

From Assistance to Autonomy: The Influence of AI Virtual Assistants on Student Learning Behavior in Higher Education

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ARTICLE INFORMATION

ABSTRACT

The emergence of artificial intelligence (AI) virtual assistants has introduced new dynamics into the higher education landscape, prompting a need to understand their influence on student learning behavior. This study investigates the usage patterns of AI tools and their perceived effects on self-regulated learning and academic behavior among second-year students at Marikina Polytechnic College. The study employed a quantitative, survey-based approach involving 186 by voluntary response sampling. A structured questionnaire measured three key domains: situational usage of AI, self-regulated learning, and academic behavior. Descriptive statistics revealed that students use AI moderately and situationally, particularly during academic difficulty, while maintaining autonomy in learning tasks such as note-taking and critical thinking. Although students acknowledged AI's usefulness in clarifying complex topics, its influence on academic performance, study productivity, and task management was perceived as neutral. The findings suggest a transitional phase in which students strategically incorporate AI without becoming dependent on it, indicating both opportunities and limitations in AI's academic role. The study highlights the need for tertiary institutions to develop AI literacy frameworks, integrate ethical and purposeful AI use into curricula, and support the cultivation of digital autonomy. This research contributes to a more contextualized understanding of AI's role in Philippine higher education and offers practical implications for instructional design, policy development, and institutional innovation.

RESUMO

O surgimento dos assistentes virtuais de inteligência artificial (IA) introduziu novas dinâmicas no cenário do ensino superior, destacando a necessidade de compreender sua influência no comportamento de aprendizagem dos estudantes. Este estudo investiga os padrões de uso de ferramentas de IA e seus efeitos percebidos sobre a aprendizagem autorregulada e o comportamento acadêmico entre estudantes do segundo ano do Marikina Polytechnic College. A pesquisa adotou uma abordagem quantitativa, baseada em levantamento, envolvendo 186 participantes por meio de amostragem por resposta voluntária. Um questionário estruturado mediu três domínios principais: uso situacional da IA, aprendizagem autorregulada e comportamento acadêmico. As estatísticas descritivas revelaram que os estudantes utilizam IA de forma moderada e situacional, especialmente diante de dificuldades acadêmicas, mantendo, ao mesmo tempo, autonomia em tarefas como anotações e pensamento crítico. Embora os estudantes reconheçam a utilidade da IA para esclarecer tópicos complexos, sua influência no desempenho acadêmico, produtividade nos estudos e gerenciamento de tarefas foi percebida como neutra. Os resultados sugerem uma fase de transição em que os estudantes incorporam estrategicamente a IA sem se tornarem dependentes dela, indicando tanto oportunidades quanto limitações no papel acadêmico dessas tecnologias. O estudo ressalta a necessidade de instituições de ensino superior desenvolverem estruturas de letramento em IA, integrarem o uso ético e intencional da IA aos currículos e apoiarem a promoção da autonomia digital. Esta pesquisa contribui para uma compreensão mais contextualizada do papel da IA no ensino superior filipino e oferece implicações práticas para o design instrucional, desenvolvimento de políticas e inovação institucional.

Article process:

S Submitted: 07/17/2025

Approved: 10/03/2025

Published: 03/08/2026



Keywords:

AI Virtual Assistants,
Self-Regulated Learning,
Student Learning Behavior,
Higher Education

Keywords:

Assistentes Virtuais de
IA, Aprendizagem
Autorregulada,
Comportamento de
Aprendizagem dos
Estudantes, Ensino Superior

Introduction

The integration of Artificial Intelligence (AI) into the global education landscape represents one of the most significant paradigm shifts in modern pedagogy (Magrill & Magrill, 2024). No longer confined to back-end automation or administrative support, AI systems have evolved into interactive learning agents capable of performing complex cognitive functions such as natural language processing, predictive analytics, and adaptive content recommendation (Barrera Castro et al., 2024). In particular, AI virtual assistants (AIVAs)—including tools such as ChatGPT, Google Gemini, and Microsoft Copilot—have rapidly become part of the contemporary learner’s toolkit (Schei et al., 2024). These platforms enable students to streamline academic tasks, explore diverse information sources, and navigate coursework with a heightened sense of immediacy and access. As these tools continue to mature, they challenge conventional notions of instruction and self-learning (Adiguzel et al., 2023). While AIVAs provide substantial support in information retrieval, text generation, and academic writing, their role in fostering, or potentially undermining, autonomous learning behaviors remains ambiguous (Tan & Maravilla, 2024). The growing accessibility of such tools prompts critical questions: Are students merely optimizing their academic routines with AI, or are they gradually relinquishing foundational study practices and independent thinking in favor of algorithmic shortcuts?

AI-enhanced education has moved from the periphery to the center of strategic innovation in universities (Abulibdeh et al., 2025). Institutions across North and South America, Europe, and Asia are actively embedding AI in teaching and learning systems (Aravantinos et al., 2024). In the UAE, 79.6% of surveyed students reported using AI tools (Swidan et al., 2025), while a U.S. study found 65% of respondents had used or planned to use AI chatbots for academic work (Deschenes & McMahon, 2024). These tools are not only altering how students engage with content but also how they develop learning routines (Yaseen et al., 2025), manage academic time (Thuy & Tien, 2025), and evaluate their understanding of complex topics (Hartley et al., 2024). Nevertheless, literatures primarily highlights the instrumental benefits of AI like efficiency, accuracy, productivity (Alshahrani et al., 2024; Bahroun et al., 2023; Salas-Pilco et al., 2022) while offering limited insights into how such tools affect students’ long-term learning autonomy, cognitive engagement, and study discipline.

The integration of artificial intelligence in education presents transformative opportunities for personalized instruction, adaptive feedback, and improved academic outcomes. However, it simultaneously raises profound ethical and governance concerns that demand urgent attention (Azman & Tmkaya, 2025). Countries such as Singapore and the United States have implemented broad, nationwide AI education frameworks designed to upskill citizens at varying levels of expertise—efforts that have been linked to higher national

AI readiness scores (Rigley et al., 2023). These inclusive strategies reflect a growing recognition that AI integration must be not only technologically robust but also socially responsive. As AI tools become more embedded in educational systems, stakeholders must engage in critical discourse about their societal purpose and pedagogical implications (Linderoth et al., 2024). Key ethical considerations include data privacy, algorithmic bias, transparency, and equitable access to AI-enabled learning resources (Azman & Tümkaya, 2025). Addressing these challenges requires cross-sector collaboration and the establishment of transparent, enforceable ethical guidelines. As proposed by Flores-Vivar and García-Peñalvo (2023), the creation of an ethical observatory for AI in education could provide a structural platform for ongoing evaluation, stakeholder dialogue, and the responsible implementation of AI technologies in academic environments.

In the Philippine higher education landscape, recent articles underscores the urgency of developing institutional AI policies that are both inclusive and ethically grounded. While technology is an essential part of teaching and learning processes (Roxas, 2023), Cacho (2024) advocates for the implementation of balanced, forward-thinking guidelines that support the responsible integration of generative AI in university teaching and learning. Meanwhile, Asirit & Hua (2023) reveal uneven levels of AI readiness among college students across demographic groups, highlighting disparities in access and understanding that could widen existing educational gaps. To address this, they call for robust and equitable AI education programs. Diokno (2024) emphasize the need for institutional frameworks that guide AI application. Moreover, Barnes & Hutson (2024) explore the ethical risks associated with AI integration—particularly issues of algorithmic bias—and argue for interdisciplinary collaboration and proactive policy design to ensure fairness and accountability. This AI policy framework should support not only instructional practices but also research activities and academic governance (Garing et al., 2025).

While global research highlights the functional advantages of AI in education, it also underscores the pressing need to establish policies that ensure its ethical and responsible integration., there remains a critical gap in understanding its impact on student autonomy, self-regulation, and engagement—particularly in resource-constrained settings like regional state colleges in the Philippines. This study investigates how second-year students at Marikina Polytechnic College use AI virtual assistants (AIVAs) in relation to their situational learning patterns, independent study behaviors, and perceived academic productivity. Grounded in the continuum from assistance to autonomy, the research aims to determine whether AIVAs merely serve as academic tools or are actively reshaping learning behaviors in the Philippine higher education context.

This study investigates the influence of AI virtual assistant usage on the learning behavior of second-year students at Marikina Polytechnic College, focusing on the frequency and context of use in relation to their learning autonomy, critical thinking, and independent study practices. It also examines how AI tools impact students' study habits, academic productivity, and perceived performance, to determine whether these technologies support self-directed learning or promote dependency. Specifically: To describe the situational patterns of AI virtual assistant usage among second-year students at Marikina Polytechnic College; To examine how AI virtual assistant usage influences students' self-regulated learning and To assess the impact of AI virtual assistants on students' academic behavior.

Methodology

Research Approach

This study adopted a quantitative, survey-based research design (Wilson et al., 2024) to explore the extent of AI virtual assistant usage and its perceived influence on the learning behaviors of second-year students at Marikina Polytechnic College. The survey approach was deemed most appropriate for gathering systematic, large-scale self-reported data related to students' study routines, independent learning practices, and perceptions of academic productivity in the context of AI-assisted learning. The research was non-experimental in nature, with an emphasis on descriptive analysis to provide a comprehensive profile of student experiences without inferring causal or predictive relationships.

Sampling

The target population for this study consisted of second-year undergraduate students enrolled at Marikina Polytechnic College during the Academic Year 2024–2025. A total of 186 students participated in the study through voluntary response sampling (Murairwa, 2015), wherein participants self-selected to take part in the survey after being invited. While this non-probability sampling method limits generalizability and is susceptible to self-selection bias, it was deemed appropriate given the exploratory nature of the research and the logistical advantages it offered in an academic setting. The final sample size was considered sufficient for descriptive statistical analysis and provided meaningful insights into student patterns of AI usage, learning autonomy, and academic behavior.

Instrument Development and Validation

To address the objectives of the study, a researcher-developed structured questionnaire served as the primary data collection instrument. The development of the tool was directly aligned with the study's three specific objectives, focusing on students' use of AI virtual assistants and their perceived influence on academic-related behaviors. The instrument was designed to gather comprehensive quantitative data across three domains: situational usage patterns, self-regulated learning, and academic behavior.

The study adhered to ensure validity and reliability of the instrument used in the study (Ansari & Khan, 2023). For the validity, the initial pool of questionnaire items was reviewed by a panel of experts in educational technology, assessment, and psychology. Their feedback guided revisions related to item clarity, domain alignment, and construct representation. A pilot test involving 30 second-year students (excluded from the main sample) was conducted to assess the instrument's reliability. Minor modifications in item phrasing and structure were applied based on pilot data analysis to enhance interpretability and response accuracy.

The questionnaire was composed of three major sections, each corresponding to a specific objective:

1. **Situational Patterns of AI Virtual Assistant Usage** – This section assessed the frequency and context of students' AI tool usage (e.g., ChatGPT, Google Gemini, Microsoft Copilot), such as whether AI was used for routine tasks, complex assignments, or content verification. The response scale followed a five-point Likert format: Never (1), Rarely (2), Sometimes (3), Often (4), Always (5). This section achieved a Cronbach's alpha coefficient of 0.841, indicating good internal consistency.

2. **Self-Regulated Learning** – This section explored students' perceived autonomy, critical engagement with AI-generated content, and sustained independent learning practices, including note-taking and problem-solving without reliance on AI tools. Respondents rated their agreement using a Likert scale of: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5). The internal consistency for this section was acceptable, with a Cronbach's alpha coefficient of 0.714.

3. **Academic Behavior** – This section examined how AI tools impact students' study habits, academic productivity, and perceived academic performance, including self-assessed learning outcomes and time management practices. The same five-point agreement scale was used: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5). This section demonstrated good internal consistency, with a Cronbach's alpha coefficient of 0.863.

Data Collection and Analysis

Data were gathered through a structured survey administered to second-year students enrolled at Marikina Polytechnic College during the Academic Year 2024–2025. The validated questionnaire was disseminated electronically via Google Forms, chosen for its efficiency, accessibility, and capacity to support wide-scale digital data collection. This platform allowed respondents to complete the instrument at their convenience while preventing duplicate submissions through a one-response-per-user setting.

Respondents were provided with clear instructions on how to accomplish the questionnaire and were given a one-week period to complete their responses. Follow-up reminders were issued at regular intervals to encourage participation and ensure a sufficient response rate. Upon the conclusion of the collection period, survey responses were automatically compiled and exported to Microsoft Excel, which was used for data cleaning, organization, and analysis. Only completed responses were retained for analysis.

The study utilized descriptive statistics, specifically the arithmetic mean, to analyze the data across the three dimensions of the study: (1) situational patterns of AI virtual assistant usage, (2) self-regulated learning, and (3) academic behavior. Each survey item was rated using a five-point Likert scale, and corresponding mean scores were computed to determine the level of frequency or agreement. Interpretation was guided by pre-established interval ranges specific to each section's response scale, facilitating a clear understanding of students' patterns of AI usage and their perceptions of its influence on their learning behavior.

Ethical Consideration

This study was conducted in accordance with institutional ethical standards for research involving human participants. Prior to data collection, the full research protocol—including the survey instrument and informed consent process—was formally reviewed and approved by the Research Ethics Committee through the Research and Development Office of Marikina Polytechnic College.

Participation in this study was entirely voluntary, with all respondents receiving a digital informed consent form outlining the study's purpose, procedures, and their right to withdraw at any time without penalty. It was made clear that participation would not impact students' academic standing or grades in any way. To ensure privacy, the survey collected no personally identifiable information, and all responses were anonymous and accessible only to the primary researcher. Data were gathered through Google Forms, stored in a password-protected digital folder, and backed up in encrypted local storage. All electronic data will be retained only until the completion and publication of the study, after which they will be permanently deleted to maintain participant confidentiality.

Result and Discussion

This section presents the results organized around the specific objectives of the. Data gathered through the structured questionnaire reveal how second-year students at Marikina Polytechnic College engage with AI tools. The following tables and analyses provide detailed insights into the behavioral patterns, cognitive strategies, and perceived academic changes associated with AI usage, offering implications for instructional practices, policy development, and AI literacy integration in higher education.

Table 1.

Situational patterns of AI virtual assistant usage among the respondents

Indicators	<i>M</i>	<i>SD</i>	<i>V.I</i>
I use AI virtual assistants to help with my studies	3.26	0.86	Sometimes
I use AI tools more now than when I first started	3.08	0.94	Sometimes
I rely on AI assistants when studying gets harder	3.27	1.00	Sometimes
I use of AI virtual assistants even for tasks I can do myself	2.43	1.01	Rarely
I check AI-generated answers before forming my own understanding of a topic	3.22	1.11	Sometimes
General Weighted Average	3.05	1.03	Sometimes

Table 1 presents the situational patterns of AI virtual assistant usage among second-year students at Marikina Polytechnic College. The general weighted mean for this domain is 3.05, interpreted as "Sometimes", which indicates that students use AI tools in a moderate and context-specific manner rather than habitually or continuously.

The item with the highest mean, "I rely on AI assistants when studying gets harder" ($M = 3.27$, $SD = 1.00$), suggests that students tend to turn to AI when confronted with academic difficulties. Similarly, "I use AI virtual assistants to help with my studies" received a comparable mean of 3.26, reinforcing the idea that AI is perceived primarily as a support tool during complex or challenging academic tasks. These findings reflect a reactive rather than proactive engagement with AI, where students selectively utilize these tools when faced with cognitive barriers or time constraints. The response to "I use AI tools more now than when I first started" ($M = 3.08$) indicates a gradual increase in AI adoption, possibly linked to growing digital fluency and exposure to platforms such as ChatGPT, Microsoft Copilot, and Google Gemini. However, this increase remains within the "Sometimes" range, implying that students are still exploring the role of AI in their academic workflows rather than fully integrating it into their routine study habits.

Notably, the item "I use AI virtual assistants even for tasks I can do myself" received the lowest mean score ($M = 2.43$, interpreted as "Rarely"). This reflects student restraint in overusing AI tools, suggesting a level of self-awareness and academic responsibility. Students appear to draw a line between assistance and dependency, indicating that they maintain control over tasks they are capable of performing independently. This behavior is a promising indicator of learner autonomy. Moreover, the item "I check AI-generated answers before forming my own understanding of a topic" scored 3.22, again within the "Sometimes" range. While this suggests that not all students consistently verify AI outputs, it does show that they practice basic critical evaluation, treating AI-generated content not as final answers but as starting points for deeper understanding.

These findings suggest that students at Marikina Polytechnic College are developing a strategic and discerning approach to AI use, treating virtual assistants as supplementary tools during academic challenges rather than as substitutes for cognitive effort. This emerging pattern of self-regulated and selective engagement highlights the need for AI literacy programs that emphasize not just technical skills, but also ethical and purposeful use (Biagini, 2024). Such practices support the integration of AI as a scaffold for learning autonomy, reinforcing the study's central theme of transitioning from assistance to independence in higher education.

Table 2

Influence of AI Virtual Assistant Usage on Self-Regulated Learning

Indicators	M	SD	V.I
AI enhanced my independent learning ability.	3.29	0.86	Neutral
I continue to verify information even if I employ AI.	3.45	0.96	Agree
AI reduced my dependence on traditional study skills.	3.14	0.85	Neutral
I personally solve the problems before referring to AI.	3.75	0.73	Agree
AI helps me to think critically rather than providing answers to me	3.52	0.79	Agree
I consciously seek learning materials other than those available from AI.	3.49	0.76	Agree
I am convinced that I can learn without anyone's support, even including AI.	3.54	0.87	Agree
I continue to make notes and study concepts on my own without relying on AI.	3.82	0.78	Agree
I study subjects based on my interest, and not merely on the advice given by AI.	3.84	0.78	Agree
AI has not distracted me from my practice of reading complete academic materials.	3.58	0.82	Agree
General Weighted Average	3.54	0.85	Agree

Table 2 presents the responses of second-year students regarding the influence of AI virtual assistant usage on their self-regulated learning behaviors, encompassing independent learning, critical thinking, and learner autonomy. The general weighted mean is 3.54 with a standard deviation of 0.85, interpreted as "Agree," indicating that students perceive AI tools as facilitators of—but not substitutes for—self-directed learning.

The highest agreement was observed for the statement "I study subjects based on my interest, and not merely on the advice given by AI" ($M = 3.84$, $SD = 0.78$), indicating that students retain personal agency in choosing learning content. Similarly, strong agreement was expressed with "I continue to make notes and study concepts on my own without relying on AI" ($M = 3.82$, $SD = 0.78$), highlighting the continued relevance of traditional learning methods despite the availability of digital tools. These findings suggest that AI has not displaced self-initiated academic practices but rather coexists with them. The item "I personally solve the problems before referring to AI" received a mean of 3.75 ($SD = 0.73$), showing that students often engage in cognitive effort prior to consulting AI tools, treating them as secondary supports rather than primary problem-solvers.

This behavior aligns with the response to "I am convinced that I can learn without anyone's support, even including AI" ($M = 3.54$, $SD = 0.87$), further reinforcing the presence of strong learner autonomy among the respondents. Students also demonstrated critical thinking in their engagement with AI. The statement "AI helps me to think critically rather than providing answers to me" had a mean of 3.52 ($SD = 0.79$), while "I continue to verify information even if I employ AI" received a mean of 3.45 ($SD = 0.96$).

These responses indicate that students do not passively accept AI-generated content but engage in evaluative practices before incorporating such information into their learning. A moderate level of agreement was shown in "I consciously seek learning materials other than those available from AI" ($M = 3.49$, $SD = 0.76$), suggesting that students are willing to explore

multiple resources, reflecting resourcefulness and academic independence. Conversely, more neutral responses were recorded for "AI enhanced my independent learning ability" ($M = 3.29$, $SD = 0.86$) and "AI reduced my dependence on traditional study skills" ($M = 3.14$, $SD = 0.85$). These indicate that students are uncertain about the transformative effect of AI on their learning independence or whether AI significantly alters their reliance on traditional academic practices. This neutrality suggests that while AI may play a role in shaping certain aspects of learning behavior, it has not yet become integral to how students regulate their learning processes.

The findings indicate that students at Marikina Polytechnic College are developing a balanced use of AI virtual assistants—supporting rather than replacing independent learning and critical engagement. This underscores the importance of integrating AI literacy into curricula to promote ethical, reflective, and self-directed use (Hazari, 2024). As students remain in a transitional phase, institutions are encouraged to design scaffolded interventions that align AI engagement with long-term goals of autonomy and self-regulated learning.

Table 3

Impact of AI Virtual Assistant Usage on Students' Academic Behavior

Indicators	M	SD	V.I
AI has improved how I study and do assignments	3.07	0.95	Neutral
AI makes me more productive in conducting studies.	2.92	0.84	Neutral
I perform better in exams and assignments using AI	2.73	0.87	Neutral
My study sessions now include more AI-based learning than before.	2.78	0.92	Neutral
My grades have been transformed after studying with the help of AI	2.88	0.86	Neutral
AI has helped me directly increase my knowledge on complex topics.	3.18	0.94	Agree
I rely more on AI-generated summaries as opposed to reading full texts.	2.72	0.94	Neutral
My capability to implement knowledge in the real world is enhanced using AI.	2.90	0.86	Neutral
AI has also influenced the manner in which I organize my study time and prioritize	2.78	0.91	Neutral
I have reduced the time I spend on traditional studying (reading books, manual, google searches, hand written notes) since embracing AI.	2.83	1.00	Neutral
General Weighted Average	2.88	0.92	Neutral

Table 3 presents the perceived impact of AI virtual assistant usage on students' academic behavior, including their study habits, productivity, academic performance, and engagement with learning tasks. The general weighted mean for this domain is 2.88, with a standard deviation of 0.92, interpreted as "Neutral." This result suggests that students do not strongly perceive AI tools as having a significant positive or negative effect on their academic behavior.

Among the indicators, the only item interpreted as "Agree" was "AI has helped me directly increase my knowledge on complex topics" ($M = 3.18$, $SD = 0.94$). This reflects that students recognize AI tools as beneficial in enhancing their conceptual understanding,

particularly in subjects they find difficult. This aligns with the global role of AI in providing instant, scaffolded explanations that assist learners in decoding complex content.

Conversely, all other indicators received mean scores interpreted as “Neutral,” reflecting mixed or uncertain perceptions of AI’s contribution to core academic behaviors. The statement “AI has improved how I study and do assignments” received a mean of 3.07 (SD = 0.95), suggesting that some students may experience improved task efficiency, but not to a degree that reflects widespread transformation.

Lower scores were recorded for more outcome-based indicators. For example, “I perform better in exams and assignments using AI” had a mean of 2.73 (SD = 0.87), and “My grades have been transformed after studying with the help of AI” scored 2.88 (SD = 0.86). These results imply that while AI may support study processes, students do not strongly attribute improvements in academic performance to AI use.

Indicators related to changes in study habits also scored within the neutral range. “My study sessions now include more AI-based learning than before” (M = 2.78, SD = 0.92) and “I have reduced the time I spend on traditional studying since embracing AI” (M = 2.83, SD = 1.00) suggest that AI has not yet replaced conventional study strategies. Similarly, the use of AI for summaries (“I rely more on AI-generated summaries as opposed to reading full texts,” M = 2.72, SD = 0.94) and time organization (“AI has influenced the manner in which I organize my study time,” M = 2.78, SD = 0.91) also remain neutral, indicating limited influence on the structure or depth of academic routines.

Finally, the statement “My capability to implement knowledge in the real world is enhanced using AI” also received a neutral rating (M = 2.90, SD = 0.86), which reflects that students may not yet see AI tools as directly enhancing their practical or applied learning skills.

The generally neutral responses suggest that while AI virtual assistants are present in students’ academic routines, they are not yet seen as transformative to learning behavior. This indicates superficial or selective use, with limited impact on productivity and study habits (Bhimavarapu, 2023). To unlock AI’s pedagogical potential, institutions must guide students in using these tools meaningfully—integrating them with traditional strategies to enhance both cognitive depth and academic efficiency.

Conclusion

This study clarifies how AI virtual assistants intersect with student learning behavior in a Philippine tertiary context by synthesizing three domains: situational usage, self-regulated learning, and academic behavior. Usage is situational and moderate (domain mean = 3.05, “Sometimes”): students report turning to AI when study demands intensify (e.g., “rely on AI when studying gets harder,” M = 3.27) and for help with coursework (M = 3.26), while

exercising restraint in tasks they can perform independently ($M = 2.43$, “Rarely”). Self-regulated learning indicators are positively endorsed (domain mean = 3.54, “Agree”): respondents continue note-taking ($M = 3.82$), attempt problem-solving before consulting AI ($M = 3.75$), verify information ($M = 3.45$), and express confidence in learning without assistance ($M = 3.54$). In contrast, perceived effects on academic behavior are neutral (domain mean = 2.88): students acknowledge help with complex topics ($M = 3.18$) yet do not attribute improvements in grades, productivity, or time management to AI (items ≈ 2.7 – 3.1 , “Neutral”).

Taken together, the evidence points to a transitional adoption pattern: students selectively integrate AI as support—especially under cognitive load—while preserving autonomy and core study habits. This aligns with your original conclusion that AI is becoming a standard component of the academic toolkit but, without structured guidance, use risks remaining shallow, inconsistent, or ethically ambiguous. Accordingly, higher education institutions should proactively scaffold AI use so that it is intentional, ethical, and pedagogically aligned with institutional learning goals. Concretely, curricula should position AI not merely as a convenience tool but as a cognitive partner within AI-enhanced instructional models that cultivate verification practices, metacognition, and reflective problem-solving—moving learners from ad-hoc assistance toward purposeful, self-directed learning with AI.

Finally, because neutral ratings cluster around productivity, time management, and perceived performance, academic support structures (tutoring, assessment design, study-skills coaching) should be AI-aware by design—embedding disciplined prompting, source-checking protocols, and task-framing strategies that help students translate AI-mediated understanding into sustained academic behaviors and outcomes. Future work can test whether course-embedded, scaffolded AI activities (e.g., verification checklists, reflection logs, and staged problem-solving before AI consultation) shift neutral academic-behavior ratings toward demonstrable gains in efficiency and performance across time and contexts.

Recommendations

To build upon the scope and limitations of this study, future research should expand beyond a single institutional context and include students from varied disciplines, year levels, and socio-demographic profiles. Broader and more diverse samples would enable comparative insights and enhance generalizability across tertiary education contexts.

Employing longitudinal or mixed-method research designs is also recommended to capture the evolving impact of AI virtual assistant usage on students’ learning behaviors over time. Moreover, incorporating faculty perspectives and institutional policy reviews would offer a holistic understanding of AI’s pedagogical integration and ethical governance in higher education. Exploring academic integrity concerns, particularly how students interpret the ethical use of AI-generated content, should also be a priority for future investigations.

For tertiary institutions, the findings highlight the need to proactively integrate AI literacy within the curriculum, equipping students with the competencies to use AI tools critically, ethically, and purposefully. Instructional models should move beyond viewing AI as a convenience and instead position it as a scaffold for independent thinking, inquiry, and creativity. Institutions must also establish clear, inclusive, and adaptive policies on AI use, ensuring academic integrity while accommodating innovation.

As disparities in digital access persist, equity-focused strategies must accompany AI adoption to avoid widening existing learning gaps. Ultimately, higher education must embrace its role in guiding students toward thoughtful and responsible engagement with AI—ensuring that technology enhances, rather than diminishes, learner autonomy and academic integrity.

Declaration of Generative AI in Scientific Writing

The author declares that ChatGPT was used to assist in the preparation of this manuscript. Its use was limited to language refinement, grammar correction, formatting guidance, and improvement of clarity and academic tone, and translation. All substantive scholarly insights, including the review of literatures, research design, and data interpretation were developed, analyzed, and critically evaluated by the author. All interpretations, arguments, conclusions and recommendations presented in this study are original and remain the full responsibility of the author.

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