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RESEARCH ARTICLE

Investigating Students' AI Usage Through the Community of Inquiry (COI) Framework: a Mixed-Method Study in the Caribbean Region

Uso da Inteligência Artificial por Estudantes do Caribe: Evidências Integradas dos Modelos COI e UTAUT

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ABSTRACT | Purpose: This study investigates how tertiary-level students in the Caribbean use artificial intelligence (AI) tools in academic practices, examining pedagogical and behavioural factors that influence technology acceptance and learning engagement.**Methodology:** A convergent mixed-methods design combined survey data (n = 114) with qualitative narratives. The research was guided by the *Community of Inquiry* (CoI) and the *Unified Theory of Acceptance and Use of Technology* (UTAUT), enabling an integrated analysis of learning perceptions and adoption behaviour. **Findings:** Most students reported using AI to clarify complex content (85%) and to generate ideas (78%). Quantitative analysis showed a strong correlation between cognitive presence and perceived learning ($\rho = 0.73$; $p < .001$), and teaching presence significantly predicted performance expectancy ($\beta = 0.44$; $R^2 = 0.29$; $p < .001$). Qualitative insights revealed AI as a cognitive amplifier and adaptive tutor, while highlighting challenges related to infrastructure, access inequities, ethical concerns, and academic anxiety. **Originality/Value:** By integrating CoI and UTAUT in a Global South context, this study provides novel empirical evidence on AI-supported learning in under-resourced environments. It advances theoretical understanding by suggesting model adaptations sensitive to equity, ethics, and cultural dimensions, while offering policy-relevant insights. **Practical Implications:** The findings underscore the importance of institutional investment in digital infrastructure, AI literacy, and inclusive governance to ensure equitable and responsible AI adoption in higher education.

Keywords | Artificial intelligence; Higher education; Caribbean; Learning engagement; Community of Inquiry; UTAUT.

RESUMO | Objetivo: Este estudo examina como estudantes de instituições de ensino superior no Caribe utilizam ferramentas de inteligência artificial (IA) em suas práticas acadêmicas, analisando fatores pedagógicos e comportamentais que influenciam a aceitação tecnológica e o engajamento em processos de aprendizagem. **Metodologia:** Foi adotado um desenho de métodos mistos convergentes, integrando *survey* quantitativo (n = 114) com narrativas qualitativas. A investigação foi orientada pelos referenciais *Community of Inquiry* (CoI) e *Unified Theory of Acceptance and Use of Technology* (UTAUT), permitindo análise integrada

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de percepções de aprendizagem e adoção tecnológica. **Resultados:** A maioria dos estudantes relatou utilizar IA para esclarecer conteúdos (85%) e gerar ideias (78%). A análise estatística identificou correlação positiva entre presença cognitiva e percepção de aprendizagem ($\rho = 0,73$; $p < 0,001$) e indicou a presença de ensino como preditora significativa da expectativa de desempenho ($\beta = 0,44$; $R^2 = 0,29$; $p < 0,001$). Os dados qualitativos apontaram a IA como amplificador cognitivo e tutor adaptativo, embora tenham emergido barreiras relacionadas a infraestrutura, equidade de acesso, ansiedade acadêmica e preocupações éticas. **Originalidade/Valor:** Ao integrar os modelos CoI e UTAUT em um contexto de Sul Global, este estudo oferece evidências empíricas inéditas sobre o uso da IA em ambientes educacionais subfinanciados, destacando implicações para a adaptação teórica e para políticas institucionais. **Implicações:** Os resultados reforçam a necessidade de investimentos institucionais em infraestrutura digital, literacia ética e diretrizes inclusivas para garantir uso responsável e equitativo da IA no ensino superior.
Palavras-chave | Inteligência artificial; Ensino superior; Caribe; Aprendizagem; CoI; UTAUT.

INTRODUCTION

The integration of artificial intelligence (AI) in higher education is accelerating rapidly. However, its impact on student learning remains uneven, particularly in under-resourced, culturally diverse contexts. Global discourse often highlights the benefits of tools like ChatGPT, Grammarly, and Quillbot. However, less attention is paid to how students in the Global South engage with these technologies. The term 'Global South' typically refers to regions marked by historical socioeconomic inequality, infrastructure gaps, and limited access to technology. This gap is especially evident in the Caribbean, where weak infrastructure, lack of policy guidance, and uneven digital literacy hinder AI adoption. AI technologies are transforming how students learn. They reshape access to knowledge, support assignment completion, and influence classroom discourse. For many students, these tools simplify complex ideas, improve writing fluency, and help manage academic workloads (Noroozi et al., 2024; Al Zaidy, 2024). At the same time, growing reliance on AI may also undermine critical thinking and reduce opportunities for self-regulated learning (Schei et al., 2024). As students increasingly incorporate generative AI into everyday academic practices, there is an urgent need to examine the pedagogical, behavioural, and ethical implications, particularly from a student-centred perspective.

In the Caribbean, the COVID-19 pandemic accelerated digital transformation across tertiary institutions, prompting widespread but uneven AI adoption. Students now routinely use AI tools for paraphrasing, summarisation, content creation, and academic task completion, often without formal training or ethical guidance (Cross et al., 2023; Julien, 2024). Although these practices offer convenience and support, they may also lead to surface-level engagement or what some scholars call "metacognitive laziness", a tendency to bypass critical thinking and reflection (Schei et al., 2024). This dynamic may deepen educational inequities, especially for students in rural or underserved areas who face unstable internet, limited device access, and little exposure to premium AI platforms. These factors highlight a persistent digital divide. As generative AI becomes more common in academic practices, it is urgent to examine not only the behavioural and pedagogical implications, but also the ethical and cultural dynamics shaping AI use in under-resourced contexts.

Theoretical and Conceptual Framework

These frameworks are applied through an integrated conceptual model that draws on both CoI and UTAUT, adapted to reflect the pedagogical, behavioural, and infrastructural realities of Caribbean higher education. This integrated model serves to align learning perceptions and technology adoption factors in a context-sensitive manner. The CoI framework (Garrison et al., 2000) provides a pedagogical lens for understanding meaningful learning in online and blended settings. It comprises three key dimensions:

- Cognitive Presence: the ability to construct meaning through sustained reflection and discourse,
- Social Presence: the ability to project oneself socially and emotionally in a learning community,
- Teaching Presence: the design, facilitation, and direction of learning processes.

To complement this pedagogical perspective, the UTAUT model (Venkatesh et al., 2003) offers a behavioural lens to understand students' intention and actual use of AI tools. UTAUT comprises four key constructs:

- Performance Expectancy: belief that using the technology will enhance academic performance,
- Effort Expectancy: perceived ease of use,
- Social Influence: perceptions about how others value or promote AI use,
- Facilitating Conditions: access to resources and institutional support.

Conceptual Framework

This study is guided by an integrated conceptual model that combines two theoretical frameworks: the Community of Inquiry (CoI) (Garrison et al., 2000) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003). Together, they are used to examine student engagement with AI tools in Caribbean higher education. The CoI model provides a pedagogical lens focused on perceived learning quality, while UTAUT offers a behavioural lens to explore technology adoption. These frameworks are situated within the unique infrastructural, ethical, and cultural realities of the Caribbean context. Figure 1 presents the integrated conceptual model underpinning this study.

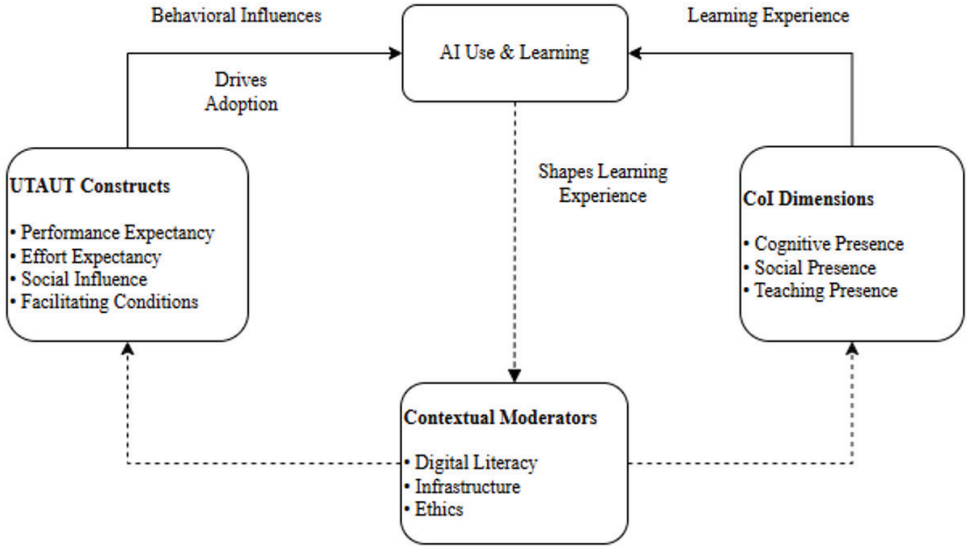

Figure 1. Integrated Conceptual Model Combining CoI and UTAUT Models for Investigating AI Use Among Caribbean Tertiary Students (Author, 2025).

At the centre of the model is AI Use & Learning, shaped by two complementary forces:

1. Behavioural influences from the UTAUT model, performance expectancy, effort expectancy, social influence, and facilitating conditions, which drive students' adoption and use of AI tools; and
2. Learning dimensions from the CoI framework, cognitive, social, and teaching presence, reflect students' perceptions of the educational value of AI-supported learning.

Surrounding these core elements are contextual moderators, including digital literacy, infrastructure, and ethical awareness. These factors influence both students' access to AI tools and the quality of their learning experiences, either enabling or constraining effective adoption.

To support clarity and alignment between theory and measurement, Table 1 maps each construct in the model to the survey variables used in this study.

Table 1. Operationalisation of Key Constructs

Theoretical Construct	Survey Focus / Variable
Cognitive Presence	Ability to apply AI to understand and reflect on academic content
Social Presence	Comfort expressing ideas or collaborating via AI-assisted tools
Teaching Presence	Perceived instructional support or structure involving AI tools
Performance Expectancy	The belief that AI improves grades or productivity
Effort Expectancy	Ease of learning and using AI tools like ChatGPT, Copilot
Social Influence	The perception that peers and faculty encourage AI tool usage
Facilitating Conditions	Access to the internet, hardware, and institutional AI resources
Contextual Moderators	Levels of digital literacy, internet access, and ethical awareness

These contextual moderators are especially significant in Caribbean settings, where access to technology, cultural norms, and ethical considerations vary widely. The model accounts for the dynamic interplay between technological acceptance, pedagogical experience, and socio-cultural conditions. By integrating theoretical and contextual elements, this study goes beyond surface-level usage metrics. It explores how, why, and under what conditions students engage with AI in ways that support or hinder meaningful learning.

Integrating the Community of Inquiry (CoI) and Unified Theory of Acceptance and Use of Technology (UTAUT) frameworks was intentional and rooted in their complementary value. CoI provides a pedagogical lens, examining students' perceptions of how AI tools influence cognitive engagement, teaching support, and social interaction. UTAUT, by contrast, offers a behavioural model that captures students' expectations, ease of use, and access to AI. Together, these frameworks enable a dual analysis: understanding not only how students experience AI in their learning (CoI), but also why and under what conditions they choose to adopt it (UTAUT). This complementarity supports the mixed methods design. The qualitative strand aligns with pedagogical insights from CoI, while the quantitative strand draws on behavioural predictors from UTAUT. By combining them within a single conceptual model, the study captures both experiential and adoption-related dimensions of AI use in the Caribbean context.

Although the integrated framework effectively guided data collection and analysis, the findings suggest that some constructs, especially within UTAUT, may need contextual adaptation to better reflect Caribbean realities. These considerations are discussed further in the discussion section.

Purpose of the Study

The purpose of this study is to explore how tertiary-level students in the Caribbean engage with AI tools in their academic practices. It examines the relationship between students' perceptions of cognitive, social, and teaching presence (CoI) and their patterns of AI use, as well as the UTAUT-related factors that influence technology acceptance. The study also investigates how infrastructural constraints, ethical awareness, and digital divides shape students' AI-supported learning behaviours.

Research Questions

1. In what ways do tertiary-level students in the Caribbean integrate AI tools into their academic practices?
2. How do students perceive cognitive, social, and teaching presence when engaging with AI tools for learning?
3. Which behavioural constructs from the UTAUT framework influence students' acceptance and use of AI technologies in academic settings?
4. What ethical considerations and infrastructural constraints shape students' engagement with AI tools in Caribbean higher education?

Although the study's overall aim is exploration (focused on understanding how Caribbean tertiary students use AI tools), it also includes theory-informed hypotheses that serve a distinct function within the quantitative strand. These hypotheses, drawn from validated constructs in the UTAUT and CoI frameworks, enable the study to test specific behavioural and pedagogical relationships using inferential statistics. This approach aligns with the convergent mixed methods design, where qualitative data allows for inductive discovery, and quantitative data permits deductive testing. The two strands are integrated at the interpretation stage, ensuring that the hypotheses do not limit exploratory insight but instead deepen the explanatory power of the findings.

Theory-Informed Hypotheses

In alignment with the conceptual model and the operationalisation of CoI and UTAUT constructs, a small set of theory-informed hypotheses were developed to guide the quantitative strand of the study. These hypotheses are intended to complement the exploratory research questions by examining specific relationships among key variables:

- H1: Students with higher performance expectancy scores (UTAUT) will report more frequent use of AI tools in academic settings.
- H2: Students with higher cognitive presence scores (CoI) will perceive AI tools as more helpful in clarifying complex course content.
- H3: There will be a significant difference in effort expectancy scores (UTAUT) between undergraduate and graduate students.
- H4: Teaching presence (CoI) will positively predict perceived usefulness of AI tools (performance expectancy).

These hypotheses were tested using inferential statistics and interpreted alongside qualitative insights, consistent with the convergent mixed methods design.

Significance and Contribution

This study makes a timely, original, and empirically grounded contribution to the discourse on AI in education. It centres the experiences and perceptions of Caribbean tertiary students, a group often marginalised in global research narratives. By integrating the Community of Inquiry (CoI) and UTAUT frameworks, this research advances theoretical understanding and provides actionable insights into how AI tools shape learning engagement and technology acceptance in under-resourced settings. These findings aim to support evidence-based decisions by educators, institutional leaders, and policymakers. The goal is to address challenges such as digital equity, responsible AI integration, and culturally responsive pedagogy in the Global South. In doing so,

this study aligns with current global efforts to promote responsible, student-centred, and culturally grounded applications of AI in higher education.

Literature Review

This section critically reviews global and regional literature to provide context for the current study. It highlights key patterns and gaps and explains the rationale for using both the Community of Inquiry (CoI) and Unified Theory of Acceptance and Use of Technology (UTAUT) frameworks.

AI Integration in Higher Education: Global Trends

An increasing body of global research affirms the pedagogical value of AI tools such as ChatGPT, Grammarly, and Quillbot. These tools support academic writing, enhance personalised learning, and improve student engagement in higher education (Zhai et al., 2021; Noroozi et al., 2024; Al Zaidy, 2024). These tools are increasingly integrated into online and blended environments to streamline feedback, support cognitive engagement, and scaffold learning autonomy (Schei et al., 2024; Nguyen, 2025). Systematic reviews also highlight their role in strengthening instructional delivery and enabling real-time academic support (Nguyen, 2025).

Yet alongside these benefits, critical voices raise concerns about overreliance on generative AI, superficial engagement, and the risk of academic dishonesty (Zlotnikova et al., 2025; Nguyen, 2025). Without robust digital literacy training and ethical safeguards, students may bypass deeper cognitive processes, reduce original thinking, or unknowingly commit academic violations. These risks are particularly salient when AI is introduced without adequate institutional policy or instructional alignment.

Notably, the vast majority of these studies are situated in Global North contexts, where technological infrastructure, device access, and institutional AI policies are often taken for granted. The pedagogical affordances of AI reported in such settings may not fully translate to under-resourced environments. This creates a gap in understanding how students in structurally constrained or culturally distinct regions, such as the Caribbean, experience AI as both a learning support and behavioural tool. The current study addresses this gap by examining both the perceived learning value (via CoI) and usage patterns (via UTAUT) among Caribbean tertiary students.

Caribbean Context: Opportunities and Constraints

In the Caribbean, the rapid digital transformation prompted by the COVID-19 pandemic has accelerated AI adoption in tertiary education, albeit unevenly. Students frequently use AI tools for paraphrasing, summarisation, brainstorming, and assignment support (Cross et al., 2023; Bissessar, 2023). Faculty members have also begun integrating AI into assessment and instructional design, contributing to broader shifts in teaching and learning practices (Haye et al., 2024; Roberts et al., 2024). Julien (2024) underscores AI's potential to promote inclusive education, citing improvements in motivation and learner engagement.

Despite these advances, systemic and infrastructural barriers persist. Limited device access, unstable internet connectivity, and inconsistent institutional support continue to shape student experiences (Haye et al., 2024; UN ECLAC, 2022; 2025). Many institutions lack formal AI use policies or training in academic integrity, creating uncertainty for both students and educators. Furthermore, regional reviews highlight the need for capacity-building and ethical frameworks tailored to Caribbean realities (UN ECLAC, 2025; World Bank, 2025). These findings collectively suggest that AI's benefits in the Caribbean are moderated by structural inequities and a policy vacuum.

While recent studies have begun to document faculty perspectives and institutional readiness (e.g., Jackman et al., 2025), the student voice remains comparatively underrepresented. Even fewer studies have examined how students interpret the educational value of AI tools, or how infrastructural, behavioural, and ethical factors intersect to shape their adoption and use. This study extends the regional discourse by foregrounding student experiences and by applying a dual-theoretical lens (CoI and UTAUT) to uncover both pedagogical perceptions and behavioural drivers of AI use in the Caribbean context.

Theoretical Frameworks: CoI and UTAUT Applications

The Community of Inquiry (CoI) framework (Garrison et al., 2000) offers a widely applied pedagogical model for understanding meaningful learning in online and blended environments. It emphasises three interdependent elements, cognitive presence, social presence, and teaching presence, as foundational to student engagement and knowledge construction. CoI has proven valuable in Caribbean tertiary contexts, particularly in evaluating student attitudes toward e-learning and digital pedagogy (Enightoola et al., 2014). More recently, AI tools have been shown to reinforce CoI dimensions by scaffolding cognitive tasks, automating feedback, and enabling student-instructor interaction (Nguyen, 2025; Schei et al., 2024).

Complementing CoI's pedagogical orientation, the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) provides a behavioural model focused on technology adoption. Its core constructs, performance expectancy, effort expectancy, social influence, and facilitating conditions, have been widely used to predict adoption across digital education contexts. In the Caribbean, UTAUT has been used to explain students' and faculty's decisions to adopt AI and other educational technologies (Bissessar, 2023; Jackman et al., 2025). Key findings show that perceived usefulness and institutional support play major roles in shaping behavioural intent.

While both frameworks have been applied independently in Caribbean education research, their integration remains rare, particularly in studies that centre student perspectives. Most CoI applications focus on online course design or faculty facilitation, while UTAUT studies typically examine adoption as an outcome variable, often detached from pedagogical quality. The current study bridges this gap by combining CoI and UTAUT to examine not only how students use AI, but also how they perceive its educational value. This integrated approach enables a multidimensional analysis of AI-supported learning that captures both experience and behaviour, particularly within structurally and culturally specific environments like the Caribbean.

Ethical and Cultural Considerations

Much of the existing research on AI in education remains concentrated in Global North contexts, where high-speed connectivity, institutional AI policies, and digital fluency are generally assumed (Zhai et al., 2021; Nguyen, 2025; Schei et al., 2024). These studies often explore AI's impact on student autonomy, feedback loops, or assessment redesign, but typically within well-resourced systems. By contrast, studies from the Caribbean and wider Global South, such as Roberts et al. (2024), Bissessar (2023), and Cross et al. (2023), highlight major challenges. These include limited device access, unstable internet, and a lack of clear institutional guidelines. However, even among these regionally grounded studies, few adopt a dual-theoretical approach that combines pedagogical and behavioural lenses. Moreover, most focus on faculty readiness or institutional policy, with minimal attention to how students themselves perceive and navigate AI in their academic practice. This study responds directly to that gap by centring student perspectives in under-resourced tertiary contexts, using an integrated CoI and UTAUT framework to explore both perceived learning value and patterns of adoption.

Research Gaps and Contribution

While global scholarship on AI in education continues to grow, empirical research focusing on student perspectives in the Caribbean remains limited. Most existing studies come from the Global North and assume stable infrastructure, universal device access, and clear institutional AI policies. These conditions often fail to reflect the realities faced by many tertiary learners in under-resourced contexts. Existing regional studies often focus on faculty readiness, policy development, or institutional frameworks (e.g., Jackman et al., 2025; Roberts et al., 2024). As a result, little is known about how students experience AI integration both pedagogically and behaviourally.

Additionally, few studies apply a dual-theory lens that integrates both learning perceptions (CoI) and adoption behaviour (UTAUT). Where these models are used, they are typically applied in isolation and with a narrow focus, either on course design or technology uptake. To date, no study in the Caribbean has examined how students' perceived learning quality interacts with their behavioural drivers of AI use. Nor has research explored how these dynamics are shaped by access equity, ethical ambiguity, or cultural context. This study contributes original insight by:

- Centring Caribbean tertiary students' voices.
- Combining CoI and UTAUT frameworks to examine both experience and behaviour.
- Applying a mixed-methods approach to identify convergences, contradictions, and emergent themes in AI-supported learning.
- And offering context-sensitive implications for pedagogy, policy, and digital equity.

In doing so, the study advances theory, practice, and policy in ways that are both regionally grounded and globally relevant.

METHODOLOGY

Research Design

This study implements a convergent mixed methods design (Creswell & Plano Clark, 2018), integrating quantitative and qualitative data within a single-phase framework. This approach aimed to develop a comprehensive understanding of how Caribbean tertiary students engage with AI tools, capturing both measurable behavioural trends and the lived experiences that shape them.

Participants and Sampling

Participants include college, undergraduate and graduate students from various tertiary-level institutions across the Caribbean. A purposive sampling strategy was employed to ensure diversity across academic disciplines, institutional types, and student demographics. Both quantitative and qualitative data were collected from the same participants via a unified survey instrument. The target sample size was 218, based on a broader population of 500. Ultimately, 114 respondents participated, sufficient for achieving thematic saturation in the qualitative strand and acceptable statistical power for group comparisons in the quantitative analysis (Guest, Bunce, & Johnson, 2006; Creswell & Plano Clark, 2018).

Instrument and Data Collection

Data were collected via a Microsoft Forms online survey, designed to operationalise constructs from the Community of Inquiry (CoI) and Unified Theory of Acceptance and Use of Technology (UTAUT) frameworks. The instrument included:

- Closed-ended items using 5-point Likert scales to assess CoI dimensions (cognitive, social, and teaching presence) and UTAUT constructs (performance expectancy, effort expectancy, social influence, and facilitating conditions).
- Open-ended items capturing students' perceptions of ethical use, contextual challenges, learning changes, and motivational shifts.

The instrument was reviewed by experts in educational technology and piloted with a subset of students to refine clarity and reliability. Each UTAUT construct was measured using a 5-point Likert scale, with one item representing each core dimension. These included: performance expectancy ("AI is useful for improving academic performance"), effort expectancy ("Learning to use AI is easy for me"), social influence ("People who influence my academic success encourage me to use AI tools"), and facilitating conditions ("I have the resources and access I need to use AI tools effectively"). The UTAUT composite scale comprised five items in total. Each CoI construct was measured using two to three items. Examples include: "AI tools help me clarify difficult course concepts" (cognitive presence) and "AI complements the instruction I receive from professors" (teaching presence). The full survey instrument, including item wording and response scales, is provided in Appendix 1.

Data Analysis

Quantitative data were analysed using Microsoft Forms and XLSTAT. Descriptive statistics (means, frequencies) were calculated to understand overall trends. In addition, inferential statistical tests, including independent samples t-tests, one-way ANOVA, Pearson correlations, and linear regression, were conducted to test the theory-informed hypotheses derived from the CoI and UTAUT frameworks. These tests explored relationships such as the link between performance expectancy and AI use frequency, or differences in effort expectancy by academic level. Internal consistency reliability for each multi-item scale was evaluated using Cronbach's alpha. The cognitive presence scale (three items) demonstrated good reliability ($\alpha = 0.82$), while the UTAUT composite scale (five items) demonstrated acceptable reliability ($\alpha = 0.76$). All reliability analyses were conducted using the final dataset.

Qualitative data were analysed using a hybrid thematic analysis approach (Braun & Clarke, 2021). This combined deductive coding based on the CoI and UTAUT frameworks with inductive coding to capture emergent themes beyond the theoretical constructs. This approach allowed for both theory-driven interpretation and openness to unanticipated insights (Braun & Clarke, 2021). To enhance the trustworthiness of the qualitative strand, the researcher engaged in peer debriefing with colleagues familiar with qualitative educational research to critically examine the development of themes and potential researcher bias. Memo writing was also used throughout the coding process to track analytical decisions, reflect on emergent patterns, and ensure transparency in how interpretations evolved.

Integration of Findings

Findings were integrated using joint displays (Table 6), allowing side-by-side visualisation of quantitative patterns and corresponding qualitative insights (Creswell & Plano Clark, 2018). For example, high performance

expectancy scores are reported; they were examined alongside narrative responses about tool usefulness and academic outcomes.

Ethical Considerations

Ethical approval was obtained from the relevant research ethics boards. Participants provided informed consent and were assured of confidentiality and the right to withdraw at any point. Data were anonymised and stored securely in compliance with institutional policies.

Trustworthiness and Rigour

- Quantitative strand: Internal consistency was tested using Cronbach's alpha during the pilot phase to ensure the reliability of constructs.
- Qualitative strand: Credibility was strengthened through peer debriefing, reflective journaling, and the maintenance of a detailed audit trail.

Although the survey instrument was piloted for clarity and internal consistency, several limitations should be acknowledged. First, although Microsoft Forms was accessible, it lacked advanced survey design features like adaptive branching and forced-response controls. This may have contributed to missing data or inconsistent interpretations across devices. Second, self-report data are subject to potential bias, including social desirability and recall inaccuracies. Third, while the sample was regionally diverse, it remains limited in size (N = 114), which may constrain generalizability beyond the study's target population. These limitations were mitigated through triangulation, peer debriefing, and inclusion of open-ended items to contextualise the quantitative data.

Researcher Positionality

As a Caribbean-based academic and tertiary instructor, I brought a personal understanding of the region's cultural and educational dynamics to this research. While this insider perspective allowed me to connect deeply with participants' experiences and narratives, I also recognized the risk of my prior beliefs about AI in education shaping data interpretation. To manage and mitigate these potential biases, I engaged continuously in reflective journaling and peer debriefing, critically examining and challenging my assumptions throughout the analysis. This process helped ensure my findings reflect a balanced interpretation, attentive both to my insider knowledge and to analytic objectivity.

FINDINGS

Quantitative Findings

The following section outlines the quantitative results related to the CoI and UTAUT constructs, focusing on usage patterns, perceived learning value, and key predictive relationships.

Participant Characteristics

The final sample included 114 tertiary-level students from across the Caribbean, representing a diverse range of disciplines, academic levels, and institutions. As shown in Table 2, the majority were undergraduate students (66.7%), with the remainder enrolled at the graduate level (33.3%). Participants' ages ranged from less

than 20 to over 35, with the largest group being 20–24 years old (43.0%). The gender distribution was evenly split, with 50.0% identifying as female and 50.0% as male. Most participants were enrolled in university programmes (85.1%), while others attended colleges (13.2%), technical institutes (0.9%), or reported work-based learning contexts (0.9%). Most respondents reported having either generally stable (58.8%) or very stable (39.5%) internet access for academic work, while a small minority (1.8%) experienced ongoing connectivity challenges. Academic disciplines were highly diverse, with Education (14%) and Psychology (8%) remaining the most frequently reported.

Table 2. Participant Demographics (N = 114)

Variable	Category	N	%
Age Group	Less than 20	12	10.5%
	20–24	49	43.0%
	25–29	12	10.5%
	30–34	18	15.8%
	35+	23	20.2%
Gender	Male	57	50.0%
	Female	57	50.0%
Academic Level	Undergraduate	76	66.7%
	Graduate	38	33.3%
Institution	University	97	85.1%
	College	15	13.2%
	Technical Institute	1	0.9%
	Work	1	0.9%
Internet Access	Generally stable with occasional issues	67	58.8%
	Very stable and fast	45	39.5%
	Unstable or slow	2	1.8%
Discipline/Program	(Highly diverse, most with 1–2 each; Education (14%), Psychology (8%))		

AI Use Patterns

Patterns of AI tool use are summarised in Table 3. Most students reported using AI tools either occasionally (36.0%), frequently (34.2%), or very frequently (21.1%), while only 1.8% indicated never using such tools. The main reasons for adopting AI tools were to better understand complex content (85.1%), generate ideas or brainstorm (77.2%), and save time (65.8%). Other common motivations included reducing workload stress (54.4%) and improving grades (41.2%).

Students most frequently used AI for summarising readings (53.5%), studying or reviewing content (50.9%), proofreading or editing (50.0%), and writing assignments (47.4%). A smaller number used AI for creating presentations (28.1%) and programming or coding support (20.2%). Laptops (91.2%) were the dominant access device, though many students also reported using smartphones (51.8%), desktops (28.9%), or tablets (25.4%). The home environment (67.5%) was the most frequent location for AI access, followed by campus (37.7%) and all available locations (30.7%). A minority accessed AI from public access points (8.8%) or through mobile data (7.9%).

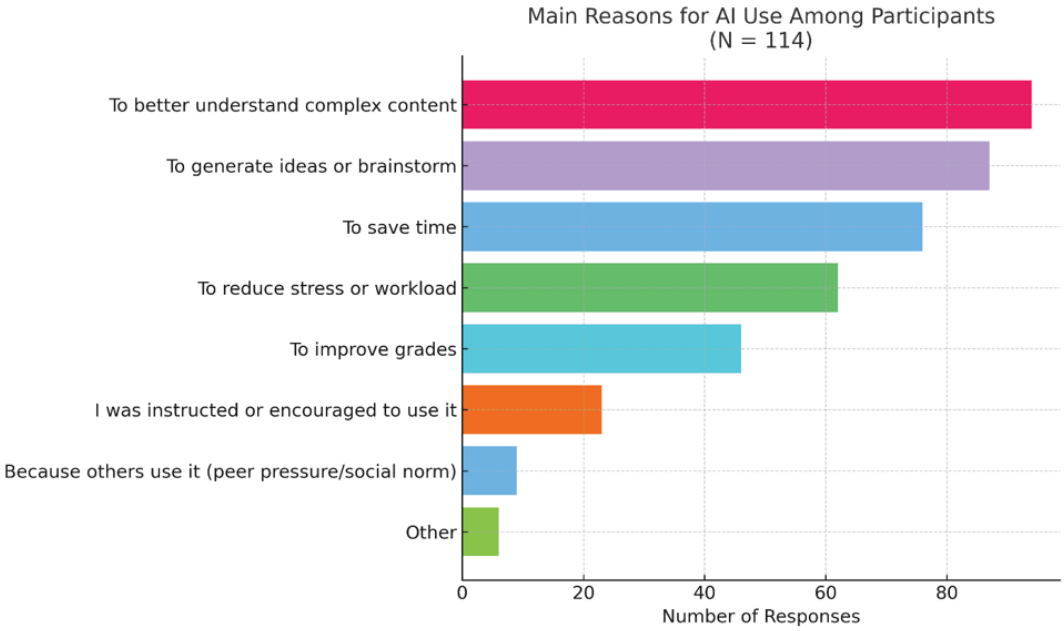

Figure 2. Main reasons for AI use among participants

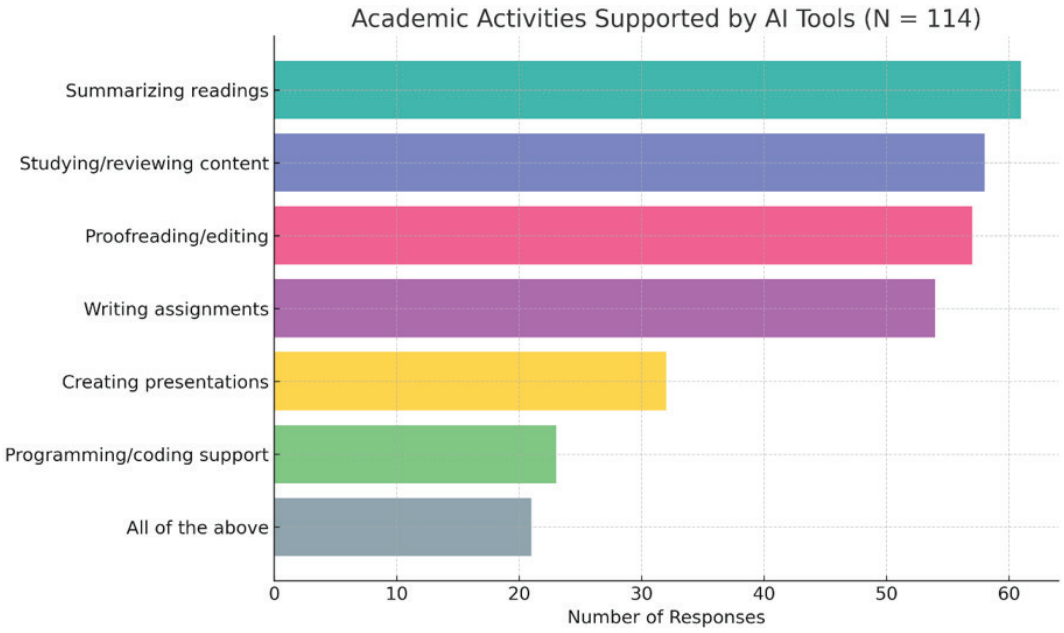

Figure 3. Academic activities supported by AI Tools

Table 3. AI Use Patterns Among Participants (N = 114)

Variable	Response/Category	N	%
Frequency of Use	Frequently	39	34.2%
	Occasionally	41	36.0%
	Very frequently	24	21.1%
	Rarely	8	7.0%
	Never	2	1.8%
Devices Used	Laptop	104	91.2%
	Smartphone	59	51.8%
	Desktop	33	28.9%
	Tablet	29	25.4%
Access Location	Home	77	67.5%
	All of the above	35	30.7%
	Campus	43	37.7%
	Public access	10	8.8%
	Mobile data	9	7.9%

Descriptive Statistics for Key Constructs

Participants' perceptions were measured across two theoretical frameworks. The Community of Inquiry (CoI), capturing cognitive, social, and teaching presences, while the Unified Theory of Acceptance and Use of Technology (UTAUT), assessing performance expectancy, effort expectancy, social influence, and facilitating conditions. As shown in Table 4, students generally expressed favourable attitudes toward AI tools. They agreed that AI clarifies difficult concepts (M = 4.24, SD = 0.85) and helps connect ideas across topics (M = 4.18, SD = 0.84). Ratings for AI usefulness, ease of use, and confidence in application were similarly high (means > 4). Perceptions of AI supporting peer interaction or collaboration were more mixed (M = 3.29, SD = 1.16). Respondents also expressed moderate concern about the ethical implications of AI use (M = 3.62, SD = 1.13).

Internal consistency was good for the cognitive presence scale (α = 0.82) and acceptable for the UTAUT composite (α = 0.76), supporting the reliability of these multi-item measures.

Table 4. Means and Standard Deviations for Key Survey Items (Likert, 1–5)

Item (Abbreviated)	Mean	SD	N
CoI: AI clarifies difficult concepts	4.2	0.8	113
CoI: AI helps connect ideas	4.2	0.8	113
CoI: AI supports peer interaction/collaboration	3.2	1.1	112
CoI: AI helps confidence in online discussions	3.6	1.1	110
CoI: AI provides helpful feedback/guidance	4.1	0.9	112
CoI: AI complements professor instruction	4.0	0.9	112
CoI: AI improves quality of learning experience	4.1	0.8	112
UTAUT: AI useful for academic performance	4.1	0.8	112
UTAUT: Learning to use AI is easy	4.1	0.9	112

Item (Abbreviated)	Mean	SD	N
UTAUT: People encourage my AI use	3.2	1.0	112
UTAUT: I have resources/access for AI	4.0	0.8	111
UTAUT: Confident using AI for academics	4.0	0.8	112
Attitude: Concerned about ethical implications	3.6	1.1	111
Attitude: Confident knowing when to use AI	4.1	0.8	111

Inferential Analyses

H1: Performance Expectancy and Frequency of AI Use

A moderate, statistically significant positive correlation was found between students' beliefs about AI's usefulness for improving academic performance and their frequency of AI use ($\rho = 0.51$, $p < 0.001$, $N = 114$). This suggests that students who viewed AI as more beneficial to their academic outcomes were more likely to report frequent use.

H2: Cognitive Presence and Learning Outcomes

Cognitive presence was measured as the average score across three items: AI helps clarify concepts, connect ideas, and provide feedback. This construct showed a strong, positive correlation with students' belief that AI improved the quality of their learning experience ($\rho = 0.73$, $p < 0.001$, $N = 114$). This indicates that students who reported higher levels of cognitive engagement with AI tools were significantly more likely to perceive a positive impact on their learning.

H3: Effort Expectancy by Academic Level

There was no significant difference in effort expectancy ("Learning to use AI tools is easy for me") between undergraduate and graduate students, $U = 4306$, $p = 0.842$. Both groups generally agreed that AI tools were easy to learn and use, indicating consistent perceptions of accessibility across academic levels.

H4: Teaching Presence as a Predictor of Performance Expectancy

Teaching presence ("The use of AI complements the instruction I receive from professors") was found to be a significant predictor of performance expectancy. A simple linear regression showed that teaching presence significantly predicted students' perceived usefulness of AI tools ($\beta = 0.437$, $p < 0.001$). It explained 26.1% of the variance in performance expectancy ($R^2 = 0.261$). This supports the role of instructional alignment in shaping students' beliefs about AI's academic value.

In summary, quantitative results show that Caribbean tertiary students who perceive AI tools as useful and cognitively enriching tend to use them more frequently and report stronger learning outcomes. Both cognitive presence and teaching presence emerged as key influences on these perceptions, while effort expectancy remained high and consistent across student groups. Though ethical concerns were noted in earlier analyses, they did not appear to significantly limit students' willingness to adopt or rely on AI for academic tasks.

Qualitative Findings

The qualitative analysis employed a hybrid approach, combining deductive coding based on the CoI and UTAUT frameworks with inductive coding to capture emergent themes beyond the theoretical structure. While many responses aligned with predefined constructs such as cognitive presence or performance expectancy, several unexpected themes also surfaced, including emotional ambivalence, academic anxiety, and metacognitive shifts. These insights were not forced into the theoretical categories but were retained as meaningful stand-alone patterns that offer additional perspectives beyond the frameworks used.

Theme 1: AI as a Cognitive and Performance Amplifier

In this study, the term performance amplifier refers to the perceived role of AI tools in enhancing students' cognitive engagement, productivity, and overall academic efficiency. A dominant theme in the qualitative analysis was the perception of AI tools as significant amplifiers of cognitive engagement and academic performance. Across all three open-ended questions, 60 responses (35%) referenced aspects of cognitive presence, that is, the use of AI to clarify complex concepts, summarise content, and scaffold learning processes. Students described AI as enabling deeper understanding and reflection, with many viewing AI tools as essential partners in breaking down difficult material. One respondent captured this sentiment: "*AI tools can articulate complex information in a more digestible and memorable way, depending on the prompt used. These tools also provide a sense of credibility, synthesising knowledge from diverse sources to deliver balanced and informed responses.*" (Q15). Q15 indicates a direct participant quotation from Question 15 of the survey.

This cognitive support extended to improved productivity and perceived academic outcomes. Performance Expectancy (a core UTAUT construct) was coded in 43 responses (25%). Students reported that AI facilitated efficient revision, improved the quality of assignments, and supported higher levels of academic performance: *"It had allowed me to spend more time reading and examining complex information and data, rather than searching for it. Thus, improving my analytical skills and the quality of work I submit."* (Q15). A notable group of students highlighted AI's role in teaching presence. They described using AI to receive step-by-step guidance or as a digital tutor, supporting tasks that might otherwise require help from an instructor. As one participant noted: *"Honestly, it has broken down certain topics for me to understand and even given a step-by-step process on how to solve it."* (Q15).

Inductively, students also reported metacognitive changes and instances of personalised learning, describing how AI encouraged more self-directed study habits and tailored support:

"For exam periods, I was able to upload my notes to create a podcast where I was able to understand the topic more and give real-world examples." (Q18). *"With AI, it learns what methods are best for explaining these concepts, creating a personalised study partner/tutor. AI however, has its limitations and thus, research and careful deliberation are necessary."* (Q19)

These narratives suggest that most students see AI tools as more than simple information retrieval devices. Instead, they function as cognitive amplifiers, academic coaches, and adaptive learning supports. These findings align with prior applications of the CoI and UTAUT frameworks in online learning. Both models emphasise the importance of cognitive and teaching presence, as well as perceived usefulness in technology adoption.

Theme 2: Effort, Access, and Student Experience

A substantial proportion of participants highlighted issues related to the ease of using AI tools, access barriers, and contextual factors that shape their day-to-day learning experience. Effort Expectancy (deductive,

UTAUT) was coded in 40 responses (23%), reflecting students' perceptions of how intuitive or challenging AI tools are to integrate into academic work.

Many respondents praised the convenience and speed of AI tools: *"The few times I used it; it gave quick detailed responses."* (Q15). Others described AI's ability to simplify complex tasks and streamline routine study processes, often in comparison to traditional or existing digital platforms: *"AI assists more with generating ideas. It proposes different approaches to sentences by expanding or simplifying an idea to benefit the quality of the work".* (Q15)

However, infrastructure and access concerns were also salient, appearing in 8 responses (5%). Students reported challenges such as limited device access, unstable internet, and a lack of institutional support. These issues constrained their ability to fully utilize AI. One participant explained: "*I only have access to AI on my phone, which makes it hard sometimes.*" (Q19). *"If there is any way it could get a student discount, I could see everyone using it to help them study."* (Q19). Some students also reflected on Social Influence (deductive, UTAUT). They mentioned how peers and institutional norms shaped their decisions to use AI. One explained: "*Everyone in my class uses AI, so I started too.*" (Q15). The theme also captured the digital divide present within the Caribbean context, where infrastructural constraints and socioeconomic status shape both the frequency and quality of AI-supported learning. This pattern is consistent with existing literature on technology integration in under-resourced settings, where ease of use and reliable access are often preconditions for equitable participation. Overall, while most students described AI tools as easy and efficient, a minority highlighted persistent barriers, underscoring that effort expectancy and facilitating conditions are not distributed evenly among tertiary students.

Theme 3: Navigating Trust, Accuracy, and Ethics

A recurring theme in the qualitative data was student ambivalence regarding the reliability, ethicality, and appropriate use of AI tools in academic work. Ethical Concerns (deductive) were coded in 13 responses (8%), and references to Trust in AI (inductive) appeared in 12 responses (7%). Participants frequently acknowledged the value of AI in supporting their studies but also highlighted doubts about the accuracy of information and the risk of academic misconduct. Students reported the need to fact-check or cross-verify AI-generated content:

"AI tools such as OpenAI can sometimes generate false or fabricated sources and present them as factual. Therefore, it's important to double-check the output, especially when accuracy and source credibility are essential. (Q19). Concerns about ethical use, including plagiarism and responsible application, were also present: *"From using AI to revise I've realised that it doesn't always get it right, so heavy reliance on AI can mislead some."* (Q18). Several participants expressed uncertainty about when and how it is appropriate to use AI. This confusion reflects the absence of clear institutional policies and digital literacy training. As one student noted: "*I also feel more anxious submitting work because of the fear that comes with using AI for assignments.*" (Q19).

This theme underscores a dual tension: while AI offers clear academic benefits, students remain vigilant about its limitations, both technical and ethical. Notably, several participants described feelings of academic anxiety stemming from the uncertainty of appropriate AI use and the fear of being penalised. These responses suggest that students are not merely passive adopters of AI. Rather, they actively weigh the risk and limitations. One student remarked, "*I feel anxious submitting work because I don't know if using AI is considered wrong*," reflecting the lack of clear ethical boundaries. While this theme overlaps with UTAUT's "facilitating conditions," it also extends beyond it, highlighting the need to consider emotional and institutional ambiguity as distinct factors in student-AI interaction. Such findings echo broader research in the Caribbean and Global South, where ethical ambiguity and limited guidance often shape student engagement with emerging educational technologies (Roberts et al., 2024; Julien, 2024)

Theme 4: Social and Emotional Dimensions of AI Use

Although mentioned less frequently than other themes, several participants noted that AI tools shaped their sense of connection, collaboration, and emotional experience in academic contexts. Social Presence (deductive, CoI) appeared in 10 responses (6%), while references to Emotional Impact (inductive) were present in 3 responses (2%). Some students valued AI's role in facilitating collaborative or interactive learning experiences: *"AI stimulated a thought process I was having, and its content connected me to another point I had in my essay."* (Q18). *"AI helps me communicate better with classmates."* (Q15). In a few cases, students described using AI to build confidence or reduce anxiety, especially when dealing with challenging content or assessments. One student noted: "*I believe AI has helped me learn in a more personalised and specialised manner. It really cuts down the time, effort, and stress caused by one specific issue that could disrupt your entire understanding of a question.*" (Q19). Conversely, some participants acknowledged that the use of AI could sometimes exacerbate anxiety about academic integrity or introduce new uncertainties regarding appropriate conduct. These findings suggest that while cognitive and instrumental benefits of AI are most common, important affective and social dimensions also exist (though less frequently reported) in AI-supported learning across the Caribbean. Such dynamics resonate with the broader literature on the Community of Inquiry framework, which identifies social and emotional presence as key to meaningful learning engagement.

Theme 5: Adaptive and Personalised Learning Paths

A subset of students described AI not just as a tool for information retrieval, but as an adaptive partner that personalises learning experiences and supports reflective, self-directed growth. Personalised Learning (inductive) appeared in 10 responses (6%), and Metacognitive Change (inductive) in another 10 responses (6%). Students shared that AI could adjust explanations, generate personalised practice, or act as a personal tutor: One participant explained *"With AI, it learns what methods are best for explaining these concepts, creating a personalised study partner/tutor."* (Q19). Another participant shared *"For exam periods I was able to upload my notes to create a podcast where I was able to understand the topic more and give real-world examples."* (Q18). Other students reflected on how AI use influenced their study habits and self-regulation. They suggested that AI can prompt deeper critical thinking and more personalised revision strategies. One participant shared: "*It had allowed me to spend more time reading and examining complex information and data, rather than searching for it. Thus, improving my analytical skills and the quality of work I submit.*" (Q15). For some students, AI tools are more than just content generators.

They function as adaptive learning companions, supporting individual growth and fostering metacognitive development. While this was not a majority theme, its presence points to the evolving and personalised potential of AI in tertiary education, a dimension highlighted in recent literature as key to future digital pedagogy (Noroozi et al., 2024, Al Zaidy, 2024; Schei et al., 2024).

Although these findings are not directly addressed by the original CoI or UTAUT constructs, they highlight an emerging dimension of AI-supported learning. AI as a personalised, adaptive, and even reflective study partner. Students reported that AI helped them regulate their learning, restructure study habits, and deepen conceptual understanding. These insights suggest a broader metacognitive and self-regulated learning (SRL) function, one not typically captured by current behavioural or pedagogical frameworks.

This inductive theme expands the conceptual scope of AI use beyond performance gains or ease-of-use, emphasizing its potential to support learner autonomy, strategic thinking, and individuated feedback loops. These patterns call for stronger theoretical integration with models of personalised learning and self-regulated learning (SRL). Future adaptations of UTAUT or CoI may need to include these emerging dimensions in AI-mediated education.

Summary of Qualitative themes and frequencies

Of the 114 students who completed the survey, 68 participants provided complete responses to the qualitative open-ended questions. The following table 5 summarises the key qualitative themes, associated codes, and frequency of mentions across the dataset. This synthesis complements the detailed narrative presented above.

Table 5. Summary Table of Qualitative Themes and Frequencies

Theme	Key Codes	Frequency (total code hits)
AI as a Cognitive and Performance Amplifier	Cognitive Presence, Performance Expectancy, Teaching Presence	60, 43, 11
Effort, Access, and the Student Experience	Effort Expectancy, Infrastructure/Access, Social Influence	40, 8, 5
Navigating Trust, Accuracy, and Ethics	Ethical Concerns, Trust in AI	13, 12
Social and Emotional Dimensions of AI Use	Social Presence, Emotional Impact	10, 3
Adaptive and Personalised Learning Paths	Personalised Learning, Metacognitive Change	10, 10

Integration of Findings

To deepen understanding and identify convergence across data strands, findings from the quantitative and qualitative analyses were integrated using a joint display. This visual representation aligns related results from both strands, allowing for comparison, synthesis, and interpretation within the study's theoretical frameworks (CoI and UTAUT). The joint display in Table 6 highlights areas of agreement, expansion, and complexity in how students experience and engage with AI tools in their academic practices.

Table 6. Integrated Joint Display Showing Alignment of Quantitative Variables (CoI, UTAUT) with Qualitative Themes and Codes

Construct	Quantitative Evidence	Qualitative Evidence
Cognitive Presence	High means for AI clarifying concepts and connecting ideas (M = 4.24–4.17); strong correlation with perceived learning outcomes ($\rho = 0.73$, $p < .001$).	Students describe AI as a "cognitive amplifier" aiding understanding and reflection (60 code hits).
Performance Expectancy	AI is seen as academically useful (M = 4.07); frequency of use correlated with usefulness ($\rho = 0.51$, $p < .001$).	AI enhances performance, efficiency, and productivity; boosts revision and quality of work (43 hits).
Teaching Presence	Moderate mean score (M = 3.96); significant predictor of perceived usefulness ($\beta = 0.437$, $R^2 = 0.261$, $p < .001$).	AI used as "digital tutor," offering step-by-step guidance (11 hits).
Effort Expectancy	High ease-of-use ratings across levels (M = 4.08); no significant difference by academic level (U = 4306, p = .842).	Most found AI tools intuitive and timesaving; some noted access limitations (40 hits).
Social Presence / Collaboration	Lower agreement that AI supports peer interaction (M = 3.22).	Limited references to AI-enabled collaboration (10 hits); some mention improved expression.
Ethical Concerns / Trust	Moderate concern about ethical implications (M = 3.59).	Concerns about plagiarism, misinformation, and appropriate use (13 hits).
Personalised/ Adaptive Learning	Not directly measured in survey items.	AI is viewed as a personalised study partner that adjusts to student needs and supports metacognitive development and learner autonomy (10 hits each: personalised, metacognitive). Insights extend beyond CoI/UTAUT.

Note: Quantitative variables refer to survey items measured using CoI (Community of Inquiry) and UTAUT (Unified Theory of Acceptance and Use of Technology) frameworks. Qualitative codes represent thematic findings from students' narrative responses. This joint display illustrates alignment and contrasts between these data sets.

As shown in the joint display (Table 6), there is strong convergence between the quantitative and qualitative strands around AI's role as a cognitive and performance amplifier. Quantitative results showed that students rated AI highly for clarifying concepts and improving learning quality, with strong correlations between cognitive presence and perceived outcomes. These patterns were echoed in qualitative data, where students described AI as a learning scaffold and "digital tutor," particularly helpful for explaining difficult concepts and supporting reflection.

Performance expectancy also emerged as a consistent driver of AI engagement. Students who believed AI improved their academic performance were significantly more likely to use it frequently. This was reinforced by narrative accounts of AI's role in boosting productivity, efficiency, and academic quality. Similarly, teaching presence played an important role, with students highlighting AI's instructional support as an extension of teaching, a finding substantiated by regression analysis showing teaching presence as a significant predictor of usefulness.

Students across academic levels reported high effort expectancy, describing AI tools as easy to use and helpful. However, some qualitative responses still pointed to contextual challenges such as device access and internet reliability, particularly in under-resourced environments. Although social presence received lower ratings and fewer mentions in student narratives, some participants noted that AI helped them communicate more effectively or feel more confident. Ethical concerns and trust issues were more prominent, reflected in moderate Likert ratings and themes around plagiarism, misinformation, and anxiety over academic integrity.

Finally, while the quantitative strand did not directly assess personalised or adaptive learning, qualitative responses showed that students increasingly view AI as a personalised tutor, one that aligns with their learning styles and supports metacognitive growth. Figure 4 illustrates the integrated findings across constructs, complementing the joint display in Table 6.

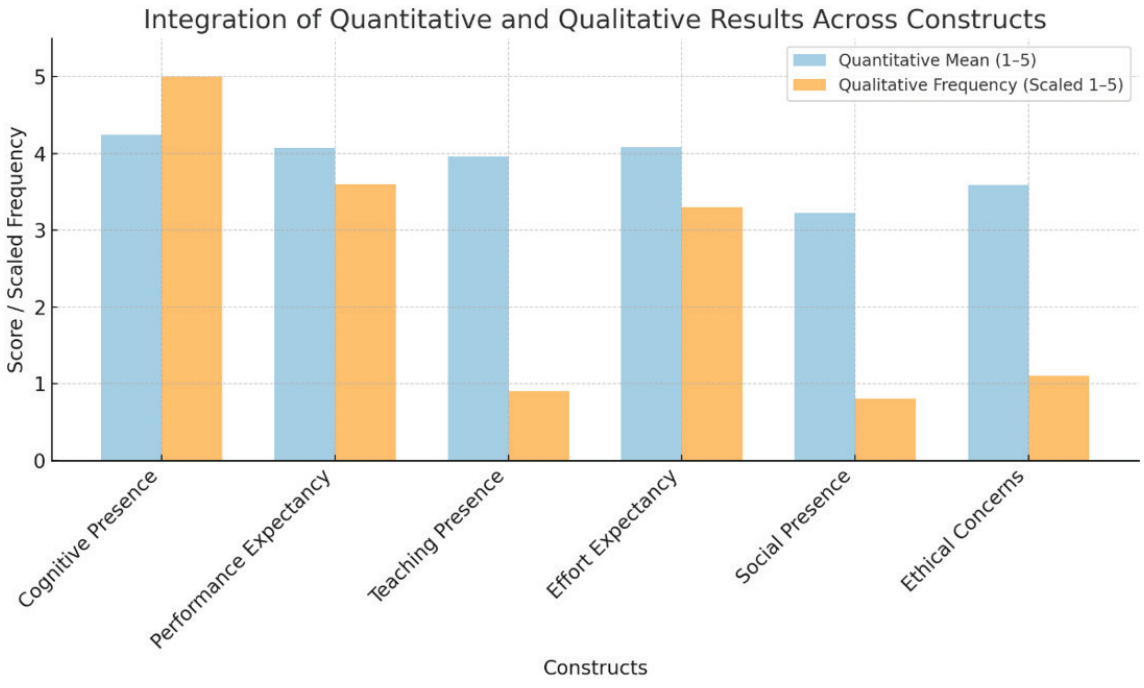

Figure 4. Integration of quantitative and qualitative results across CoI and UTAUT constructs

DISCUSSION

This study explored how tertiary-level students in the Caribbean use artificial intelligence (AI) tools in their academic lives. It was guided by the Community of Inquiry (CoI) and the Unified Theory of Acceptance and Use of Technology (UTAUT) frameworks. Through a convergent mixed-methods design, findings reveal that AI is widely regarded by students as a powerful cognitive and performance amplifier. Students reported high mean scores for cognitive presence and performance expectancy. These, along with strong correlations between AI use and academic improvement, highlight AI's growing role in learning across the region.

In particular, students rated AI tools highly for their ability to clarify complex content and enhance academic productivity. These findings were reinforced by qualitative narratives in which students described AI as a "digital tutor" or study partner that improved understanding and supported task completion. The strong correlation between cognitive presence and perceived learning improvement ($\rho = 0.73$) suggests that students see AI not merely as a convenience, but as a meaningful contributor to their educational experience.

Performance expectancy emerged as a critical factor in adoption, i.e. students who found AI useful were significantly more likely to engage with it frequently. This aligns with broader UTAUT findings and reflects a shift in students' beliefs from AI as an optional support tool to AI as an essential academic resource. Furthermore, teaching presence significantly predicted performance expectancy ($\beta = 0.437$, $p < 0.001$). This suggests that alignment between instructional guidance and AI-supported learning plays a key role in building students' trust in AI's usefulness.

In addition to the theoretically grounded findings, the qualitative strand revealed emergent patterns that extend beyond the original frameworks. Specifically, students described AI as a personalised tutor, reflective partner, and metacognitive scaffold. These narratives suggest that AI tools may play a growing role in self-regulated learning, helping students modify strategies, structure their study routines, and deepen conceptual understanding. These insights extend beyond CoI's cognitive presence and UTAUT's performance expectancy. They highlight the need for future research to explore models of personalised learning and strategic self-regulation in AI-mediated education.

Despite these positive indicators, the data reveal that AI's potential to support social presence and collaboration remains underutilised. Both quantitative and qualitative data suggest that students experience AI more as a personal tool than a collaborative one. Scores for peer interaction and comments on group use were notably lower. This reflects a broader global trend and signals an opportunity for instructional design that better integrates AI into peer-based activities.

Encouragingly, effort expectancy scores were high across academic levels, with both undergraduate and graduate students reporting ease of use. However, access-related barriers remain. Qualitative data revealed disparities in digital infrastructure, with students citing limitations in devices, internet access, and institutional support. These findings reinforce the persistent digital divide in the Caribbean and highlight the need for system-level investment in equitable AI access. Such disparities are not isolated but align with broader regional patterns of digital exclusion in the Caribbean educational landscape (ECLAC, 2022).

Ethical concerns also surfaced as a consistent theme. While ethical awareness did not appear to suppress AI use, many students expressed anxiety around appropriate boundaries, academic integrity, and the accuracy of AI-generated information. These concerns suggest a lack of formal guidance and digital literacy training, which may lead to inconsistent or uncritical use of AI tools. These patterns reflect global calls for more holistic AI literacy models that go beyond functionality to include ethical reasoning, bias awareness, and reflective thinking (Biagini, 2025).

Finally, qualitative responses revealed an emergent pattern of personalised and metacognitive learning. Students described AI tools as adaptive and reflective, citing experiences where AI helped them modify their study strategies or gain deeper conceptual understanding. Although not explicitly measured in the survey, this inductive theme points toward an important trajectory for future research on AI's evolving role in learner autonomy and personalisation.

While the application of CoI and UTAUT provided useful insights, the findings also suggest that these models may require adaptation to better reflect the realities of Global South contexts. For instance, social influence received lower ratings and minimal qualitative support. This may reflect weak institutional advocacy or a lack of peer guidance around AI, factors that differ from Global North contexts where structured support is more common. Similarly, facilitating conditions were not evenly distributed: some students cited access to laptops and stable internet, while others faced infrastructure limitations and affordability concerns. These findings point to the need for a context-sensitive refinement of UTAUT, one that more explicitly integrates variables such as policy clarity, ethical ambiguity, and infrastructure equity. Likewise, the CoI framework might benefit from greater emphasis on emotional presence or institutional alignment in low-resource learning environments. Future research should consider extending these models to account for such contextual complexities, thereby strengthening their explanatory power in diverse global settings. Over time, these adaptations may lay the groundwork for the development of new, empirically grounded models that better capture learner agency, digital inequity, and ethical uncertainty in AI-supported education across the Global South.

Implications and Limitations

While the findings suggest that many Caribbean tertiary students view AI tools as beneficial for clarifying content and enhancing academic productivity, these perceptions were not uniform across all subgroups. Students with consistent access to laptops, stable internet, and supportive institutional environments appeared to benefit more strongly from AI use. In contrast, others faced limitations due to device constraints, affordability, or lack of exposure to advanced AI platforms. These infrastructural and socioeconomic factors moderated the extent to which students could adopt AI meaningfully or apply it to complex academic tasks. As such, the study's implications should be interpreted with attention to these contextual boundaries, avoiding overgeneralization across institutions or learner profiles. Policies and pedagogical strategies should be tailored to reduce disparities and ensure equitable access, particularly for students in rural, low-bandwidth, or under-resourced learning environments.

From a policy perspective, the results underscore the urgent need to address infrastructural inequities. Despite students' enthusiasm, access to AI tools remains uneven, often shaped by device availability and internet reliability. Institutional investment in digital infrastructure, along with the provision of AI literacy training, will be critical to ensuring equitable AI adoption across diverse student populations. This highlights an urgent need to promote critical data literacies that prepare students to assess, question, and use AI tools responsibly (Pangrazio & Selwyn, 2023).

However, several limitations should be acknowledged. The cross-sectional design limits causal inferences and captures only a snapshot of student perceptions. Self-reported data may also be influenced by social desirability bias or students' evolving understanding of AI tools. Additionally, the sample, while regionally diverse, may not be fully representative of all tertiary institutions across the Caribbean.

Future research could address these limitations by employing longitudinal designs, incorporating faculty and institutional perspectives, and testing intervention models to explore how structured AI integration influences learning outcomes over time.

CONCLUSION AND RECOMMENDATIONS

This study demonstrates that many Caribbean tertiary students perceive AI tools as beneficial for clarifying complex content, improving academic performance, and supporting personalised learning. The study, guided by the Community of Inquiry (CoI) and Unified Theory of Acceptance and Use of Technology (UTAUT), found that cognitive presence, teaching presence, and performance expectancy shape student engagement with AI. However, access and support were not equally distributed: students with better infrastructure and institutional encouragement reported more positive experiences, while others expressed concerns about access, ethics, or academic anxiety. These patterns underscore the need to interpret AI adoption trends through an equity-focused lens.

Beyond confirming theoretical constructs, the study also revealed emergent themes, such as self-regulated learning and ethical ambiguity, that extend beyond CoI and UTAUT. These findings suggest the need for adapting these frameworks to better reflect Global South contexts, where infrastructural constraints, cultural perceptions, and institutional gaps may mediate how students engage with AI. To support more equitable and meaningful AI integration, higher education institutions must invest in digital infrastructure, ethical literacy, and inclusive instructional design. Future research should explore these dynamics longitudinally and across more diverse student populations to build models that are both globally informed and locally grounded. By integrating CoI and UTAUT in a single study focused on student perspectives, this research offers a novel framework for understanding AI-supported learning in under-resourced contexts. These findings lay the groundwork for adapting dominant technology adoption models to better reflect the realities of the Global South.

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APPENDIX 1: SURVEY INSTRUMENT

Participant Consent

Purpose of the Study: You are invited to participate in a research study exploring how tertiary-level students in higher education use AI tools in their learning. This study is conducted as part of an academic research project.

Voluntary Participation: Your participation is entirely voluntary. You may skip any question or exit the survey at any time without penalty.

Anonymity and Confidentiality: Your responses are anonymous and will be used only for research purposes. No identifying information will be collected.

Estimated Time: The survey will take approximately 10–12 minutes to complete.

Contact: sharlene.bakshsubero@concordia.ca

Do you consent to participate?

☐ Yes
☐ No

Demographic Information

2. What is your age group?
   ☐ Less than 20
   ☐ 20–24
   ☐ 25–29
   ☐ 30–34
   ☐ 35+
3. What is your gender?
   ☐ Male
   ☐ Female
   ☐ Non-binary
   ☐ Prefer not to say
4. What is your academic level?
   ☐ Undergraduate
   ☐ Graduate
5. What is your academic discipline or program area? *(open-ended)*
6. What type of institution are you currently enrolled in?
   ☐ University
   ☐ College
   ☐ Technical Institute
   ☐ Other
7. What is the quality of your internet access for academic work?
   ☐ Very stable and fast
   ☐ Generally stable with occasional issues
   ☐ Unstable or slow
   ☐ Mobile data only
   ☐ Other

AI Usage Patterns

8. What are your main reasons for using AI tools in your coursework? (Select all that apply)
   - ☐ To save time
   - ☐ To better understand complex content
   - ☐ To improve grades
   - ☐ To generate ideas or brainstorm
   - ☐ To reduce stress or workload
   - ☐ Because others use it (peer pressure/social norm)
   - ☐ I was instructed or encouraged to use it
   - ☐ Other
9. Have you ever chosen not to use an AI tool for academic work? (Select one)
   - ☐ Yes, I felt it was inappropriate/unethical
   - ☐ Yes, I did not find it helpful
   - ☐ Yes, I did not have access or time
   - ☐ No, I use it whenever it can help
   - ☐ Other
10. How frequently do you use AI tools (e.g., ChatGPT, Gemeni, Copilot, Quillbot, etc.) for academic purposes?
    - ☐ Never
    - ☐ Rarely
    - ☐ Occasionally
    - ☐ Frequently
    - ☐ Very frequently
11. How long have you been using AI tools for academic purposes?
    - ☐ Less than 1 month
    - ☐ 1–3 months
    - ☐ 4–6 months
    - ☐ More than 6 months
    - ☐ I have never used AI tools
12. For which of the following academic activities have you used AI tools? (Select all that apply)
    - ☐ Writing assignments
    - ☐ Summarizing readings
    - ☐ Proofreading/editing
    - ☐ Studying/reviewing content
    - ☐ Programming/coding support
    - ☐ Creating presentations
    - ☐ All of the above
    - ☐ Other
13. What devices do you use to access AI tools?
    - ☐ Laptop
    - ☐ Tablet
    - ☐ Desktop
    - ☐ Smartphone
    - ☐ Other

14. Where do you typically access AI tools?
    - ☐ Home
    - ☐ Campus
    - ☐ Public access
    - ☐ Mobile data
    - ☐ All of the above
    - ☐ Other

Open-Ended Question

15. In what ways do you believe AI tools have changed how you learn compared to traditional and online tools (e.g., LMS like Moodle, discussion boards)? *(Open-ended)*

Likert Scale Questions

(1 = Strongly disagree to 5 = agree strongly)

(Community of Inquiry (CoI) Items)

16. Please indicate your level of agreement with the following statements:
    a. AI tools help me clarify difficult course concepts.
    b. Using AI helps me connect ideas across different topics.
    c. AI tools support interaction or collaboration with peers.
    d. AI tools help me feel more confident participating in online discussions.
    e. AI tools provide helpful feedback or guidance on learning tasks.
    f. The use of AI complements the instruction I receive from professors.
    g. Overall, I believe AI tools have improved the quality of my learning experience.

(UTAUT Items)

17. Please indicate your level of agreement with the following statements:
    a. I find AI tools useful for improving my academic performance.
    b. Learning to use AI tools is easy for me.
    c. People who influence my academic success encourage me to use AI tools.
    d. I have the resources and access I need to use AI tools effectively.
    e. I feel confident in my ability to use AI tools effectively for academic tasks.

Additional Open-Ended Questions

18. Describe a specific instance where an AI tool significantly helped or hindered your learning. What happened?
19. What benefits and challenges have you experienced using AI tools for academic purposes?

Ethics and Confidence Items

(1 = *Strongly disagree to 5 = agree strongly)*

20. Please indicate your level of agreement with the following statements:
    a. I am concerned about the ethical implications of using AI tools in my academic work. b. I feel confident in knowing when it is appropriate to use AI tools for learning.

End of survey!

Thank you for participating in this survey! Your responses are valuable and will contribute to research on AI use in higher education.

APPENDIX 2: MAPPING OF THEORETICAL CONSTRUCTS TO SURVEY ITEMS

Construct	Framework	Item Example	Item Count
Performance Expectancy	UTAUT	"I find AI tools useful for improving my academic performance."	1
Effort Expectancy	UTAUT	"Learning to use AI tools is easy for me."	1
Social Influence	UTAUT	"People who influence my academic success encourage me to use AI tools."	1
Facilitating Conditions	UTAUT	"I have the resources and access I need to use AI tools effectively."	1
Cognitive Presence	CoI	"AI tools help me clarify difficult course concepts."	3
Teaching Presence	CoI	"The use of AI complements the instruction I receive from professors."	2
Social Presence	CoI	"AI tools support interaction or collaboration with peers."	2
Ethical Concern & Confidence	Additional	"I am concerned about the ethical implications of using AI tools in my academic work."	2

APPENDIX 3: DECLARATION OF TECHNOLOGY TOOLS

To support the visual representation of the theoretical and conceptual framework, Figure 1 was created using Draw.io, a diagramming tool suitable for academic modelling. Figures 2 and 3 were generated directly from Microsoft Forms analytics, based on participant survey data. Figure 4 was exported from XLSTAT. Additionally, Grammarly was used throughout the writing process to assist with grammar, clarity, and readability, ensuring consistency in language and tone across the manuscript.