Quantifying the Influence of Artificial Intelligence Dependency on Computer Engineering Students in Bulacan State University

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ABSTRACT

Artificial intelligence (AI) is rapidly transforming education, with tools like ChatGPT offering instant solutions and explanations. This study aims to investigate the growing reliance on AI among computer engineering students at Bulacan State University exploring the extent of this dependency and its factors influencing their academic performance. The study of of Liu and Wang showed that the application and merging of AI to engineering education is essential for managing innovation, strategic thinking and multidisciplinary skills. The study also proved that the emergence of AI boosts the increase of publication of papers related to engineering education then stated that AI is already starting to mold the change the way engineering education is going to be and its significant impact to colleges and universities. Utilizing a quantitative approach with a descriptive method, the research surveyed thirty (30) 3rd Year computer engineering students during the Second Semester of Academic Year 2023 2024. The findings reveal a high level of AI dependency with a mean score of 3.5 on a 5-point Likert scale. The research concludes that a significant portion of Bulacan State University's computer engineering students heavily rely on AI for academic support. Time constraints, perceived academic benefits, accessibility, and the rising trend of AI use were identified as key influencing factors. Furthermore, a correlation between students' AI reliance and their academic achievement was observed. Based on these findings, the study recommends strategies to address this issue, including improved time management support for students, integration of AI education into the curriculum, and development of new learning materials that equip students to navigate the challenges and opportunities presented by AI in the field of computer engineering. By proactively preparing its students for the evolving technological landscape, Bulacan State University can ensure its computer engineering program fosters responsible development and utilization of AI for the benefit of society.

Keywords: Artificial Intelligence, ChatGPT, Dependency, educational context, academe support.

INTRODUCTION

The increasing integration of Artificial Intelligence (AI) within educational context is causing a fundamental change on how the learning environments function. Several kinds of AI technology are used in this field including plagiarism checkers, paraphrasing tools, and the most popular, the ChatGPT. These tools are capable of generating answers almost instantly, whether they are writing an essay, creating a summary, generating a code for a program, or explaining difficult math problems. Students were suddenly granted access to new, powerful technologies. The use of artificial intelligence has advantages and problems, particularly among students. It gives an optimal method to problem solving as well as step-by-step answers, which is extremely important in terms of improving the quality of learning and education. While this integration offers efficiency and innovation, it also raises questions about the potential drawbacks and challenges associated with an overreliance on these technologies. Local survey showed that 83% of students rely on AI such as ChatGPT in order to provide answers for their inquiries. A result such as that is alarming in terms of progressive development in our society due to the majority of students' dependency on AI.

Despite all the drawbacks of using AI, it is empirically true that with proper usage, especially in the field of engineering education, may create a greater impact in terms of accuracy, reliability and lessen the form of bias, misinformation, and data gathering malpractice (Johri, 2023). The recent popularity and reliability of

generative AI applications and web sites like ChatGPT shows a new era in terms of learning, understanding and developing knowledge in the field of engineering education. But to be able to grasp this, the addition of human touch and ethical use of AI is strictly needed. These may help and support the educations and pedagogy for Filipino learners.

In a study of Liu and Wang (2025), The application and merging of artificial intelligence to engineering education is quite essential for managing innovation, strategic thinking and multiple interdisciplinary skills up to this date. In their study, it was proven that from 2018 to 2023, there was a significant increase of publication related to engineering education and suggests it marks the new era for creating various researchers in that field making the use of AI more relevant. Data mining, machine learning and block chain helps researchers find better, more reliable and secure sources of information. These evolutions proved to be very beneficial where information is abundant but lacks reliability and trust.

Another study from Nuñez (2020) supported the aforementioned statement above. He stated that artificial intelligence is already starting to mold and change the way engineering education and system are conceived. More studies and researches achieved its goals due to the use of AI specially in both technical and theoretical manner. The study also analysed the potential impact of the use of artificial intelligence in improving the overall operation of schools, colleges and universities since AI was able to handle vast amounts of data simultaneously.

The researchers aim to address the challenges posed by the growing reliance on AI among computer engineering students at Bulacan State University. The research entitled "Quantifying the Influence of Artificial Intelligence Dependency on Computer Engineering Students in Bulacan State University" seeks to explore the extent to which AI is utilized and reasons behind this dependency.

Objectives of the Study:

- To be able to identify to what extent computer engineering students rely on artificial intelligence technologies in their academic pursuits
- To be able to identify the factors influencing the dependancy of computer engineering students to AI.
- Identify how does the level of dependency on artificial intelligence among computer engineering students affect their academic performances

METHODOLOGY

Research Design

For the research design of the study, it used the mixed method type wherein the quantitative research design, it emphasizes objective measurements, statistical, mathematical, or numerical analysis of data collected through the research instrument used. Additionally, according to Dr. McLeod (2019), while in the quantitative research, it is a process of objectively collecting and analyzing numerical data to find patterns and averages, make predictions, test causal relationships, and generalize results to wider populations. In quantitative analysis, the researchers respond to the research questions by determining the trend of individual responses and noting how the trend differs. The descriptive method of analysis was used in the study. According to McCombes (2023), descriptive research focused on providing accurate and systematic descriptions of populations, situations, or phenomena. It can answer what, when, and how questions, but not why. It is also the approach that aims to understand the underlying reasons about a certain topic.

Participants and Sampling Technique

For the population, sample and location of the study, it was conducted in order to quantify the dependency on artificial intelligence of Computer Engineering students in Bulacan State University. The population of the study consisted of thirty (30) 3rd year students enrolled during the 2nd Semester of Academic Year 2023-2024. This sample was obtained from three sections of the Computer Engineering department where ten (10) students per section were chosen as respondents. The sampling technique used in this study is simple random

sampling. Simple random is a technique in which the researchers select a random subset of a bigger group or population. It gives each member of the group an equal probability of being selected. This is often used in statistics to generate a sample that is representative of the wider population (Horton, 2024). Research Instrument In the present study, the researchers used an online survey questionnaire entitled "Quantifying the Influence of Artificial Intelligence Dependency on Computer Engineering Students in Bulacan State University" via Google Forms as the main instrument for data collection. The answers provided by the respondents in the said questionnaire will be processed and statistically analyzed in order to provide a graphical representation of the results. The researchers gathered all of the insights of the respondents with different demographic profiles in order to seek answers with regards to the study.

Data Gathering Procedure

The researchers had allotted vigorous time, effort, and cooperation in developing and verifying the questionnaire so as to serve its intended respondents. The questionnaire consisted of eight (8) statements which were related to determining the students' dependency on AI. For the factors influencing their dependency, six (6) statements were rated by respondents. The last section of the form consists of a question indicating their general-weighted average (GWA) for the last semester. In the survey questionnaire, 5-point Likert scale was used to determine how the respondent agreed or disagreed in the question statement. The researchers began the process of collecting data by distributing questionnaires to the 30 respondents online through Facebook Messenger. The data will be automatically collected after the respondents have answered. All the data gathered from this survey questionnaire were tallied and computed for interpretation. The interpretation served as the basis to determine the students' dependency on AI. Data Processing and Statistical Treatment The data gathered from the study were presented in tabular forms. These served as the basis of presenting the results of the analysis. Appropriate statistical treatments were used to analyze the data. For this study, responses that are accumulated through the surveys will be statistically analyzed using mean, frequency, and percentage distribution used to determine and to see the differences gained in terms of the results of computer engineering students' dependency on AI technologies in their academic pursuits and factors influencing their dependency.

Data Analysis Procedure

The method used in this research is "Descriptive Method" since this aims to describe the interconnection of the two variables in conflict with the intervening variable. The method used in gathering data is random sampling method which is further elaborated at the respondents and sampling section wherein, each the respondents are picked randomly giving them equal probabilities from the selected sample size with a total population of 30. Furthermore, the result will then be interpreted in accordance with the three variables that were mentioned and provide some sort of guidelines in answering the questions in the Statement of the Problem that will determine the hypotheses that were used. Lastly, the mean scores of the test were analyzed using the following scale shown in Table 1 titled "Levels of the Students' Dependency on AI". The factors influencing their dependency can also be interpreted using this table.

Furthermore, the use of mean, median and mode is needed in order to get the quantitative values needed in order to get an interpretation based of the answers of the respondents to the questionnaire.

Ethical Considerations

To ensure the confidentiality of the respondents, aliases and codes will be shown instead of their actual names. Also, the online form that submitted by the respondents does not include their names or private/sensitive information. Lastly, all the respondents shall be informed about where their responses will be used, as such, will be solely on this study.

Table I Level Of Students' Dependency On Artificial Intelligence

Mean Scores	Classification
1.00 – 1.56	Very Low

1.57 – 2.42	Low
2.43 – 3.28	Average
3.29 – 4.14	High
4.15 – 5.00	Very High

Mean = Sum of all values / Total number of values

Median = Middle value

Mode = Most common value

RESULTS AND DISCUSSION

Table Ii Mean And Interpretation Of Specific Question 1

Dependency on AI Statements	**Mean**	**Interpretation**
1. I will use AI as an academic helping tool	4.13	High
2. I will rely on AI-based code generation and optimization for my programming assignments	3.23	Average
3. I utilize AI-assisted debugging tools to identify and fix errors in my code.	3.73	High
4. I use AI-powered tools for circuit simulation and analysis	2.93	Average
5. I will ask AI to generate sentences of paragraphs	3.37	High
6. I will ask AI to paraphrase my essays	4.07	High
7. I rely on AI-powered documentation generation	2.8	Average
8. I believe AI technologies can improve my problem-solving skills in computer engineering.	3.73	High
Overall	**3.5**	**High**

Table II shows the results of the students' dependency on AI using mean. Data gathered from the survey questionnaires are observed, verified and made into tabular form for further interpretation and analyzation. Result shows that the respondents have high level of dependency of AI with the mean score of 4.13 in the statement "I will use AI as an academic helping tool.", average level with the mean score of 3.23 in the statement "I rely on AI-based code generation and optimization for my programming assignments.", high with a mean score of 3.73 in the statements "I utilize AI-assisted debugging tools to identify and fix errors in my code." and " I believe AI technologies can improve my problem-solving skills in computer engineering." respectively, average level with means of 2.93 in the statement " I use AI-powered tools for circuit simulations and analysis.", high level with the mean of 3.37 in the statement "I will ask AI to generate sentences or paragraphs.", high with the mean of 4.07 in the statement "I will ask AI to paraphrase my essays." and also Average level with mean of 2.8 in the statement "I rely on AI powered documentation generation for my technical reports or project presentations.". The overall AI dependency level of computer engineering students in Bulacan State University is high with a mean score of 3.5.

Table Iii Mean And Interpretation Of Specific Question 2

Factors Influencing the Dependency on AI	Mean	Interpretation
1. I use AI because it saves me time on doing	3.77	High

difficult tasks.		
2. I find AI explanations of complex concepts clearer than traditional methods.	3.6	High
3. I find AI-generated summaries and study materials helpful for comprehending complex topics.	3.63	High
4. The availability of user-frindly AI platforms encourages exploration and experimentation	3.9	High
5. AI-powered research assistants help me find relevant sources and information for projects more efficiently.	2.9	Average
6. The growing trend of AI Integration in various engineering domains motivates its use in studies	3.7	High
Overall	3.58	High

Table III shows the results of the factors influencing the dependency of computer engineering students on artificial intelligence. First statement shows that the interpreted level regarding the intervening variable "time" is high with a mean score of 3.77 in the statement "I used AI because it saves me time on doing difficult tasks. Second statement shows that the interpreted value of the intervening variable "academic capabilities" is high with a score 3.6 in the statement "I find AI explanations of complex concepts clearer than traditional methods.", high with a score of 3.63 in the statement "I find AI-generated summaries and study materials helpful for comprehending complex topics.", high with a score of 3.9 in the statement "The availability of user-friendly AI platforms encourages exploration and experimentation.", average with a score of 2.9 in the statement "AI-powered research assistants help me find relevant sources and information for projects more efficiently.", and high with a mean score of 3.7 in the statement "The growing trend of AI integration in various engineering domains motivates its use in studies.". The overall mean result of Table 3 indicates that time, use for its academic capabilities, availability, and trend of AI is high with a mean score of 3.58.

Table Iv Percentage of Students' General Weighted

GWA	Frequency	Percentage (%)
1.00-1.25	0	0
1.26-1.50	2	6.7
1.51-1.75	12	40
1.76-2.00	11	36.7
2.01-2.25	4	13.3
2.26 below	0	0
Total	30	100.0

Table IV presents the general weighted average (GWA) of the students, along with the frequency and percentage distributions. The data aligns with the questions and responses from the earlier part of the survey. Among the thirty students, 6.7% (2 students) have a GWA of 1.26 to 1.50, 40% (12 students) have a GWA of 1.51 to 1.75, 36.7% (11 students) have a GWA of 1.76 to 2.00, 13.3% (4 students) have a GWA of 2.01 to 2.25, and 3.3% (1 student) have a GWA below 2.26. The results indicate a correlation between students' average scores, their level of reliance, and their academic achievement over the semester. This implies that

students' average scores align with their level of reliance and their academic performance during the semester. However, these findings might differ due to the intervening variables mentioned in the previous chapter.

SUMMARY OF FINDINGS

The data were analyzed, and the following findings were formulated in accordance with the specific given questions under the survey questionnaires providing credible information needed to answer the questions presented in the Statement of the Problem. • The overall AI dependency level of computer engineering students in Bulacan State University is high with a mean score of 3.5. • The mean results indicate that time, use for academic capabilities, availability, and trend are the factors influencing the students' dependency on AI • The findings reveal a correlation between students' average scores, their level of reliance, and their academic achievement over the semester. Conclusion Based on the results and findings of this study, the following conclusions are formulated: Specific question 1. To what extent are computer engineering students at Bulacan State University dependent on artificial intelligence technologies in their academic pursuits?

According to the statistics reported in the previous chapter, there is a high mean score indicating respondents' dependency on artificial intelligence academic assistance resources. As previously stated, this addresses the issue in the first Statement of the Problem, which might be taken as implying that the majority of students rely on AI. Specific question 2. What are the factors influencing the dependency of computer engineering students on artificial intelligence? The overall mean score for question number two is 3.58, which is considered high. With all of the possible conditions determined by the survey questionnaires, this answers the question in the Statement of the Problem number 2: the factors associated with the intervening variables mentioned previously are time, academic capabilities, and their overall weighted average. It can be shown that the criteria described above are strongly associated to their responses in the reliance of AI surveys. Specific question 3. How does the level of dependency on artificial intelligence among computer engineering students affect their academic performances? The results show a correlation between their average scores and their level of reliance, as well as their academic achievement over the semester. This suggests that their average scores are consistent with both their level of reliance and their academic achievement during the semester. The findings may vary based on the intervening variables discussed in the preceding chapter. To summarize, the impact of artificial intelligence (AI) is evident. AI is increasingly altering our environment by automating tasks and adapting experiences. As AI technology advances, the demand for qualified computer engineering students, notably at Bulacan State University, will only increase. These students will help shape the future of AI and ensure its ethical and useful usage for society. The potential for AI to enhance our lives is enormous, and Bulacan State University has the possibility to take a major role in this promising subject. By developing the next generation of AI professionals, the institution can contribute to ensuring that AI is utilized for good and that its advantages are enjoyed by everybody.

RECOMMENDATION

Based on the findings of the survey, it can be concluded that the majority of students rely heavily on Artificial Intelligence to assist them in their academic activities.

1. The researchers recommend further enhancing or assisting their students in disseminating their tasks and academic loads properly and orderly, taking into account the students' time and availability.
2. It is also recommended to integrate and cultivate AI learnings in the future; as technology evolves, the precision of these AIs can be improved. With all of the variables considered and based on the data analysis shown, the researchers recommend that new lessons be developed.
3. By developing the next generation of AI professionals, the institution can contribute to ensuring that AI is utilized for good and that its advantages are enjoyed by everybody.

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