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Factors Influencing Polytechnic College Students' Intention to Use ChatGPT for Learning: An Integrated TAM–TPB–UTAUT2 Framework

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Abstract

The rapid development of generative artificial intelligence (GenAI) has accelerated the adoption of ChatGPT in higher education. However, evidence on the factors influencing students' intention to use ChatGPT remains limited, particularly in vocational education. This study develops and validates an integrated framework combining the Technology Acceptance Model (TAM), the Theory of Planned Behavior (TPB), and the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2), while incorporating Trust in ChatGPT and AI Literacy. Data were collected from 380 Polytechnic College students and analyzed using Structural Equation Modeling (SEM). The results indicate that Perceived Ease of Use, Perceived Usefulness, Trust in ChatGPT, AI Literacy, and Social Influence positively influence students' attitudes toward using ChatGPT, with Perceived Usefulness showing the strongest effect. Attitude significantly predicts behavioral intention and mediates the relationships between the antecedent variables and intention. The proposed model demonstrates strong explanatory power for ChatGPT adoption. These findings extend technology acceptance research and provide practical implications for promoting the effective, ethical, and sustainable integration of AI-powered learning technologies in vocational higher education.

Keywords: ChatGPT; Generative Artificial Intelligence; Behavioral Intention; Polytechnic Students; Technology Acceptance Model; Theory of Planned Behavior; UTAUT2; Structural Equation Modeling.

1. Introduction

The rapid development of Generative Artificial Intelligence (GenAI) has fundamentally transformed the educational landscape by enabling intelligent, interactive, and personalized learning experiences. Unlike traditional educational technologies that primarily facilitate access to digital learning materials, GenAI systems can generate human-like responses, explain complex concepts, summarize academic documents, assist with programming tasks, and support creative problem-solving through natural language interaction. Among these technologies, ChatGPT, developed by OpenAI, has become one of the most widely adopted AI-powered applications in higher education because of its accessibility, versatility, and ability to provide immediate academic assistance. As a result, ChatGPT is increasingly recognized as a valuable learning companion that supports both formal and self-directed learning across diverse academic disciplines.

In higher education, ChatGPT has rapidly evolved from a conversational chatbot into a multifunctional educational tool. Students increasingly rely on ChatGPT to retrieve information, summarize research articles, generate ideas for assignments, improve academic writing, translate texts, solve mathematical problems, develop programming code, and receive personalized explanations of difficult concepts. These capabilities not only improve learning efficiency but also encourage independent learning, critical thinking, and problem-solving skills. Consequently, many educational institutions have begun exploring how generative AI can complement traditional teaching practices while preparing students for an increasingly AI-driven society.

Despite these educational benefits, the rapid adoption of ChatGPT has also generated considerable debate among educators, researchers, and policymakers. Concerns have been raised regarding the accuracy and reliability of AI-generated information, students' overreliance on automated responses, academic integrity, plagiarism, privacy protection, and the ethical use of artificial intelligence in education. ChatGPT occasionally produces inaccurate or fabricated information, commonly referred to as "AI hallucinations," which may negatively influence learning outcomes if students accept generated content without critical evaluation. Therefore, the educational value of ChatGPT depends not only on the technological capabilities of the system but also on students' ability to use AI responsibly, critically assess generated responses, and integrate AI assistance appropriately into their learning processes.

In Vietnam, the application of ChatGPT in higher education has expanded rapidly since its public release. Students from universities and vocational colleges increasingly utilize ChatGPT for literature searches, language learning, report writing, programming practice, examination preparation, and project development. This growing popularity reflects the accelerating digital transformation of Vietnamese higher education and the increasing demand for AI-supported learning tools. Nevertheless, students differ considerably in their willingness to adopt ChatGPT because of variations in technological perceptions, digital competence, AI literacy, learning experience, and social influence. Some students perceive ChatGPT as an indispensable learning assistant, whereas others remain skeptical because of concerns about information reliability, ethical issues, or insufficient knowledge of artificial intelligence. These differences indicate that students' behavioral intention to use ChatGPT cannot be explained solely by technological characteristics but should also consider psychological, cognitive, and social factors.

Previous studies have employed several theoretical frameworks to explain individuals' acceptance of emerging technologies. The Technology Acceptance Model (TAM) emphasizes the roles of Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) as fundamental determinants of technology adoption. The Theory of Planned Behavior (TPB) proposes that behavioral intention is primarily influenced by individuals' attitudes, subjective norms, and perceived behavioral control. Meanwhile, the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) extends earlier acceptance theories by incorporating additional constructs, including social influence, facilitating conditions, hedonic motivation, price value, and habit, thereby providing a more comprehensive explanation of technology adoption in consumer contexts. These theoretical models have been extensively validated across various educational technologies, including e-learning platforms, mobile learning systems, and online educational services.

Although these frameworks have substantially advanced technology acceptance research, their application to generative AI remains limited. Most previous studies have relied on a single theoretical perspective, primarily focusing on traditional educational technologies rather than conversational AI systems. Furthermore, recent research suggests that the adoption of generative AI is influenced by factors extending beyond perceived usefulness and ease of use. In particular, trust has emerged as a critical determinant because students are more likely to use AI systems when they believe the generated information is accurate, reliable, and beneficial. Likewise, AI literacy has become increasingly important, as students must understand how AI

systems operate, formulate effective prompts, evaluate AI-generated outputs critically, and recognize the limitations and ethical implications of artificial intelligence. However, these AI-specific factors remain insufficiently integrated into existing technology acceptance models, particularly within vocational and polytechnic education.

Another important limitation concerns the research context. Existing empirical studies have predominantly examined students enrolled in comprehensive universities in developed countries, while evidence from vocational and polytechnic institutions in developing economies remains scarce. Polytechnic students often engage in practice-oriented learning that requires technical problem-solving, programming, engineering applications, and professional skill development. Consequently, their motivations for using ChatGPT and the factors shaping their adoption behavior may differ from those of students in conventional academic programs. Understanding these differences is essential for developing effective institutional strategies that promote responsible AI adoption while enhancing teaching quality and student learning outcomes.

To address these gaps, this study develops and empirically validates an integrated framework combining the Technology Acceptance Model (TAM), the Theory of Planned Behavior (TPB), and the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2). The proposed framework is further extended by incorporating Trust in ChatGPT and AI Literacy, thereby providing a more comprehensive explanation of students' attitudes and behavioral intention toward using ChatGPT for learning. Specifically, the study investigates the effects of Perceived Ease of Use, Perceived Usefulness, Trust in ChatGPT, AI Literacy, and Social Influence on students' attitudes, while examining the influence of attitude on behavioral intention and its mediating role between the antecedent variables and behavioral intention.

This study makes three important contributions. First, it enriches the literature on AI adoption by integrating three established technology acceptance theories with two AI-specific constructs into a unified conceptual framework. Second, it provides empirical evidence regarding the determinants of ChatGPT adoption among vocational college students in Vietnam, a context that has received limited scholarly attention. Third, the findings offer practical guidance for higher education institutions, lecturers, and policymakers seeking to design effective strategies that enhance AI literacy, strengthen students' trust in generative AI, and promote the responsible and sustainable integration of ChatGPT into teaching and learning.

2. Literature Review

2.1. ChatGPT Adoption in Higher Education

The emergence of Generative Artificial Intelligence (GenAI) has substantially reshaped higher education by providing intelligent systems capable of generating human-like content and supporting various teaching and learning activities. Among these technologies, ChatGPT has become one of the most influential AI-powered educational tools because of its advanced natural language processing capabilities and ability to generate contextually relevant responses. Unlike conventional search engines that primarily retrieve existing information, ChatGPT synthesizes knowledge, explains concepts, generates examples, summarizes documents, and provides interactive feedback in real time. These capabilities enable students to receive personalized learning support across a wide range of academic disciplines.

Recent studies have shown that ChatGPT is increasingly used for information retrieval, academic writing, programming, language learning, research support, and examination preparation. Its ability to provide immediate feedback encourages independent learning, enhances students' problem-solving skills, and

improves learning efficiency. Consequently, ChatGPT has been recognized as an innovative educational technology that complements traditional teaching methods and supports learner-centered education.

Nevertheless, educational researchers have also highlighted several challenges associated with ChatGPT adoption. The system may occasionally generate inaccurate information, fabricated references, or biased responses, requiring students to critically evaluate AI-generated content before applying it in academic contexts. Furthermore, concerns regarding plagiarism, academic integrity, privacy protection, and excessive dependence on AI have prompted higher education institutions to establish policies for responsible AI use. These opportunities and challenges indicate that students' willingness to adopt ChatGPT depends not only on technological characteristics but also on their trust in AI, digital competence, and perceptions of educational value.

2.2. Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), proposed by Davis (1989), remains one of the most influential frameworks for explaining users' acceptance of information technologies. TAM argues that individuals' behavioral intention is primarily determined by two cognitive beliefs: Perceived Ease of Use (PEOU) and Perceived Usefulness (PU).

Perceived Ease of Use refers to the degree to which individuals believe that using a particular technology requires minimal physical or cognitive effort. Technologies that are easy to learn and operate generally reduce users' anxiety while increasing satisfaction during interaction. In educational contexts, students who perceive ChatGPT as intuitive and user-friendly can formulate prompts more effectively, navigate the system with less effort, and obtain useful responses more efficiently.

Perceived Usefulness represents users' beliefs that using a technology improves their task performance. Within higher education, students may perceive ChatGPT as useful because it facilitates information searching, explains difficult concepts, supports academic writing, improves programming performance, and increases learning productivity.

Previous empirical studies consistently demonstrate that PEOU positively influences PU, while both constructs positively affect users' attitudes toward adopting educational technologies. These findings remain applicable to ChatGPT because students are more likely to appreciate its educational value when they can interact with the system efficiently.

H1. Perceived Ease of Use positively influences Perceived Usefulness of ChatGPT.

H2. Perceived Ease of Use positively influences students' Attitude toward using ChatGPT.

H3. Perceived Usefulness positively influences students' Attitude toward using ChatGPT.

2.3. Theory of Planned Behavior (TPB)

The Theory of Planned Behavior (TPB), introduced by Ajzen (1991), proposes that behavioral intention is determined by three psychological factors: attitude, subjective norm, and perceived behavioral control. Among these constructs, attitude has consistently been identified as the strongest predictor of technology adoption in educational environments.

Attitude reflects an individual's overall positive or negative evaluation of performing a particular behavior. Students who believe that ChatGPT improves learning effectiveness, saves time, and enhances academic performance are more likely to develop favorable attitudes toward its use. These positive evaluations subsequently increase their intention to continue using the technology in future learning activities.

Although TPB originally includes Subjective Norm and Perceived Behavioral Control, the present study focuses primarily on Attitude because Social Influence, adopted from UTAUT2, conceptually captures external social pressure more comprehensively in technology adoption contexts. This integration avoids conceptual redundancy while enhancing the explanatory power of the proposed framework. Accordingly, the following hypothesis is proposed. H4. Attitude toward using ChatGPT positively influences students' Behavioral Intention to use ChatGPT.

2.4. UTAUT2 and Social Influence

The Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) extends previous technology acceptance theories by incorporating several determinants that better explain technology adoption in consumer settings. Among these determinants, Social Influence (SI) has consistently demonstrated a significant impact on users' acceptance of emerging technologies.

Social Influence refers to the extent to which individuals perceive that important others—including lecturers, classmates, friends, and educational institutions—believe they should use a particular technology. Within higher education, recommendations from lecturers, peer experiences, and institutional encouragement often shape students' perceptions of innovative educational technologies.

As ChatGPT becomes increasingly integrated into teaching and learning, students who observe widespread acceptance among lecturers and classmates are more likely to develop favorable attitudes toward the technology. Previous studies on educational technology adoption consistently report that positive social influence enhances students' willingness to adopt AI-supported learning systems. Therefore, the following hypothesis is proposed. *H5. Social Influence positively influences students' Attitude toward using ChatGPT.*

2.5. Trust in ChatGPT

Trust has emerged as one of the most important determinants of artificial intelligence adoption because AI systems frequently operate as "black-box" technologies whose decision-making processes remain largely invisible to users. In educational settings, trust reflects students' confidence that ChatGPT provides reliable, accurate, and beneficial information that supports learning activities.

Students who trust ChatGPT are more willing to consult the system regularly, integrate AI-generated suggestions into their coursework, and perceive AI as a valuable learning assistant. Conversely, concerns regarding misinformation, hallucinated responses, and unreliable references may reduce users' confidence and discourage continued use.

Recent empirical studies consistently demonstrate that trust significantly influences users' attitudes toward adopting generative AI applications. Consequently, students who perceive ChatGPT as trustworthy are expected to develop more positive attitudes toward using the technology. *H6. Trust in ChatGPT positively influences students' Attitude toward using ChatGPT.*

2.6. AI Literacy

AI Literacy refers to individuals' ability to understand, evaluate, and effectively utilize artificial intelligence technologies while recognizing their capabilities, limitations, and ethical implications. Beyond basic digital literacy, AI literacy requires users to formulate appropriate prompts, critically assess AI-generated responses, identify misinformation, and apply AI responsibly within specific contexts. In educational environments, students possessing higher AI literacy are generally better equipped to exploit ChatGPT's capabilities while avoiding inappropriate dependence on AI-generated content. They understand that ChatGPT should function as a learning assistant rather than a substitute for independent thinking.

Previous studies indicate that AI literacy improves students' confidence, reduces uncertainty toward AI technologies, and strengthens positive attitudes toward AI-assisted learning. Therefore, students with stronger AI literacy are expected to demonstrate greater acceptance of ChatGPT. *H7. AI Literacy positively influences students' Attitude toward using ChatGPT.*

2.7. The Mediating Role of Attitude

Both TAM and TPB suggest that external variables frequently influence behavioral intention indirectly through users' attitudes. In the context of generative AI, students who perceive ChatGPT as useful, easy to use, trustworthy, socially supported, and compatible with their AI competencies are more likely to develop favorable attitudes, which subsequently increase their intention to continue using the technology. Accordingly, attitude is expected to function as an important psychological mechanism linking technological perceptions, AI-related competencies, and social factors with behavioral intention. *H8. Attitude toward using ChatGPT mediates the relationships between Perceived Ease of Use, Perceived Usefulness, Trust in ChatGPT, AI Literacy, Social Influence, and Behavioral Intention to use ChatGPT.*

Research Gap

Although previous studies have applied TAM, TPB, and UTAUT2 to explain technology acceptance in education, important gaps remain in understanding ChatGPT adoption. Most research focuses on traditional educational technologies and relies on a single theoretical framework, overlooking the distinctive features of generative AI and the combined effects of technological, psychological, and social factors. In addition, trust in ChatGPT and AI literacy have received limited attention, particularly in vocational education in developing countries, while empirical evidence from Vietnamese vocational college students remains scarce. To address these gaps, this study integrates TAM, TPB, and UTAUT2 with trust in ChatGPT and AI literacy to provide a more comprehensive explanation of Polytechnic College students' intention to use ChatGPT for learning.

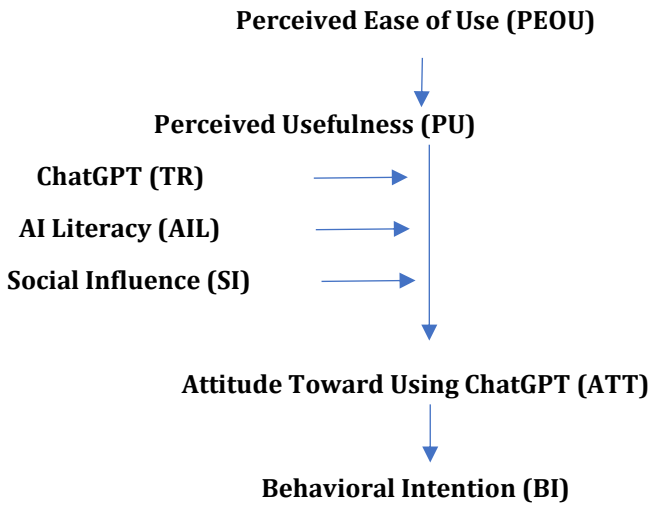
3. Research Methodology

3.1. Research Model

Based on the theoretical foundations of the Technology Acceptance Model (TAM), the Theory of Planned Behavior (TPB), and the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2), this study proposes an integrated conceptual framework to explain Polytechnic College students' behavioral intention to use ChatGPT for learning. To better capture the distinctive characteristics of generative artificial intelligence, the framework further incorporates Trust in ChatGPT (TR) and AI Literacy (AIL) as additional antecedents of students' attitudes.

The proposed model assumes that Perceived Ease of Use (PEOU) positively influences Perceived Usefulness (PU) and students' Attitude Toward Using ChatGPT (ATT). Perceived Usefulness, Trust in ChatGPT, AI Literacy, and Social Influence (SI) are also expected to positively influence students' attitudes. Subsequently, Attitude Toward Using ChatGPT directly affects Behavioral Intention (BI). In addition, attitude is proposed as a mediating variable through which technological perceptions, trust, AI literacy, and social influence indirectly influence students' behavioral intention. Figure 1 illustrates the proposed research framework.

Figure 1. Proposed Research Model



3.2. Measurement Instrument

A structured questionnaire was developed to measure seven constructs: Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Trust in ChatGPT (TR), AI Literacy (AIL), Social Influence (SI), Attitude Toward Using ChatGPT (ATT), and Behavioral Intention (BI). Measurement items were adapted from validated scales and adjusted for the ChatGPT learning context in vocational higher education. The questionnaire was translated into Vietnamese using back-translation to ensure semantic consistency.

Each construct was measured using multiple items on a five-point Likert scale (1 = Strongly disagree to 5 = Strongly agree). Before the main survey, the instrument was reviewed by three experts and pilot-tested with 40 students to assess clarity, relevance, and reliability. Necessary revisions were made based on the feedback before the final data collection.

3.3. Data Collection and Sample

The target population consisted of Polytechnic College students with prior experience using ChatGPT for academic activities such as information searching, assignment support, academic writing, programming, language learning, and exam preparation. Data were collected from October 2025 to January 2026 through online and paper-based questionnaires using convenience and snowball sampling due to the absence of an official sampling frame of ChatGPT users.

A total of 400 questionnaires were distributed, and 380 valid responses were retained, yielding a 95.0% response rate. The sample size met the recommended requirements for covariance-based SEM analysis. Among respondents, 58.9% were male and 41.1% female. Second-year students accounted for the largest proportion (36.3%), followed by first-year (27.9%), third-year (24.7%), and fourth-year students (11.1%). Participants represented various disciplines, including Information Technology, Engineering, Business Administration, and Foreign Languages. Regarding usage experience, 81.6% used ChatGPT at least weekly, and 43.7% had used it for over six months, indicating adequate familiarity with the technology.

3.4. Data Analysis

The collected data were analyzed using IBM SPSS Statistics 26.0 and AMOS 24.0. A two-step analytical procedure recommended for covariance-based Structural Equation Modeling was adopted.

First, descriptive statistics were calculated to summarize respondents' demographic characteristics. The reliability of each construct was then assessed using Cronbach's Alpha and Corrected Item–Total Correlation. Following Hair et al. (2019), Cronbach's Alpha values above 0.70 and corrected item–total correlations exceeding 0.30 were considered acceptable.

Second, Exploratory Factor Analysis (EFA) was conducted to examine the underlying factor structure of the measurement scales. The suitability of the data for factor analysis was evaluated using the Kaiser–Meyer–Olkin (KMO) measure and Bartlett's Test of Sphericity. Factors with eigenvalues greater than one and standardized factor loadings above 0.50 were retained.

Third, Confirmatory Factor Analysis (CFA) was employed to validate the measurement model. Reliability and convergent validity were assessed through standardized factor loadings, Composite Reliability (CR), and Average Variance Extracted (AVE). Discriminant validity was evaluated using both the Fornell–Larcker criterion and the Heterotrait–Monotrait ratio (HTMT) to ensure that each construct was empirically distinct from the others. The overall model fit was evaluated using multiple goodness-of-fit indices, including the chi-square divided by degrees of freedom (χ^2/df), the Comparative Fit Index (CFI), the Tucker–Lewis Index (TLI), and the Root Mean Square Error of Approximation (RMSEA).

Finally, Structural Equation Modeling (SEM) was employed to test the proposed hypotheses and estimate the structural relationships among the latent constructs. Standardized path coefficients (β), critical ratios (CR), and p-values were used to evaluate the significance of each hypothesized relationship. To examine the mediating role of Attitude Toward Using ChatGPT, a bias-corrected bootstrapping procedure with 5,000 resamples was conducted. Mediation effects were considered statistically significant when the 95% bootstrap confidence intervals did not include zero.

Furthermore, Common Method Bias (CMB) was assessed using Harman's single-factor test. The first unrotated factor accounted for less than 50% of the total variance, indicating that common method bias was unlikely to pose a serious threat to the validity of the findings. Prior to SEM estimation, data were also examined for missing values, outliers, and multivariate normality to ensure compliance with the assumptions of covariance-based SEM.

4. Results

4.1. Respondent Profile

A total of 380 valid questionnaires were included in the final analysis after data screening. As shown in Table 1, male students accounted for 58.9% of the sample, while female students represented 41.1%. Regarding academic year, second-year students constituted the largest group (36.3%), followed by first-year (27.9%), third-year (24.7%), and fourth-year students (11.1%). Respondents were drawn from diverse academic disciplines, including Information Technology, Engineering, Business Administration, Foreign Languages, and other majors, ensuring adequate representation of Polytechnic College students.

Most respondents reported previous experience using ChatGPT for learning. Specifically, 81.6% used ChatGPT at least once per week, while 43.7% had more than six months of experience with the system. This

suggests that the participants possessed sufficient familiarity with ChatGPT to provide reliable evaluations of the research constructs.

4.2. Reliability Analysis

The internal consistency of the measurement scales was first assessed using Cronbach's Alpha and Corrected Item–Total Correlation (CITC). As presented in Table 2, all constructs demonstrated satisfactory reliability. Cronbach's Alpha coefficients ranged from 0.841 to 0.914, exceeding the recommended threshold of 0.70 (Hair et al., 2019). Similarly, all corrected item–total correlations were above 0.30, indicating that each measurement item contributed adequately to its respective construct.

Among the seven constructs, Behavioral Intention (BI) exhibited the highest reliability ($\alpha = 0.914$), followed by Attitude Toward Using ChatGPT (ATT) and Perceived Usefulness (PU). These results confirm that the measurement scales possess strong internal consistency and are suitable for subsequent factor analyses.

Table 2. Reliability Analysis of the Measurement Scales

Construct	Number of Items	Cronbach's Alpha
Perceived Ease of Use (PEOU)	4	0.841
Perceived Usefulness (PU)	4	0.889
Trust in ChatGPT (TR)	4	0.864
AI Literacy (AIL)	4	0.852
Social Influence (SI)	4	0.847
Attitude Toward Using ChatGPT (ATT)	4	0.901
Behavioral Intention (BI)	4	0.914

4.3. Exploratory Factor Analysis

Exploratory Factor Analysis (EFA) was performed to examine the underlying factor structure of the measurement scales. The Kaiser–Meyer–Olkin (KMO) measure was 0.914, indicating excellent sampling adequacy for factor analysis. In addition, Bartlett's Test of Sphericity was statistically significant ($\chi^2 = 4{,}896.372$, $p < 0.001$), confirming that the correlation matrix was appropriate for factor extraction.

Principal Component Analysis with Varimax rotation extracted seven factors, corresponding exactly to the proposed theoretical constructs. Together, these factors explained 71.36% of the total variance, exceeding the recommended minimum value of 50%.

All observed variables loaded strongly on their intended constructs, with standardized factor loadings ranging from 0.693 to 0.891, while no problematic cross-loadings were detected. These findings provide preliminary evidence supporting the construct validity of the measurement model.

4.4. Confirmatory Factor Analysis

Following EFA, Confirmatory Factor Analysis (CFA) was conducted to assess the reliability and validity of the measurement model.

The overall measurement model demonstrated a satisfactory fit to the observed data:

- $\chi^2/df = 2.145$

- CFI = 0.936
- TLI = 0.925
- RMSEA = 0.055

All indices satisfied the commonly accepted recommendations, indicating that the proposed measurement model adequately represented the empirical data.

Convergent validity was confirmed through standardized factor loadings, Composite Reliability (CR), and Average Variance Extracted (AVE). Standardized loadings ranged from 0.719 to 0.892, all exceeding the recommended threshold of 0.70 and reaching statistical significance ($p < 0.001$). Composite Reliability values varied between 0.852 and 0.920, while AVE values ranged from 0.594 to 0.742, demonstrating satisfactory convergent validity.

Discriminant validity was examined using both the Fornell–Larcker criterion and the Heterotrait–Monotrait (HTMT) ratio. For every construct, the square root of AVE exceeded the corresponding inter-construct correlations. Furthermore, all HTMT values remained below the recommended threshold of 0.85, confirming that each construct measured a conceptually distinct dimension.

Overall, the CFA results indicate that the proposed measurement model possesses satisfactory reliability, convergent validity, and discriminant validity, thereby supporting further structural model analysis.

4.5. Structural Equation Modeling and Hypothesis Testing

After establishing the adequacy of the measurement model, Structural Equation Modeling (SEM) was employed to examine the proposed hypotheses. The structural model demonstrated a satisfactory fit to the empirical data, with goodness-of-fit indices remaining within recommended thresholds ($\chi^2/df = 2.145$, CFI = 0.936, TLI = 0.925, RMSEA = 0.055).

The SEM results indicate that all hypothesized relationships were statistically significant.

Consistent with the Technology Acceptance Model, Perceived Ease of Use positively influenced Perceived Usefulness ($\beta = 0.472$, $p < 0.001$), supporting H1. Furthermore, Perceived Ease of Use exerted a significant positive effect on students' attitudes toward using ChatGPT ($\beta = 0.214$, $p < 0.001$), confirming H2.

Among all antecedent variables, Perceived Usefulness exhibited the strongest influence on students' attitudes ($\beta = 0.326$, $p < 0.001$), supporting H3. This finding suggests that students primarily adopt ChatGPT because they perceive it as beneficial for improving learning effectiveness and academic performance.

In addition, Trust in ChatGPT significantly enhanced students' attitudes ($\beta = 0.187$, $p = 0.002$), providing support for H6. Likewise, AI Literacy demonstrated a positive influence on attitude ($\beta = 0.165$, $p = 0.004$), indicating that students with greater competence in understanding and utilizing artificial intelligence tend to evaluate ChatGPT more favorably.

The effect of Social Influence was also statistically significant ($\beta = 0.142$, $p = 0.013$), confirming H5. This result implies that recommendations and encouragement from lecturers, classmates, and learning communities contribute to more positive perceptions of ChatGPT.

Finally, Attitude Toward Using ChatGPT exerted the strongest direct effect on Behavioral Intention ($\beta = 0.418$, $p < 0.001$), supporting H4. This finding is consistent with the Theory of Planned Behavior, which identifies attitude as the immediate determinant of behavioral intention.

Table 3. Results of Structural Model Analysis

Hypothesis	Path	β	p-value	Decision
H1	PEOU → PU	0.472	<0.001	Supported
H2	PEOU → ATT	0.214	<0.001	Supported
H3	PU → ATT	0.326	<0.001	Supported
H4	ATT → BI	0.418	<0.001	Supported
H5	SI → ATT	0.142	0.013	Supported
H6	TR → ATT	0.187	0.002	Supported
H7	AIL → ATT	0.165	0.004	Supported

4.6. Mediation Analysis

The mediating role of Attitude Toward Using ChatGPT was examined using a bias-corrected bootstrapping procedure with 5,000 resamples. The indirect effects of Perceived Ease of Use, Perceived Usefulness, Trust in ChatGPT, AI Literacy, and Social Influence on Behavioral Intention through Attitude were all statistically significant, as the corresponding 95% bootstrap confidence intervals excluded zero.

These findings provide empirical support for H8, indicating that students' attitudes constitute an important psychological mechanism through which technological perceptions, trust, AI literacy, and social influence shape behavioral intention.

The structural model demonstrated substantial explanatory power. Specifically, the proposed framework explained 58.4% of the variance in Attitude Toward Using ChatGPT ($R^2 = 0.584$) and 61.2% of the variance in Behavioral Intention ($R^2 = 0.612$). According to established guidelines for Structural Equation Modeling, these values indicate moderate-to-high explanatory capability, confirming that the integrated TAM–TPB–UTAUT2 framework provides a robust explanation of students' intention to use ChatGPT for learning.

5. Discussion

This study developed and validated an integrated framework combining TAM, TPB, and UTAUT2 to explain Polytechnic College students' intention to use ChatGPT for learning. By incorporating Trust in ChatGPT and AI Literacy, the model provides a more comprehensive understanding of generative AI adoption in vocational higher education. The findings indicate that technological perceptions, individual competencies, psychological evaluations, and social factors collectively shape students' attitudes, which subsequently determine behavioral intention.

Perceived Usefulness (PU) emerged as the strongest predictor of students' attitudes, indicating that students primarily adopt ChatGPT based on its educational value rather than technological novelty. When students perceive ChatGPT as helpful for understanding concepts, improving academic writing, solving problems, and enhancing learning efficiency, they are more likely to develop positive attitudes. This finding reinforces the central role of usefulness in technology acceptance research.

Perceived Ease of Use (PEOU) also positively influenced attitudes and perceived usefulness, confirming that user-friendly AI interfaces reduce barriers and enhance recognition of educational benefits. Furthermore, Trust in ChatGPT significantly affected attitudes, highlighting that confidence in AI-generated

information accuracy and reliability is essential for continued use. Concerns about misinformation or unreliable outputs may reduce students' willingness to depend on AI tools.

AI Literacy was another significant factor influencing attitudes, suggesting that students with better AI knowledge, prompt formulation skills, and critical evaluation abilities are more capable of using ChatGPT effectively. This finding emphasizes that successful AI adoption depends not only on technological features but also on users' cognitive readiness. Social Influence also positively affected attitudes, although its impact was weaker, indicating that lecturers and peers provide support but students ultimately rely on personal learning experiences when evaluating ChatGPT.

Consistent with TPB, Attitude Toward Using ChatGPT was the strongest direct predictor of Behavioral Intention. The mediation analysis further confirmed that attitude acts as a key psychological mechanism linking usefulness, ease of use, trust, AI literacy, and social influence to students' intention to use ChatGPT.

Theoretically, this study extends previous technology acceptance research by demonstrating the value of integrating TAM, TPB, and UTAUT2 with AI-specific factors. Empirically, it provides evidence from vocational higher education in Vietnam, a context that remains underexplored. Practically, the findings suggest that educational institutions should focus on enhancing perceived usefulness, building trust, improving AI literacy, and promoting responsible AI use to maximize the benefits of ChatGPT in learning.

6. Practical Implications

The findings provide several practical implications for higher education. First, educational institutions should integrate ChatGPT into teaching and learning by emphasizing its educational value in areas such as information retrieval, academic writing, programming, language learning, and project-based learning. Second, improving students' AI literacy through training in prompt engineering, critical evaluation, fact-checking, and ethical AI use is essential for responsible adoption. Third, institutions should promote trust by establishing ethical AI guidelines and encouraging students to verify AI-generated content with reliable academic sources. Fourth, lecturers should incorporate ChatGPT into classroom activities that foster critical thinking, such as evaluating AI-generated responses and discussing AI ethics. Finally, policymakers should support AI integration through national AI literacy frameworks, ethical regulations, digital infrastructure, and professional development initiatives. Overall, effective ChatGPT adoption requires a balanced approach that combines technological accessibility, AI literacy, ethical governance, and institutional support to maximize educational benefits while minimizing potential risks.

7. Conclusion

This study developed and validated an integrated TAM–TPB–UTAUT2 framework, extended with Trust in ChatGPT and AI Literacy, to explain Polytechnic College students' intention to use ChatGPT for learning. Based on SEM analysis of data from 380 students, the results showed that Perceived Ease of Use, Perceived Usefulness, Trust, AI Literacy, and Social Influence positively influenced students' attitudes, with Perceived Usefulness emerging as the strongest predictor. Attitude was the strongest determinant of behavioral intention and mediated the effects of the antecedent variables. The findings enrich the literature on AI adoption in higher education, particularly in the context of vocational education in Vietnam, and suggest that institutions should strengthen AI literacy, foster trust, integrate ChatGPT into teaching, and promote ethical AI use. However, the study is limited by its single-institution sample, non-probability sampling, and cross-sectional design. Future research should employ longitudinal and multi-institutional studies while

incorporating additional factors such as perceived risk, privacy concerns, facilitating conditions, AI ethics, habit, and institutional support.

Conflict of Interest Statement

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