

RESEARCH ARTICLE

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Acceptance of Google Classroom in Selected Colleges of Education: An Exploratory Study Using UTAUT Approach

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Abstract: This study examined the factors that influence pre-service teachers' use of Google Classroom within the Unified Theory of Acceptance and Use of Technology (UTAUT) framework, extending it with the construct of perceived reliability. Two research questions were posed: 1) What is the relationship between performance expectancy, effort expectancy, social influence and behavioural intention to use Google Classroom? 2) What is the relationship between facilitating conditions, perceived reliability, behavioural intention and self-reported use behaviour of Google Classroom? Using a descriptive and confirmatory cross-sectional survey design, data were collected from 337 pre-service teachers through a multi-stage sampling technique and analysed using Structural Equation Modelling (SEM). The findings revealed that performance expectancy and effort expectancy were positively and significantly associated with behavioural intention to use Google Classroom, suggesting that pre-service teachers' intentions to use the platform were associated with their perceptions of its performance benefits and ease of use. In contrast, social influence was not significantly associated with behavioural intention. Facilitating conditions had a positive and significant association with use behaviour, indicating a relationship between institutional support and resources and the use of Google Classroom. Additionally, the newly introduced construct, perceived reliability, was positively and significantly associated with use behaviour, suggesting a relationship between perceptions of the platform's reliability and its use. Based on these associations, the study recommends that Colleges of Education focus on enhancing pre-service teachers' perceptions of the performance benefits and ease of use of Google Classroom through targeted training sessions, workshops, and the sharing of examples demonstrating its effectiveness and user-friendliness.

Keywords: *Pre-service teachers, Google Classroom, UTAUT framework, perceived reliability, Colleges of Education.*

INTRODUCTION

In the rapidly evolving landscape of educational technology, Google Classroom has emerged as a pivotal tool for facilitating digital learning and streamlining educational processes. The service is a virtual education platform created by Google that allows both instructors and learners to actively participate in educational environments inside and outside of the classroom in an innovative way (Pham & Nguyen, 2024). Google Classroom offers numerous functionalities that assist teachers in creating courses, managing assignments, distributing materials, communicating with students, and collecting and grading assignments. This platform has been recognized for significantly improving the workflow between teachers and students, enhancing collaboration, and enabling effective communication. Valiyev et al. (2026) have reported that Google Classroom is an accessible and effective digital learning platform that improves learning flexibility, communication, and academic engagement. Additionally, Khoiriyah & Pulungan (2022) reported Google Classroom as effective in improving students access and

attentiveness towards learning, knowledge and skills. Google Classroom make students to be active learners, as a digital tool, it provides meaningful feedback to both students and teachers. Despite these benefits, the successful adoption of Google Classroom depends not only on the availability of its features but also on users' perceptions and willingness to incorporate the platform into their learning activities. Understanding these perceptions is important because students may differ in how they evaluate the usefulness, ease of use, and institutional support associated with a digital learning platform. For instance, Ramdani & Priyanto (2024) applied the Unified Theory of Acceptance and Use of Technology (UTAUT) to examine Google Classroom acceptance among students in Indonesia. Their findings identified social influence and facilitating conditions as relevant factors in acceptance, alongside other technology-related factors. Similarly, Pham & Nguyen (2024) reported positive perceptions of Google Classroom among university students in Vietnam, indicating that students' experiences and perceptions are important considerations in understanding platform adoption.

The UTAUT, developed by Venkatesh et al. (2003), provides a theoretical framework for explaining users' acceptance and use of technology. The model identifies four central determinants: performance expectancy, effort expectancy, social influence, and facilitating conditions. Performance expectancy concerns the extent to which users believe that using a technology will improve their performance, while effort expectancy relates to the perceived ease of using the technology. Social influence captures the extent to which users perceive that important people in their environment expect them to use the technology, whereas facilitating conditions refer to the availability of organisational and technical resources that support its use. These constructs provide a useful basis for examining the factors associated with pre-service teachers' acceptance and use of Google Classroom in teacher education institutions. Recent research continues to demonstrate the relevance of UTAUT in educational technology studies. In a systematic review of UTAUT applications in higher education, Xue et al. (2024) found that the model has been widely applied to examine technology acceptance, with performance expectancy emerging as a particularly important determinant of behavioural intention. However, the review also highlighted the need for research that considers diverse educational contexts and user groups. This is important because the acceptance of educational technologies may vary according to institutional environments, technological infrastructure, and the characteristics of learners.

Although studies have examined Google Classroom acceptance in different educational settings, further investigation is needed into how its acceptance is shaped among pre-service teachers in Colleges of Education, particularly within the Ghanaian context. Pre-service teachers occupy a distinctive position as both learners and future teachers who are expected to integrate digital technologies into their professional practice. Their acceptance of Google Classroom may therefore have implications not only for their own learning experiences but also for their preparedness to use digital platforms in future teaching. Moreover, findings from other countries and educational settings may not fully reflect the institutional and technological circumstances of Colleges of Education (CoEs) in Ghana. Consequently, examining Google Classroom acceptance among pre-service teachers in selected CoEs can provide context-specific evidence on the factors associated with their behavioural intention and use of the platform. This exploratory study aims to investigate the acceptance of Google Classroom among selected CoEs. By examining the factors associated with its adoption and utilization, this research seeks to provide insights into the effectiveness of Google Classroom in enhancing educational experiences and outcomes in CoEs. The findings will contribute to the broader understanding of digital learning platforms and their role in modern education.

Problem Statement

Despite the significant potential of Google Classroom as an effective digital learning management system (LMS), its usage and acceptance vary considerably across different educational contexts. This

discrepancy highlights the need for a deeper understanding of the factors influencing its adoption and implementation. Several studies have underscored these variations. Nafidi & El-Batri (2023) found that students rated Moodle more highly than Google Classroom in their comparative evaluation of online learning platforms, suggesting that Google Classroom may not meet all learners' expectations as effectively as alternative learning management systems. Similarly, Harahap et al. (2022) reported higher user satisfaction with the SIPDA LMS than with Google Classroom among lecturers and students at the State University of Medan, suggesting that user satisfaction may vary across learning management platforms. Moreover, Gupta and Pathania (2021) found that while a majority of teachers demonstrated a high level of acceptance of Google Classroom, there were notable reservations among some educators regarding its use. This indicates potential barriers that might be impeding its full adoption. Additionally, Susanto et al. (2021) reported that some students face challenges in using Google Classroom, pointing to usability issues that could affect the overall effectiveness of the platform. Given these mixed findings, it is crucial to investigate the acceptance of Google Classroom specifically within CoEs. By doing so, the study seeks to identify the enablers and barriers to the effective use of Google Classroom, providing insights that could inform strategies for enhancing its adoption and optimizing its use in educational settings.

Research Questions

1. What is the relationship between Performance expectancy, effort expectancy, social influence and behavioural intention to use Google Classroom among CoE students?
2. What is the relationship between facilitating conditions, perceived reliability and behavioural intention and self-reported use behaviour of Google Classroom among CoE students?

Hypotheses

- H1₀: Performance expectancy has no significant relationship with behavioural intention to use Google Classroom.
- H1₁: Performance expectancy has a significant relationship with behavioural intention to use Google Classroom.
- H2₀: Effort expectancy has no significant relationship with behavioural intention to use Google Classroom.
- H2₁: Effort expectancy has a significant relationship with behavioural intention to use Google Classroom.
- H3₀: Social influence has no significant relationship with behavioural intention to use Google Classroom.
- H3₁: Social influence has a significant relationship with behavioural intention to use Google Classroom.
- H4₀: Facilitating conditions have no significant relationship with self-reported use behaviour of Google Classroom.
- H4₁: Facilitating conditions have a significant relationship with self-reported use behaviour of Google Classroom.
- H5₀: Perceived reliability has no significant relationship with self-reported use behaviour of Google Classroom.
- H5₁: Perceived reliability has a significant relationship with self-reported use behaviour of Google Classroom.
- H6₀: Behavioural intention has no significant relationship with self-reported use behaviour of Google Classroom.
- H6₁: Behavioural intention has a significant relationship with self-reported use behaviour of Google Classroom.

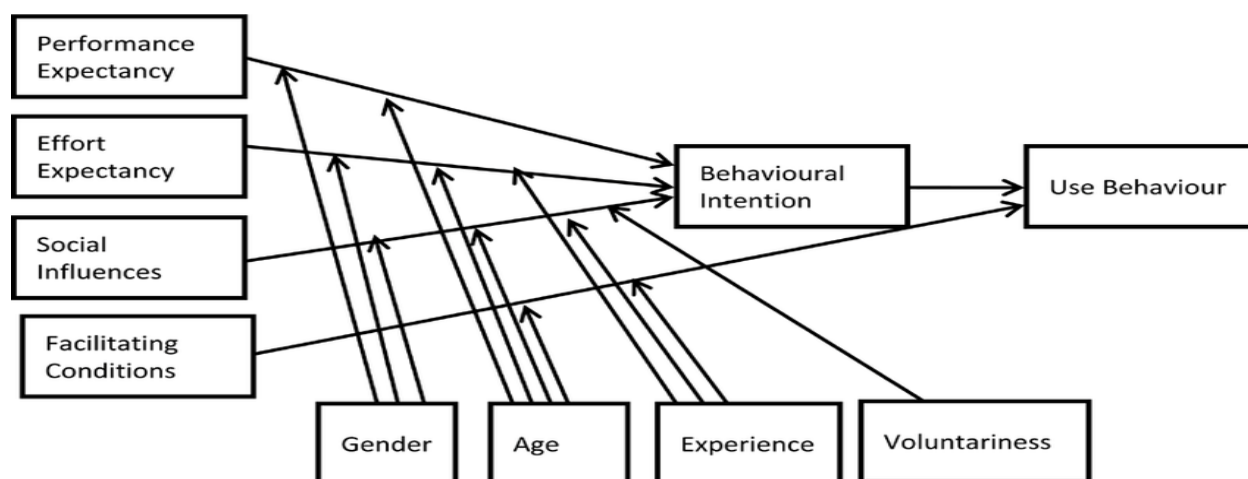
LITERATURE REVIEW

The Unified Theory of Acceptance and Use of Technology (UTAUT) Model

The UTAUT model, developed by Venkatesh et al. (2003) is a widely recognized theoretical framework for understanding the factors associated with the adoption and usage of technology. This model synthesizes eight prominent models of technology acceptance, including the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), the Motivational Model (MM), the Theory of Planned Behaviour (TPB), the Combined TAM and TPB, the Model of PC Utilization (MPCU), the Innovation Diffusion Theory (IDT), and the Social Cognitive Theory (SCT). The UTAUT model posits four key determinants of technology acceptance and use: performance expectancy, effort expectancy, social influence, and facilitating conditions. Performance expectancy refers to the degree to which an individual believes that using the technology will help them achieve benefits in their job or task performance. Effort expectancy is the degree of ease associated with the use of the technology. Social influence represents the extent to which an individual perceives that important others believe they should use the new technology. Facilitating conditions are the degree to which an individual believes that organizational and technical infrastructure supports the use of the technology (Venkatesh et al., 2003). The UTAUT model also considers the moderating effects of gender, age, experience, and voluntariness of use on the relationships between the four key determinants and the intention to use and actual use of the technology. This comprehensive framework has been extensively applied and validated in various technology adoption studies, including those in the field of education (Bayaga & du Plessis, 2024; Venkatesh et al., 2003; Xue et al., 2024).

In the context of Google Classroom, the UTAUT model provides a robust theoretical foundation to investigate the factors that influence teachers' acceptance and usage of this digital learning platform. By examining the key determinants of performance expectancy, effort expectancy, social influence, and facilitating conditions, researchers can gain deeper understanding of the motivations and barriers that shape students' adoption and utilization of Google Classroom within CoE settings.

Figure 1 UTAUT Model (Source: Venkatesh et al., 2003)



UTAUT Model and Google Classroom

The UTAUT model has been extensively applied to investigate the factors influencing the adoption and use of various educational technologies, including Google Classroom. Mokhtar and Karim (2021)

conducted a study to examine the acceptance of Google Classroom among pre-service teachers in Malaysia using the UTAUT framework. Their findings revealed that performance expectancy, effort expectancy, and social influence were significant predictors of pre-service teachers' intention to use Google Classroom. The researchers also found that facilitating conditions and intention to use positively influenced the actual use of the platform. Similarly, studies in Indonesia have explored the acceptance of Google Classroom among secondary school teachers using the UTAUT model. The findings showed that performance expectancy, effort expectancy, and social influence were significant determinants of teachers' intention to use Google Classroom (Venkatesh et al., 2003; Zulherman et al., 2021). Another study by Alotumi (2022) investigated the factors influencing the acceptance of Google Classroom among university students in Malaysia using the UTAUT approach. The results indicated that performance expectancy, effort expectancy, and social influence were significant determinants of students' intention to use Google Classroom. The researchers also found that facilitating conditions and intention to use had a positive impact on the actual use of the platform. These studies highlight the relevance and applicability of the UTAUT model in understanding the acceptance and usage of Google Classroom in various educational settings, including CoEs. A deeper examination of the key UTAUT constructs will allow researchers to gain a deeper understanding of the factors that shape teachers' and students' adoption and utilization of Google Classroom within the CoEs context. The findings from these studies provide valuable insights for educational institutions and policymakers as they seek to promote the effective integration of Google Classroom and other educational technologies in the teaching and learning process.

Perceived Reliability as an Extension of UTAUT

The UTAUT model provides an established framework for explaining technology acceptance through performance expectancy, effort expectancy, social influence and facilitating conditions (Venkatesh et al., 2003). However, these constructs do not explicitly capture users' perceptions of the dependability and consistent functioning of the technology itself. Performance expectancy concerns the benefits users expect from using a technology, effort expectancy concerns the ease associated with its use, social influence concerns the perceived expectations of important others and facilitating conditions concern the availability of resources and support. Although these factors provide important explanations of technology acceptance, they do not directly address whether users perceive the technological system as sufficiently stable, dependable, and consistently functional for actual use. This distinction is particularly important in the context of educational technologies such as Google Classroom. The usefulness and ease of a platform may encourage adoption, but actual engagement may also depend on whether users perceive the platform to perform its intended functions consistently. For example, students depend on Google Classroom to access learning materials, receive announcements, submit assignments, communicate with lecturers, and participate in other academic activities. Perceived instability, technical failure or inconsistent system performance may interfere with these activities and consequently affect users' actual engagement with the platform. Thus, reliability represents a system-level characteristic that complements, rather than duplicates, the motivational, social and facilitating factors represented in UTAUT.

The inclusion of perceived reliability is also consistent with the information-systems literature, which identifies system quality and system characteristics as important considerations in explaining users' interaction with information systems. Recent research continues to identify system quality as an important dimension of information systems success, particularly in online learning, where it has been associated with learner satisfaction and success (Sokro et al., 2025). Similarly, system and technology

characteristics have been shown to be relevant to students' acceptance and use of e-learning systems in higher education (Alyoussef, 2023; Fitria et al., 2024). Building on these perspectives, the present study extends UTAUT by incorporating perceived reliability to capture users' perceptions of the consistent, stable, and dependable functioning of Google Classroom.

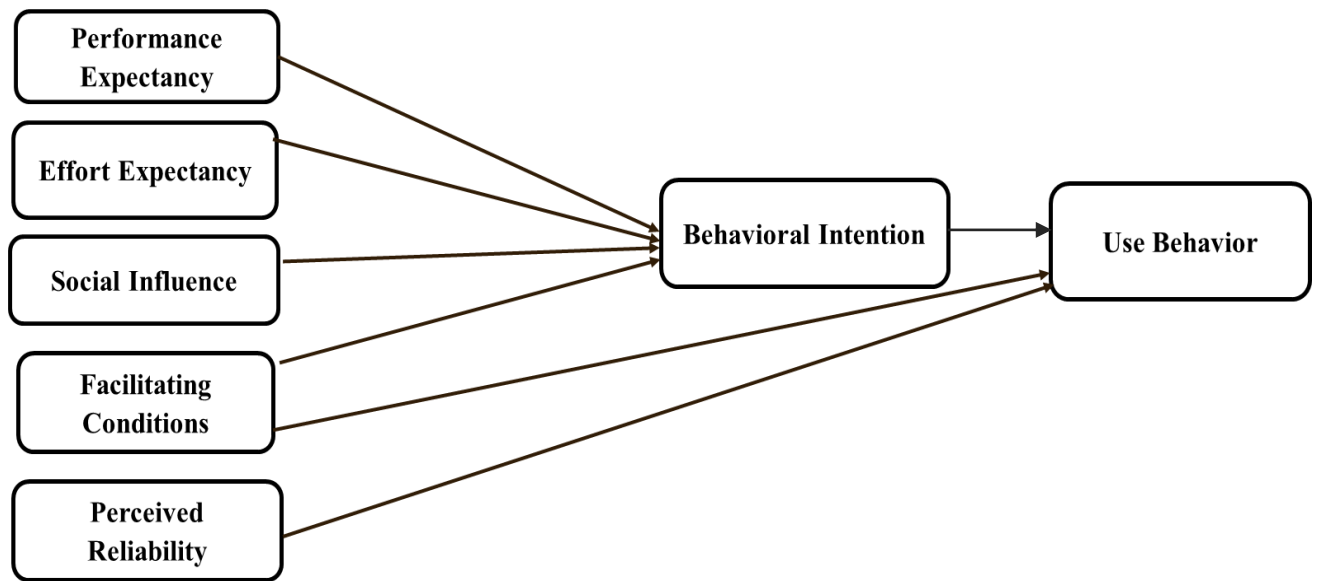
Perceived Reliability and Use Behaviour

The present study proposes that perceived reliability has a direct relationship with use behaviour. This proposition is based on the distinction between behavioural intention, which represents a user's willingness or intention to use a technology and use behaviour, which represents actual engagement with the technology. Whereas users may form an intention to use Google Classroom based on its expected benefits, ease of use, social influence, and available facilitating conditions, actual use is also influenced by their experience of the system's dependable functioning. Perceived reliability is therefore expected to operate directly at the level of actual system use.

When users perceive Google Classroom as stable, dependable, and capable of consistently performing its intended functions, they are more likely to rely on it for academic activities. Conversely, perceptions of unreliability may discourage actual engagement even when users recognise the usefulness of the platform or have formed an intention to use it. This direct relationship is conceptually distinct from facilitating conditions: Facilitating conditions concern the availability of external resources and support for technology use, whereas perceived reliability concerns the user's assessment of the technology's own dependable functioning. Accordingly, the present study does not assume that perceived reliability cannot influence behavioural intention. Rather, based on the specific theoretical role assigned to reliability as a system-quality characteristic, the study focuses on its direct relationship on self-reported use behaviour. This specification allows the extended UTAUT model to capture an aspect of technology use that is not explicitly represented by the original UTAUT constructs.

Adaptation of the UTAUT model

Although the original UTAUT model incorporates age, gender, experience, and voluntariness of use as moderating variables, these variables were not included in the present study. The decision was based on the specific objectives and research questions of the study, which focus on examining the direct relationships between the core UTAUT constructs and users' behavioural intention and use behaviour. In particular, the study examines the relationship between performance expectancy, effort expectancy, and social influence on behavioural intention, and the effects of facilitating conditions, perceived reliability, and behavioural intention on use behaviour. Consequently, the study adopts a parsimonious adaptation of UTAUT in which the proposed direct relationships are examined without specifying the moderating effects of age, gender, experience, and voluntariness of use. The omission of these moderators does not imply that they are theoretically irrelevant; rather, their moderating effects are outside the scope of the present investigation. The adapted model therefore concentrates on the direct explanatory relationships relevant to the research questions while extending UTAUT through the inclusion of perceived reliability.

Figure 2 Conceptual framework (adapted UTAUT model with perceived reliability)

MATERIALS AND METHODS

Research Design

This study utilizes a descriptive and confirmatory cross-sectional survey design to explore the acceptance of Google Classroom among students in CoEs using the UTAUT approach. The research aims to understand the association between Performance expectancy, effort expectancy, and social influence and behavioural intention in their use of Google Classroom. Additionally, it investigates the associations between facilitating conditions, perceived reliability, and behavioural intention and use behaviour of Google Classroom among CoE students. The study employs a quantitative approach, leveraging descriptive statistics and hypothesis testing to analyze the data.

Measurement of Constructs

The study measured seven latent constructs: Performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), perceived reliability (PR), behavioural intention (BI), and self-reported use behaviour (UB). The constructs were operationalised using questionnaire items developed from the UTAUT framework and the literature on technology acceptance, with perceived reliability included as an extension to the original UTAUT model. The questionnaire items were formulated to capture respondents' perceptions and reported use of Google Classroom within the selected CoEs.

Performance expectancy (PE) was measured in terms of the extent to which respondents perceived that using Google Classroom would improve their academic activities and performance. The items assessed respondents' perceptions of the usefulness and benefits of Google Classroom for accomplishing academic tasks. Effort expectancy (EE) was measured as the perceived ease of using Google Classroom. The items focused on the extent to which respondents perceived Google Classroom to be easy to learn, understand, and use in carrying out academic activities. Social influence (SI) evaluated the degree to which respondents perceived that key stakeholders in their academic environment (lecturers, colleagues, and peers) expected or encouraged them to adopt Google

Classroom. facilitating conditions (FC) measured respondents' perceptions of the availability of the resources, technical support, and infrastructure necessary to use Google Classroom. The items therefore assessed the extent to which respondents believed that they had adequate institutional and technological support for using the platform. Perceived reliability (PR) was included as an additional construct to the UTAUT model. It was measured in terms of respondents' perceptions of the reliability, consistency, stability and dependable functioning of Google Classroom. The items assessed the extent to which respondents trusted the platform to perform its intended functions without frequent technical failures or disruptions. Behavioural intention (BI) was measured in terms of respondents' intention or willingness to continue using Google Classroom for academic purposes. The items assessed respondents' stated intention to use the platform in their future academic activities. Use behaviour (UB) measured respondents' reported use of Google Classroom for academic activities. The construct captured the extent to which respondents used the platform for activities associated with teaching and learning.

Instrument

The questionnaire items were reviewed and pre-tested in a College of Education before the main data collection to establish their clarity, relevance, and suitability for the study context. Feedback obtained during the pre-testing exercise was used to refine the wording and presentation of the items before the final questionnaire was administered. The resulting measures were treated as indicators of their respective latent constructs in the subsequent structural equation modelling analysis. The questionnaire comprised dichotomous questions, closed and open-ended questions.

Table 1. UTAUT Model Measurement Items and Sources

Construct	Sample Item	No. of items	Source/adapted from
PE	Using Google Classroom improves my effectiveness in learning.	5	Venkatesh et al. (2003)
EE	I find Google Classroom easy to use.	5	Venkatesh et al. (2003)
SI	People who are important to me think that I should use Google Classroom for learning.	5	Venkatesh et al. (2003)
FC	I have the necessary resources and technical support to use Google Classroom.	5	Venkatesh et al. (2003)
PR	I can rely on Google Classroom to function consistently when I need to use it.	5	Fitria et al. (2024)
BI	I intend to continue using Google Classroom for my learning activities.	5	Venkatesh et al. (2003)
UB	I frequently use Google Classroom for my learning activities.	5	Venkatesh et al. (2003)

Table 1 presents the measurement items used to assess the seven constructs in the extended UTAUT model. Each construct was measured using five items, resulting in 35 items across performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), perceived reliability (PR), behavioural intention (BI), and use behaviour (UB). The items for six constructs were adapted from Venkatesh et al. (2003), while those for perceived reliability were adapted from Fitria et

al. (2024). Sample items are provided to illustrate how each construct was operationalised in the context of students' acceptance and use of Google Classroom for learning.

Sample Size Selection

Two Colleges of Education, namely Komenda College of Education and Kibi Presbyterian College of Education, were purposively selected because they share characteristics that are relevant to the objectives of the study. Both institutions are public Colleges of Education that offer teacher education programmes and provide an appropriate setting for examining the acceptance of Google Classroom among CoE students. The two colleges were also selected to provide representation of institutions operating in different geographical contexts, thereby allowing the study to capture potentially diverse experiences among the target population. In addition, two of the researchers are lecturers in the respective colleges, which facilitated institutional access, participant recruitment, and data collection. However, the researchers' affiliation with the institutions was treated as an access consideration rather than the substantive basis for their selection. Following the purposive selection of the two institutions, stratified random sampling was used to select the student participants. The students were stratified according to their programme levels, namely Early Grade, Upper Primary, and Junior High School (JHS). The Krejcie & Morgan (1970) method for determining sample size was used. Krejcie and Morgan developed a sample-size table based on a defined population size, assuming a population proportion of .50, a 95% confidence level, and a 5% degree of accuracy. The total student population of the two institutions was 2,700, comprising 1,400 students at Komenda College of Education and 1,300 students at Kibi Presbyterian College of Education. For purposes of proportional allocation, the students were distributed across the three programme strata in an approximate ratio of 1:1:2 for Early Grade, Upper Primary, and JHS, respectively.

Ethical Considerations

Ethical considerations were strictly adhered to throughout the study. Informed consent was obtained from all participants, ensuring they were fully aware of the study's purpose and their rights as participants. Confidentiality of the respondents was maintained at all times. Although the study did not receive formal ethical approval from an institutional ethics review board, the researchers took deliberate steps to uphold the ethical principles governing research involving human participants. Permission was sought from the participating institutions before data collection and the purpose and nature of the study were explained to the relevant institutional authorities and prospective participants. Participation in the study was voluntary. Respondents were informed about the purpose of the study and were not compelled to participate. They were also informed that they could decline to participate or discontinue their participation without penalty. The researchers took measures to protect participants' privacy and confidentiality and information collected from respondents was used solely for the purposes of the study. No personally identifying information was unnecessarily collected or reported and the findings were presented in aggregate form to minimize the possibility of identifying individual participants. The researchers also respected the interests and institutional requirements of the participating CoEs throughout the data-collection process. Data were collected in a manner intended to minimize disruption to institutional activities, and the information obtained from the institutions and respondents was treated confidentially. These measures were undertaken to protect the rights, dignity, autonomy, and welfare of the participants and to ensure responsible conduct of the research.

Data Analysis

The data were analysed using Structural Equation Modeling (SEM) to examine the hypothesised relationships among the constructs in the extended UTAUT model. SEM was considered appropriate because it enabled the simultaneous examination of multiple interrelated relationships, including the associations of performance expectancy (PE), effort expectancy (EE) and social influence (SI) with behavioural intention (BI), as well as those of facilitating conditions (FC), perceived reliability (PR), and BI with self-reported use behaviour (UB). The analysis was conducted using IBM SPSS AMOS Version 22. The analysis involved two stages: assessment of the measurement model and assessment of the structural model.

Measurement Model Assessment

Confirmatory Factor Analysis (CFA) was used to assess the measurement model and determine whether the observed indicators adequately represented their respective latent constructs: PE, EE, SI, FC, PR, BI, and UB. The measurement model was assessed in terms of factor loadings, construct reliability, convergent validity, and discriminant validity. The overall adequacy of the measurement model was assessed using appropriate model-fit indices.

Structural Model Assessment

Following assessment of the measurement model, the structural model was estimated to test the hypothesised relationships among the constructs. Specifically, the model estimated the effects of PE, EE, and SI on BI, and the effects of FC, PR, and BI on UB. The significance of the hypothesised relationships was assessed using the estimated path coefficients, standard errors (S.E.), critical ratios (C.R.), and p-values. A relationship was considered statistically significant at 5% significance level ($p < .05$). The structural model was also assessed using appropriate goodness-of-fit indices to determine the extent to which the hypothesised model adequately represented the observed data. The results of the structural model were used to evaluate the research questions and the hypothesised relationships among the constructs.

RESULTS

Reliability Analysis

Table 2. Internal Consistency Reliability of Constructs

Construct	Number of Items	Cronbach's Alpha	Interpretation
Facilitating conditions (FC)	5	0.884	Excellent
Performance expectancy (PE)	5	0.888	Excellent
Effort expectancy (EE)	5	0.870	Good
Perceived reliability (PR)	5	0.867	Good
Social influence (SI)	5	0.840	Good
Behavioural intention (BI)	5	0.889	Excellent
Use behaviour (UB)	5	0.779	Acceptable

The reliability of the measurement scales was assessed using Cronbach's alpha coefficients. As shown in Table 2, all constructs recorded alpha values above the recommended threshold of 0.70.

facilitating conditions ($\alpha = 0.884$), performance expectancy ($\alpha = 0.888$), and behavioural intention ($\alpha = 0.889$) demonstrated excellent reliability, while effort expectancy ($\alpha = 0.870$), perceived reliability ($\alpha = 0.867$), and social influence ($\alpha = 0.840$) showed good reliability. Use behaviour also achieved an acceptable reliability level ($\alpha = 0.779$). These results indicate that all measurement scales possessed adequate internal consistency and were suitable for further analysis.

Descriptive Statistics

Table 3. Means of Study Constructs

Construct	Mean
Facilitating conditions (FC)	4.13
Performance expectancy (PE)	3.90
Effort expectancy (EE)	4.12
Perceived reliability (PR)	3.93
Social influence (SI)	3.83
Behavioural intention (BI)	3.93
Use behaviour (UB)	3.84

Table 3 presents the mean scores for the study constructs. FC recorded the highest mean ($M = 4.13$), followed closely by EE ($M = 4.12$). PR and BI both recorded a mean of 3.93, while PE had a mean of 3.90. SI and UB recorded means of 3.83 and 3.84, respectively. Overall, the results indicate relatively high mean scores across all constructs, with facilitating conditions and effort expectancy receiving the highest ratings.

Correlation Analysis

Table 4. Correlation Matrix of Study Constructs

Variable	FC	PE	EE	PR	SI	BI	UB
FC	1.000	.525	.465	.388	.416	.432	.440
PE	.525	1.000	.651	.648	.680	.704	.506
EE	.465	.651	1.000	.758	.648	.641	.498
PR	.388	.648	.758	1.000	.653	.725	.458
SI	.416	.680	.648	.653	1.000	.724	.566
BI	.432	.704	.641	.725	.724	1.000	.517
UB	.440	.506	.498	.458	.566	.517	1.000

Table 4 presents the correlations among the study variables. All constructs exhibited positive relationships with one another. BI demonstrated strong associations with PR ($r = .725$), SI ($r = .724$) and PE ($r = .704$). UB was most strongly associated with SI ($r = .566$) and BI ($r = .517$). The observed

relationships are consistent with the assumptions of the UTAUT framework and provide preliminary support for the proposed model.

Table 5. Convergent Validity Results

Construct	CR	AVE	Assessment
Facilitating conditions (FC)	0.887	0.613	Supported
Performance expectancy (PE)	0.888	0.613	Supported
Effort expectancy (EE)	0.873	0.583	Supported
Perceived reliability (PR)	0.863	0.559	Supported
Social influence (SI)	0.837	0.519	Supported
Behavioural intention (BI)	0.890	0.622	Supported
Use behaviour (UB)	0.791	0.447	Not fully supported

The results of the measurement model assessment as presented in Table 5 indicate that six of the seven constructs demonstrated satisfactory convergent validity and composite reliability. FC, PE, EE, PR, SI and BI recorded composite reliability (CR) values ranging from 0.837 to 0.890, exceeding the recommended threshold of 0.70. Their average variance extracted (AVE) values ranged from 0.519 to 0.622, meeting the recommended minimum of 0.50. These findings suggest that the indicators adequately represent their respective constructs and that the constructs demonstrate satisfactory internal consistency and convergent validity. However, UB recorded a CR value of 0.791, indicating acceptable composite reliability, but an AVE of 0.447, which falls below the recommended threshold. Thus, although the UB indicators demonstrate acceptable internal consistency, their convergent validity was not fully established. Overall, the measurement model provides satisfactory evidence of reliability and convergent validity for six constructs, while the UB construct requires further examination and possible refinement.

Hypothesis Testing Results

Based on the structural model estimates in Table 8 of the manuscript, the hypotheses were tested at the 5% significance level ($p < .05$).

Table 6. Hypothesis Testing Results for the Structural Relationships in the Extended UTAUT Model

Hypothesis	Relationship tested	Estimate	p-value	Decision
H1 ₀	PE → BI	0.354	.001	Reject H1 ₀
H2 ₀	EE → BI	0.483	.001	Reject H2 ₀
H3 ₀	SI → BI	0.032	.300	Fail to reject H3 ₀
H4 ₀	FC → UB	0.432	.001	Reject H4 ₀

H5 ₀	PR → UB	0.245	.001	Reject H5 ₀
H6 ₀	BI → UB	0.276	.001	Reject H6 ₀

Interpretation of the Results

H1: Performance expectancy had a positive, statistically significant relationship with behavioural intention. The null hypothesis was rejected.

H2: Effort expectancy had a positive, statistically significant relationship with behavioural intention. The null hypothesis was rejected.

H3: Social influence had no statistically significant relationship with behavioural intention ($p = .300$). The null hypothesis was not rejected.

H4: Facilitating conditions had a positive, statistically significant relationship with use behaviour. The null hypothesis was rejected.

H5: Perceived reliability had a positive, statistically significant relationship with use behaviour. The null hypothesis was rejected.

H6: Behavioural intention had a positive, statistically significant relationship with use behaviour. The null hypothesis was rejected.

Conclusion: Five of the six hypothesised relationships were statistically significant, while the relationship between social influence and behavioural intention was not significant.

Overall Model-Fit Evaluation

Table 7. Summary of Model-Fit Assessment

Criterion	Corrected result	Interpretation
Reliability range	0.779–0.889	Acceptable to excellent
Significant predictors of BI	PE, EE	Supported
Non-significant predictor of BI	SI	Not supported
Significant predictors of UB	FC, PR, BI	Supported
R ² for BI	0.668	Substantial
R ² for UB	0.267	Moderate

Table 7 summarises the overall assessment of the proposed UTAUT model. The reliability coefficients ranged from 0.779 to 0.889, indicating acceptable to good internal consistency across the constructs. The model explained 66.8% of the variance in BI ($R^2 = 0.668$) and 26.7% of the variance in use behaviour ($R^2 = 0.267$), indicating substantial and moderate explanatory power, respectively. The structural results showed that performance expectancy and effort expectancy were positively and significantly associated with behavioural intention, whereas SI was not statistically significant. FC, PR, and BI were positively and significantly associated with UB. These findings support the usefulness of the extended UTAUT model for examining Google Classroom acceptance and use among pre-service teachers in the selected CoEs. Although the measurement model demonstrated acceptable internal consistency, the average variance extracted (AVE) for UB was below the recommended threshold of 0.50, suggesting that its convergent validity should be interpreted with caution. Overall, the structural results provide empirical

support for the proposed relationships, particularly those involving PE and EE with BI, and FC, PR, and BI with UB.

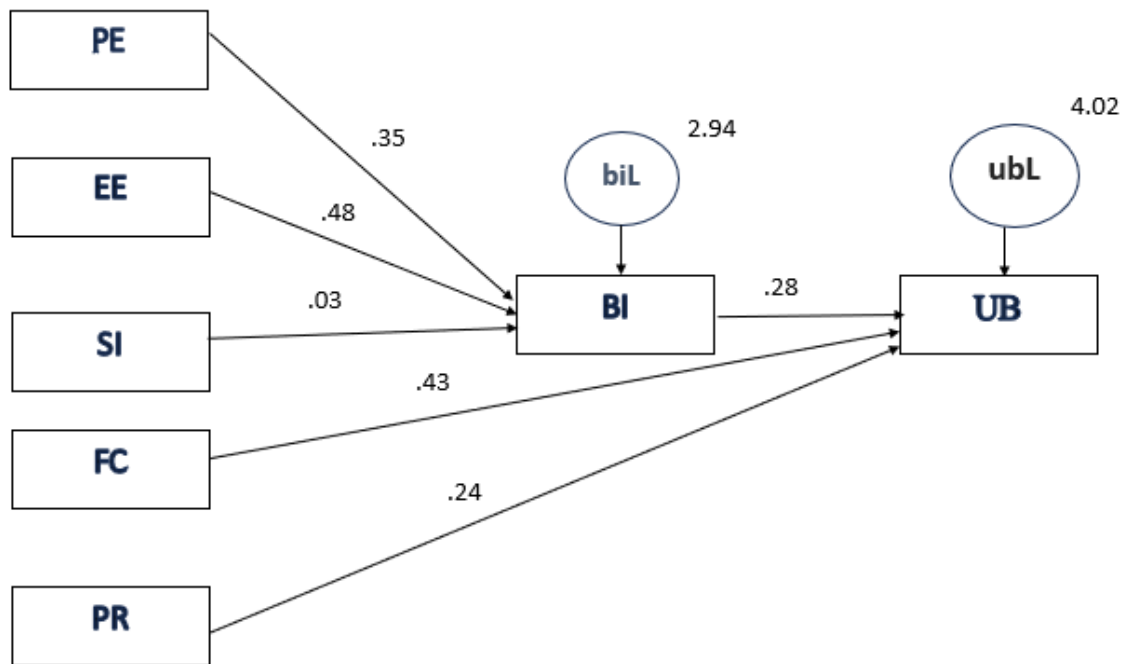
Table 8. Structural Model Estimates for the Relationships Among UTAUT Constructs and Google Classroom Use Behaviour

			Estimate	S.E.	C.R.	P	Label
BI	<---	PE	0.354	0.04	8.762	0.001	
BI	<---	EE	0.483	0.04	12.012	0.001	
BI	<---	SI	0.032	0.031	1.036	0.3	
UB	<---	FC	0.432	0.037	11.641	0.001	
UB	<---	PR	0.245	0.037	6.536	0.001	
UB	<---	BI	0.276	0.038	7.328	0.001	

Table 8 presents the structural model estimates for the relationships among the constructs in the extended UTAUT model. Five of the six hypothesised relationships were positive and statistically significant, while the relationship between SI and BI was not significant. PE had a positive and statistically significant relationship with BI (estimate = 0.354, SE = 0.040, CR = 8.762, $p = .001$). This finding suggests that students who perceived Google Classroom as useful for improving their learning effectiveness tended to report stronger intentions to use the platform. Similarly, EE was positively and significantly associated with BI (estimate = 0.483, SE = 0.040, CR = 12.012, $p = .001$). EE recorded the largest estimate among the three predictors of BI, suggesting that perceived ease of use was particularly relevant to students' intentions to use Google Classroom.

In contrast, SI was not significantly associated with BI (estimate = 0.032, SE = 0.031, CR = 1.036, $p = .300$). This indicates that perceived encouragement or expectations from lecturers, colleagues, and peers did not have a statistically significant independent relationship with students' intentions to use Google Classroom in the estimated model. Consequently, the null hypothesis was not rejected. Regarding UB, FC had a positive and statistically significant relationship with UB (estimate = 0.432, SE = 0.037, CR = 11.641, $p = .001$). FC recorded the largest estimate among the three predictors of UB, highlighting the relevance of access to resources and technical support. PR was also positively and significantly associated with UB (estimate = 0.245, SE = 0.037, CR = 6.536, $p = .001$), suggesting that students who perceived Google Classroom as dependable tended to report greater use of the platform. Additionally, BI was positively and significantly associated with UB (estimate = 0.276, SE = 0.038, CR = 7.328, $p = .001$), indicating that stronger intentions to use Google Classroom were associated with greater reported use. Overall, the findings support five of the six hypothesised relationships. PE and EE were significantly associated with BI, whereas FC, PR, and BI were significantly associated with UB. The nonsignificant relationship between SI and BI suggests that SI was not a significant independent correlate of BI in this study. These results highlight the relevance of perceived usefulness, ease of use, enabling resources, and platform reliability in understanding students' acceptance and use of Google Classroom. However, because UB was self-reported, the findings should not be interpreted as evidence of objectively verified platform usage or causal relationships.

Figure 3 Extended UTAUT Model Testing the Direct Effect of perceived reliability (PR) on Google Classroom Use Behavior.



Note. PE = performance expectancy; EE = effort expectancy; SI = social influence; FC = facilitating conditions; PR = perceived reliability; BI = Behavioral Intention; UB = Use Behavior. Values along arrows indicate standardized path coefficients (β).

The structural model illustrates the relationships among the constructs in the extended UTAUT model. PE (PE; $\beta = .35$) and EE (EE; $\beta = .48$) have positive relationships with BI, while SI (SI; $\beta = .03$) has a very weak relationship with BI. Regarding UB, FC show a positive relationship ($\beta = .43$), followed by PR (PR; $\beta = .24$) and BI (BI; $\beta = .28$). Overall, the model suggests that effort expectancy is the strongest predictor of behavioural intention, while facilitating conditions have the strongest relationship with use behaviour.

DISCUSSION

This study examined factors associated with pre-service teachers' acceptance and use of Google Classroom in two Colleges of Education using an adapted UTAUT framework extended with perceived reliability. Performance expectancy and effort expectancy were positively associated with behavioural intention. While social influence was not significant, facilitating conditions, perceived reliability and behavioural intention were positively associated with self-reported use behaviour. These findings suggest that Google Classroom use is associated with both students' perceptions of the platform and the conditions under which it is used.

The significant positive association between Performance expectancy and behavioural intention is consistent with recent higher-education research. Xue et al. (2024), in a systematic review of UTAUT studies in higher education, identified performance expectancy as one of the strongest determinants of behavioural intention, and also reported a strong performance expectancy-behavioural intention relationship across e-learning studies. Zhao (2024) similarly found performance expectancy to be an important predictor of students' intention to use e-learning. In the present context, students may be more willing to use Google Classroom when they perceive that it helps them access materials, receive

announcements, submit assignments, communicate with lecturers, and complete academic tasks more efficiently. For pre-service teachers, such perceived benefits may also contribute to their preparation for future technology-supported teaching. In contrast, social influence was not significantly associated with behavioural intention. Although some recent studies have reported significant social influence–behavioural intention relationships, evidence is not consistent across educational contexts. Nouredine et al. (2025) found considerable variation in the strength of UTAUT relationships across higher-education settings, while Xue et al., (2024) reported only a moderate overall social influence–behavioural intention relationship. The nonsignificant finding in the present study may reflect the context of the CoEs, where students may rely more on their own assessments of Google Classroom’s usefulness and ease of use than on expectations from lecturers or peers. Where the platform is already incorporated into academic activities, practical academic requirements may also be more important than social pressure. However, because the study is cross-sectional, this interpretation cannot establish how the importance of social influence changes over time. The positive facilitating conditions–use behaviour relationship is consistent with recent research emphasizing the importance of resources, infrastructure, and technical support in educational technology use. Bervell et al. (2021) highlighted the importance of facilitating conditions in Google Classroom use, while Xue et al. (2024) identified facilitating condition as an important component of technology acceptance in higher education. In the present study, access to appropriate devices, reliable internet connectivity, and technical support may help students translate their intentions into actual Google Classroom use.

The significant Perceived Reliability–Use Behaviour relationship provides support for extending UTAUT with a system-level characteristic concerned with the dependable functioning of Google Classroom. Recent research has similarly emphasized system quality in e-learning adoption. Zhao (2024), for example, found system quality to be significantly associated with e-learning acceptance. In this study, students may be more likely to use Google Classroom when they perceive it as stable, dependable, and consistently available for accessing materials, receiving announcements, submitting assignments, and communicating with lecturers. Finally, the positive behavioural intention–use behaviour relationship indicates that students with stronger intentions to use Google Classroom were also more likely to report using it. This is consistent with recent research showing that behavioural intention remains an important component of technology-use models in education (Alotumi, 2022; Zhao, 2024). However, the simultaneous significance of facilitating conditions and perceived reliability suggests that intention alone may not be sufficient for actual use. Students also require adequate resources, support, and confidence in the reliability of the platform. Overall, the findings indicate that Google Classroom acceptance in the selected institutions is associated with both individual perceptions and contextual conditions. Performance expectancy and effort expectancy were important in relation to behavioural intention, while facilitating conditions, perceived reliability, and behavioural intention were associated with use behaviour. The nonsignificant social influence–behavioural intention relationship suggests that students’ personal evaluations of usefulness and ease of use may be more important than social expectations in this context. The significant perceived reliability–use behaviour relationship further suggests that incorporating system-level characteristics such as reliability may provide additional insight into educational technology use beyond the traditional UTAUT constructs. Institutions should therefore emphasize the academic benefits and ease of use of Google Classroom while providing adequate infrastructure, technical support, and reliable system performance.

CONCLUSION AND RECOMMENDATIONS

This exploratory study examined the acceptance of Google Classroom in selected CoEs using the UTAUT model, extended to include perceived reliability. The findings provide insights into the relationships between key technological and institutional factors, pre-service teachers’ behavioural

intention to use Google Classroom, and their use of the platform as reported by participants. Performance expectancy and effort expectancy were positively associated with behavioural intention, suggesting that pre-service teachers who perceive Google Classroom as beneficial to their learning and easy to use tend to report stronger intentions to use it. Facilitating conditions and perceived reliability were significantly associated with use behaviour, highlighting the relevance of adequate technical resources, institutional support, and confidence in the platform's consistent performance. In contrast, social influence was not significantly associated with behavioural intentions, suggesting that perceived social expectations may have a limited relationship with behavioural intention in the context examined. Overall, the findings underscore the importance of perceived educational value, ease of use, institutional support, and technological reliability in understanding the acceptance and use of Google Classroom in the selected Colleges of Education.

Based on these findings, several recommendations are proposed. First, Colleges of Education should strengthen pre-service teachers' perceptions of the educational value and ease of use of Google Classroom through targeted training, practical workshops and opportunities for hands-on engagement with the platform. Training activities should demonstrate how Google Classroom can support teaching and learning, facilitate access to learning materials, improve communication, and enhance the management of learning activities. Such initiatives may help users better appreciate the platform's educational benefits and develop confidence in navigating its features. Second, institutions should strengthen the facilitating conditions associated with the effective use of Google Classroom. This requires sustained investment in reliable internet connectivity, appropriate digital devices, accessible training resources, and responsive technical support. Colleges should also provide ongoing assistance to pre-service teachers and lecturers to address technical difficulties and encourage the integration of the platform into teaching and learning activities. These measures may help reduce practical barriers to use and support more consistent engagement with the platform. Third, given the significant association between perceived reliability and use behaviour, institutions should prioritise the stability, accessibility, and consistent performance of the technological infrastructure supporting Google Classroom. Reliable network connectivity, adequate hardware resources and timely technical maintenance are essential for minimising disruptions and sustaining users' confidence in the platform. Institutions should also communicate clearly about available support arrangements and provide guidance on managing common technical challenges.

Suggestions for Further Studies

Future research should consider conducting longitudinal studies to assess the long-term impact of Google Classroom on student performance, engagement, and retention. Tracking these variables over multiple semesters or academic years would provide deeper insights into the sustained benefits and potential challenges of using this platform. Finally, future research should examine the acceptance of Google Classroom across a wider range of educational institutions and contexts to assess the generalizability of the present findings. Subsequent studies could investigate additional individual, technological, and institutional factors that may be associated with variations in acceptance and use. Longitudinal research and studies incorporating objective usage records, where feasible, could also provide deeper insights into the relationships between behavioural intention and actual use over time. Such investigations would help validate and extend the UTAUT model and inform more context-sensitive strategies for integrating digital learning platforms into teacher education.

Limitation of the study

This study has several limitations. First, its cross-sectional design captures perceptions and reported use at a single point in time; therefore, the findings indicate associations rather than causal effects. Second,

the use of self-reported measures may introduce recall and social-desirability biases. In addition, because the predictor and outcome constructs were measured from the same respondents using the same questionnaire at one point in time, common-method variance cannot be completely ruled out. Although no formal statistical test for common-method variance was conducted, procedural measures—including assuring confidentiality, emphasizing that there were no right or wrong answers, encouraging honest responses, and using clearly worded items adapted from established measures—were adopted to minimize this risk. Third, the purposive selection of only two Colleges of Education limits the representativeness of the sample and, consequently, the generalizability of the findings to other Colleges of Education and educational contexts. Future studies could address these limitations through longitudinal designs, objective measures of platform use, broader institutional coverage, probability-based sampling, and mixed-methods approaches.

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