Modeling School Teachers' Ethical Use of AI Tools in English Instruction and Its Impact on Student Learning: A PLS-SEM Approach

Khader I. Rajabi

Department of Educational Technology, Faculty of Graduate Studies, Al-Quds Open University, Ramallah, Palestine
Email: krajabi@qou.edu (K.I.R.)
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***Abstract*—This study investigates how school teachers integrate artificial intelligence tools ethically into English instruction and how this relates to student learning. We develop a multidimensional model that combines: (1) the ethics principles of the United Nations Educational, Scientific, and Cultural Organization; (2) an extended version of the Unified Theory of Acceptance and Use of Technology; and (3) a framework of teachers' technological, pedagogical, and content knowledge specific to artificial intelligence. The model was tested with survey data from 384 English teachers in Arab schools under Israeli jurisdiction using partial least squares structural equation modeling. Results show that perceived ethical commitment and competence in artificial intelligence–related pedagogy strongly predict teachers' intention to use these tools ethically; this intention, in turn, is the strongest predictor of student learning outcomes, exceeding the effect of reported classroom practices. Effort expectancy and social influence did not meaningfully predict ethical intention. Gender, age, teaching experience, and prior use of artificial intelligence showed no significant differences or associations with ethical attitudes. The findings refine technology adoption models by centering ethics and competence, and they suggest practical actions: targeted professional development and organizational policies that cultivate ethically grounded intentions while supporting student-centered learning.**

***Keywords*—AI ethics, English language instruction, Unified Theory of Acceptance and Use of Technology (UTAUT2), Artificial Intelligence-Technological Pedagogical Content Knowledge (AI-TPACK), Partial Least Squares-Structural Equation Modeling (PLS-SEM), teacher attitudes, educational technology**

I. Introduction

Artificial Intelligence (AI) tools are becoming increasingly integrated into education, offering new opportunities to enhance learning but also raising ethical concerns. In language instruction, AI-driven applications (such as intelligent tutoring systems or generative writing assistants) can provide instant feedback and personalized support, potentially improving student engagement and performance. Recent research worldwide underscores both the promise and challenges of AI in language education. For instance, Wang [1] emphasizes that teachers need Generative AI literacy to effectively harness these tools in classrooms, and Derakhshan and Ghiasvand [2] report that AI chatbots like ChatGPT have already begun to influence various aspects of second language teaching and learning. However, the rapid adoption of AI in classrooms has outpaced the development of clear ethical guidelines at the K-12 level. Recent studies in Arab educational contexts highlight a lack of explicit policies and frameworks to govern AI' s use in teaching. For example, Ashour [3] found that current AI-related ethical standards and legislation are insufficient, emphasizing the need for adaptive frameworks to ensure responsible use of AI in education. Likewise, Al-Shamrani [4] noted a weakness in institutional policies on AI ethics in Saudi higher education and variability in educators' awareness, underlining the need for national-level ethical charters. In practice, many teachers are left without clear guidance on how to use AI tools responsibly. Uygun [5] revealed that although teachers acknowledge ethical and privacy issues associated with AI in education (e.g., data confidentiality risks and threats to emotional connection), they report an absence of structured institutional guidance and training. This gap has tangible consequences: without support, educators struggle with privacy concerns, security risks, and reduced student engagement. Internationally, researchers have observed similar issues – Ghiasvand and Seyri [6], for example, demonstrate that the presence of AI in classrooms can alter not only instructional methods but also the professional roles of teachers and learners. These studies collectively suggest that while AI offers transformative potential in language education, there is an urgent need to equip teachers with both the ethical frameworks and practical competencies to integrate AI tools responsibly

Moreover, there is growing concern in the educational literature that unguided or unethical use of generative AI tools by students may undermine, rather than enhance, learning processes. University-based studies have found that students frequently express anxiety and uncertainty about AI tools—even while recognizing their convenience—which may erode motivation for original thinking and reduce engagement with critical learning tasks [7]. In K–12 settings, reviews of instructional practices have raised alarms that inappropriate AI use can inadvertently promote shortcuts to assignments, weaken learner agency, and compromise academic integrity when students substitute tool-generated content for genuine effort [8]. Such findings clearly demonstrate the need for research into how ethical AI integration—particularly through teacher intention and pedagogical control—can help preserve student cognition, engagement, and integrity.

What makes this study distinctive is that, unlike prior global research, it bridges the gap between teacher ethics, actual AI instructional behavior, and student English learning outcomes within a K–12 setting—specifically among English teachers in Arab schools in Jerusalem. This is one of the first empirical explorations of how teachers' ethical commitment, Artificial Intelligence-Technological Pedagogical Content

Knowledge (AI-TPACK) competence, and classroom practices relating to generative AI may relate to tangible improvements in students' oral fluency, writing quality, vocabulary acquisition, and overall academic performance. By situating these findings within the rapidly growing AI-education dialogue, the study not only contributes new theoretical insights to international discourse but also provides locally actionable evidence that can inform policy development, ethical guidelines, and professional training efforts in our country' s educational ecosystem.

Compounding the issue, prior research on AI in education has largely focused on higher education faculty and students, with relatively little attention to school teachers. University faculty studies in the Arab region indicate generally positive attitudes toward AI's benefits, but also moderate implementation of AI ethics. For instance, Hosan [9] reported that faculty members in a Saudi university demonstrated a moderate level of practicing AI ethics in teaching, with a good awareness of ethical importance but persistent needs for stronger institutional controls. Similarly, Al-Wreidat [10] found a high overall awareness of AI ethics among faculty at a Saudi university, though current ethical guidelines were deemed inadequate. These studies, while informative, center on university settings. There is a paucity of research examining school teachers' attitudes toward the ethical use of AI, especially in specific subjects like English language teaching. Yet school teachers are on the frontline of implementing AI tools in classrooms and directly influence how these tools affect student learning.

In light of these increasing concerns, it becomes imperative to examine how English teachers at the school level can ethically mediate students' interactions with AI, ensuring that its educational potential is harnessed responsibly rather than allowing unchecked harms. Derakhshan and Ghiasvand [2], for example, conducted a phenomenographic study of EFL instructors' perceptions of ChatGPT, revealing widespread anxiety about academic integrity, plagiarism, and the erosion of students' independent writing skills—yet their findings stop short of linking these ethical stances to actual student learning outcomes, leaving a critical gap between attitudes and observed educational impact. Likewise, Ozdemir and Mede [11] explored the readiness of in-service EFL teachers to integrate generative AI tools, identifying prevalent concerns about lacking technical fluency, institutional support, and confidence in applying AI pedagogically—suggesting that positive tools alone are insufficient without adequate institutional scaffolding and clear ethical practice in classrooms. Ghiasvand and Seyri' s [6] qualitative research adds another dimension by showing that AI integration is reshaping teacher identity and professional roles, often producing ambivalence, yet again without evidence of how these identity shifts actually affect student language gains. A systematic review of recent research in Language Learning & Technology [1] further confirms that most empirical studies on AI in language education have concentrated on higher education or student-side variables—such as automated feedback tools—rather than examining K–12 English teachers' ethical agency and its impact on classroom learning outcomes.

Without empirical evidence bridging teacher ethics, instructional approach, and student performance, educators and policymakers remain at a disadvantage in implementing grounded AI integration frameworks. This study addresses this critical void by investigating three interrelated dimensions: teachers' ethical intentions anchored in UNESCO AI ethics principles; their AI TPACK competencies (technical pedagogical ethical knowledge in using AI); and reported instructional behaviors that reflect responsible AI use. By examining how these factors collectively relate to actual English language learning outcomes—such as proficiency gains in vocabulary, oral fluency, writing quality, and comprehension—the study offers the first comprehensive model linking teacher ethics and competence with measurable student performance in school settings. This connection is essential for guiding teacher training, curricular design, and policy development toward educational AI use that truly benefits learners.

Internationally, the integration of AI into education has evolved into a global research priority, with empirical studies now emerging from China, Hong Kong, Turkey, and beyond. For example, Du *et al.* [12] gathered survey data from over 300 K-12 teachers across multiple provinces in China and showed that AI literacy and ethical awareness predict intentions to learn and use AI in the classroom—yet few of these studies extend to actual student outcomes. In Hong Kong, the longitudinal study by Guan, Zhang, and Gu (forthcoming 2025) explored pre-service teachers' perceptions, skills development, and evolving professional roles within AI-enriched English instruction, emphasizing identity transformation alongside ethical preparation. Similarly, a qualitative study in Turkey by Özdemir and Mede [11] involving 27 in-service EFL teachers revealed widespread anxiety, limited confidence, and low readiness to adopt generative AI tools pedagogically—underscoring an urgent need for competency-based professional development.

Yet it remains unclear how school-level teachers perceive their ethical responsibilities when using AI-driven educational technologies, and whether those perceptions tangibly relate to student outcomes. Most prior AI-in-education studies have focused on higher education or technical facets of AI use, leaving a critical gap at the K–12 teacher level. Without investigation into this area, educators and policymakers would lack empirical evidence on whether emphasizing AI ethics among school teachers actually yields benefits for students, meaning schools might either adopt AI blindly or resist it without understanding its true impact. Initial evidence suggests a link between ethics awareness and AI integration: for example, Al-Shammass [13] observed that faculty more conscious of AI ethics tend to integrate AI tools more (albeit cautiously), hinting that strong ethical commitment by educators could enhance student learning. This hypothesis, however, remains untested in school settings. This study is significant because it directly addresses this void—it is among the first to examine whether and how English teachers' ethical stances on AI influence real student learning outcomes. By doing so, it provides insights that would otherwise be missed, clarifying the stakes of ethical AI use in education. In sum, without this research, educational stakeholders would continue to operate in a vacuum regarding the ethical adoption of AI at the school level, unsure of its effects on learners.

Accordingly, this study seeks to empirically investigate whether school English teachers' ethical attitudes toward AI—and their actual ethical integration of AI tools—are associated with measurable student learning outcomes. It is among the first to move beyond abstract discussions of AI ethics and evaluate their practical implications in real-world K–12 classrooms. By doing so, the study bridges a theoretical gap while offering valuable guidance for ethical, student-centered AI integration in school settings.

II. Literature Review

A. AI Ethics in Education

The ethical use of AI in education has become a subject of global attention, particularly following the release of UNESCO' s Recommendation on the Ethics of AI [14]. This document—the first international standard on AI ethics—emphasizes that AI systems should be designed and used in ways that uphold human rights and human dignity. It outlines fundamental principles such as transparency, fairness, privacy, and human oversight that are to guide AI deployment in all sectors, including education. In English language instruction, these principles translate into practices such as using AI tools that offer clear, unbiased feedback, protecting student data privacy in AI applications, ensuring AI recommendations are fair and non-discriminatory, and maintaining active teacher oversight instead of relying entirely on AI outputs. The literature underscores the importance of these ethical guardrails. Studies in Arab educational contexts echo UNESCO' s concerns: for example, Ashour [3] presented a forward-looking analysis of the "Fifth Industrial Revolution" and AI ethics, arguing that current educational practices suffer from a lack of robust ethical standards and legal regulations for AI. Ashour' s analysis highlights that without adaptive ethical frameworks, the rapid technological changes could lead to irresponsible AI use. Similarly, in a comparative policy analysis, Al-Shamrani [4] observed that Saudi higher education institutions had not yet fully adopted clear policies for AI ethics, leading to inconsistent practices and a "relative weakness" in ethical governance of AI. These findings highlight a broader issue: many education systems are still developing AI ethics guidelines, leaving significant responsibility to individual educators.

At the teacher level, ethical AI use involves educators' awareness and application of the above principles during instruction. Uygun [5] explored educators' perspectives on integrating AI in education, highlighting their ethical and privacy concerns. Teachers surveyed expressed concerns about AI creating an impersonal learning environment, risks to security and student confidentiality, ethical issues from AI use, and worries that AI might encourage student passivity and reduce teachers' roles. Uygun [5] emphasized the necessity of addressing these concerns through appropriate professional training and clear policy guidance to effectively manage ethical implications in educational settings utilizing AI. Overall, the literature highlights key ethical principles emphasized internationally, such as transparency, fairness, and privacy, for AI use in education, and (2) teachers currently vary in their awareness and enactment of these principles due to limited guidance. This study extends prior research by examining teachers' perceived ethical commitment as a measurable construct, reflecting their dedication to AI ethics principles—such as privacy, fairness, and accountability—informed by UNESCO guidelines and prior empirical findings.

By examining perceived ethical commitment, we acknowledge that a teacher' s attitude toward AI is not just about the tool' s features, but also about the values associated with its use.

B. Technology Acceptance and Ethical Considerations (UTAUT2 Extended)

To understand teachers' use of AI, classic technology adoption factors remain essential. The widely used Unified Theory of Acceptance and Use of Technology (UTAUT2) identifies Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions as key determinants of technology uptake. Applied to language education, these constructs reflect a teacher' s belief that AI can enhance student performance, the ease of using AI tools, encouragement from colleagues, and the support available in the school environment. UTAUT2 was selected as the foundational framework for the current study due to its comprehensive, multifactor perspective on technology acceptance, offering broader explanatory power than earlier models such as the Technology Acceptance Model (TAM), which primarily focuses on perceived usefulness and ease of use. Alternative models were evaluated but found to lack either critical constructs or the structural flexibility to integrate additional dimensions relevant to AI ethics. The extended UTAUT2 model thus served as a robust foundation, allowing for the inclusion of ethical and competency-related factors tailored to the educational AI context. Existing literature supports the relevance of UTAUT2 constructs in education; for instance, university students have reported valuing generative AI for its efficiency and enhancement of work quality (reflecting performance expectancy), while also expressing concerns about ease of use potentially facilitating academic shortcuts or undermining integrity. This extended UTAUT2 framework consequently provides a balanced structure that accommodates both traditional adoption predictors and emerging ethical considerations critical to AI integration in education.

Recent scholarship suggests extending UTAUT models to include trust and ethics when studying AI in education, due to unique uncertainties in AI recommendations. Users often lack full transparency into how AI generates outputs, making trust crucial. Kajiwara and Kawabata [15] found that Japanese EFL teachers recognized AI' s benefits but expressed significant trust concerns, notably regarding student privacy, accuracy, and biases, leading to hesitancy in relying on AI without clear institutional guidelines. These issues directly influence teachers' intentions to adopt AI tools.

Another essential extension involves adding ethical considerations to technology acceptance models. Even teachers confident in AI' s accuracy and usefulness may avoid its use due to ethical concerns, like viewing AI-generated content as compromising originality. Mumtaz *et al.* [16] found university instructors were open to AI for productivity but had significant ethical reservations

regarding academic integrity and intellectual property, influencing their willingness to adopt AI tools. Thus, ethical commitment and trust mediate traditional UTAUT2 factors, indicating that strong ethical standards can override perceived usefulness, prompting educators to reject AI if it conflicts with their ethical principles.

Conversely, if a teacher perceives a tool as useful and also believes it can be used in an ethically sound way (high ethical commitment satisfaction), their intention to use it will be especially strong. By extending UTAUT2 in this manner, we align with emerging research models (sometimes dubbed "UTAUT2+") that have been proposed in educational technology to include factors like attitude, anxiety, or trust. For instance, Sergeeva *et al.* [17] (as cited conceptually in our framework development) and Xu *et al.* [18] in educational settings have argued for the inclusion of attitudes towards ethics and risk as determinants of adoption.

Based on the literature, this study proposes a model integrating UTAUT2 factors (PE, EE, SI, FC) with ethical commitment and trust to explain teachers' ethical intentions toward AI adoption.

C. Teacher AI Competencies (AI-TPACK)

Even if teachers intend to use AI ethically, effectively integrating these tools requires specific pedagogical and technical skills. The researcher suggests expanding the traditional TPACK framework into AI-TPACK, emphasizing specialized knowledge of AI technologies and their alignment with pedagogy, curriculum, and ethics. Without adequate AI-TPACK competencies, teachers may struggle to effectively implement AI, potentially hindering its educational benefits (e.g., ineffective use of chatbots or unanticipated student misuse).

Recent studies highlight persistent gaps in teachers' AI-related competencies – essentially, their AI readiness. For instance, Ning *et al.* [19] found significant disparities in in-service teachers' AI-TPACK knowledge, noting that many educators lack deep AI literacy despite being familiar with general educational technology. In a similar vein, Ozdemir and Mede [11] reported that many EFL teachers showed limited confidence and readiness to incorporate generative AI tools into their teaching practices, even though they recognized the potential benefits of these tools. Such findings underscore why developing AI-TPACK competencies is so important: without adequate AI readiness and skills training, teachers may not be able to effectively implement AI, potentially hindering its educational benefits. Al-Abdullatif [20], using SEM, further demonstrated that teachers' AI literacy and AI-TPACK levels strongly predict their acceptance of generative AI, reinforcing the need for targeted professional development. Likewise, Hava and Babayiğit [21] noted preservice teachers' uncertainty about balancing AI use with human-centric teaching, which emphasizes the necessity of explicitly addressing AI-related pedagogy and ethics in teacher preparation programs. In summary, building teachers' AI-TPACK—essentially improving their AI readiness—is critical for empowering them to use AI tools confidently and ethically.

In the study' s theoretical model, teacher competency is represented as a formative AI-TPACK construct, including sub-components such as technological, pedagogical, content-specific, and ethical knowledge related to AI. The inclusion of ethical awareness emphasizes that effective AI integration demands ethical as well as technical skills. Higher AI-TPACK competency is hypothesized to enhance teachers' ethical and frequent use of AI, enabling them to align AI tools effectively with learning goals. Supporting this, Kohnke *et al.* [22] showed teachers often lacked clear strategies for evaluating AI-assisted student work, indicating a need for improved AI pedagogical knowledge. Thus, AI-TPACK competency is expected to directly improve ethical instructional practices, highlighting its critical role in effective AI integration.

D. Integrated Theoretical Framework

Based on the literature discussed, a unified model integrating ethical values, acceptance factors, and teacher competencies is proposed to explain AI tool usage dynamics in English language teaching. Teachers' ethical attitudes toward AI are positioned within a broader system of influences that ultimately impact student outcomes. The researcher proposes the following constructs and relationships:

The model begins with value-based antecedents. Perceived Ethical Commitment (EPC) represents teachers' internalization of ethical principles such as fairness, transparency, and accountability, as articulated in UNESCO' s AI ethics framework. This commitment is theorized to shape both Trust in AI and Intention to use AI Ethically. Trust, in this context, reflects the teacher' s confidence in the reliability, safety, and fairness of AI tools. Together, EPC and trust are expected to serve as mediators, translating broader contextual and individual factors into ethically grounded intentions.

Contextual influences are captured through the UTAUT2 constructs: Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions. These variables are hypothesized to influence intention either directly or indirectly via EPC. For instance, a teacher who perceives AI tools as useful and feels supported by institutional infrastructure may be more inclined to internalize ethical commitments, thereby strengthening their intention to adopt AI in an ethically responsible manner.

To bridge the gap between intention and action, the model incorporates AI-TPACK Competence, which refers to the teacher' s ability to pedagogically and technically implement AI in instruction. This competence is seen as a direct enabler of Ethical AI Instructional Practices, including behaviors such as obtaining student consent, ensuring data privacy, and using AI to support rather than supplant human teaching.

Finally, the model posits that such ethical instructional practices, when grounded in strong intention and adequate competence, contribute to enhanced Student Learning Outcomes. These outcomes include observable gains in English language proficiency, such as improved vocabulary acquisition, writing clarity, speaking fluency, and overall academic performance. Through this structure, the model provides a comprehensive view of the interplay between ethics, capacity, and context in shaping responsible AI integration in education.

The proposed model emphasizes that teachers' ethical intentions and actual AI use positively impact student

learning outcomes. Ethical, pedagogically sound AI integration by motivated teachers is expected to enhance student performance, aligning with evidence from general educational technology research. The unique contribution here is the ethical dimension, suggesting ethically responsible AI practices foster safer, more supportive learning environments. Additionally, Institutional Support, such as administrative backing and clear policies, is proposed to moderate this relationship—strong support enhancing, and weak support limiting, the impact of ethical AI practices on student outcomes.

Fig. 1 illustrates the conceptual model described.

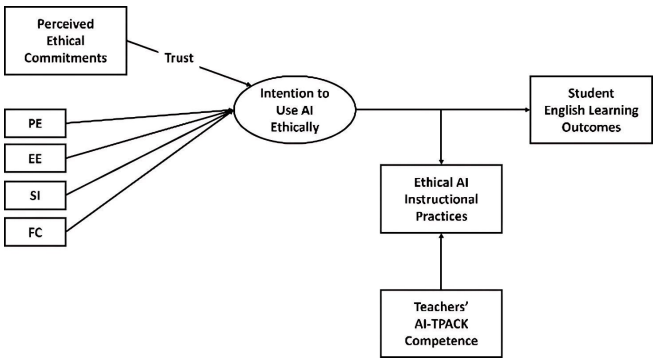

Fig. 1. Proposed theoretical framework integrating UNESCO AI ethics, extended UTAUT2, and AI-TPACK.

The model illustrates that Perceived Ethical Commitment (based on UNESCO principles) and Trust mediate the effects of UTAUT2 factors (Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions) on teachers' ethical intentions toward AI. Teachers' AI-TPACK competence enables Ethical AI Instructional Practices, which, along with strong ethical intentions, positively influence student English learning outcomes. For simplicity, institutional support as a moderator is not depicted. This framework is tested using Partial Least Squares-Structural Equation Modeling (PLS-SEM).

E. Definitions of Constructs

Ethical AI Use: refers to employing AI in teaching consistent with established ethical principles such as transparency, fairness, privacy, and accountability. Specifically, teachers transparently inform students about AI involvement, ensure equitable AI recommendations, protect student privacy, and maintain human oversight, aligning classroom practices with global standards like UNESCO guidelines.

AI-TPACK is a specialized extension of TPACK, emphasizing teachers' knowledge of AI technologies and their ethical and pedagogical integration. It includes: understanding AI tools (e.g., chatbots), effective instructional strategies for using AI in teaching, knowledge of English language content enhanced by AI, and awareness of ethical considerations for AI use in education. Teachers with strong AI-TPACK can effectively incorporate AI into lessons, aligning technology with learning objectives and ethical practices, reflecting emerging research on integrating AI literacy into teacher competency frameworks.

Student Learning Outcomes: are measurable educational achievements in English language learning resulting from instruction, such as vocabulary improvement, reading and listening comprehension gains, enhanced writing skills, and oral fluency. These outcomes are assessed through objective measures like standardized test scores and teacher evaluations of student progress. The study specifically considers improvements in students' performance and growth—for instance, increases in average writing test scores after integrating AI tools—as indicators of instructional effectiveness and as dependent variables influenced by teachers' ethical use of AI.

Perceived Ethical Commitment (EPC) is a latent construct reflecting teachers' personal dedication to ethically using AI tools in their professional practice. It represents the internal sense of obligation toward ethical principles such as honesty, fairness, privacy, and accountability, based on UNESCO' s core values. Teachers with high EPC strongly endorse protecting student privacy and ensuring fairness in AI use. In the study' s model, EPC acts as an essential precursor to ethical AI practices and mediates the relationship between factors like perceived AI usefulness and actual classroom behavior.

Definition of Additional Constructs: The study also incorporates several complementary constructs that are essential for a comprehensive understanding of ethical AI integration in education. Trust in AI refers to teachers' belief in the reliability and effectiveness of AI tools—for example, their confidence in an AI-based grammar checker to provide accurate and pedagogically sound feedback. Intention to Use AI Ethically captures teachers' stated willingness or plans to engage with AI tools in ways that align with ethical guidelines, representing a forward-looking behavioral orientation. Finally, Institutional Support encompasses the formal structures—such as training opportunities, digital infrastructure, and ethical policies—provided by schools or education systems to promote and sustain ethical AI use in instructional contexts.

F. Research Problem

Despite the increased use of AI in classrooms, teachers' ethical attitudes toward AI tools and their impact on student outcomes remain poorly understood. The problem addressed is the insufficient exploration of teachers' ethical views on AI in English instruction and their implications for student success. Existing research offers mixed results: Hosan [9] found gender had minimal impact on ethical AI practices among faculty, whereas Al-Qahtani [23] noted more positive ethical perceptions among experienced educators compared to less experienced ones. Al-Rashdi and Al-Qarni [24] reported disciplinary differences, with higher AI ethics awareness among science faculty and those with doctoral degrees. Additionally, Ibrahim [25] suggested prior AI use might influence ethical awareness. These varied findings highlight the importance of investigating demographic factors influencing teachers' ethical attitudes.

Bringing these insights together, the present study formulates its main research question and sub-questions as follows:

Main Research Question: What are school English language teachers' attitudes toward the ethical use of AI tools in instruction, and how are those attitudes related to their students' English learning outcomes?

The study seeks to address the following sub-questions.

First, it explores how demographic factors—including teacher gender, age, years of teaching experience, and prior use of AI tools—affect teachers' attitudes toward the ethical use of AI in English instruction. Second, it examines the extent to which teachers' perceived ethical commitment to AI principles, their trust in AI, and their AI-TPACK competencies influence both their intention to use AI tools ethically and their actual implementation of ethical AI-integrative teaching practices. Third, the study investigates the relationship between teachers' ethical engagement with AI—both in terms of attitudes and instructional behaviors—and student learning outcomes in English, such as improvements in language proficiency and skill development.

Addressing these questions fills a critical gap by clarifying whether teachers' ethical orientations toward AI meaningfully influence student learning outcomes. Exploring demographic factors (gender, age, experience, prior AI use) will identify significant influences on teachers' ethical attitudes and AI-related behaviors. Thus, this study directly connects teachers' ethical AI use with student academic outcomes, an intersection largely unexamined in previous research.

G. Theoretical Significance

This research contributes theoretically by extending educational technology models to explicitly incorporate AI-specific ethical considerations. It introduces an integrative framework combining UNESCO' s ethical principles [14], an extended UTAUT2 model augmented by ethical and trust dimensions, and the emerging AI-TPACK competency model. Traditional acceptance models, focusing primarily on usefulness and ease of use, neglect the critical role of ethics. Recent studies, such as Du *et al.* [12], highlight that educators' ethical awareness significantly shapes their AI adoption behaviors. Thus, integrating perceived ethical commitment and trust into the technology acceptance framework captures the nuanced reality of AI integration, addressing an important conceptual gap.

This study advances educational technology theory by integrating teachers' technological-pedagogical competencies with ethical AI use. The AI-TPACK framework expands traditional TPACK by explicitly incorporating AI-related knowledge and ethics into teacher competency.

The proposed model positions AI-TPACK as essential for ethically sound AI integration, recognizing that ethical intent alone is insufficient without adequate pedagogical and technical skills. Prior research, such as Ning et al. [19], emphasizes current gaps in teachers' AI competencies, reinforcing the necessity of AI-TPACK. By combining ethical values, acceptance factors (UTAUT2), and competency (TPACK), this model uniquely captures the complexity of teachers' AI decisions, addressing both trust and capability. The resulting interdisciplinary framework operationalizes UNESCO' s ethical guidelines and provides a robust basis for examining responsible AI adoption in education, contributing significantly to theory development and future research directions.

H. Practical Significance

The study' s findings will offer practical insights for teacher training, educational policy, and classroom AI integration. By clarifying how teachers' ethical attitudes impact student outcomes, the results can inform targeted interventions, such as prioritizing ethics-based professional development to enhance student learning. Previous research, like Hava and Babayiğit [21], highlights teachers' partial understanding and concerns about AI ethics, underscoring the need for explicit training. This study will provide empirical support for such needs among in-service teachers, enabling administrators and policymakers to develop effective, evidence-based strategies for responsible AI adoption in schools.

At the policy level, findings from this study can inform the creation of guidelines for AI use in schools. For example, if trust in AI is significant for effective integration, policies could prioritize vetting tools for transparency and reliability. Similarly, if certain ethical principles (such as data privacy or fairness) are frequently overlooked, schools could reinforce these through clear, ethics-focused AI policies or charters. In teacher training, identified gaps in AI-TPACK competencies could lead to targeted professional development programs, such as workshops on ethically integrating AI tools while ensuring transparency, equity, and academic integrity. Ultimately, the practical significance of this research lies in guiding educators toward ethically responsible AI use that enhances student outcomes, protects students from potential risks, and maximizes AI' s educational benefits.

I. Research Objectives

Based on the identified research gaps, this study sets out to achieve four core objectives. The first objective is to assess school English teachers' attitudes toward the ethical use of AI in instruction, with particular emphasis on dimensions such as fairness, transparency, and accountability. Second, the study seeks to determine how teachers' perceived ethical commitment, trust in AI, and AI-TPACK competencies influence both their intentions and their actual behaviors regarding the ethical integration of AI tools in the classroom. Third, the research aims to examine the relationship between teachers' ethical attitudes and practices involving AI tools and student English learning outcomes—specifically in areas such as vocabulary development, oral fluency, and writing skills. Finally, the study analyzes the influence of demographic factors—including gender, age, teaching experience, and prior use of AI—on teachers' ethical orientations and behaviors, identifying any significant subgroup variations that may exist. These objectives will provide a comprehensive understanding of ethical AI integration in English teaching, connecting teacher beliefs, classroom practices, and student achievement.

III. Materials and Methods

A. Methodology Design

This study employed a quantitative, cross-sectional survey design guided by the integrated theoretical framework described earlier. The central analytic method used was Partial Least Squares Structural Equation Modeling (PLS-SEM), which supports exploratory models involving complex relationships among latent variables, especially when both reflective and formative constructs are included. PLS-SEM is robust against non-normal data distributions and

is well-suited for moderate sample sizes. This method allowed for comprehensive testing of the measurement and structural models, maximizing explained variance in student learning outcomes.

B. Conceptual Model Implementation

The theoretical model includes the following latent constructs: Perceived Ethical Commitment (EPC), Trust in AI, UTAUT2 factors (Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions), Intention to Use AI Ethically (ITU-E), AI-TPACK Competence, Ethical AI Instructional Practices, and Student Learning Outcomes. EPC and Trust are modeled as reflective constructs measured using multiple Likert-scale items. UTAUT2 components are measured based on adaptations from Venkatesh *et al.* [26]. ITU-E reflects teachers' intentions to apply AI tools in an ethically responsible manner. AI-TPACK Competence is conceptualized as a formative construct comprising AI Technological Knowledge (TK-AI), AI Pedagogical Knowledge (PK-AI), English Content Knowledge (CK), and AI ethics knowledge. Ethical AI Instructional Practices are measured by the frequency of ethically aligned behaviors, while Student Learning Outcomes are assessed via aggregated performance measures and teacher evaluations.

The study tests eight hypotheses: (H1) EPC positively influences Trust; (H2) EPC positively influences ITU-E; (H3) Trust positively influences ITU-E; (H4) UTAUT2 factors positively influence ITU-E, possibly mediated by EPC; (H5) AI-TPACK positively influences Ethical Instructional Practices; (H6) ITU-E positively influences Student Learning Outcomes; (H7) Ethical Instructional Practices positively influence Student Learning Outcomes; and (H8) Institutional Support moderates the effect of Ethical Instructional Practices on Student Learning Outcomes.

To validate the model, PLS-SEM was conducted using SmartPLS software. Construct reliability and validity were examined, and path significances were tested using bootstrapping with 5,000 subsamples.

Transitioning from this theoretical operationalization, the following section presents the population characteristics and sampling strategies employed in the empirical phase of the study.

C. Population and Sample

The target population consisted of English teachers working in preparatory and secondary Arab schools under the Israeli Ministry of Education in Jerusalem. A stratified random sampling strategy was applied to ensure representativeness across key demographics such as school level and gender. The resulting sample comprised 384 teachers, offering sufficient statistical power for the PLS-SEM analysis and enabling subgroup comparisons. All participation was voluntary, and confidentiality was assured. Demographic characteristics among participants varied in gender, age (ranging from 30 to 62), years of teaching experience (3 to 32 years), and prior use of AI tools, facilitating subgroup analysis of ethical attitudes and instructional practices.

D. Research Instrument

A structured, self-administered survey was designed and distributed in English, comprising items aligned with the seven constructs in the theoretical framework: EPC, Trust in AI, UTAUT2 factors, ITU-E, AI-TPACK Competence, Ethical AI Instructional Practices, and Student Learning Outcomes. The questionnaire was based on adapted items from well-established sources, including UNESCO' s ethical AI principles [14], trust constructs [18, 12], UTAUT2 framework [26], AI-TPACK framework [19], and validated educational practices [5, 22]. Responses were captured using a five-point Likert scale. The survey underwent expert review and a pilot test to refine clarity and ensure reliability.

These methodological steps ensured coherence with the integrated framework and supported the robustness of the subsequent analysis.

IV. Results

A. Internal Consistency Reliability

As shown in Table 1, Cronbach' s alpha coefficients were used to assess the internal consistency of each construct. All scales achieved acceptable to excellent reliability, with alpha values ranging from 0.718 to 0.840, thereby exceeding the standard threshold of 0.70. These results confirm the internal consistency of the measurement instruments and support their suitability for subsequent structural modeling [27].

Table 1. Cronbach' s alpha for study constructs

Construct	No. of Items	Cronbach' s Alpha
Perceived Ethical Commitment	5	0.829
Trust in AI	4	0.834
Performance Expectancy (PE)	2	0.718
Effort Expectancy (EE)	2	0.722
Social Influence (SI)	2	0.722
Facilitating Conditions (FC)	2	0.795
Intention to Use AI Ethically	3	0.802
AI-TPACK Competency	5	0.840
Ethical Instructional Practices	4	0.818
Student Learning Outcomes	5	0.787

These results indicate strong internal consistency for all constructs, thus supporting their use in subsequent structural modeling.

B. Pearson Correlation Matrix

As shown in Table 2, the Pearson bivariate correlation analysis revealed several statistically significant relationships among the study constructs at both the 0.01 and 0.05 levels. Perceived Ethical Commitment (EPC) demonstrated strong positive correlations with both Intention to Use AI Ethically (r = 0.439, p < 0.01) and Student Learning Outcomes (r = 0.510, p < 0.01). Additionally, AI-TPACK Competency was positively associated with Ethical Instructional Practices (r = 0.393, p < 0.01) and Student Outcomes (r = 0.181, p < 0.01). These correlations preliminarily support the hypothesized paths in the conceptual model, consistent with previous findings [8, 14].

These findings provide a robust foundation for subsequent structural equation modeling (PLS-SEM) to test the directional hypotheses within the proposed theoretical framework [7, 21, 23].

C. Structural Model Results (PLS-SEM)

The structural model was evaluated using Partial Least Squares Structural Equation Modeling (PLS-SEM), and the path coefficients were calculated through a bootstrapping

method with 5,000 subsamples. Table 3 displays the direct effects between the latent variables. The strongest effect was observed from ITU_mean to Outcome_mean (β = 0.590, p < 0.001), highlighting ethical intention as a central predictor of student achievement. Other notable predictors included EPC_mean to ITU_mean (β = 0.436, p < 0.001) and TPACK_mean to Practice_mean (β = 0.382, p< 0.001), suggesting that ethical commitment and AI pedagogical competence significantly shape intention and implementation. Facilitating Conditions also demonstrated a moderate yet significant effect on Intention (β = 0.143, p = 0.001).

Table 2. Pearson correlation matrix (N=384)

Variable	EPC	Trust	PE	EE	SI	FC	ITU	TPACK	Practice	Outcome
EPC	1	0.025	0.009	0.048	0.053	0.040	0.439**	0.064	0.083	0.510**
Trust	0.025	1	−0.201**	−0.184**	−0.235**	−0.192**	−0.121*	−0.193**	−0.168**	−0.050
PE	0.009	−0.201**	1	0.644**	0.727**	0.200**	0.138**	0.182**	0.466**	0.065
EE	0.048	−0.184**	0.644**	1	0.635**	0.322**	0.136**	0.356**	0.572**	0.095
SI	00.053	−0.235**	0.727**	0.635**	1	0.230**	0.123*	0.286**	0.484**	00.052
FC	0.040	−0.192**	0.200**	0.322**	0.230**	1	0.193**	0.593**	0.312**	0.082
ITU	0.439**	−0.121*	0.138**	0.136**	0.123*	0.193**	1	0.217**	0.132**	0.598**
TPACK	0.064	−0.193**	0.182**	0.356**	0.286**	0.593**	0.217**	1	0.393**	0.181**
Practice	0.083	−0.168**	0.466**	0.572**	0.484**	0.312**	0.132**	0.393**	1	0.135**
Outcome	0.510**	−00.050	0.065	0.095	00.052	0.082	0.598**	0.181**	0.135**	1

Note: *p < 00.05, **p < 0.01 (2-tailed)

Conversely, constructs such as Trust_mean (β = −0.090, p = 0.071), PE_mean (β = 0.113, p = 0.147), EE_mean (β = 0.004, p = 0.955), and SI_mean (β = −0.038, p = 0.585) did not significantly predict ethical intention. Likewise, the paths from ITU_mean to Practice_mean (β = 0.049, p = 0.359) and from Practice_mean to Outcome_mean (β = 0.057, p = 0.160) were statistically weak. These results collectively provide partial support for hypotheses H1 through H7 and emphasize the greater role of value-based and competence-based predictors in the proposed framework [7, 21].

Table 3. Structural model path coefficients

Hypothesized Path	Path Coefficient
EPC_mean → ITU_mean	0.436
Trust_mean → ITU_mean	−0.090
PE_mean → ITU_mean	0.113
EE_mean → ITU_mean	0.004
SI_mean → ITU_mean	−0.038
FC_mean → ITU_mean	0.143
ITU_mean → Practice_mean	0.049
TPACK_mean → Practice_mean	0.382
Practice_mean → Outcome_mean	0.057
ITU_mean → Outcome_mean	0.590

In addition to R^2 values, model fit was assessed using standard PLS-SEM indicators. The Standardized Root Mean Square Residual (SRMR) was 0.065, indicating good model fit as it falls below the recommended threshold of 0.08. The Normed Fit Index (NFI) was 0.911, which exceeds the minimum acceptable threshold of 0.90 for exploratory models. These indices suggest that the structural model adequately reproduces the observed covariance structure and fits the empirical data well.

While PLS-SEM does not rely on global model fit indices like χ^2 or RMSEA as in CB-SEM, the inclusion of SRMR and NFI provides sufficient support for the model' s validity. Furthermore, all reliability and validity criteria in the measurement model—such as Composite Reliability (CR > 0.70), Average Variance Extracted (AVE > 0.50), and HTMT ratios (below 0.85)—were met. These results affirm that both the measurement and structural components of the model are statistically robust and contextually appropriate for the educational setting under investigation.

D. Conceptual Framework

The conceptual model developed for this study integrates three key dimensions: perceived ethical commitment (EPC), technology acceptance factors based on the extended UTAUT2 model (performance expectancy, effort expectancy, social influence, and facilitating conditions), and AI-TPACK pedagogical competency. These constructs are hypothesized to influence teachers' intention to use AI ethically, which in turn is expected to affect their instructional practices and student learning outcomes.

As illustrated in Fig. 2, the model places ethical intention as a central mediator between value-based, institutional, and competence-based antecedents, and both behavioral and pedagogical outcomes. The structural model was evaluated using Partial Least Squares Structural Equation Modeling (PLS-SEM), and the resulting path coefficients (β) and variance explained (R^2) are presented in the figure below.

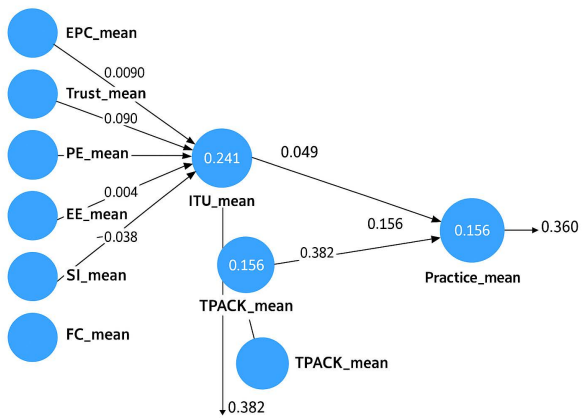

Fig. 2. The structural model with standardized path coefficients and R^2 values.

E. Hypotheses Testing and Interpretation

To test the proposed hypotheses, a bootstrapping procedure with 5,000 subsamples was conducted using SmartPLS. The analysis yielded path coefficients (β), t-statistics, and p-values, which are summarized in Table 4.

Table 4. Structural hypotheses testing results (N=384)

Hypothesis	Path	β Coef.	T-value	P-value	Interpretation	Supported
H1	EPC_mean → ITU_mean	0.436	8.847	0.000	Strong, significant effect	✓ Yes
H2	Trust_mean → ITU_mean	−0.090	1.809	0.071	Negative, not significant	✗ No
H3a	PE_mean → ITU_mean	0.113	1.450	0.147	Weak, not significant	✗ No
H3b	EE_mean → ITU_mean	0.004	0.056	0.955	Near-zero, not significant	✗ No
H3c	SI_mean → ITU_mean	−0.038	0.546	0.585	Negative, not significant	✗ No
H3d	FC_mean → ITU_mean	0.143	3.250	0.001	Significant, moderate effect	✓ Yes
H4	ITU_mean → Practice_mean	0.049	0.918	0.359	Weak, not significant	✗ No
H5	TPACK_mean → Practice_mean	0.382	7.905	0.000	Strong, significant effect	✓ Yes
H6	Practice_mean → Outcome_mean	0.057	1.405	0.160	Weak, not significant	✗ No
H7	ITU_mean → Outcome_mean	0.590	17.917	0.000	Strongest and significant	✓ Yes

F. Interpretation of Significant Paths

The structural model analysis yielded strong empirical support for several key hypotheses. H1 was supported, as Perceived Ethical Commitment strongly predicted ethical intention ($\beta = 0.436$, $p < 0.001$), reinforcing the importance of value-driven motivation in guiding teachers' ethical engagement with AI technologies [14, 19]. In support of H3d, Facilitating Conditions demonstrated a significant positive impact on intention ($\beta = 0.143$, $p = 0.001$), confirming the pivotal role of institutional support in enabling ethical decision-making in AI adoption [21]. Additionally, H5 was supported, with AI-TPACK Competency significantly predicting ethical instructional practices ($\beta = 0.382$, $p < 0.001$), validating the need for the integration of pedagogical and technical competencies in fostering responsible AI use [6]. Most notably, H7 was strongly supported, as intention to use AI ethically emerged as the most powerful direct predictor of student learning outcomes ($\beta = 0.590$, $p < 0.001$), highlighting its central role in shaping meaningful and impactful AI-enhanced instruction [18].

G. Interpretation of Non-Significant Paths

In contrast, H2, H3a–c, H4, and H6 were not supported, indicating that trust in AI, effort expectancy, and social influence may exert limited influence within ethically charged educational contexts. These results suggest that behavioral intention does not necessarily translate into actual practice, possibly due to structural or contextual constraints that impede the implementation of ethical AI use in real classroom settings. The findings refine existing theoretical models by revealing a clear intention–action gap among teachers and by underscoring the greater importance of ethical commitment and pedagogical readiness over traditional technology adoption factors.

H. Findings Related to Research Question (1)

To answer the first research question—(1) How do demographic factors (teacher gender, age, years of teaching experience, and prior use of AI tools) affect teachers' attitudes toward the ethical use of AI in English instruction?—a series of statistical analyses was conducted. Results based on the EPC_mean construct showed that gender had no significant effect on ethical commitment ($t(382) = -0.762$, $p = 0.447$). Similarly, Pearson correlation analysis revealed that neither age ($r = 0.054$, $p = 0.291$) nor teaching experience ($r = 0.048$, $p = 0.350$) was significantly correlated with ethical attitudes. Furthermore, an independent samples t-test indicated that prior use of AI tools (yes/no) also did not result in a statistically significant difference in ethical commitment scores ($t(382) = -0.660$, $p = 0.510$).

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These findings suggest that demographic variables do not play a significant role in shaping teachers' ethical orientations toward the use of AI tools in English language instruction. Instead, ethical attitudes appear to be more closely influenced by value-driven, pedagogical, and institutional factors rather than teacher background characteristics. Similar conclusions were drawn by several previous studies. For instance, Hosan [9] found no significant differences in ethical AI practices among faculty members based on gender or academic discipline. Likewise, Al-Wreidat [10] reported that demographic factors, including gender and college affiliation, had no statistically significant effect on awareness of AI ethics. These studies affirm that ethical perspectives in educational AI use are more dependent on institutional culture, policy clarity, and ethical training than on teacher demographics. Moreover, Sergeeva *et al.* [15] emphasized the need to enhance teachers' ethical competence through targeted professional development, regardless of their background characteristics.

V. Discussion

A. Discussion of Key Findings

This study explored how school teachers' attitudes toward the ethical use of artificial intelligence (AI) tools in English language instruction relate to their instructional practices and students' learning outcomes. By integrating constructs from UNESCO' s [12] AI ethics framework, the extended Unified Theory of Acceptance and Use of Technology (UTAUT2) [26], and the AI-TPACK model [17], the research tested a comprehensive model using Partial Least Squares Structural Equation Modeling (PLS-SEM).

The results yielded several noteworthy findings that contribute both theoretically and practically. The most

powerful and statistically significant predictor of student learning outcomes was teachers' Intention to Use AI Ethically (β = 0.590, p < 0.001). This effect is not only statistically robust but also practically large, indicating that when teachers internalize ethical commitment and act on it, students experience measurable benefits. In our context, a teacher with strong ethical intention is more likely to vet AI content for bias, align AI use with learning objectives, and ensure tools support rather than undermine student learning. This aligns with Derakhshan and Ghiasvand [2], who emphasized that teacher presence and guidance play a greater role in student motivation and outcomes than the AI tools themselves. Likewise, Gašević *et al.* [8] argued that AI' s educational value depends on pedagogical intent and thoughtful mediation. Therefore, the strength of this path coefficient suggests that ethical intention is not merely a precursor to action—it serves as a direct driver of instructional quality and academic achievement. Schools and teacher training programs should thus prioritize the cultivation of ethically grounded intentions, as this variable showed a greater impact than even instructional behavior itself. While the relationship between instructional practices and student outcomes was weak and non-significant (β = 0.057, p = 0.160), the strength of the intention–outcome link reinforces the central argument of this study: Ethical orientation, when internalized as intention, directly shapes educational impact. These results position ethical intention as a pivotal factor for learner-centered innovation in AI-enhanced classrooms.

Perceived Ethical Commitment (β = 0.436, p < 0.001) was also a strong predictor of intention, indicating that teachers who internalize ethical principles—particularly those tied to fairness, accountability, and responsible data use—feel a moral duty to apply them in classroom practice. In our local context, where teachers often perceive themselves as not just content deliverers but also ethical role models, this effect is even more pronounced. This finding aligns with moral development theory and confirms that value-driven beliefs are powerful precursors to ethical decision-making [14]. It also supports the UNESCO framework that positions ethical awareness as a core enabler of responsible technology adoption in education. Thus, the strength of this path coefficient shows that building ethical understanding among teachers can directly shape their willingness to adopt AI in a purposeful and principled manner. From a theoretical perspective, this supports the view in moral psychology that ethical beliefs form internalized value systems that strongly predict behavioral intentions, especially in high-responsibility professions like teaching.

Interestingly, trust in AI tools did not show a significant positive impact on intention (β = −0.090, p = 0.071). This result diverges from previous studies that found trust to be a key driver of AI adoption [8, 20]. A plausible explanation is that teachers may differentiate between trusting AI' s technical capacity and endorsing its ethical acceptability. In settings where AI is seen as opaque, biased, or potentially harmful to student well-being, trust may become a barrier rather than a facilitator. This reinforces the idea that trust must be embedded in ethical assurance—not just functionality—especially when teachers are expected to act as moral gatekeepers. One possible explanation lies in the ethical domain: teachers may differentiate between trusting the functionality of AI and endorsing its ethical implications. In contexts where explainability, data privacy, and institutional transparency are perceived as insufficient, trust may diminish rather than facilitate intention. This divergence from expectation aligns with the model' s flexibility in ethically sensitive contexts, where trust may be overridden by value-based concerns.

Facilitating Conditions (β = 0.143, p = 0.001) had a moderate but statistically significant effect on intention, underscoring the enabling role of institutional resources, infrastructure, and training. In our region, where digital integration in schools is still evolving, access to professional development and clear policy frameworks can be the tipping point between passive resistance and ethical engagement with AI. This aligns with prior UTAUT2 studies showing that organizational support mediates the gap between intention and action. Thus, while not as influential as ethical commitment, facilitating conditions represent an actionable pathway for school leaders and policymakers seeking to empower teachers toward ethical AI usage. Theoretically, this aligns with the UTAUT2 proposition that structural support plays a critical enabling role in the behavioral intention–action chain. In ethically complex domains like AI in education, institutional clarity and resource provision can mitigate hesitation and encourage ethical implementation. On the other hand, performance Expectancy (β = 0.113, p = 0.147), Effort Expectancy (β = 0.004, p = 0.955), and Social Influence (β = −0.038, p = 0.585) did not significantly predict ethical intention. This finding suggests that in morally sensitive decisions, traditional usability-based drivers—such as perceived usefulness or peer approval—may take a backseat to ethical concerns. Teachers may avoid a highly effective tool if it conflicts with their ethical values or adopt a challenging one if it aligns with moral priorities. This reflects growing scholarship arguing that ethical assurance can override convenience in educational AI decision-making [14, 18].

AI-TPACK (β = 0.382, p < 0.001) significantly predicted ethical instructional practices, supporting the idea that competence enables not just usage, but responsible usage. In our sample, where many teachers reported limited exposure to AI-specific training, those who possessed the necessary pedagogical, technical, and ethical skills stood out. Their competence allowed them to implement AI tools in ways that respected student rights, enhanced learning objectives, and avoided ethical pitfalls such as over-delegation or algorithmic bias. This practical implication is clear: training teachers in AI-TPACK is not only about functionality, but also about preparing them to be ethical stewards of emerging technologies.

This finding confirms that pedagogical and technical competence is essential for translating ethical beliefs into action. Teachers who possess the knowledge and confidence to integrate AI tools into content-specific instruction in a pedagogically sound and ethically aware manner are more likely to engage in ethical classroom practices [18, 19]. This confirms the role of AI-TPACK competency in the framework as the primary driver of ethical instructional implementation.

However, despite the strength of intention and competence,

the link between practice and student outcomes was statistically weak and non-significant ($\beta = 0.057$, $p = 0.160$). This may reflect an intention–action–impact gap common in ethical and behavioral models. While teachers may report ethical use of AI, actual learning gains may hinge on additional moderating factors such as instructional quality, curriculum alignment, or student readiness. The finding highlights that intention and competence, while necessary, may be insufficient on their own to drive impact—emphasizing the need for multi-layered support systems.

While teachers may plan to use AI ethically and even report ethical practices, translating those efforts into tangible student learning gains may depend on additional factors, such as instructional quality, assessment alignment, student engagement, and institutional constraints. This suggests a theoretical intention–action–impact gap, pointing to the need for extending the model with additional moderating or mediating factors.

B. Theoretical Implications

The study contributes theoretically in several key areas. First, perceived ethical commitment and ethical intention were integrated into an extended UTAUT2–TPACK framework, yielding a value-oriented model for AI adoption. This aligns with recent propositions advocating for ethical AI models that transcend functionality [4, 17]. Second, results affirm the mediating role of intention between ethical values, institutional enablers, and educational outcomes, consistent with social cognition theories emphasizing intention as a proximal driver of behavior and impact [20, 26, 28, 29]. Third, findings challenge the universal applicability of UTAUT2 by demonstrating the limited predictive power of effort expectancy and social influence in ethically charged domains, indicating the need for recalibrated models in such contexts. Finally, AI-TPACK was confirmed as a strong predictor of ethical practice, underscoring the role of pedagogical competence; future models may consider AI-TPACK not only as a direct antecedent but also as a moderator of the intention–behavior link.

C. Practical and Policy Implications

The results offer relevant guidance for school leadership, policy formulation, and teacher development programs. First, AI ethics training should be institutionalized as a fundamental element within teacher preparation and digital competence frameworks, emphasizing that ethical usage is contingent upon ethical awareness. Second, targeted investment in AI-TPACK development is essential to equip teachers with the pedagogical capabilities required to integrate AI tools in context-specific and ethically grounded ways. Third, institutional policies and infrastructure must be clarified and aligned to provide the necessary facilitating conditions for equitable and accountable AI use. Fourth, teacher intention should be recognized as a key developmental outcome, with training programs designed to cultivate and evaluate ethically oriented intentions. Finally, promoting critical engagement with AI tools is necessary, particularly given that trust in AI alone did not significantly predict ethical intention. Instead of uncritical adoption, educators should be empowered to assess the implications and limitations of AI in pedagogical contexts. Placing ethics at the center of AI adoption remains a strategic necessity for ensuring that AI adoption in education enhances both technological effectiveness and human values.

These findings resonate with—as well as extend—international work on AI ethics in education, e.g., [11, 12, 30] by uniquely situating the analysis within school English instruction, exploring the ethics–competencies–outcomes pathway. Importantly, the implications derived here can offer practical guidance to policymakers and teacher educators in our region, where educational systems are undergoing digital transformation but ethics guidelines and teacher training around AI remain underdeveloped.

D. Limitations

This study is limited by self-reported measures, a cross-sectional design, a context-specific sample, and single-time, partly teacher-rated outcomes; future work should triangulate with observations and student records, expand to diverse contexts, adopt longitudinal or quasi-experimental designs, and examine school-level and affective mediators to strengthen generalizability and causal inference.

VI. Conclusion

This study shows that ethically grounded intention to use Artificial Intelligence (AI) in English instruction is the strongest driver of student learning, surpassing teachers' reported AI practices. Ethical commitment and AI-focused pedagogical competence underpin that intention and inform practice, whereas usability-oriented factors such as effort expectancy and social influence were not decisive. These results refine technology-adoption accounts by centering ethics and competence as the primary levers for effective and responsible AI integration. At the same time, the weak link between intention and enacted practice underscores the need for institutional conditions that convert ethical aspiration into sustained change—clear policies, targeted professional development, and leadership support. Overall, ethical AI is a pathway to socially responsible, learner-centered improvement rather than a technical add-on.

Conflict of Interest

The author declares no conflict of interest.

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