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How to Use ChatGPT to Support Research Writing Among Preservice Teachers

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Abstract: Generative artificial intelligence (GenAI), particularly ChatGPT, has rapidly entered academic writing workflows in higher education, yet evidence from Global South preservice teacher contexts remains sparse. Grounded in the Technological Pedagogical Content Knowledge (TPACK) framework and the Unified Theory of Acceptance and Use of Technology (UTAUT), this study examines how graduating preservice teachers integrate ChatGPT into research writing, what motivates adoption, and how such use maps onto anticipated professional roles. A sequential explanatory mixed-methods design was employed, combining an institutional census survey (n = 197) with three focus group discussions (FGDs; 27 volunteers). Descriptive statistics were computed for survey constructs, and reflexive thematic analysis was applied to verbatim transcripts following Braun and Clarke (2006). ChatGPT use concentrated at high-yield, low-risk stages — most frequently grammar and style polishing (64% always) and brainstorming (57% always) — with markedly lower use for statistical explanation (19% always). Four themes emerged: continuous multi-stage drafting support, deliberate timing to protect authorial voice, source-anchored prompting to reduce hallucinations, and systematic verification routines. Participants rated ChatGPT highly relevant to roles including personalized learning (67% very relevant) and ethical AI stewardship (48% very relevant). When embedded within structured writing pedagogy — human-first planning, anchored prompting, and process-transparent verification — ChatGPT functions as a cognitive scaffold. Teacher education programs should institutionalize these practices to cultivate research writing fluency and the professional judgment required for AI-aware classroom leadership.

Keywords: Teacher education; ChatGPT; Generative artificial intelligence; Research writing; TPACK; UTAUT; AI literacy; Sequential explanatory mixed methods; Cognitive scaffolding; Philippines

Introduction

Generative artificial intelligence (GenAI) tools, most prominently ChatGPT, have achieved widespread penetration across academic writing contexts within a remarkably compressed timeframe—reaching 100 million users within two months of its public release and spawning a rapidly expanding body of scholarly inquiry (Lendvai, 2025). Reviews of higher education practice consistently demonstrate that the benefits of GenAI depend heavily on instructional design, transparency requirements, and sustained human oversight; without these conditions, concerns regarding factual accuracy, authorship integrity, and the erosion of critical reasoning remain pronounced (Cummings et al., 2024; Dwivedi et al., 2023; Lo et al., 2024). Meta-analytic evidence further quantifies these benefits: across 51 experimental studies, ChatGPT use was associated with a large mean effect on learning performance (g = 0.867) and a moderate effect on higher-order thinking (g = 0.457), with appropriate scaffolding identified as the primary moderating condition (Wang & Fan, 2025). Similarly, a meta-analysis of task-based language teaching applications found an overall Hedges's g of 0.75, rising to 1.03 when teacher–GenAI collaboration was structured rather than unmediated (Li et al., 2025). These figures underscore that ChatGPT's educational efficacy is contingent rather than unconditional—a distinction with direct implications for research-writing pedagogy.

Recent syntheses equally document persistent risks. A systematic review covering 2023–2025 identified three structural tensions in GenAI-integrated academic writing: efficiency versus depth of learning, fluency

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versus originality, and accessibility versus critical integrity (Sanz-Tejeda et al., 2026). The concern extends to cognitive consequences: Gerlich (2025), drawing on data from 666 participants, found a strong negative correlation between AI tool use and critical thinking ($r = -0.49$) and a correspondingly strong positive correlation between AI use and cognitive offloading ($r = +0.89$). Over-reliance on AI is not a neutral behaviour; when students delegate substantive thinking to AI systems, critical reasoning capacities are measurably attenuated (Abubakar et al., 2025; Gerlich, 2025). The global policy landscape reflects this ambivalence: an analysis of 40 universities across six regions documented that institutional AI policies are markedly less developed in Global South contexts, with AI literacy consistently identified as a foundational institutional priority but unevenly operationalized (Jin et al., 2025). In the Philippines specifically, national AI adoption rates stand at 3.02% across all sectors (Quimba et al., 2024), and higher education institutions face documented gaps in both AI literacy among students and formal policy frameworks to guide responsible adoption (Vergara, 2024).

Within teacher education, research writing constitutes a primary venue for developing disciplinary inquiry skills and professional judgment, yet preservice teachers frequently encounter difficulty framing researchable questions, synthesizing complex literature, and sustaining an authoritative academic voice. Two theoretical threads converge to illuminate this challenge. The first is the Technological Pedagogical Content Knowledge (TPACK) framework (Mishra & Koehler, 2006), which conceptualizes effective technology integration as residing at the intersection of technological, pedagogical, and content knowledge domains. Applied to generative AI, TPACK has been extended toward an 'AI-TPACK' paradigm that demands not only technical facility with AI tools but principled judgment about their deployment across disciplinary contexts (Kuzu, 2025; Rodrigo, 2024). A bibliometric analysis of 3,623 papers on AI in preservice teacher education confirmed that the dominant gap in the literature lies precisely at this intersection — between technical AI concepts and their practical pedagogical implementation (Kuzu, 2025). A scoping review of AI applications in preservice teacher professional development similarly underscored that TPACK, combined with reflective practice, provides the most coherent framework for guiding preservice teachers' AI integration, with perceived ease of use emerging as the most significant determinant of AI tool acceptance in this population (Liu et al., 2026). Evidence from Philippine contexts is convergent: Rodrigo (2024) demonstrated that TPACK reveals challenges for under-resourced teachers as 'not merely technical but deeply pedagogical — knowing how to teach with AI requires rethinking the nature of instruction itself.'

The second theoretical thread is the Unified Theory of Acceptance and Use of Technology (UTAUT; Venkatesh et al., 2003), which models technology adoption as a function of performance expectancy, effort expectancy, social influence, and facilitating conditions. Extended models of UTAUT and the related Technology Acceptance Model (TAM) have been extensively applied to AI adoption in higher education, consistently demonstrating that perceived usefulness and ease of use are primary adoption drivers, though local contextual factors significantly moderate these relationships. In an extended TAM study ($N = 498$), perceived usefulness was the strongest predictor of attitude toward AI adoption ($\beta = 0.546$), with multimodal literacy and university support functioning as critical enabling conditions (Zhao et al., 2025). A Philippines-based hybrid SEM–ANN study found that perceived risk and ease of use outweighed perceived usefulness as adoption determinants in that context, suggesting that Global South students' AI uptake is conditioned by trust and accessibility concerns beyond those captured by classical TAM (Saflor, 2025). A related extended TAM study further found that ethical concerns directly predicted AI adoption behaviour ($\beta = 0.095$), with trust serving as a complementary pathway (Mustofa et al., 2025). Together, these frameworks — TPACK and UTAUT — provide complementary explanatory purchase on the study's central questions: TPACK illuminates what constitutes disciplinarily appropriate AI use in research writing, while UTAUT clarifies why preservice teachers elect to adopt ChatGPT in the first instance.

The intersection of AI literacy and professional identity formation is equally salient in preservice teacher populations. A longitudinal qualitative study tracking 46 preservice language teachers documented a three-phase trajectory in AI perception — from initial skepticism, through tentative optimism, to what the authors term 'wary readiness to adapt' — grounded explicitly in TPACK and mediated by structured pedagogical engagement with AI tools (Uwosomah & Dooly, 2025). Similarly, among 46 Philippine preservice elementary teachers, AI literacy was found to be above average but preparedness was only at a moderate level, with preparedness — rather than literacy per se — emerging as the significant predictor of motivation to use AI (Malacapay, 2025). A task-differentiated observational study of 103 preservice teachers in the Philippines found that ChatGPT was the dominant tool across all course phases, with AI use intensity increasing monotonically across a semester ($\chi^2 = 360.40$, $p < .001$, Cramér's $V = .20$), demonstrating purposive, task-calibrated AI selection behaviours consonant with

emergent domain-specific AI literacy (Hershkovitz et al., 2025). These findings collectively suggest that Philippine preservice teachers are neither passive technology consumers nor unreflective AI adopters; rather, they occupy a developmental space in which structured curricula can play a decisive role.

Reviews of GenAI in academic writing further establish that writing is the single most prevalent use case for GenAI among higher education students globally (Gabay et al., 2026; Hershkovitz et al., 2025), with scaffolded AI use — wherein students engage critically with outputs rather than accepting them wholesale — consistently producing superior learning outcomes relative to unrestricted or unguided use (Mahdi et al., 2025; Sanz-Tejeda et al., 2026). From a cognitive standpoint, AI tools demonstrably reduce extraneous cognitive load in second-language writing contexts, freeing resources for higher-order meaning-making (Yao & Fan, 2025), though this cognitive relief can become counterproductive if students transfer substantive intellectual work to the AI system rather than treating it as a scaffold within their zone of proximal development (Karagöl et al., 2025; Mahdi et al., 2025). A generative AI literacy framework mapping eight skills across Bloom's taxonomy found that 82% of 1,667 university students supported formal GenAI instruction, favouring curriculum integration over standalone training (Hershkovitz et al., 2025). These convergent signals from the literature imply that teacher-education programs occupying a Global South context — where national AI adoption infrastructure remains nascent and institutional policy frameworks are still emerging (Bond et al., 2024; Quimba et al., 2024; Vergara, 2024) — face a particular urgency in developing discipline-specific, pedagogically grounded approaches to AI-supported research writing.

This study addresses three interconnected research questions: (a) How do preservice teachers use ChatGPT across stages of the research writing process? (b) What motivates preservice teachers to adopt ChatGPT in research writing? (c) How do preservice teachers perceive the relevance of ChatGPT use to their future professional roles? By grounding the analysis in a Philippine teacher-education context, the study contributes discipline-specific, Global South evidence to a literature in which approximately 80% of studies originate from high-income, Global North settings (Bond et al., 2024), while offering practical implications for curriculum design and institutional policy.

Method

A sequential explanatory mixed-methods design was adopted, wherein a descriptive quantitative survey was administered first, followed by qualitative focus group discussions that elaborated the mechanisms and meanings underlying the survey findings (Creswell & Plano Clark, 2011). This design is appropriate for the study's explanatory purpose: the quantitative phase mapped the distribution of ChatGPT use, motivation, and perceived professional relevance across the graduating cohort, while the qualitative phase provided the contextually grounded reasoning that descriptive statistics cannot capture. Integration of results was achieved through joint displays and theme-by-statistic explanations consistent with established mixed-methods practice.

Study Design, Population, and Setting

The study was conducted at a college of teacher education in a public university in the Philippines. All graduating students constituted the population, and an institutional census survey yielded 197 usable responses. The census approach was employed rather than probability sampling to maximise representativeness within the institution, given the bounded and accessible nature of the graduating cohort. From among the survey respondents, 27 students volunteered for participation in focus group discussions; these were organised into three sessions of 8 to 10 participants each. All participants had completed classroom-based action research as part of internship requirements, ensuring a shared experiential baseline for discussing research writing with ChatGPT.

Study Tools and Data Collection

The survey instrument assessed ChatGPT use frequency across five research-writing stages (pre-writing, literature review, composing and editing, presenting results, and interpreting data), motivations for use, and perceived professional relevance across ten anticipated teacher roles. All items employed a three-point frequency scale (Always, Sometimes, Rarely). Content and face validity were established through expert review by three faculty members with specialisations in educational research and educational technology. For the qualitative phase, a semi-structured focus group guide aligned with the survey constructs was employed, probing decisions about timing of AI use, source-anchored prompting strategies, and verification routines.

Data Analysis

Descriptive statistics, frequencies and percentages, were computed for all survey items. Focus group audio recordings were transcribed verbatim, and reflexive thematic analysis following Braun and Clarke's (2006) six-phase model was conducted. The researcher served as primary coder; an independent coder reviewed the

codebook and reconciled disagreements through iterative discussion and memoing. An audit trail documented instrument decisions, coding moves, and integration choices throughout the analytic process.

Ethical Considerations

Participation was entirely voluntary, and written informed consent was obtained from all participants prior to data collection. No personally identifying information was retained in any data files. Any AI-assisted paraphrasing employed during analysis and write-up was verified against original sources. The study is bounded by its single-institution setting and reliance on self-reported data; causal effects on writing quality were neither claimed nor estimated. All findings are interpreted as descriptive and contextually explanatory.

Results and Discussion

Result

RQ1. ChatGPT Use Across Stages of Research Writing

Table 1 presents the self-reported frequency of ChatGPT use across the five research-writing stages surveyed. The distribution reveals a consistent and theoretically coherent pattern: students concentrate AI assistance at stages where benefits are immediate and interpretive risks are contained.

Table 1. Self-Reported Use of ChatGPT Across the Research-Writing Process (n = 197)

Stage	Specific Practice	Always	Sometimes	Rarely
Pre-writing	Brainstorming research topics	57%	25%	18%
Pre-writing	Drafting research questions	51%	29%	20%
Reviewing literature	Synthesizing literature	43%	34%	23%
Reviewing literature	Generating citations	38%	30%	32%
Composing and editing	Grammar and style polishing	64%	22%	14%
Presenting results	Crafting tables/figures	27%	28%	45%
Interpreting data	Explaining statistics	19%	26%	55%

Note. Percentages are rounded to the nearest whole number.

Grammar and style polishing at the composing and editing stage recorded the highest consistent-use rate (64% always), followed by brainstorming research topics at pre-writing (57% always) and drafting research questions (51% always). These high-use, low-interpretive-risk stages contrast markedly with lower rates for explaining statistics (19% always) and crafting tables or figures (27% always) — tasks that require methodological judgment and domain-specific interpretive competence. Literature synthesis occupied an intermediate position (43% always), reflecting measured but conditional use at a stage where accuracy and source fidelity are paramount.

Focus group narratives illuminate the reasoning behind this distribution. Participants typically maintained ChatGPT open during drafting but deliberately deferred deeper AI involvement in analytic phases until a human-generated outline or provisional narrative had been established. Two complementary timing strategies were consistently described: in the first, participants composed a complete human draft and subsequently employed ChatGPT to refine structure and style; in the second, they invoked ChatGPT briefly to overcome writer's block before reverting to human drafting prior to a second, selective AI pass. Across both approaches, participants articulated a risk calculus that favoured AI assistance where speed and surface readability were paramount, while actively constraining AI involvement when tasks demanded methodological precision or interpretive authority. One participant stated: 'I use it to fix my grammar and sometimes to get started when I'm stuck — but for the analysis and conclusions, I want that to be mine, because that's where my voice matters.'

RQ2. Motivations for ChatGPT Adoption

Table 2 presents the motivation profile of the survey cohort.

Table 2. Reasons for Using ChatGPT During Research Writing (n = 197)

Reason	Always	Sometimes	Rarely
Efficiency booster	68%	22%	10%
Language support	61%	26%	13%
Idea catalyst	54%	32%	14%
Confidence builder	48%	37%	15%
Curiosity/exploration	42%	38%	20%

Note. Percentages are rounded to the nearest whole number.

Efficiency was the most consistently cited motivation (68% always), followed by language support (61% always) and ideation (54% always). Confidence building and exploratory curiosity were reported with moderate frequency. In focus group discussions, efficiency was operationalised by participants as the compression of routine sub-tasks — rephrasing paragraphs, generating alternative framings for research topics, and restructuring transitional passages — rather than as the wholesale delegation of intellectual work. Language support was invoked specifically to achieve

greater clarity without sacrificing authorial voice, reflecting a normative framing of 'AI as writing coach' rather than 'AI as author.' A recurring practice was to compare multiple AI-generated suggestions against self-authored sentences and to select, modify, or reject AI outputs based on alignment with one's own argumentative intent: 'I treat it like a mirror — I can see how the sentence sounds to someone else. But I decide which version stays.'

Participants also described proactive strategies to mitigate known limitations of ChatGPT, particularly hallucination and citation fabrication. Several recounted pasting their own notes, excerpts from primary literature, or codebook entries directly into prompts to constrain AI outputs — a practice that aligns with evidence that grounding prompts in source materials improves factual alignment and reduces drift (Lo et al., 2024; Wang et al., 2024). Verification routines were equally prevalent: participants described DOI look-ups, cross-referencing against their institution's library databases, and maintaining brief AI-use logs as standard practice. These behaviours correspond to the 'source verification as critical gap' finding in recent scoping reviews of GenAI in academic writing (Gabay et al., 2026; Wu et al., 2026).

RQ3. Perceived Professional Relevance

Table 3 presents participants' self-reported perceptions of ChatGPT's relevance to anticipated professional roles.

Table 3. Perceived Relevance of ChatGPT Use to Future Professional Roles (n = 197)

Role	Very Relevant	Relevant	Not Relevant
Personalized learning architect	67%	24%	9%
Data-driven decision strategist	60%	28%	12%
Technology integration specialist	57%	30%	13%
Learning analytics interpreter	55%	30%	15%
AI literacy facilitator	52%	34%	14%
Continuous professional development curator	53%	33%	14%
Research mentor for AI-enhanced inquiry	50%	36%	14%
Ethical AI steward	48%	37%	15%
Prompt-craft coach	42%	40%	18%
Collaborator with AI and research communities	38%	45%	17%

Note. Percentages are rounded to the nearest whole number.

Participants ascribed the greatest professional relevance to ChatGPT for the role of personalized learning architect (67% very relevant), with data-driven decision making (60%), technology integration (57%), and learning analytics interpretation (55%) rated closely behind. Notably, ethical AI stewardship — rated very relevant by 48% — reflects a professional self-conception that extends beyond competency-based adoption to normative responsibility. In focus group discussions, participants elaborated that research writing with ChatGPT served dual pedagogical purposes: it simultaneously improved their own immediate academic outputs and rehearsed habits of mind — grounding, verification, disclosure — that they anticipated transferring to classroom practice. As one participant articulated: 'If I teach my students to write with AI, I need to show them how to use it properly — with sources, with checking — because that's also how I want to do research. It's the same skill.' Participants also delineated explicit boundaries they would maintain as future teachers, including mandatory disclosure of AI assistance, source-anchored prompting in student tasks, and tiered verification routines calibrated to learners' developmental levels.

Table 4. Joint Display: Quantitative Trends and Qualitative Themes Across Research-Writing Stages

Stage of Writing	Quantitative Finding (% Always)	Qualitative Theme	Representative FGD Quote
Pre-writing (brainstorming & question drafting)	57% brainstorm; 51% draft questions	AI as ideation catalyst — strategic entry point at zero-risk cognitive stage	"I open ChatGPT first when I'm staring at a blank page. It gives me five or six ideas and I pick the one that feels right for my context. Then I take over."
Literature review (synthesis & citations)	43% synthesize; 38% generate citations	Source-anchored prompting to reduce hallucinations — cautious, conditional use	"I paste the abstract of the paper directly into the prompt and say: summarise this for my literature review on [topic]. That way, it can't make up references — they're already there."

Stage of Writing	Quantitative Finding (% Always)	Qualitative Theme	Representative FGD Quote
Composing and editing (grammar & style)	64% polish grammar/style (highest rate)	Deliberate timing and authorial voice protection — AI as style coach post-draft	"I write my own draft first — always. Then I ask ChatGPT to clean it up, but I compare its version to mine and I change it back if it loses my meaning or my tone."
Presenting results (tables & figures)	27% craft tables/figures (low use)	Risk calibration — AI withheld at stages requiring data accuracy and precision	"Constructing the table is about my data. I don't trust ChatGPT to know what my numbers mean. That's where the mistakes can happen, so I do that part alone."
Interpreting data (statistics explanation)	19% explain statistics (lowest rate)	Verification routines and metacognitive control — AI excluded at highest-stakes interpretive stage	"Statistics interpretation is the part where you can ruin your study if you get it wrong. I do that myself and I go back to my methods textbooks. ChatGPT is not for that."

Note. Quantitative findings are drawn from the survey (n = 197). FGD quotes are verbatim extracts from focus group transcripts. Quotes were selected to represent the dominant theme within each stage and were verified against the corresponding survey distribution.

Discussion

The findings of this study — considered jointly across the quantitative survey and the qualitative focus group data — present a theoretically coherent and practically instructive account of how preservice teachers navigate GenAI within the demanding cognitive ecology of research writing. Three overarching interpretive threads emerge from the integration of results across the three research questions.

Strategic AI Placement and the TPACK Lens

The concentration of ChatGPT use at pre-writing and composing/editing stages, with markedly restrained use at interpretive and statistical stages, reflects a form of domain-specific AI literacy that is most productively theorised through the TPACK framework. Within TPACK's intersection of technological, pedagogical, and content knowledge (Mishra & Koehler, 2006), the participants' behaviour maps onto an intuitive understanding that AI assistance is appropriately deployed where its technological affordances (language fluency, ideation speed, surface editing) align with low-stakes writing sub-tasks, and is appropriately withheld where content knowledge and methodological judgment — the epistemological core of research writing — are at stake. This pattern is structurally consistent with Kuzu's (2025) finding that the primary gap in preservice teacher AI education is not technical but pedagogical-epistemic: knowing when and why to invoke AI in disciplinary work. It also resonates with Liu et al.'s (2026) scoping review conclusion that reflective practice, combined with TPACK, provides the most robust framework for guiding preservice teachers' AI integration decisions.

Importantly, the observed pattern converges with experimental evidence from writing research. Mahdi et al. (2025) found that AI tools were most effective as cognitive scaffolds at the pre-writing stage — precisely where the present study records the highest rates of consistent use. The systematic review by Liu and Zhong (2025), drawing on 74 studies, reported an overall standardised mean difference of SMD = 0.732 for GenAI integration in student learning, rising to 0.830 at the university level, with the notable caveat that pedagogical design consistently outweighed curricular content in moderating these effects. The metacognitive timing strategies described by participants — human-first drafting, selective AI polish, deliberate exclusion from analytic stages — operationalise exactly the kind of scaffolded, human-centred pedagogy that these meta-analytic findings identify as the decisive condition for positive outcomes (Wang & Fan, 2025).

Motivation, Adoption, and the UTAUT Framework

The motivation profile — efficiency and language support as primary drivers, followed by ideation, confidence, and curiosity — is interpretable through both the UTAUT and TAM frameworks. Efficiency and language support correspond closely to UTAUT's performance expectancy construct, while the confidence-building and curiosity motives reflect hedonic motivation dimensions incorporated in UTAUT2 (Venkatesh et al., 2012). The Philippine TAM study by Saflor (2025) is particularly pertinent: in a higher education sample from the same national context, perceived risk and ease of use emerged as more powerful adoption determinants than perceived usefulness alone, suggesting that students in the Philippine setting weight accessibility and safety

concerns alongside instrumental gains. This finding helps explain the grounding and verification behaviours documented qualitatively: participants were not merely efficiency-seeking but were simultaneously managing perceived risk of inaccuracy, citation error, and voice loss — risks that are acutely felt in formal research writing contexts.

The ethical dimension of the motivation profile merits particular attention. The active verification routines — DOI look-ups, source cross-referencing, AI-use logs — reflect a form of ethical-AI agency that complements the academic integrity concerns documented in the broader literature. Mustofa et al. (2025) established that ethical concerns directly predict AI adoption behaviour among students ($\beta = 0.095$); in the present study's population, ethical concern appears to be operationalised not as a barrier to use but as a design constraint on use — shaping the contours of adoption without foreclosing it. This nuanced posture aligns with what Uwosomah and Dooly (2025) characterise as 'wary readiness': an orientation that is neither technophobic nor uncritically enthusiastic, but disciplinarily aware. The risk of departure from this equilibrium is real: Gerlich (2025) documented that AI use is strongly associated with cognitive offloading ($r = +0.89$) and negatively correlated with critical thinking ($r = -0.49$), and Abubakar et al. (2025) found that over-reliance directly predicted negative learning outcomes ($\beta = 0.48$), moderated only when ethical awareness was high. The verification behaviours observed in this study may represent a protective mechanism, though their robustness under conditions of higher workload or weaker institutional support remains an open empirical question.

Professional Identity, AI Literacy, and Contributions to the Field

The professional relevance findings reveal that preservice teachers are engaging in a form of dual-purpose learning: developing research writing competence while simultaneously rehearsing the AI-mediated professional practices they anticipate enacting as classroom educators. This identity-as-learning dynamic is theoretically consistent with Malacapay's (2025) finding that preparedness — the readiness to act — is a stronger predictor of AI motivation than literacy alone, and with the task-differentiated AI selection study of Philippine preservice teachers (Hershkovitz et al., 2025), in which AI use intensity increased monotonically as semester complexity rose, suggesting deepening purposive agency rather than dependency. That 67% of participants rated ChatGPT as very relevant to personalized learning and 48% as relevant to ethical AI stewardship indicates a professional self-conception that integrates technological, pedagogical, and normative dimensions — precisely the AI-TPACK orientation that Kuzu (2025) identifies as the emerging target competency for preservice teacher AI education.

The study's contributions to the field are threefold. First, it provides discipline-specific quantitative and qualitative evidence from a Philippines-based teacher-education context, addressing the documented underrepresentation of Global South voices in AI education research — a gap in which approximately 80% of studies originate from the Global North (Bond et al., 2024). Second, it operationalises the joint display as an integrative methodological device that explicitly maps quantitative stage-use distributions to qualitative reasoning, strengthening the sequential explanatory design's inferential coherence. Third, it advances a program-level argument — grounded empirically rather than prescriptively — for treating ChatGPT as a pedagogically mediated scaffold rather than a freely available shortcut: the conditions under which this scaffolding is educationally beneficial are not intrinsic to the technology but depend on instructional design choices that programs and individual instructors actively control. The convergence of TPACK and UTAUT as complementary theoretical frames provides a more parsimonious account of this dynamic than either framework affords alone: TPACK explains the disciplinary-epistemic structure of appropriate AI use, while UTAUT explains the motivational and contextual conditions under which preservice teachers elect to engage with it in the first place.

Implications for Teacher-Education Programs

The convergent findings across the three research questions yield several actionable program-level implications. Research-writing courses should incorporate explicit checkpoints at each major stage of the writing process — planning, literature synthesis, drafting, and verification — at each of which students document any AI use and justify decisions to accept or modify AI outputs. The assessment architecture should grade reflective memos, anchored-prompting records, and audit trails alongside the final manuscript, so that ChatGPT functions demonstrably as a scaffold rather than a substitute. Exemplars of source-anchored prompts — incorporating students' own notes, textual excerpts, and citation lists — should be provided, and course policies should align with current guidance on transparent, human-centred AI use, positioning disclosure and verification as habits of professional integrity rather than bureaucratic compliance (Dwivedi et al., 2023; Funa & Gabay, 2025; Luo, 2024).

GenAI literacy frameworks that map writing-specific competencies across cognitive complexity levels — such as the eight-skill Bloom's-aligned framework proposed by Hershkovitz et al. (2025) — offer practical

scaffolding for curriculum design in this direction. The finding that 82% of university students in a large-scale study supported formal GenAI instruction embedded within disciplinary coursework suggests strong student receptivity for such integration. Programs in Global South contexts face additional imperatives: given that Philippine AI adoption rates remain low at the national level (3.02%; Quimba et al., 2024) and institutional policy frameworks are still nascent (Vergara, 2024), teacher-education programs are strategically positioned to model the responsible adoption practices they hope to see proliferate across basic education. As Funa and Gabay (2025) recommend, emerging economies should prioritize AI literacy integration at foundational educational levels, and programs that produce the next generation of classroom teachers occupy a direct pathway to that goal.

Limitations and Directions for Future Research

Several methodological and contextual limitations qualify the transferability of these findings. First, the study is bounded by a single-institution setting — a public university college of teacher education in the Ilocos Norte province of the Philippines. While the census design maximises internal representativeness, the institutional context carries specific characteristics — a predominantly Ilocano-speaking student population, a predominantly face-to-face delivery mode, and an institutional infrastructure that may differ meaningfully from private higher education institutions, urban universities with stronger digital infrastructure, or institutions in regions with greater English language dominance. Transferability of findings to other Philippine teacher-education contexts — particularly those in highly urbanised or highly under-resourced settings — should not be assumed without replication. More broadly, findings from this Global South context may not generalise to the Global North settings that dominate the AI-in-education literature (Bond et al., 2024), as the institutional policy landscape, language background, infrastructure, and student-AI interaction norms differ substantially.

Second, all outcome measures rely on self-report, which introduces social desirability bias and retrospective reconstruction errors that cannot be ruled out. Participants may have described more methodologically responsible AI use practices than are reflected in their actual writing workflows, particularly given the researcher's institutional role. Future studies should employ digital trace data — platform usage logs, prompt histories, or document revision trails — to corroborate self-reported patterns. The inclusion of writing product analysis, in which actual manuscripts are examined for evidence of AI-mediated text alongside researcher-coded process data, would materially strengthen causal inference about ChatGPT's effects on writing quality.

Third, the study captures a cross-sectional snapshot of a rapidly evolving technological landscape. The capabilities of ChatGPT and competing GenAI tools are advancing quickly, and students' usage patterns, risk calculi, and professional orientations may shift substantially as tool capabilities, institutional policies, and disciplinary norms co-evolve. Longitudinal designs — tracking the same cohort across semesters or into early in-service teaching — would provide evidence on whether the scaffolding-oriented AI use habits documented here are durable, transfer to new writing contexts, or are displaced by greater dependency as tool accessibility improves. Cross-institutional and cross-national comparative designs would further illuminate the contextual factors — language background, institutional AI policy, infrastructure, and faculty modelling — that either sustain or erode responsible AI use practices among preservice teachers.

Fourth, while the study addresses preservice teachers in a research-writing context, it does not examine how these students translate their own AI-writing practices into AI-teaching practices during practicum or early career teaching. This pedagogical transfer question — whether preservice teachers who develop scaffolded AI-use habits in research writing subsequently design scaffolded AI-writing activities for their own students — represents a theoretically important and empirically underexplored direction for future work at the intersection of TPACK, AI literacy, and classroom pedagogy.

Conclusion

This study documents that preservice teachers in a Philippine teacher-education institution deploy ChatGPT with discernible strategic intentionality across the research-writing process: concentrating AI assistance at pre-writing and composing/editing stages, exercising deliberate restraint at interpretive and statistical stages, grounding prompts in source materials to reduce hallucination risk, and maintaining verification routines as a standard feature of their AI-assisted writing practice. These behaviours, interpreted through the complementary lenses of TPACK and UTAUT, reflect an emerging form of domain-specific AI literacy in which technological knowledge is actively calibrated against pedagogical and content knowledge demands — the hallmark of TPACK-informed professional judgment. The findings further indicate that preservice teachers understand their current research-writing practices as anticipatory professional development: the habits of grounding, verification, and

transparent disclosure cultivated now are the same habits they intend to model and teach in their future classrooms. When teacher-education programs construct explicit scaffolding conditions — human-first drafting requirements, anchored-prompting instruction, process-oriented assessment, and disclosure-as-integrity norms — ChatGPT functions as a genuine cognitive scaffold rather than an academic shortcut. This evidence, drawn from an underrepresented Global South context, extends the international evidence base and offers a practical design template for programs seeking to cultivate AI-literate, pedagogically grounded, and ethically reflective teacher candidates in an AI-mediated educational landscape.

Author Contributions

Leonardo Daquioag Tejano: Conceptualization, Methodology, Data curation, Formal analysis, Writing—Original draft preparation, Writing—Reviewing and Editing.

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Conflicts of Interest

The author declares no conflicts of interest.

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