

“The Impact of Artificial Intelligence Usage on Skill Retention of Third-Year Computer Engineering Students at Bulacan State University”

Kenneth Rhey G. Hipolito¹, Erl Francis M. Samson², Lawrence Dominique B. Tan³, Maria Lorena S.P. Villena⁴, Clark Anthony S. Maglaque⁵

Bulacan State University

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ABSTRACT

The researchers investigate the possible impact of Artificial Intelligence (AI) towards the skill retention of third-year students in Bulacan State University Main Campus. The researchers utilized online survey questionnaires application to ensure proper dissemination and a steadfast response from the students, Google Forms was used to efficiently collect data from third-year Computer Engineering students. The questionnaire was disseminated through an online messaging app where the respondents can easily open and access the survey form, the researchers gathered a total of ninety two (92) responses from the third-year computer engineering students. Five-point likert scale was adopted to weigh in the respondents' response towards the questionnaire provided. Through the data gathered from the respondents, researchers were able to collect relevant information and analyze data in order to draw conclusions. The result of the survey exhibits a neutral result in their skill retention towards problem-solving and programming logic, suggesting that their AI usage has no significant effect in recalling basic programming logics and problem solving skills despite a large number of responses indicating that they do not have the capability of solving engineering problems without the help of AI tools during the process of problem-solving and having a difficulty in coding and debugging programming code without the help of AI tools. Above all, these results imply that students were able to maintain their problem solving abilities and programming logic skills amidst the growing popularity and a threatening advancements of AI, while those who depend most in AI tend to lose fundamental engineering skills.

Keywords: Artificial Intelligence, Computer Engineering, skill retention, problem-solving, basic programming logic, impact of AI.

INTRODUCTION

The use of artificial intelligence (AI) has dramatically increased especially in higher education because it has changed the way students study and complete their academic work. Students use ChatGPT and Meta AI platforms as their daily learning tools because these platforms help them meet their academic goals more quickly according to Zawacki-Richter and his team in 2019. The tools provide clear value to users. The tools became extremely popular which creates a critical issue because their usage affects students' ability to learn over time especially for Computer Engineering students according to Holmes and his team in 2019.

The advantages of AI technology for student learning prove to be beneficial. Smutny and Schreiberova (2020) demonstrated that excessive AI usage leads to a decline in an individual's ability to think independently. The moment students begin to avoid their studies their capacity to handle challenges without assistance needs major support. The Engineering profession requires professionals to possess fundamental competencies and to demonstrate their capacity to work independently. The present situation appears beneficial because students allow AI to complete all their work yet this practice leads to complete destruction of their progress toward developing essential skills. The research indicates that students will not be ready for their upcoming engineering responsibilities (Kasneci et al. 2023).

The research investigates how third-year Computer Engineering students at Bulacan State University Main

Campus use AI for their daily academic activities. The researchers' study intends to assess their dependence on technology for mathematics and programming and their daily learning activities. The essential information the researchers require is essential information about their main programming logic development process through this study. The researchers will provide the Engineering Department with authentic data about current situations through this method.

Statement of the Problem

- What is the level and frequency of AI usage among Computer Engineering students in their academic activities?
- How does the use of Artificial Intelligence affect students' retention of basic computer engineering skills, particularly in problem-solving and programming logic?
- Is there a significant relationship between the usage of AI and the skill retention level of computer engineering students at Bulacan State University?

Significance of the Study

This research will be beneficial to the following people:

To the computer engineering students: The study would allow them to understand how the use of AI tools might affect their skill retention of important technical skills. This study may also encourage computer engineering students to appropriately utilize AI tools in a balanced manner that encourages skill retention rather than dependency.

To the faculty members: The results of the study could help instructors design their instruction and assessment in a manner that utilizes AI for tools while also encouraging critical thinking and problem-solving, as well as independent development of technical skills among students.

To the university administrators: The study could provide an opportunity to create institutional policies and guidelines on the ethical and effective utilization of AI in higher education. This study will be particularly useful within engineering programs.

To the future researchers: This study would be a resource and provide empirical data for other researchers interested in AI, learning behaviors, and skill retention in higher education.

REVIEW OF RELATED LITERATURE

Related Theories

Connectivism Learning Theory (Siemens, 2005) – This framework explains that learners acquire knowledge through establishing connections with external information networks. Digital systems function as knowledge repositories that students use today. Students use AI platforms to get immediate access to information which helps them learn at a faster rate. The theory requires one specific condition which must be met before it can operate. Students need to work through the learning material they obtain. Students who only imitate AI outputs without engaging their minds will fail to develop authentic knowledge. Students face challenges in remembering complex engineering principles because they developed this behavior through practice over multiple years.

Siemens research demonstrates how engineering students have developed new methods to approach their work which directly relates to the research. Computer engineering students currently use AI platforms as external knowledge sources which they access to obtain immediate solutions. The researchers are using this framework to see if leaning too much on these digital networks is actually causing students to lose their own technical skills. The research team wants to investigate whether this particular behavior will decrease their skills in writing code syntax and developing logical reasoning abilities.

Cognitive Load Theory (Sweller, 1988) – Explains how human beings can store information in their working memory. Sweller states that people need to undergo mental effort which he defines as "germane cognitive load" in order to transfer new information into their long-term memory. The term "extraneous load" refers to unnecessary mental challenges which result in student frustration but do not contribute to their educational development. People need to find easier methods to handle academic pressure when their academic work becomes too complex to manage. Students can achieve genuine learning when they manage cognitive loads to dedicate effort exclusively to knowledge development.

In connection with this research, it supports Cognitive Load Theory because it explains why engineering students choose to work with AI tools for their studies. Students utilize these systems to eliminate the distracting extra work that results from making fundamental coding syntax errors. The main danger of using this shortcut too much leads to a significant disadvantage. Students who depend on AI for their logical development lose the advantage which germane load brings to their educational experience. Students need to engage in a productive mental struggle which will help them develop independent programming skills into long-term memory storage.

Technology Acceptance Model (Davis, 1989) – This concept explains the exact reasons behind why a person chooses to adopt a newly introduced digital system. Davis hinges this entire adoption process on two specific variables. He identifies these driving factors as Perceived Usefulness and Perceived Ease of Use. Before fully committing to a platform, users evaluate the payoff. Will this software actually improve my daily output? And more importantly, is it simple enough to operate without a massive learning curve? If the answer to both is yes, user adoption happens fast.

In relation to this study, Davis's model shows exactly why so many computer engineering students are rapidly adopting AI technologies. The students obviously find these tools helpful for fixing their scripts or solving hard math equations. On top of that, submitting brief inquiries to a conversational AI takes way less effort than sitting there for hours trying to find a bug in their code manually. The researchers are using this model to measure whether prioritizing this extreme convenience is the main reason why their foundational technical skills are dropping.

Related Literature

Impact on Analytical and Problem-Solving Skills (Smutny & Schreiberova, 2020) – This study provides a rigorous examination of the disadvantages of using chatbots and AI assistants in school. Their biggest worry is "cognitive engagement." Primarily, they argue that if a student leans too much on AI, their own ability to think creatively and solve problems independently starts to fade. According to their research, when you constantly let an AI generate your answers, you stop actually wrestling with the lesson. This carries significant implications for technical disciplines where problem-solving is a "use it or lose it" skill. Without the struggle of solving things manually, the brain paths you need to build logic just never fully develop.

This literature links directly to the researchers study, specifically the part about keeping logic formulation skills sharp. For us as Computer Engineering students, being able to mentally build a program's logic is everything. The researchers are using Smutny and Schreiberova's findings to see if the high AI usage the researchers see on campus is linked to students losing their ability to solve complex logic problems without a chatbot helping them.

The Role of AI: Efficiency vs. Effort (Rahmat et al., 2021) – Shows how artificial intelligence functions as a dual educational resource in contemporary classrooms because it enables teachers to work faster and make fewer mistakes. However, the authors point out that in an academic setting "inefficiency" which includes the coding trial-and-error process leads to the most effective learning results. The literature warns that while AI successfully reduces a student's workload it often reduces the "learning load" as well. When a student shifts from learning the material to completing the task as quickly as possible it results in the loss of educational value.

In relation to this research, Rahmat's distinction between workload and learning load underpins the "Dependency" variable. It helps explain the motivation behind why students use AI. This study uses this framework to evaluate whether Computer Engineering students are prioritizing the rapid completion of slow projects over the actual acquisition of debugging and programming skills.

Cognitive Consequences of AI Dependency (Grassini, 2023) – This research investigates how a heavy dependence on artificial intelligence for educational purposes may lead to long-term cognitive impairments. Grassini describes an increasing "Access Paradox" which demonstrates that students who have access to unlimited information actually develop less internal knowledge. Grassini's core argument is that independent problem-solving skills simply fade away when students let AI take over the mental heavy lifting. Essentially, trading real study habits for AI shortcuts can diminish a student's foundational competencies. This is a huge risk in engineering, a field where you have to stay sharp and navigate complex logic across every year of the degree.

The researchers' skill erosion hypothesis receives strong theoretical support from the "Access Paradox" which serves as the theoretical framework for this research project. The concept directly supports the goal of measuring how AI usage impacts skill retention among Computer Engineering students. The study uses this framework to examine whether students trade their internal mental abilities for external digital resources. The researchers want to identify whether this trade-off causes students to forget essential engineering concepts which they need for their professional development.

Related Studies

Local Studies

The study conducted by Navarra, Marcelo, and Borromeo (2025) used a quantitative descriptive study that examined the AI technology dependencies of Computer Engineering students at Bulacan State University. The research investigated three questions which concerned student usage of AI tools together with their level of dependency on those tools and the factors which caused students to depend on AI tools. The survey results showed that most Computer Engineering students at Bulacan State University used AI tools for various tasks because they could easily access those tools and people believed that using AI tools would help students finish their work more efficiently.

In connection to this study, this model contrasts with value-based learning, where students are motivated by the intrinsic value of becoming skilled in engineering based on their own long-term goals. The way motivation is provided may impact the retention of learned computer engineering skills or the ability of students to continue applying their computer engineering skills over time.

Based on the study of Hernandez, Canlas, and Nacianceno (2025), they investigated student trust in AI tools while assessing their perceived value and their need to use these tools for learning programming. The researchers used student data from the Philippines to conduct surveys which revealed student patterns of AI tool usage when completing their academic assignments. The research demonstrates that students who depended on AI tools for their work showed diminished programming abilities because they relied on the tools for all their assignments yet completed their work more efficiently with the tools. AI tools reduced students' capacity to develop critical thinking skills and algorithmic thinking skills because AI users spent less time working on the problem-solving components of their tasks. The students need to achieve a balance between their AI tool usage and their independent study of programming concepts.

Relating this to the present research, students who have an immediate task completion focus rather than value the learning process may use AI tools simply because they have become accustomed to using them. The learning behavior that activates through cues leads to programming skill difficulties for students because it results in their programming skills being poorly retained.

International Studies

Kasneji et al. (2023) investigated how Large Language Models (LLM) implementation would change Post-Secondary (PS) educational learning procedures. The results confirmed that both "opportunities" and "threats" to the PS Learning Environment exist with respect to LLM. The use of AI tools brought three benefits to learning because students could learn more effectively and their productivity increased while they gained better access to educational resources. Students who relied too heavily on LLMs showed less progress in developing their critical thinking abilities and reasoning abilities. Students who used LLMs showed reduced cognitive involvement compared to those who used LLMs at normal levels. Researchers warned against using LLM

products in place of significant (cognitive) effort on the part of the student. Klasenini et al. who supported post-secondary education established that students should use LLMs to assist their learning process while producing learning materials that serve as educational resources.

In the context of this study, regular dependence on AI could potentially take away a student's motivation to critically analyze material at a deeper level, leading to less retention of material learned in technical fields such as computer engineering.

Smutny and Schreiberova (2020) examined two aspects of artificial intelligence. The authors of this article found that when students relied too much on the use of AI, students did not exert as much cognitive effort and develop their analytical skills. Students preferred to solve problems through fast answer searching instead of learning the fundamental concepts behind their solutions. The authors stated that independent thought enables students to remember learned material permanently while they warned against using AI as your primary tool.

Applying these findings to the present research, students who are more motivated to learn because of habits and convenience may develop less effective, void of importance, strategies for deep learning and will suffer from short retention of skill.

THEORETICAL FRAMEWORK

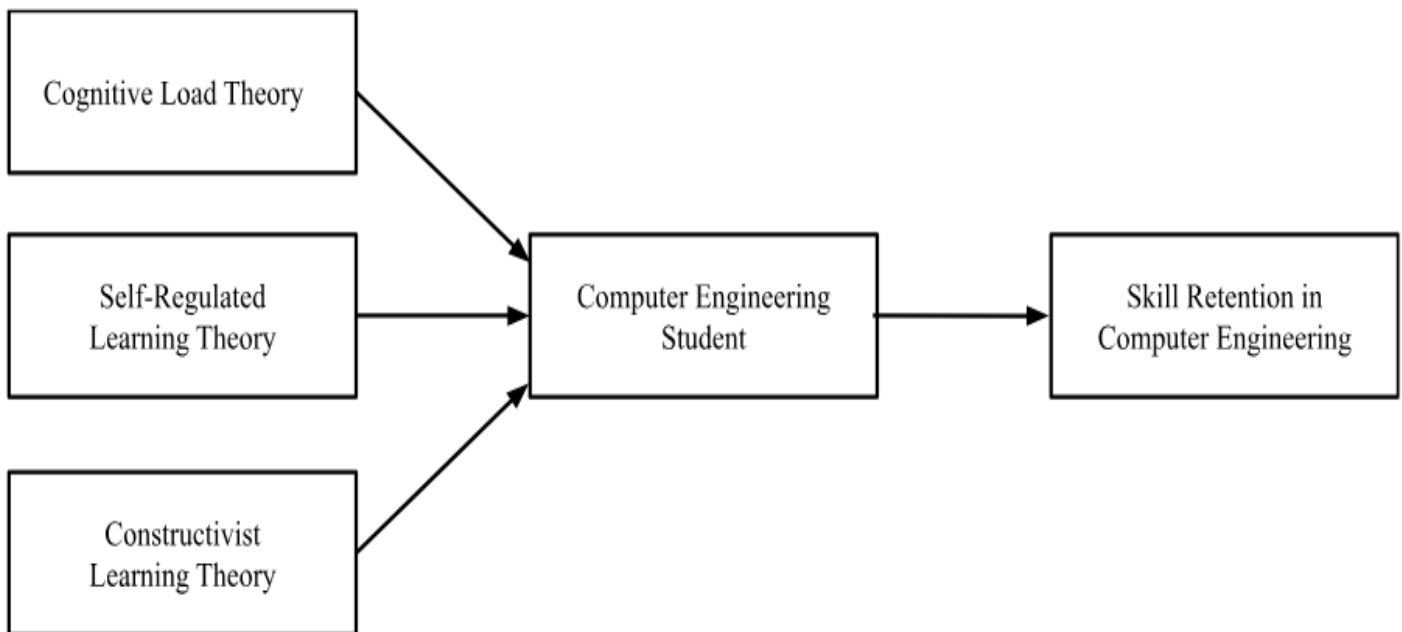


Figure 1. Theoretical framework of the Impact of Artificial Intelligence on skill retention of Third-year Computer Engineering students in Bulacan State University

The study applies three established learning theories which include Cognitive Load Theory (Sweller, 1988), Self-Regulated Learning Theory, and Constructivist Learning Theory (Siemens, 2005). Cognitive Load Theory provides a definition of effective learning which describes an optimal mental effort level that students must reach to achieve successful learning outcomes. The habitual use of artificial intelligence (AI) tools prevents individuals from experiencing the mental activities needed to master new information and abilities. Self-Regulated Learning Theory explains that learners take charge of their educational process because they need to observe their learning progress and decide which strategies to apply. Students who use AI for solving problems and doing programming work develop a weaker ability to control their study process.

Siemens' (2005) Connectivism demonstrates that Constructivist Learning Theory requires students to participate actively in their studies to develop knowledge through authentic educational experiences. Students use AI to obtain immediate solutions which results in two negative outcomes for their learning process because they lose both genuine understanding and their capacity to remember skills. Theoretical frameworks provide a foundation

for studying how students use AI technology to maintain essential computer engineering competencies (Sweller, 1988; Siemens, 2005).

Conceptual Framework

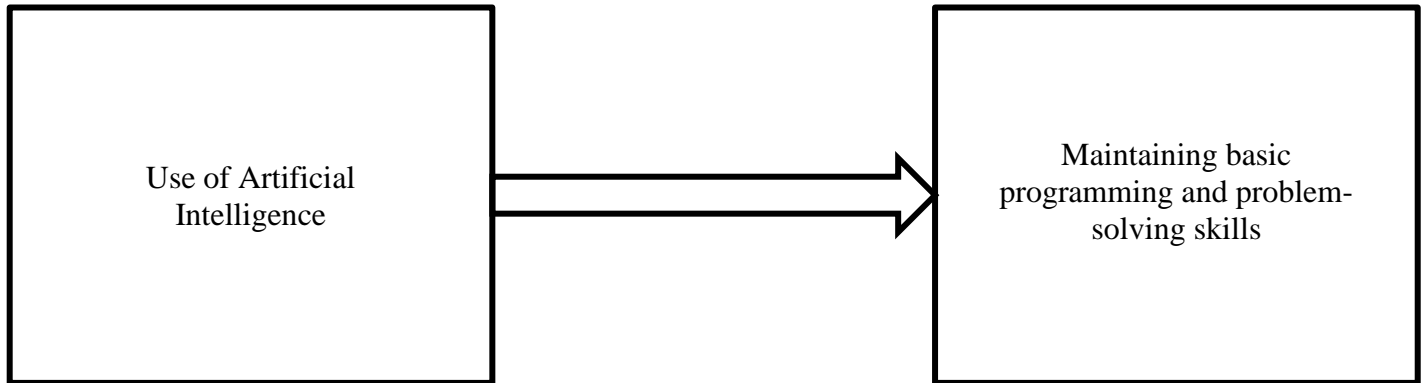


Figure 2. Conceptual Framework

Figure 2.2 demonstrates how artificial intelligence usage which serves as the independent variable affects the skill retention abilities of third-year computer engineering students which function as the dependent variable. The usage of artificial intelligence requires assessing both how often students use it and why they use it and how much they rely on the AI system. The paradigm argues that the way in which students interact with AI can have a direct impact on their retention of basic engineering skills.

Research Objectives

- To be able to identify the level and frequency of AI usage among Computer Engineering students in their academic activities.
- To be able to determine if the use of Artificial Intelligence affects students’ retention of basic computer engineering skills, particularly in problem-solving and programming logic.
- To discover if there is a significant relationship between the usage of AI and the skill retention level of computer engineering students at Bulacan State University

METHODOLOGY

The methodology used in this study is mainly quantitative and descriptive–correlation in nature. The following approaches were made by the researchers to conduct the needed data gathering:

- **Research Approach:** The researchers used the quantitative approach for collecting and analyzing data regarding skill retention and AI usage among third-year Computer Engineering students in Bulacan State University – Main Campus. Applying descriptive-correlation is the design to evaluate the relationship between the students’ problem-solving and programming skills and their AI usage.
- **Participants:** The study selected third-year computer engineering students from Bulacan State University Main Campus as its research population. The research team selected 92 participants through a process of stratified random sampling. The sampling method used in this study ensures that researchers will obtain sufficient demographic distribution across various population groups.
- **Data Collection Instruments:** Structured questionnaire that was distributed through Google Forms was applied by the researchers to efficiently and accurately gather the needed data from the selected population. The provided questionnaire was divided into different sections having their own part and purpose, these covers AI usage frequency, AI usage purpose, AI dependency, skill retention in problem-solving, and skill

retention in programming logic. Likert scale was used, ranging from Highly Disagree to Highly Agree (1 to 5), to measure the students' perception and experience.

- **Validation:** The research instrument required expert evaluation and validation from Computer Engineering and Research and Statistics specialists who confirmed that the structured questionnaire met study objectives. Expert recommendations required mandatory changes which researchers had to implement.
- **Data Processing and Analysis:** The researchers used statistical tools to analyze the data which they had collected. Data Processing and Analysis The researchers used statistical tools to analyze the data which they had collected. The researchers used frequency counting and percentage methods to analyze the demographic data of the participants. The researchers calculated weighted mean values to study how AI usage affected students' skill retention between 0.05 significance level.

Research Instruments

The researchers developed a structured questionnaire for their study to collect essential research data. The instrument is organized into specific sections to cover all the variables. The first section of the study requires respondents to provide their demographic information. The study proceeds to evaluate how often people use AI technology together with their reasons for using it and their level of AI dependence. The final assessment section evaluates whether individuals can sustain their abilities in problem-solving and programming logic skills.

The research employs a 5-point Likert scale which starts with Strongly Disagree at 1 and ends with Strongly Agree at 5 to measure participant responses to various stimuli. The scale described by Joshi et al. (2021) serves as a standard method to assess educational research participants' attitudes which researchers can trust as a reliable measurement tool.

Data Gathering Procedure

The researchers need to obtain official permission from the College of Engineering before they can start their data collection work. The structured questionnaires will be distributed to selected respondents after they receive permission to use Google Forms. The study informs all online participants that they can choose whether to participate and their answers will remain completely private. The researchers will gather all information after the data collection period ends to prepare for their analysis work.

Ethical Considerations

The researchers maintained ethical standards throughout their entire study procedure. The survey required voluntary participation because respondents needed to learn about research objectives before they could complete the survey. All participants provided their informed consent before the researchers started collecting data.

The research team chose not to gather any data that could reveal the participants' identities. The research team maintained complete confidentiality of all responses which they used exclusively for academic research purposes. Only the researchers had access to the securely stored data which they had collected. The study followed all requirements established by the Data Privacy Act of 2012 (Republic Act No. 10173) which guaranteed complete protection of respondents' rights and privacy.

RESULTS AND DISCUSSION

Table 1. Distribution of Respondents by Age

Age Bracket	Frequency	Percentage
19 below	4	4.35%
20	30	32.61%
21	38	41.30%
22	10	10.87%

23	4	4.35%
24 and above	6	6.52%
Total:	92	100.00%

Part II. Assessment of AI Usage

Table 2. Assessment of AI Usage Weighted Mean

Questions	Weighted mean	Interpretation
Q1. I use AI tools for academic work on a regular basis.	3.68	Agree
Q2. I use AI tools on a daily basis for my academic requirements.	3.58	Agree
Q3. I use AI tools in most of my Computer Engineering subjects.	3.53	Agree
Q4. I use AI tools during both minor and major academic tasks.	3.76	Agree
Overall Weighted Mean	3.64	Agree

Part III. AI Usage Purpose

Table 3. AI Usage Purpose Weighted Mean

Questions	Weighted mean	Interpretation
Q5. I use AI tools when solving engineering or mathematical problems.	3.676	Agree
Q6. I use AI tools to generate or debug programming code.	3.772	Agree
Q7. I use AI tools to better understand difficult lessons or topics.	3.837	Agree
Q8. AI tools help me complete my academic tasks more efficiently.	3.967	Agree
Overall Weighted Mean	3.81	Agree

Part IV. AI Dependency

Table 4. AI Dependency Weighted Mean

Questions	Weighted mean	Interpretation
Q9. I trust AI-generated answers even without full verification.	1.68	Disagree
Q10. I use AI tools even for tasks I can do on my own.	2.40	Disagree
Q11. I depend on AI tools to help me understand complex academic problems.	3.83	Agree
Q12. I often turn to AI tools before attempting to solve academic problems independently.	2.47	Disagree
Overall Weighted Mean	2.60	Neutral

Part V. Skill Retention - Problem Solving

Table 5. Skill Retention - Problem Solving Weighted Mean

Questions	Weighted mean	Interpretation
Q13. I can solve engineering problems without using AI tools.	2.49	Disagree
Q14. I remember problem-solving steps after completing my coursework.	3.55	Agree
Q15. I analyze problems independently before using AI assistance.	3.54	Agree
Q16. I can apply learned problem-solving techniques to new problems.	3.52	Agree
Overall Weighted Mean	3.28	Neutral

Part VI. Skill Retention - Programming Logic

Table 6. Skill Retention - Programming Logic Weighted Mean

Questions	Weighted mean	Interpretation
Q17. I can write program logic without AI assistance.	1.87	Disagree
Q18. I understand the logic behind AI-generated code.	3.51	Agree
Q19. I can debug basic programming errors independently	2.15	Disagree
Q20. I remember programming concepts even without AI tools.	2.82	Neutral
Overall Weighted Mean	2.59	Neutral

Part VII. Overall Perception on AI Use

Table 7. Overall Perception on AI Use Weighted Mean

Questions	Weighted mean	Interpretation
Q21. AI tools enhance learning when used responsibly.	3.986	Agree
Q22. Responsible use of AI helps maintain strong foundational skills.	4.178	Agree
Q23. Clear guidelines on AI usage improves students' learning experience.	3.792	Agree
Q24. Proper regulation of AI use in academic settings supports skill development.	4.009	Agree
Overall Weighted Mean	3.99	Agree

Table 8. Correlation Analysis of AI Usage and Skill Retention

Variables Correlated	Pearson (r) Value	p-value	Decision	Interpretation
AI Usage Frequency vs. Overall Skill Retention	-0.54	0.000	Reject H ₀	Significant Negative Correlation

Level of Significance = 0.05

Summary of Findings

Based on the result presented in Section 4, the following findings were extracted:

Demographic Profile of Respondents

Most of the participants were ages 20 to 21 years old, which is within the range of expected age for a third-year Computer Engineering Student. This shows that the respondents of the questionnaire are of the same colleague.

Level and Frequency of AI Usage

The majority of the respondents agreed that they regularly use AI tools to complete academic tasks. Usage of AI tools is embedded into their routine in executing tasks for both minor and major activities. This shows that AI tools has become part of the students' system

Purpose of AI Usage

The findings suggest that AI is generally used to improve their efficiency and lessen their tasks, especially for solving mathematical problems and creating programming code. This shows that students view AI tools as a powerful tool that helps them perform better in terms of academic activities.

Level of AI Dependency

The outcome of the students evaluation resulted as Neutral. While students describe their dependency on AI for understanding and solving complicated problems, most of the students disagree in trusting the product of AI without verification or attempting to solve complex problems on their own before turning to AI. This conveys that rather than full dependency, they ought to rely on AI partially.

Skill Retention in Problem-Solving

The overall research findings of skill retention in problem-solving appeared to be neutral. Despite the fact that students agreed they remember the steps in solving complex problems and analyze it independently, a large number disagreed that they don't have the capability to solve engineering problems without the help of AI tools during the process of problem-solving. This illustrates weakened independent execution regardless of them maintaining the conceptual understanding.

Skill Retention in Programming Logic

Similarly, programming logic skill retention was explained to be Neutral. Based on the outcome, some students reported to have difficulty in creating and debugging programming code without the use of AI tools. This suggests that foundational programming competencies of students are weakening.

Overall Perception on AI Use

Students generally agree that AI tools can improve their learning capabilities and broaden their knowledge when used responsibly. They also acknowledge that implementing rules and regulations for AI usage is a must to maintain the foundational skills. This shows that students who use AI for performing academic activities know the potential risk in overuse of AI tools where foundational skills can be affected and the benefits it provides if responsibly used.

Relationship Between AI Usage and Skill Retention

The Pearson Product-Moment Correlation Coefficient analysis showed a significant negative correlation between skill retention and AI usage with a correlation coefficient of r equals negative 0.54 and a p value less than 0.05. The relationship between students' skill retention and their AI tool usage shows that students who use AI tools more frequently will experience decreased problem-solving and programming logic retention.

CONCLUSION

The research results demonstrate that third-year Computer Engineering students at Bulacan State University Main Campus extensively use Artificial Intelligence (AI) tools for their academic work. Students use AI technology to solve problems, generate code and debug programs and complete schoolwork because it helps them study more effectively. While the students' level of dependency on AI tools was deemed neutral, it has been integrated in their system to use AI tools in achieving their goal and during their learning process. In addition, the respondents acknowledge the risk it provides in overuse and also the benefits it gives when used responsibly, they strongly agree that proper guidelines and regulations is a must to retain foundational and fundamental computer engineering skills.

The results demonstrate that students retain basic problem-solving abilities together with programming logic skills although their use of AI technologies results in reduced retention of their skills. The study shows that people who depend more on AI tools tend to lose their fundamental engineering skills. The excessive use of AI technology without proper controls decreases students' ability to develop their analytical and programming competencies that they need for their future work. This research contributes to the other existing studies by providing quantitative evidence that skill retention among Computer Engineering students has a negative correlation with their increased use of AI even with neutral AI dependency

The outcome of this study is related and with great relationship with the related literature and related studies

presented in the research. The findings uphold Smutny and Schreiberova (2020) and Grassini (2023), which claims that excessive leaning on AI can minimize cognitive engagement and independent problem-solving skills. Comparably, the results align with Rahmat et al. (2021) and Kasneci et al. (2023), who highlights that with AI, efficiency is greatly improved while also decreasing deep learning when abused. Local studies conducted by Navarra et al. (2025)

And Hernandez et al. (2025), affirms that Computer Engineering students depend on AI tools for accomplishing academic tasks, which can negatively affect their fundamental skills in programming and analytics. These resemblances verifies that the current results of the investigation supports other existing related studies that AI generates advantages but also undermines foundational skills when excessively used.

The study findings demonstrate that Artificial Intelligence can provide benefits, and meaningful insights when used correctly and with proper guidance. Everyone should have the right management when it comes to usage of AI as balance is needed to help students learn efficiently without reducing their cognitive thinking and instead enhance it. Proper application of guidelines by the institute will be of great assistance to students to not just preserve their skills, but to develop them while harvesting the benefits of technological advancements and reducing its risks. The investigation contributed in the growing field of AI, especially in Engineering Education by providing data and insights on how AI usage affects the skills and cognitive functions of Computer Engineering students.

RECOMMENDATION

Based on the conclusions of the study, the following recommendations are advised:

For Computer Engineering Students

- a. Students should focus on attempting to solve given problems independently before turning on to AI tools.
- b. AI should be used as an enhancement tool in improving ones' knowledge rather than a replacement for critical thinking.
- c. Students should routinely engage in problem-solving and/or programming logic to enhance and retain their fundamental skills.

For Faculty Members

- a. Professors should design activities that limit the use of AI tools, such as manual coding inside a classroom or time limited tasks.
- b. Instructors can incorporate tasks that require explaining the program logic for better understatement.
- c. Faculty Teachers may provide lessons and discussions regarding the responsible use of AI tools in their subjects.

For University Administrators

- a. They should develop and implement a clear set of institutional policies on using AI tools in executing academic activities.
- b. They can provide students with seminars and lectures to properly teach them regarding the responsible use of AI tools.
- c. Institutional guidelines should focus on retaining problem-solving and programming skills of students while still giving the chance for innovation and technological advancement.

For Future Researchers

- a. Future studies may include experimental or longitudinal research designs to examine long-term cognitive effects of AI dependency.
- b. Researchers can stretch their scope that includes other year levels and even departments.
- c. Further studies may be conducted to evaluate the actual performance-based skill retention of the students rather than depending on the self answered responses of the students.

REFERENCES

1. Copeland, B. J. (1998, July 20). Artificial intelligence (AI). Encyclopedia Britannica. <https://www.britannica.com/technology/artificial-intelligence>
2. Creswell, J. W., & Creswell, J. D. (2022). *Research design: Qualitative, quantitative, and mixed methods approaches* (6th ed.). SAGE Publications.
3. Etikan, I., & Bala, K. (2021). Sampling and sampling methods. *Biometrics & Biostatistics International Journal*, 10(1), 5–7. <https://doi.org/10.15406/bbij.2021.10.00305>
4. Field, A. (2022). *Discovering statistics using IBM SPSS statistics* (6th ed.). SAGE Publications.
5. Foundational learning. (2025, May 16). World Bank. <https://www.worldbank.org/en/topic/education/brief/foundational-learning>
6. Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2023). *How to design and evaluate research in education* (11th ed.). McGraw-Hill Education.
7. Hernandez, H. E., Canlas, R. B., & Nacienceno, M. C., ... & Miranda, J. P. P. (2025). Trust, Usefulness, and Dependency on AI in Programming: A Hierarchical Clustering Approach. *International Journal of Computing and Digital Systems*, 15(2), 45–58.
8. Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial intelligence in education: Promises and implications for teaching and learning*. Center for Curriculum Redesign.
9. Holmes, W., Bialik, M., & Fadel, C. (2022). *Artificial intelligence in education: Promises and implications for teaching and learning*. Center for Curriculum Redesign.
10. Joshi, A., Kale, S., Chandel, S., & Pal, D. K. (2021). Likert scale: Explored and explained. *British Journal of Applied Science & Technology*, 7(4), 396–403.
11. Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., ... Kasneci, G. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences*, 103, 102274. <https://doi.org/10.1016/j.lindif.2023.102274>
12. Navarra, L. W. M., Marcelo, H. L., & Borromeo, J. R. (2025). Quantifying the influence of artificial intelligence dependency on computer engineering students in Bulacan State University. *International Journal of Research and Innovation in Social Science*, 9(10), 541–550. <https://doi.org/10.47772/IJRISS.2025.910000541>
13. Ortega-Dela Cruz, R., & Dela Cruz, R. (2025). AI Integration in IT Education: Challenges, Opportunities, and Future Directions. *Asia Pacific Journal of Education, Arts and Sciences*, 10(2), 22–31.
14. Smutny, P., & Schreiberova, P. (2020). Chatbots for learning: A review of educational chatbots for the Facebook Messenger. *Computers & Education*, 151, 103862. <https://doi.org/10.1016/j.compedu.2020.103862>
15. Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education. *International Journal of Educational Technology in Higher Education*, 16(1), 39.