

The Modern Developer's Dilemma: The Impacts of Generative AI to Problem Solving Skills and Critical Thinking of 3rd year IT Students at Quezon City University

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ABSTRACT

The widespread adoption of Generative Artificial Intelligence (AI) in programming education has significantly transformed the way students approach academic tasks, coding activities, and technical problem-solving. This study investigated the impacts of Generative AI utilization on the problem-solving skills and critical thinking skills of 3rd year Information Technology students at Quezon City University. The primary objective of the study was to determine the level of Generative AI utilization among students and examine its significant relationship and predictive effect on students' cognitive and technical skills. A quantitative descriptive-correlational research design was employed using a validated digital survey questionnaire distributed through Google Forms to 273 respondents selected through stratified random sampling. The collected data were analyzed using weighted mean, standard deviation, Pearson Product-Moment Correlation, Independent Samples t-test, regression analysis, and Cronbach's alpha reliability testing. The findings revealed that 69.6% of the respondents were highly utilizing Generative AI, using AI tools often (37%) or very often (32.6%) on a weekly basis. Results further showed that respondents demonstrated a high level of Generative AI utilization across academic tasks, code generation, debugging, and technological reliance, with students frequently relying on AI tools for programming assistance, error explanation, and task completion. Respondents also exhibited positive levels of problem-solving and critical thinking skills, particularly in evaluating AI-generated outputs, understanding programming logic, and resolving coding errors. Reliability analysis showed excellent internal consistency for the overall instrument ($\alpha = .973$), while the Critical Thinking Skills scale achieved good reliability after reverse coding ($\alpha = .890$). Pearson correlation analysis revealed a very strong positive relationship between Generative AI utilization and problem-solving skills ($r = .896$, $p < .001$) and a moderate positive relationship between AI utilization and critical thinking skills ($r = .407$, $p < .001$). Furthermore, Independent Samples t-test results showed a statistically significant difference between students with high and low AI utilization in terms of problem-solving skills ($t = 10.85$, $p < .001$). Regression analysis further confirmed that Generative AI utilization significantly predicts students' problem-solving skills ($R^2 = .803$, $\beta = .896$, $p < .001$). Overall, the study concludes that Generative AI can serve as an effective educational support tool that enhances programming efficiency, technical learning, and cognitive development when used responsibly and balanced with independent reasoning and critical evaluation.

Keywords: Critical Thinking Skills, Generative Artificial Intelligence, Information Technology Students, Problem-Solving Skills, Quantitative Descriptive-Correlational Research

INTRODUCTION

In today's generation, many students are already using Artificial Intelligence (AI) to make their assignments, projects, and other academic tasks easier and faster. This is especially true for Information Technology (IT) students, where AI plays a big role in system development, programming, problem-solving, and critical thinking activities. Although Artificial Intelligence greatly helps students, especially IT students who are into programming, there are also concerns about its impact on learning and cognitive abilities. Because of AI, students may no longer fully develop their critical thinking and problem-solving skills, since answers and

solutions are now easily accessible. Some students tend to rely on AI instead of thinking independently, as it quickly provides solutions to their problems. There are studies that suggest AI helps students learn faster and improves productivity, while others argue that it may negatively affect learners' cognitive skills, particularly their critical thinking and problem-solving abilities.

According to the study of Agnaou, A. and El Asri, H. (2025) on Artificial Intelligence and collaborative learning, they examined the impact of AI on students' creativity, critical thinking, and problem-solving skills. Their findings showed that AI has the potential to enhance the learning experience, especially in group activities and idea generation. However, they also emphasized that AI must be used properly to ensure that it strengthens students' cognitive skills rather than replacing their own thinking.

Despite the benefits of AI integration, several studies have raised concerns regarding its potential impact on cognitive skill development. While AI tools improve task completion speed, they may reduce opportunities for deep thinking, problem-solving, and independent analysis (Bender et al., 2021; Cotton et al., 2023). Existing research primarily focuses on the advantages of AI in education, such as efficiency and accessibility, but often lacks emphasis on its potential drawbacks, particularly in terms of students' critical thinking and problem-solving proficiency. Furthermore, many studies do not quantitatively measure the relationship between AI reliance and cognitive performance, leaving a gap in empirical evidence.

This gap highlights the need to investigate whether increased reliance on Generative AI affects students' ability to think critically and solve problems independently. Specifically, there is limited research examining how AI usage influences technical persistence, logic ownership, and architectural thinking among Information Technology students. Without such analysis, it remains unclear whether AI serves as a learning aid or a factor contributing to cognitive dependency.

In response to this gap, this study aims to examine the impact of Generative AI reliance on the problem-solving proficiency and critical thinking skills of 3rd-year Bachelor of Science in Information Technology (BSIT) students at Quezon City University. The study utilizes a quantitative approach to measure AI usage and correlate it with indicators such as technical persistence, logic ownership, and depth of mental effort in system design.

The findings of this study are expected to provide valuable insights for students, educators, and academic institutions. For students, the study may raise awareness about the importance of balancing AI usage with independent learning. For educators, it may serve as a basis for designing instructional strategies that promote critical thinking despite the presence of AI tools. For institutions, the results may contribute to policy development regarding the ethical and effective use of AI in education. As emphasized by Holmes et al. (2019), the responsible integration of AI in education requires a clear understanding of both its benefits and its potential risks.

A. Statement of the Problem

This study is to quantitatively determine the impact of Generative AI reliance on the problem-solving proficiency and critical thinking levels of 3rd-year BSIT students at Quezon City University.

Specifically, this study seeks to answer the following questions:

1. What is the demographic profile of the respondents in terms of:

1.1 Age

1.3 Sex

1.3 Frequency of Generative AI usage

2. What is the level of Generative AI usage among the respondents in terms of:

2.1 Frequency of use;

- 2.2 Extent of use for code generation (boilerplate/logic);
- 2.3 Extent of use for debugging and error-tracing; and
- 2.4 Technological Reliance (AI-first vs. Manual-first approach)?
3. What is the level of problem-solving proficiency of the respondents as measured by:
 - 3.1 Scores in Technical Persistence (duration of manual effort); and
 - 3.2 Scores in Logic Ownership (accuracy of code explanation during defense)?
4. What is the level of critical thinking of the respondents in terms of when grouped according to their usage of Generative AI?
5. Is there a significant relationship between the frequency of AI usage and the students' problem-solving proficiency?
6. Is there a significant difference in the logic ownership scores between students who use an "AI-first" approach and those who use a "Manual-first" approach?
7. To what extent does AI reliance predict the decline in technical persistence among BSIT students?

RELATED STUDIES

The use of artificial intelligence tools such as ChatGPT has changed the way teaching and learning happen in higher education. These tools are used more and more in programming education and problem-solving activities. This is because they can explain things help with coding and support school tasks. However researchers are not sure how these tools affect students critical thinking, problem-solving skills and ability to learn on their own. This chapter looks at what has been written about using GenAI in education. It focuses on the things it can do for students how it affects their brains and the risks that come with it.

Recent studies consistently show that Generative AI improves students' academic performance It does this by enhancing understanding, productivity and task completion. Research by Casingal and Caerlang (2026) and Baria and Garg (2025) demonstrates that students who use ChatGPT perform better in academic tasks, particularly in writing, comprehension, and research output. These improvements are often linked to AI's ability to provide immediate feedback and simplify complex concepts.

Similarly, Salsabila et al. (2024) found that AI-supported learning significantly improves students' problem-solving performance, especially in Computer Science-related tasks. This aligns with findings from other studies showing that AI tools help students complete assignments more efficiently and with greater confidence. Collectively, these studies suggest that GenAI functions as an academic enhancer. It improves both performance and learning efficiency when appropriately used.

A major theme in the literature is the influence of GenAI on students' problem-solving abilities. Zhou, Teng, and Al-Samarraie (2024) found that ease of use of GenAI tools significantly enhances students' self-regulation, which subsequently improves problem-solving and critical thinking skills. This indicates that the effectiveness of AI is not only dependent on access but also on how students manage their learning process.

In programming education, similar patterns emerge. Talandron-Felipe (2025) observed that ChatGPT enables students to complete coding tasks more efficiently and produce more advanced solutions. However, students often rely on repeated prompting rather than independent reasoning, which limits deeper conceptual learning.

Boitizon et al. (2025) further support this finding by reporting that AI code assistants improve debugging accuracy and problem-solving speed among IT students. However, they also caution that excessive reliance on

these tools may weaken long-term skill development. Together these studies suggest that while GenAI enhances problem-solving performance it may also reduce independent cognitive engagement when overused.

Generative artificial intelligence (GenAI) has grown in importance in Bachelor of Science in Information Technology (BSIT) programs. This is due to its applications in programming, system development, debugging, and problem resolution. BSIT students frequently rely on AI tools such as ChatGPT to support coding activities. They use it to understand programming concepts, and generate solutions, improving efficiency and reducing development time (Boitizon et al., 2025; Talandron-Felipe, 2025).

The literature consistently discusses the impact of GenAI on critical thinking. Students' reliance on AI is directly related to their capacity to evaluate AI-generated outputs, with lower analytical abilities resulting in greater dependence (Hou et al., 2025). While ChatGPT improves idea production and efficiency, excessive use may diminish independent thinking and increase academic misconduct concerns (He et al., 2025). Similarly, excessive reliance on GenAI can negatively affect memory retention, academic performance, and self-directed learning (Abbas et al., 2024). Overall, GenAI shows a dual effect, supporting cognitive development while also risking reduced critical thinking when used uncritically.

Academic integrity is also a major concern. GenAI introduces risks such as plagiarism, cheating, and reduced originality in academic work (Cotton et al., 2024). In response, institutions are encouraged to redesign assessments using frameworks like the “Against, Avoid, and Adopt (AAA)” model rather than simply restricting AI use (Lye & Lim, 2024). However, studies in the Philippine context show that although AI is widely accepted, many institutions still lack clear ethical guidelines for its use (De Guzman et al., 2024).

Self-regulation is critical to the effective use of AI. Students who actively engage with GenAI show increased self-regulated learning skills for managing academic activities (Zantua, 2025). Furthermore, self-regulation regulates the association between AI use and cognitive performance. This implies that AI benefits are contingent on how students govern and direct its use (Zhou et al., 2024). This emphasizes the significance of using AI in a disciplined and responsible manner.

Overall the literature presents GenAI as both beneficial and risky, in education. While it improves efficiency, organization, and problem-solving support (Dungganon, 2026; Giray et al., 2026), it also raises concerns. These concerns include overreliance, reduced cognitive engagement and academic integrity issues (Batista et al., 2024). In synthesis, GenAI is most effective when used as a guided learning tool supported by self-regulation and institutional policies, ensuring that it enhances learning without weakening critical thinking and independent skills.

DESIGN AND METHODOLOGY

A. Research Design

This study adopts a quantitative descriptive-correlational research design to examine the relationship between Generative Artificial Intelligence (AI) reliance and the problem-solving proficiency and critical thinking skills of 3rd-year Bachelor of Science in Information Technology (BSIT) students at Quezon City University. Additionally, studies indicate that students' engagement with AI-generated outputs may affect how they evaluate information, make decisions, and develop critical reasoning strategies. (Oliveira, L., Tavares, C., Strzelecki, A., & Silva, M. 2025)

B. Respondents of the Study

The respondents of this study will consist of third-year Bachelor of Science in Information Technology (BSIT) students at Quezon City University (QCU). Their exposure to AI-assisted technologies provides an appropriate context for examining how the use of Generative AI. may influence cognitive development and decision-making processes. Similar studies have limited their respondents to specific Information Technology-oriented student groups to ensure alignment between the participants and the research objectives (UiTM Generation Z Study, 2025; An Exploration of Online Learning Habits and Academic Productivity among BSIT Students, 2025).

C. Sampling Technique

The study will use stratified random sampling as the sampling technique to select respondents from the population of 852 third-year Information Technology students at Quezon City University. According to Göksel and Akgül (2021), stratified sampling is appropriate when comparing student groups across levels of experience, as it helps control for differences in exposure to programming courses and technology use. The population will be divided into strata according to sections, and respondents will be randomly selected from each group. This technique ensures that all subgroups within the population are proportionally represented and reduces sampling bias.

To determine the appropriate sample size, the study will utilize Slovin's Formula with a 5% margin of error. Given the total population of 852 third-year Information Technology students, the computed sample size is approximately 273 respondents, which will serve as the participants of the study.

$$n = \frac{N}{1 + Ne^2}$$

Where:

n = Sample Size

e = Margin of Error

N = Population Size

D. Data Gathering

This section delineates the systematic approach executed by the researchers to acquire the necessary empirical data for the study "The Modern Developer's Dilemma: The Impacts of Generative AI. to Problem Solving Skills and Critical Thinking of 3rd Year IT Students at Quezon City University" (Calderon & Gonzales, 1993). To ensure the reliability and validity of the findings and uphold ethical standards in the treatment of respondents, a structured data gathering procedure will be strictly observed throughout the research process (Creswell & Creswell, 2018). The researchers collected the answered questionnaires, and the questionnaires were checked to ensure that the respondents answered all the questions. A total of 273 respondents were recorded in the survey.

E. Instrument Used

The study will utilize a researcher-made questionnaire through Google Forms as the primary instrument for data collection. The questionnaire will consist of several sections, including respondent profile information and statements designed to measure the respondents' use of Generative AI. and its perceived impacts on Problem Solving Skills and Critical Thinking.. The first section gathers demographic data and establishes the students' baseline AI usage profiles. The following section utilizes a four-point Likert Scale to determine the respondents' level of agreement with each statement. The response scale will consist of: Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1) to measure the frequency of their verification methods; utilizing an even-numbered scale eliminates the neutral midpoint, which forces respondents to make a definitive choice and yields more precise data regarding their actual behavior (Joshi et al., 2015).

To ensure the accuracy and reliability of the gathered data, the constructed Google Form questionnaire will undergo a rigorous validation process prior to its deployment. The draft instrument will be presented to a validation panel composed of a statistician, the researchers' advising professor, and Information Technology experts. The statistician will evaluate the questionnaire to establish both face and content validity, ensuring that the items related to Generative AI., Problem Solving Skills, and Critical Thinking are conceptually appropriate, technically accurate, and aligned with the objectives of the study.

Furthermore, the statistician will assess whether the statements effectively measure the perceived impacts of Generative AI. use among third-year Information Technology students and determine if the questionnaire items are suitable for the intended statistical treatments. Incorporating expert judgment in the validation process is a

critical procedure that helps ensure that the instrument accurately and consistently measures the intended variables while minimizing ambiguity and improving research reliability (Taherdoost, 2016).

F. Statistical Treatment of Data

To ensure systematic analysis and interpretation of the gathered data through the Google Forms questionnaire, the data will be organized, tabulated, and statistically analyzed to determine the relationship between Generative AI., Problem Solving Skills, and Critical Thinking. Appropriate statistical treatments will be employed to ensure accurate interpretation of the findings and to address the objectives of the study (Creswell & Creswell, 2018).

- 1. Frequency and Percentage.** This tool will be used to describe the demographic profile of the respondents, such as age, sex, and other relevant characteristics. This statistical tool helps summarize and present categorical data in a clear and understandable manner (Saunders, Lewis, & Thornhill, 2019).

Formula:

$$P = \frac{f}{N} \times 100$$

Where:

P = Percentage

f = Frequency of responses

N = Total number of respondent

- 2. Weighted Mean.** This will be used to determine the respondents' level of agreement regarding statements related to Generative AI., Problem Solving Skills, and Critical Thinking using the four-point Likert scale: Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1). According to Bluman (2018), the weighted mean is used to calculate the central tendency of a data set where values are assigned specific weights, such as in survey scales. In this study, it will be calculated to determine the central tendency of the students' responses.

Formula:

$$WM = \frac{\Sigma(f \times w)}{N}$$

Where:

WM = Weighted Mean

f = Frequency of responses

x = Weight assigned to each scale value

N = Total number of respondents

The interpretation of the weighted mean scores will follow the scale below:

Table 1 Likert Scale Used in Assessing the Impacts of Generative AI to Problem Solving Skills and Critical Thinking of 3rd Year IT Students at Quezon City University

Scale	Range	Verbal Interpretation
4	3.26 – 4.00	Strongly Agree (SA)
3	2.51 – 3.25	Agree (A)

2	1.76 – 2.50	Disagree (D)
1	1.00 – 1.75	Strongly Disagree (SD)

3. Pearson Product-Moment Correlation Coefficient. This will be utilized to determine whether a significant relationship exists between the use of Generative AI. and students’ Problem Solving Skills and Critical Thinking. Pearson correlation is widely used to measure the strength and direction of relationships between variables in quantitative research (Field, 2018). This statistical treatment will help determine whether increased use of Generative AI. has a corresponding effect on the cognitive skills being examined in the study.

RESULT AND DISCUSSION

This chapter deals with the presentation and interpretation of data. Which are presented in tables, analyzed, and interpreted using the descriptive rating data.

A. Demographic Profile of the Respondents

This section presents the baseline characteristics of the 273 surveyed Third Year Information Technology respondents at Quezon City University for the Academic Year 2025–2026. To establish a clear context for the sample population, the respondents are characterized across three primary demographic variables: age, sex, and their frequency of Generative AI usage. Analyzing these demographic variables is essential, as they provide the underlying context for interpreting the students' subsequent technical behaviors.

1.1 Age.

Table 2 Demographic profile of the respondents in terms of Age

Age	Frequency	Percentage
20 – 21	186	68.13%
22 – 23	56	20.51%
24 and above	31	11.36%
Total	273	100%

Table 2 reveals that more than half of the surveyed respondents (68.13%) fall within the 20 – 21 age bracket, making it the most prominent demographic group. This is followed by students aged 22 – 23, who account for 20.51% of the sample. Combined, these two groups constitute the vast majority (88.64%) of the population, indicating that the study primarily captures the perspectives of traditional, college-aged youth. Only a small fraction of the respondents are aged 24 and above

1.2 Sex

Table 3 Demographic profile as to Sex

Sex	Frequency	Percentage
Male	144	52.75%
Female	105	38.46%
Prefer not to say	24	8.79%
Total	273	100%

The distribution of respondents by sex is presented in Table 3. Males represent the majority of the sample at 52.75% followed by females at 38.46%, while 8.79% preferred not to say. This distribution is characteristic of typical enrollment patterns observed within technical and computing degree programs, where male students historically represent a larger proportion of the student body.

1.3 Frequency of Generative AI Usage Per Week

Table 4 Frequency of Generative AI Usage Per Week

Usage Frequency	Frequency	Percentage
Never	0	0%
Rarely (1–2 times)	9	3.3%
Sometimes (3–4 times)	74	27.1%
Often (5–6 times)	101	37.0%
Very Often (more than 6 times)	89	32.6%
Total	273	100%

Table 4 presents the distribution of respondents according to frequency of Generative AI usage per week into their workflow. Most respondents reported using Generative AI often (37%) or very often (32.6%), while only a small proportion indicated rare usage (3.3%). This pattern suggests that Generative AI tools have become integrated into the academic practices and programming routines of students.

B. Level of Generative AI Usage

This section presents the level of Generative AI usage among the 273 surveyed Third Year Information Technology students at Quezon City University for the Academic Year 2025–2026. The respondents’ level of AI usage is examined through indicators such as AI dependency, code generation, debugging and error tracing, and technological reliance. Analyzing these dimensions is essential in understanding how students integrate AI technologies into their academic and programming activities.

2.1 Frequency and General Usage

Table 5 Frequency and General Usage

Indicator	N	Mean	Standard Deviation	Interpretation
1. I use Generative AI tools regularly for academic tasks.	273	3.18	0.7	Agree
2. I rely on AI when completing programming assignments.	273	3.27	0.73	Strongly Agree
3. I consult AI even for simple coding problems.	273	3.16	0.75	Agree
4. I use AI as my first step when solving technical tasks.	273	3.18	0.79	Agree
5. I can complete tasks without AI assistance.	273	3.13	0.78	Agree

In the Table 5, the findings indicate that respondents generally demonstrated an agreeing to strongly agreeing level of Generative AI utilization in academic and programming-related activities. Among the indicators under

AI usage behavior, respondents strongly agreed that they rely on AI when completing programming assignments ($M = 3.27$, $SD = 0.73$), suggesting that Generative AI has become a frequently utilized tool in accomplishing coding tasks. Respondents also agreed that they regularly use AI for tasks with a mean score of 3.18 and a standard deviation of 0.70. They also agreed that they consult AI for coding problems with a mean score of 3.16 and a standard deviation of 0.75. Furthermore they agreed that they use AI as an approach for technical tasks with a mean score of 3.18 and a standard deviation of 0.79.

The standard deviation values ranging from 0.70 to 0.79 indicate relatively consistent responses among participants. This finding suggests that students share similar patterns in integrating AI into their learning and programming practices. The results support previous studies indicating that Generative AI tools are increasingly embedded in educational environments and programming activities due to their accessibility and efficiency in assisting students with technical tasks. Research shows that AI tools can help students work efficiently and learn better when appropriately utilized.

2.2 Code Generation

Table 6 Code Generation

Indicator	N	Mean	Standard Deviation	Interpretation
6. I use AI to generate entire code solutions.	273	3.11	0.78	Agree
7. I depend on AI to structure my program logic.	273	3.07	0.78	Agree
8. I use AI for boilerplate or repetitive code.	273	3.17	0.74	Agree
9. I modify AI-generated code to suit my needs.	273	3.21	0.71	Agree
10. I understand the code generated by AI.	273	3.21	0.67	Agree

In the table 6, the results of code generation show that respondents mostly agreed with the use of AI-assisted coding practices. The greatest mean score was reported for altering AI-produced code to meet personal needs and understanding AI-generated code ($M = 3.21$), demonstrating that students adjust and interpret created content rather than merely copying AI outputs. Respondents also agreed that they utilize AI for repetitive or boilerplate code ($M = 3.17$, $SD = 0.74$) and to generate comprehensive coding solutions ($M = 3.11$, $SD = 0.78$).

The relatively low standard deviations (0.67-0.78) indicate moderate consistency in responses. These findings indicate that students utilize AI as a coding help rather than a complete replacement for their own programming abilities. This is consistent with prior literature, which shows that AI can increase code development efficiency while still needing people to exert comprehension and oversight.

2.3 Debugging and Error-Tracing

Table 7 Debugging and Error-Tracing

Indicator	N	Mean	Standard Deviation	Interpretation
11. I use AI to identify errors in my code.	273	3.24	0.71	Agree
12. I rely on AI to fix bugs instead of debugging manually.	273	3.11	0.73	Agree
13. I ask AI to explain errors I do not understand.	273	3.33	0.69	Agree

14. I attempt to debug code manually before using AI.	273	3.27	0.69	Strongly Agree
15. AI helps me resolve errors faster than manual debugging.	273	3.29	0.71	Strongly Agree

In the Table 7, the results show that people think Generative AI is a tool when it comes to finding and fixing mistakes. Respondents strongly agreed that AI helps resolve errors faster than manual debugging ($M = 3.29$, $SD = 0.71$) and that they attempt manual debugging before seeking AI assistance ($M = 3.27$, $SD = 0.69$). Moreover, respondents agreed that they frequently ask AI to explain errors they do not understand ($M = 3.33$, $SD = 0.69$), which obtained the highest mean score in this dimension.

These findings tells that students use AI not only as an answer provider but also as a learning aid for understanding programming errors. The consistency of responses ($SD = 0.70$ – 0.72) further indicates common experiences among participants. Previous studies have found that using AI to help with debugging can make things more efficient and save time when fixing coding problems for people who are just starting to learn how to program.

2.4 Technological Reliance

Table 8 Technological Reliance

Indicator	N	Mean	Standard Deviation	Interpretation
16. I depend on AI more than my own problem-solving skills.	273	3.06	0.85	Agree
17. I feel less confident solving problems without AI.	273	2.96	0.83	Agree
18. I prefer AI solutions over manual coding efforts.	273	3.04	0.77	Agree
19. I try to solve problems manually before asking AI.	273	3.1	0.74	Agree
20. AI has become essential to my coding workflow.	273	3.2	0.7	Agree

In terms of technological reliance, respondents generally agreed with statements related to dependence on AI tools. In Table 8, the statement "AI has become essential to my coding workflow" got the average rating ($M = 3.20$, $SD = 0.7$). It indicating the increasing role of AI in students' programming activities. However, respondents also agreed that they attempt to solve problems manually before seeking AI assistance ($M = 3.10$, $SD = 0.74$), suggesting that students maintain a degree of independent problem-solving behavior.

The standard deviations ranging from 0.69 to 0.86 suggest moderate variability in responses. This may indicate differing levels of dependency among participants. Existing studies have raised concerns that excessive reliance on AI may affect the development of independent problem-solving and cognitive skills when learners become dependent on automated assistance.

C. Level of Problem-Solving Skills

This section presents the level of problem-solving skills of the 273 surveyed Third Year Information Technology students at Quezon City University for the Academic Year 2025–2026. The respondents' problem-solving skills are assessed through indicators such as technical persistence and logic ownership. Examining these variables is important in determining how students approach challenges and develop solutions within programming and technical environments. According to the Organization for Economic Co-operation and Development (OECD), problem-solving skills refer to an individual's capacity to engage in cognitive processes to understand and resolve situations where solutions are not immediately obvious, requiring reasoning and active problem engagement.

3.1 Technical Persistence

Table 9 Technical Persistence

Indicator	N	Mean	Standard Deviation	Interpretation
21. I continue solving coding problems even when they are difficult.	273	3.21	0.71	Agree
22. I spend time trying different solutions before asking for help.	273	3.17	0.75	Agree
23. I give up quickly when I encounter coding difficulties.	273	2.13	1.22	Disagree
24. I attempt multiple approaches to solve a problem.	273	3.19	0.73	Agree
25. I rely on my own effort before seeking external help.	273	3.19	0.75	Agree

The findings in Table 9 show that respondents generally agreed with statements about persistence in dealing with technical difficulties. Respondents reported continuing in solving coding issues even when tasks became tough ($M = 3.21$, $SD = 0.71$) and relying on their own effort before seeking external aid ($M = 3.19$, $SD = 0.75$).

However, respondents also agreed with the negative statement, "I give up quickly when I encounter coding difficulties" ($M = 2.87$, $SD = 1.22$). This finding may indicate variation in coping techniques among respondents and may necessitate reverse coding during analysis if the instrument is intended to measure perseverance favorably.

Overall, these data show that students demonstrate moderate technical tenacity despite acknowledging problems during tough programming tasks.

3.2 Logic Ownership

Table 10 Logic Ownership

Indicator	N	Mean	Standard Deviation	Interpretation
26. I can clearly explain how my code works.	273	3.15	0.73	Agree
27. I understand the logic behind my solutions.	273	3.19	0.71	Agree
28. I struggle to explain the code that I submit.	273	2.01	1.26	Disagree
29. I can defend my solution during presentations.	273	3.19	0.71	Agree
30. I fully understand the outputs of my programs.	273	3.22	0.72	Agree

In terms of logic ownership, respondents acknowledged that they understand and can explain their coding methods. The highest mean score in Table 10 was obtained for fully comprehending program results ($M = 3.22$, $SD = 0.72$), followed by understanding solution logic and defending solutions during presentations ($M = 3.19$).

These findings show that, even using AI, responders maintain control of their coding logic and comprehension. Low standard deviation values (0.66-0.86) indicate relatively consistent perceptions among participants.

D. Level of Critical Thinking Skills

This section presents the level of critical thinking skills of the 273 surveyed Third Year Information Technology students at Quezon City University for the Academic Year 2025–2026. The respondents’ critical thinking skills are evaluated based on their ability to analyze, evaluate, and assess information and AI-generated outputs. Understanding these indicators is essential in determining how students apply reasoning and judgment while interacting with Generative AI technologies. According to the Organization for Economic Co-operation and Development (OECD), critical thinking involves reflective and analytical processes that enable individuals to evaluate information, make judgments, and assess the validity of ideas and solutions.

The results of the critical thinking skills study in the Table 11 show that respondents had a generally positive tendency toward evaluative thinking. The greatest mean score was obtained when examining numerous answers before selecting one ($M = 3.27$, $SD = 0.87$), indicating good agreement. Respondents also agreed to evaluate AI-generated answers ($M = 3.09$, $SD = 0.86$) and detect biases or errors in AI outputs ($M = 3.20$, $SD = 0.85$).

However, reactions to negatively worded indications, such as accepting AI-generated answers without questioning them ($M = 2.52$, $SD = 0.95$) and not interrogating AI solutions ($M = 2.65$, $SD = 0.93$), raise concerns about overreliance on AI outputs. These products may also necessitate reverse coding, depending on the measuring design.

Table 11 Level of Critical Thinking Skills

Indicator	N	Mean	Standard Deviation	Verbal Interpretation
31. I evaluate the accuracy of AI-generated answers.	273	3.09	0.86	Agree
32. I don't question the solutions provided by Generative AI.	273	2.35	0.93	Disagree
33. I compare multiple solutions before choosing one.	273	3.27	0.87	Strongly Agree
34. I can identify biases or errors in AI outputs.	273	3.2	0.85	Agree
35. I accept AI-generated answers without questioning them.	273	2.33	0.95	Disagree
36. I rarely check if AI-generated information is correct.	273	2.33	0.98	Disagree

E. Reliability Analysis (Cronbach’s Alpha)

Table 12 Reliability Analysis of Research Instrument

Variable	No. of Items	Cronbach’s Alpha	Interpretation
Generative AI Utilization	20	.977	Excellent
Problem-Solving Skills	10	.963	Excellent
Critical Thinking Skills	6	.890	Good
Overall Instrument	36	.973	Excellent

Reliability analysis was performed using Cronbach's alpha to determine the internal consistency of the instrument. Results revealed an excellent reliability coefficient for Generative AI Utilization ($\alpha = .977$),

Problem-Solving Skills ($\alpha = .963$), and the overall instrument ($\alpha = .973$), indicating high internal consistency among items. However, Critical Thinking Skills obtained a low reliability coefficient ($\alpha = .320$), suggesting weak internal consistency and possible issues with item construction, reverse-coded statements, or multidimensionality. According to commonly accepted criteria, coefficients above .70 are considered acceptable for social science research.

Prior to analysis, negatively worded indicators were reverse-coded to ensure that all items measured the construct in the same directional orientation. Specifically, reverse coding was applied to Q32, Q35, and Q36 using the standard reverse-scoring formula:

$$\text{Reverse-Coded Score} = 5 - \text{Original Score}$$

The analysis produced a Cronbach's alpha coefficient of $\alpha = .890$, which indicates good internal consistency among the indicators. This suggests that the items consistently measured the respondents' critical thinking skills in relation to Generative AI utilization.

According to Lee J. Cronbach (1951), Cronbach's alpha is used to evaluate the extent to which questionnaire items consistently measure the same construct. Furthermore, George and Mallery (2003) stated that reliability coefficients ranging from 0.80 to 0.89 are considered good, while values above 0.90 are considered excellent. Therefore, the obtained reliability coefficient confirms that the Critical Thinking Skills instrument is reliable and suitable for statistical analysis.

The improvement in reliability after reverse coding indicates that the previously low coefficient was caused by inconsistent item directionality. Proper reverse coding aligned the negatively worded items with the positively stated indicators, resulting in a more accurate measurement of the construct.

F. Pearson Correlation

Table 13 Pearson Correlation Between Generative AI Utilization and Student Skills

Variables	r	p-value	Interpretation
AI Utilization × Problem-Solving Skills	.896	< .001	Very Strong Positive Relationship
AI Utilization × Critical Thinking Skills	.407	< .001	Moderate Positive Relationship

Pearson Product–Moment Correlation analysis was conducted to determine the relationship between Generative AI utilization and students' problem-solving and critical thinking skills. Results revealed a very strong positive relationship between Generative AI utilization and problem-solving skills ($r = .896$, $p < .001$). This indicates that as students' utilization of Generative AI increases, their problem-solving skills also tend to increase.

Similarly, the analysis showed a moderate positive relationship between Generative AI utilization and critical thinking skills ($r = .407$, $p < .001$). This suggests that Generative AI utilization is also associated with improvements in students' critical thinking abilities, although the relationship is weaker compared to problem-solving skills.

According to Karl Pearson (1895), Pearson correlation is used to measure the strength and direction of the linear relationship between two variables. Furthermore, Cohen (1988) explained that correlation coefficients closer to ± 1.00 indicate stronger relationships, while coefficients near 0 indicate weaker relationships.

Since the obtained p-values were lower than the 0.05 level of significance, the null hypothesis was rejected. Therefore, there is a statistically significant relationship between Generative AI utilization and the respondents' problem-solving and critical thinking skills.

G. Independent Samples T-Test

Table 14 Independent Samples t-test on Problem-Solving Skills Based on AI Utilization Groups

Group	Mean	Standard Deviation	t-value	p-value
High AI Utilization	3.32	0.41	10.85	< .001
Low AI Utilization	2.89	0.46		

An Independent Samples t-test was conducted to determine whether a significant difference exists between respondents with high and low levels of Generative AI utilization in terms of problem-solving skills.

The findings revealed that respondents with high Generative AI utilization obtained a higher mean score (M = 3.32, SD = 0.41) compared to respondents with low AI utilization (M = 2.89, SD = 0.46). The computed t-value of 10.85 and p-value less than .001 indicate a statistically significant difference between the two groups.

According to Student's t-test, the Independent Samples t-test is used to compare the mean scores of two independent groups to determine whether observed differences are statistically significant. Furthermore, Pallant (2020) explained that when the p-value is lower than the 0.05 level of significance, the null hypothesis should be rejected.

Since the obtained p-value was lower than the 0.05 significance level, the null hypothesis was rejected. Therefore, there is a significant difference in problem-solving skills between respondents with high and low levels of Generative AI utilization.

H. Regression Analysis

Table 15 Regression Analysis Predicting Problem-Solving Skills from Generative AI Utilization (Model Summary)

R	R ²	Adjusted R ²
.896	.803	.802

Table 16 Regression Analysis Predicting Problem-Solving Skills from Generative AI Utilization (Coefficients Table)

Predictor	B	Beta	t	p-value	Interpretation
Constant	.258	—	2.92	.004	Significant
AI Utilization	.912	.896	33.23	< .001	Significant Predictor

Regression analysis was performed to determine whether Generative AI Utilization significantly predicts problem-solving skills. Results indicated that AI utilization significantly predicted problem-solving performance ($\beta = .896$, $t = 33.23$, $p < .001$).

According to Linear regression, regression analysis determines the predictive relationship between independent and dependent variables. Furthermore, Cohen (1988) stated that higher R² values indicate stronger explanatory power of the predictor variable.

The model explained 80.3% of the variance in problem-solving skills (R² = .803), indicating that AI utilization accounted for a substantial proportion of the observed variation in students' problem-solving performance.

Therefore, Generative AI Utilization was found to be a significant predictor of problem-solving skills among respondents.

CONCLUSION

The purpose of this study was to determine how third-year IT students' critical thinking and problem-solving abilities were affected by the use of Generative AI. The study's specific objectives were to assess students' use of Generative AI and ascertain whether there are any meaningful correlations or predictive effects between students' use of AI and their technical and cognitive abilities.

The study's conclusions demonstrated that Generative AI is now a crucial component of students' academic and programming endeavors. AI tools are frequently used by students for academic support, debugging, coding aid, and technical problem-solving. The study also showed that, despite extensive use of AI, pupils typically maintain high levels of critical thinking and problem-solving abilities.

The results also shown a strong correlation between students' critical thinking and problem-solving abilities and the use of Generative AI. Students who used AI more frequently also performed better when solving problems and showed more sophisticated critical thinking skills. This implies that information technology students' learning effectiveness, technical comprehension, and analytical thinking can be enhanced by Generative AI when applied sensibly and critically.

Additionally, the study confirmed that the use of Generative AI strongly predicts students' problem-solving abilities, suggesting that AI-assisted technologies may enhance students' capacity for technical task analysis, troubleshooting, and completion. Therefore, the study emphasizes the potential of Generative AI as a tool for instructional support that improves technical competence and academic output.

Overall, the study adds to the growing body of information about the use of Generative AI in technology education. The results show that, when combined with independent thought and critical assessment, Generative AI can be a useful learning aid. In order to prevent students from becoming overly dependent on automated systems, the study also highlights the significance of responsible AI usage to ensure that students continue to develop their own cognitive, analytical, and problem-solving skills.

REFERENCES

1. Abbas, M., Jam, F. A., & Khan, T. I. (2024). Is it harmful or helpful? Examining the causes and consequences of Generative AI usage among university students. *Education and Information Technologies*. <https://doi.org/10.1186/s41239-024-00444-7>
2. Baria, H. G., & Garg, S. (2025). Influence of Generative AI on problem-solving skills among students. *International Journal of Scientific Research in Engineering and Management (IJSREM)*. <https://harshbariAIIn/assets/papers/Influence-of-Generative-AI-on-Problem-Solving-Skills-among-Students.pdf>
3. Batista, J., Mesquita, A., & Carnaz, G. (2024). Generative AI and Higher Education: Trends, Challenges, and Future Directions from a Systematic Literature Review. *Information*, 15(11), 676. <https://doi.org/10.3390/info15110676>
4. Bender, E. M., Gebru, T., McMillan-Major, A., & Shmitchell, S. (2021). On the Dangers of Stochastic Parrots: Can Language Models Be Too Big? In *Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency (FAccT'21)* (pp. 610-623). Association for Computing Machinery. <https://doi.org/10.1145/3442188.3445922>
5. Bluman, A. G. (2018). *Elementary statistics: A step-by-step approach* (10th ed.). McGraw-Hill Education.
6. Boitizon, J. M. G., Barte, B. P., Layco, J. P., Zoleta, A. N. J., & Balmes, I. L. (2025). The influence of AI code assistants on programming learning: A descriptive study of student dependence. *Proceedings of the International Conference on Applied Innovations in IT (ICAIIIT)*. [3-6-ICAIIIT 2025 13\(5\).pdf](https://doi.org/10.1145/3442188.3445922)

7. Calderon, J. F., & Gonzales, E. C. (1993). *Methods of Research and Thesis Writing*. National Book Store.
8. Casingal, C. P., & Caerlang, L. J. (2026). Assisted but Unguided: AI Tool Integration, Academic Performance, And Institutional Policy Gaps Among Filipino College Students. *MSI Journal of AI and Technology*, Volume 2(1), 01–25. <https://doi.org/10.5281/zenodo.19029680>
9. Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.
10. Cotton, D. R. E., Cotton, P. A., & Shipway, J. R. (2023). Chatting and cheating: Ensuring academic integrity in the era of ChatGPT. *Innovations in Education and Teaching International*, 61(2), 228–239. <https://doi.org/10.1080/14703297.2023.2190148>
11. Creswell, J. W., & Creswell, J. D. (2018). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (5th ed.). Sage Publications.
12. Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297–334.
13. De Guzman, M. A. G., Tenedero, P. P. P., Gapas, W. G. A., & Deabanico, A. M. (2024). AI anxiety and readiness of English language teachers and students: A Philippine university case study. *Asian Journal of English Language Studies*, 12(2). <https://doi.org/10.59960/12.2.a1>
14. Dungganon, M. C. (2026). ChatGPT in education and beyond: Aid or obstacle? *Southeast Asian Interdisciplinary Research Journal*, 7(1).
15. Field, A. (2018). *Discovering Statistics Using IBM SPSS Statistics* (5th ed.). Sage Publications.
16. Genesis G. Camarista, Jan Mark S. Garcia, Edlin Z. Muzones, Jerson T. Valiao, Suzenette M. Javellana, Michelle D. Deasis, Mark Ian S. Tilog (2025). An Exploration of Online Learning Habits and Academic Productivity of BSIT Students. , 12(9), <https://doi.org/10.51244/IJRSI.2025.120800320>
17. Göksel, N., & Akgül, M. (2021). Social media trust and verification habits of undergraduate students. ERIC Document Reproduction Service. <https://files.eric.ed.gov/fulltext/EJ1395193.pdf>
18. Gosset, W. S. (1908). The probable error of a mean. *Biometrika*, 6(1), 1–25
19. H. P. S. M. F. I. Ghorban Tanhaei, "Predictive analytics in customer behavior: Anticipating trends and preferences," vol. 17, 2024. Agnaou, A., & El Asri, H. (2025). Artificial intelligence and collaborative learning: Impacts on creativity, critical thinking, and problem-solving. *Journal of Educational Research & Practice*, 15, 1–19. <https://doi.org/10.5590/JERAP.2025.15.2120>
20. He, Q., You, X., & Shen, J. (2026). AI-generated content and academic norms: perspectives and reflections of college students. *Interactive Learning Environments*, 34(3), 1006–1020. <https://doi.org/10.1080/10494820.2025.2511252>
21. Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial Intelligence in Education: Promises and Implications for Teaching and Learning*. Center for Curriculum Redesign.
22. Hou, C., Zhu, G., & Sudarshan, V. (2025). The role of critical thinking on undergraduates' reliance behaviours on Generative AI in problem-solving. *British Journal of Educational Technology*, 56, 1919–1941. <https://doi.org/10.1111/bjet.13613>
23. Joshi, A., Kale, S., Chandel, S., & Pal, D. K. (2015). Likert scale: Explored and explained. *British Journal of Applied Science & Technology*, 7(4), 396–403. <https://doi.org/10.9734/BJAST/2015/14975>
24. Louie Giray, Ruth Aquino, Mark Bonnin Jara et al. Qualitative Analysis of College Teachers' Practices Using ChatGPT to Develop Educational Materials and the Introduction of the TEACH Framework for Effective AI Integration, 24 March 2026, PREPRINT (Version 1) available at Research Square <https://doi.org/10.21203/rs.3.rs-8984458/v1>
25. Lye, C. Y., & Lim, L. (2024). Generative Artificial Intelligence in Tertiary Education: Assessment Redesign Principles and Considerations. *Education Sciences*, 14(6), 569. <https://doi.org/10.3390/educsci14060569>
26. OECD, Critical Thinking. https://www.oecd.org/content/dam/oecd/en/topics/policy-issues/future-of-education-and-skills/learning-compass-constructs/Critical%20Thinking.pdf?utm_source
27. OECD. Student problem solving skills. <https://www.oecd.org/en/topics/problem-solving.html>
28. Oliveira, L., Tavares, C., Strzelecki, A., & Silva, M. (2025). Prompting Minds: Evaluating how Students Perceive Generative AI's Critical Thinking Dispositions. *Electronic Journal of e-Learning*. <https://doi.org/10.34190/ejel.23.2.3986>
29. Pallant, J. (2020). *SPSS survival manual* (7th ed.). McGraw-Hill Education.

30. Pearson, K. (1895). Notes on regression and inheritance in the case of two parents. *Proceedings of the Royal Society of London*, 58, 240–242.
31. Salsabila, N. F., Sari, E. D. R., Safrida, I. D., Mahardika, M., & Hayatin, N. (2024). The impact of moderating ChatGPT usage on problem-solving skills among computer science students. [View of The Impact of Moderating ChatGPT Usage on Problem-Solving Skills among Computer Science Students](#)
32. Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research Methods for Business Students* (8th ed.). Pearson Education.
33. Taherdoost, H. (2016). Validity and Reliability of the Research Instrument; How to Test the Validation of a Questionnaire/Survey in a Research. *International Journal of Academic Research in Management*, 5(3), 28–36.
34. Talandron-Felipe, M. M. P. (2025). Efficiency or understanding? Novice programmers' problem-solving with and without ChatGPT. *International Conference on Computers in Education*. <https://library.apsce.net/index.php/ICCE/article/view/606>
35. UiTM Generation Z Study. (2025). Study on Generation Z Students' Utilization of AI Technologies in Academic Tasks.
36. Zantua, J. V. (2025). Self-regulated learning in student-led Generative AI-based learning activities of junior high school students. Retrieved from https://animorepository.dlsu.edu.ph/etdm_elmd/56
37. Zhou, X., Teng, D., & Al-Samarraie, H. (2024). The Mediating Role of Generative AI Self-Regulation on Students' Critical Thinking and Problem-Solving. *Education Sciences*, 14(12), 1302. <https://doi.org/10.3390/educsci14121302>