classrooms in Nigeria. It is recommended that the CL4STEM OERs should be adopted to enhance science and mathematics teachers' capacity building to foster HOTIE in Nigerian classrooms.

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