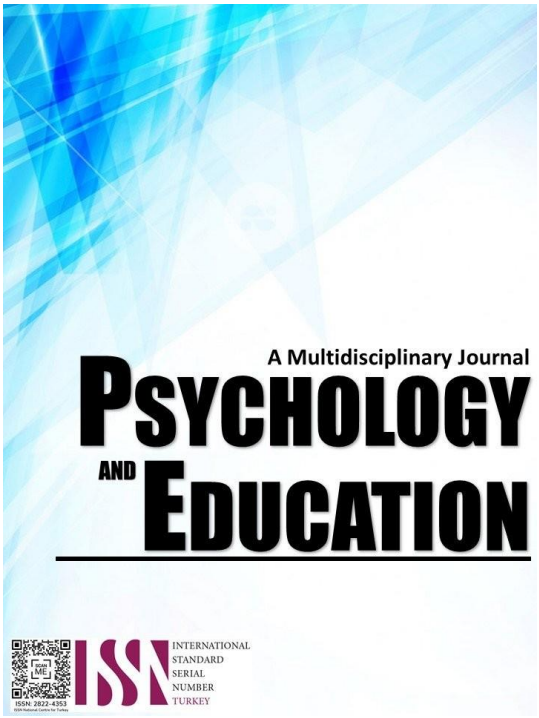
IMPACTS OF ARTIFICIAL INTELLIGENCE TECHNOLOGY ON STUDENT LEARNING OF SELECTED COLLEGE STUDENTS IN GUMACA, QUEZON



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Research Article

Impacts of Artificial Intelligence Technology on Student Learning of Selected College Students in Gumaca, Quezon

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Abstract

This research aimed to describe the impacts of artificial intelligence (AI) technology, specifically ChatGPT, Google Meet, and Google Classroom, on student learning experiences in selected colleges and universities in Gumaca, Quezon. It sought to identify the demographic profile of respondents, their usage of AI technologies, the perceived impacts of AI on various aspects of student learning such as access and equity, personalized learning experience, enhance learning outcome, teacher-student interactions, and practical application, and whether these impacts vary based on demographic profiles. This applied descriptive survey method utilizing researcher-made questionnaires that were validated by experts to gather necessary data. Purposive sampling selected 100 students already integrating AI technology into their studies. Data were analyzed using percentage, frequency, and weighted mean along with One-Way ANOVA to determine significant differences. Findings revealed that the respondents are 19-20 years old (32%), females (67%), and second year college students (32%). All the students use ChatGPT (100%) but not everyone use Google Meet (75%) and Google Classroom (73%). Additionally, the respondents agree on the positive impact of using AI in student learning in terms of access and equity (mean=3.91), personalized learning experience (mean=4.02), enhance learning outcome (mean=4.00), teacher-student interactions (mean=3.87), and practical applications (4.14) but has to improve using AI for 21st century skills development, student progress monitoring, objective grade computation, efficiency in assignment submissions, and providing lifelong learning opportunities. Lastly, ANOVA results showed that there is no significant difference on the perceived impacts of artificial intelligence in students learning when respondents are group according to profiles as to age, sex, and college level. The study recommends for parents, teachers, students, and future researchers to be conscious on the positive application of AI with due guidance, exploration of trends and AI for different context, and consideration of ethical considerations in its utilization.

Keywords: *artificial intelligence, student learning, chat GPT, google meet, google classroom*

Introduction

In an era marked by swift technological progress, the incorporation of Artificial Intelligence (AI) technology into educational settings has become increasingly widespread specially in the 21st century (Chen, Chen, & Lin, 2020). This study aims to investigate and comprehend the effects of AI technology on student learning, concentrating on a selected group of college students in Gumaca, Quezon. As different educational institutions grapple with the challenges and opportunities posed by AI, it is crucial to examine how these technologies impact the learning experiences and outcomes of students in varied academic environments.

Furthermore, it is also imperative to address the growing distress about the idea of AI technologies replacing the teachers' role in learners' education. The job of teachers will transform but not be gone. It will be transformed in a way that teachers can effectively use AI technologies in the learning process (Zhai et al., 2021). AI can assist educators which contribute to student development, offering extra training opportunities that open valuable classroom time for more advanced learning activities (Mina, et al., 2023).

The intersection of education and technology has undergone a paradigm shift with the advent of AI. AI applications in education range from intelligent tutoring systems and virtual classrooms to adaptive learning platforms, promising personalized and enhanced learning experiences (Zhai et al., 2021). Three of these commonly use web applications in the locality that use AI technologies are Google Meet, Google Classroom and ChatGPT (Baidoo-Anu & Ansah, 2023). Similarly, Gumaca, is a municipality in the province of Quezon that serves as the setting for this research that offers the opportunity to examine the impacts of these AI technologies in student learning having diverse academic environments.

The research aims to recognize the potential of AI technology in transforming the system of education in the Philippines specially in Gumaca, Quezon and as we delve deeper in its transformative potential, we hope that this research can shed light on not only the personal experience of college students of Gumaca, Quezon in the use of AI technologies but also how well it impacts their learning.

Futhermore, the researcher hopes that this study can serve as a guide for the Department of Education, Commission of Higher Education and other educational institutions in developing policies about the integration if AI in educational curriculum.

Research Questions

This study aimed to determine the impact of artificial intelligence technology (chat gpt, google meet and google classroom) on student learning of selected college students in Gumaca, Quezon. Specifically, this study sought to answer the following:.

1. What is the demographic profile of the respondents in terms of:
    1.1. age;
    1.2. sex; and
    1.3. college year level?
2. What artificial intelligence technology are the respondents using:
    2.1. ChatGPT;
    2.2. google meet; and
    2.3. google classroom?
3. How does AI technology (ChatGPT, Google Meet, and Google Classroom) impact college students' learning in terms of:
    3.1. access and equity;
    3.2. personalized learning experience;
    3.3. enhance learning outcome;
    3.4. teacher-student interactions; and
    3.5. practical applications?
4. Is there a significant difference in the perceived impacts of artificial intelligence on students learning when respondents are grouped according to profile?

Methodology

Research Design

This study used descriptive survey method to collect data for impact of AI technology in student learning. The researcher used survey questionnaire as an instrument. Based on the survey's results, the researcher was able to determine the details of the study.

Descriptive survey method is a type of quantitative research. Quantitative research is a systematic approach to gathering and interpreting numerical data. This method involves the collection of statistical information, enabling the identification of patterns, calculation of averages, prediction of outcomes, testing of causal relationships, and the extrapolation of findings to broader populations (Sidel et al., 2018).

Descriptive survey method allows the researchers to gather large volumes of data that can be analyze for frequencies, averages and patterns.

Respondents

Purposive criterion sampling was used to purposively select the 100 students who are enrolled in different colleges and universities in the SY 2023-2024 and impacts of AI technology in learning was the focus of the study. The criterion was the "use at least two (2) of the following web applications; ChatGPT, Google Meet, and Google Classroom.

Purposeful sampling is guided by the principle that intentionally selecting samples rich in information contributes to a comprehensive understanding of the phenomena under investigation (Obilor, 2023). The choice of respondents becomes feasible only after conducting several observational visits to the research sites. These visits aid in the identification and selection of samples that align well with the study's purpose and objectives. Researchers may use criteria such as age, gender, experience, functional role, or organizational ideology as initial parameters to focus on a specific study location.

Instrument

The researcher used a researcher-made questionnaire. This questionnaire employed a likert scale of 5 points where 5 – Strongly Agree (SA), 4 –Agree (A), 3 – Moderately Agree (MA), 2 – Disagree (DA) and 1 – Strongly Disagree (SA). For understanding about the impacts of artificial intelligence technology on student learning of selected college students in Gumaca, Quezon. The researcher prepared questionnaire to the respondents. It is composed of demographic profile of the respondents and perceive impact of AI technology in student learning.

Moreover, research questionnaires were validated by three (3) experts. A school head and master teachers. This underwent thorough content, face, and construct validation to maximize full validity of the data to be gathered. Validators' suggestions were also incorporated in the drafting of questionnaires for piloting.

A pilot testing was conducted using Cronbach's Alpha to test the internal consistency of the instrument. The results were 0.70 and above, hence, the items were accepted.

Procedure

Gathering of the needed data began with the sending of research communications to the head of the colleges with permit from the university to conduct the study signed by the researcher and the adviser.

Then, the target populations among the college students of Gumaca, Quezon were identified. The descriptive research method using likert scale was used in order to rate the impacts of artificial intelligence technology on student learning. Data were gathered through researcher-made and validated questionnaires that was participated by the respondents considering the conducted criterion purposive sampling in both male and female college students of Gumaca, Quezon.

In administering the questionnaire, the researcher used the time allotted for vacant time to avoid distraction of class discussion. The student response was given enough time to answer the questions. After data gathering, the researcher collected it for tallying the scores and to apply the statistical treatment in descriptive and inferential analysis in the study.

Furthermore, ethical considerations were carefully incorporated throughout the data gathering process. Prior consent was obtained from the relevant authorities, and participants were assured of the confidentiality and anonymity of their responses. Additionally, efforts were made to minimize any potential distractions or interruptions during questionnaire administration to uphold the integrity and reliability of the gathered data.

Data Analysis

In this study, the researcher used statistical measures to treat the collected data. All the data were carefully read and examined for analysis. They were tallied and entered into a master list of the data collection sheet. Percentage and Frequency were used to interpret the profile of the respondents. The significant difference was tested using One-Way ANOVA test.

Results and Discussion

This section comprehensively presents all the analysis and interpretation of the gathered data. All the data gathered were presented here in tabulated form with corresponding interpretation. There are four parts of the chapter, the first concerns the demographic profile of the respondents, the second is the artificial intelligence used by the respondents, the third is the impact of AI among the students, and the fourth is the inferential stat on the hypothesis results.

Table 1. *Frequency Count and Percentage Distribution of Respondents According to Age*

Age	*Frequency*	*Percentage (%)*	*Rank*
17-18	28	28	2
19-20	32	32	1
21-22	26	26	3
23-24	14	14	4
Total	100	100	

Table 1 presents the frequency count and percentage distribution of respondents according to age. The majority of respondents fall within the age groups of 19-20 years old, constituting 32% of the sample, followed by the age group of 17-18 years old, accounting for 28%. Meanwhile, 21-22-year-olds make up 26% of the sample, and those aged 23-24 represent 14%. Overall, the distribution indicates a relatively even spread across the different age groups surveyed, with the largest proportion falling within the 19-20 age bracket.

The findings indicate that AI technology has the potential to positively influence student learning across various age groups, as evidenced by the relatively uniform distribution of respondents across different age categories. This also suggests that AI-based educational interventions can be effective regardless of students' age, highlighting the versatility and applicability of AI in catering to diverse learning needs. However, further research is needed to explore the specific mechanisms through which AI impacts student learning and to identify potential factors that may moderate these effects, such as individual differences in technology proficiency and learning styles.

Same with the current findings, Asirit and Hua's (2023) study on AI awareness, utilization, and perceptions among college students also reveals an age profile skewed towards those aged 18 – 22, with a predominance of males, underscoring the importance of AI education to mitigate knowledge gaps, particularly among younger cohorts and in less AI-savvy fields. Additionally, the study of Akgun and Greenhow (2022) showed how important is the use of AI among learners of different age groups but has to address ethical challenges.

Table 2. *Frequency Count and Percentage Distribution of Respondents According to Sex*

Sex	*Frequency*	*Percentage (%)*	*Rank*
Male	33	33	2
Female	67	67	1
Total	100	100	

Table 2 presents the frequency count and percentage distribution of respondents according to sex. The data reveal that the majority of respondents are female, constituting 67% of the sample, while males make up 33%.

Findings suggests a significant gender disparity in the study population, with females outnumbering males. Such an imbalance may

have implications for the generalizability of the findings and the representation of diverse perspectives in the study. It is essential to consider how gender dynamics may influence the impacts of artificial intelligence technology on student learning, as perceptions, experiences, and needs may vary between male and female college students. A different study may explore gender-specific factors that could shape the effectiveness and implications of AI technology in educational settings to ensure inclusive and equitable outcomes for all students.

Similar to the current findings Luengo et al., (2021) also showed that one of the most frequently used approaches is susceptible-infected-recovered (SIR) modeling, in which models are usually designed based on regional statistics capturing age and sex, and potentially other variables. Also, findings of Escamos et al., (2023) that sex profile has significant relationship to the Artificial Intelligence applications used in lesson preparation, implementation, and in quizzes/activities of professional teachers.

Table 3. *Frequency Count and Percentage Distribution of Respondents According to College Level*

College Level	*Frequency*	*Percentage (%)*	*Rank*
First Year	28	28	2
Second Year	32	32	1
Third Year	26	26	3
Fourth Year	14	14	4
Total	100	100	

Table 3 displays the frequency count and percentage distribution of respondents according to college level. The data reveal that the largest proportion of respondents are in the second year, constituting 32% of the sample, followed by first-year students at 28%, third-year students at 26%, and fourth-year students at 14%. This distribution provides insights into the representation of students across different stages of their college education.

The findings imply that the study sample encompasses a diverse mix of college levels, allowing for a comprehensive examination of the impacts of artificial intelligence technology on student learning across various stages of academic progression. However, the lower representation of fourth-year students raises questions about whether the findings adequately capture the experiences and perspectives of senior students who may have more exposure to AI technology and advanced learning practices.

Concurrent to the findings Bates et al., (2020) identified first year college students entering higher education in Taiwan with a high risk of subsequent drop-out, and also identifying factors associated with high risk of drop-out. Significantly, the Asia University in Taiwan has a policy of 'Give up on no-one' and has instituted differentiated learning paths and instructor intervention to adapt to individual differences.

Table 4. *Frequency Count and Percentage Distribution of Respondents on the Artificial Intelligence Technology Being Used*

Artificial Intelligence Technology Being Used	*Frequency*	*Percentage (%)*	*Rank*
Chat GPT	100	100	1
Google Meet	75	75	2
Google Classroom	73	73	3
Total	100	100	

Table 4 presents the frequency count and percentage distribution of respondents on the artificial intelligence technology being used. The data indicates that ChatGPT is the most commonly used AI technology among the selected college students, with 100% of respondents utilizing it. Google Meet and Google Classroom follow, with 75% and 73% of respondents, respectively, reporting their usage.

The analyzed data underscores the widespread adoption of AI technologies in student learning environments, highlighting the role of AI in various aspects of academic activities, including virtual assistance, online collaboration, and course management. However, the dominance of ChatGPT usage raises questions about the diversity of AI tools employed in student learning and the potential implications for pedagogical practices and learning outcomes. Further investigation into the factors influencing students' preferences for specific AI technologies and their perceived effectiveness in supporting learning is warranted to inform the design and implementation of AI-integrated educational interventions that cater to diverse student needs and preferences.

Similar to the findings indicated, the studies by Escamos et al. (2023), Timmons et al. (2021), and Romero et al. (2020) both shed light on integrating Artificial Intelligence (AI) and digital tools in educational settings. Escamos et al. (2023) examined the acceptability of AI applications among professional teachers, revealing that demographic profiles had no significant relationship with the AI tools used in lesson preparation, implementation, and quizzes. Meanwhile, Timmons et al. (2021) focused on the challenges of remote teaching and learning in early primary contexts using Google Meet, uncovering themes such as equity considerations, teaching modalities, social-emotional impacts, and academic effects.

Table 5. *Average Weighted Mean Distribution of the Respondents on the Impact of AI Technology among College Students' Learning in terms of Access and Equity*

Access and Equity Indicators	*5 SA*	*4 A*	*3 MA*	*2 D*	*1 SD*	*WM*	*INT*	*R*
1. AI technology facilitate remote learning by providing intelligent tutoring system.	49	19	32	0	0	4.17	A	2
2. AI technology supplement the development of 21st century skills such as critical-thinking, problem-solving and creativity.	4	55	33	8	0	3.55	A	5
3. AI technology shows unbiased or non-discrimination of race, gender and /or ethnicity granting education for all.	32	23	44	1	0	3.86	A	3
4. AI technology facilitate interactive learning experiences like virtual reality and other immersive technologies.	21	43	28	8	0	3.77	A	4
5. AI technology establish more connections through collaborative classrooms platforms.	55	12	33	0	0	4.22	SA	1
Average Weighted Mean						3.91	A	

Table 5 illustrates the Access and Equity Indicators of the impacts of artificial intelligence technology on student learning among selected college students. The general average weighted mean (WM) is 3.91, indicating overall agreement. The highest mean score is attributed to statement 5, "AI technology establishes more connections through collaborative classroom platforms," with a mean of 4.22, indicating a strong agreement among respondents. On the other hand, the lowest mean score is for statement 2, "AI technology supplements the development of 21st-century skills such as critical-thinking, problem-solving, and creativity," with a mean of 3.55, signifying agreement but to a lesser extent compared to other statements. The other means range from 3.77 to 3.86, suggesting agreement with the respective statements but varying in degrees.

These findings imply that college students generally perceive AI technology positively in facilitating remote learning, promoting interactive learning experiences, and fostering connections through collaborative classroom technologies. However, leveraging AI technology to develop 21st-century skills effectively and ensuring unbiased access to education for all students, irrespective of race, gender, or ethnicity can further be developed. Efforts to address these implications may involve refining AI-integrated educational interventions to better align with student needs and equity principles, as well as providing training and support to educators in implementing AI technologies inclusively and effectively that can benefit all the students in the community at wide.

Same with the results of the study, the studies by Cheddadi and Bouache (2021) and Estrellado and Miranda (2023) delve into the complex relationship of access and equity in education, particularly within higher education and the integration of Artificial Intelligence (AI). Cheddadi and Bouache's (2021) research addresses the persistent issue of access barriers in higher education due to demographic factors, proposing the use of deep neural networks to predict students' outcomes as a means to promote equity. Their findings suggest that AI, particularly deep learning, holds promise in mitigating disparities and improving educational outcomes. Meanwhile, Estrellado and Miranda (2023) explore the academic challenges and opportunities presented by AI in education, emphasizing the need for robust technological infrastructure, policy frameworks addressing data privacy and the digital divide, and ongoing faculty training. Their review shows the importance of collaboration between educators and policymakers to harness the potential of AI while ensuring equal access to quality learning, highlighting the imperative of addressing social and ethical implications in AI integration efforts.

Table 6. *Average Weighted Mean Distribution of the Respondents on the Impact of AI Technology among College Students' Learning in terms of Personalize Learning Experience*

Personalized Learning Experience Indicators	*5 SA*	*4 A*	*3 MA*	*2 D*	*1 SD*	*WM*	*INT*	*R*
1. AI technology can assess students' strengths and weaknesses.	39	52	8	1	0	4.29	SA	2
2. AI technology provides flexible learning strategies where students can demonstrate their understanding.	35	25	38	2	0	3.93	A	3
3. AI technology provides a self-paced learning allowing mastery before moving on.	27	49	12	12	0	3.91	A	4
4. AI technology offer personalized recommendations.	57	23	20	0	0	4.37	SA	1
5. AI technology can identify students who are struggling and at risk of falling behind.	20	31	37	12	0	3.59	A	5
Average Weighted Mean						4.02	A	

Table 6 presents the Average Weighted Mean Distribution of the respondents regarding the Impact of AI Technology on College Students' Learning in terms of

Personalized Learning Experience. The general Average Weighted Mean (WM) is 4.02, indicating an overall agreement with the statements provided. The highest mean score is reflected in indicator 4, "AI technology offers personalized recommendations," with a mean of 4.37, signifying a strong agreement among respondents. Following closely is statement 1, "AI technology can assess students' strengths and weaknesses," with a mean of 4.29, also indicating strong agreement. Statements 2 and 3, regarding flexible learning strategies and self-paced learning, respectively, both received mean scores above 3.93 and 3.91, suggesting agreement but to a slightly

lesser extent compared to the highest-rated statements. Meanwhile, the lowest mean score is for statement 5, "AI technology can identify students who are struggling and at risk of falling behind," with a mean of 3.59, indicating agreement but to a slightly lesser degree compared to other statements.

The findings suggest that college students generally perceive AI technology positively in terms of providing personalized learning experiences, including assessing strengths and weaknesses, offering flexible learning strategies, and providing self-paced learning opportunities. On the other hand, there is room for improvement in AI's ability to identify struggling students effectively. Addressing these implications involves further refining AI algorithms and interventions to better support personalized learning experiences and student success.

Same with the research findings in personalized learning experience, Pratama, Samplelolo, and Lura (2023) employed a qualitative descriptive method incorporating questionnaires, interviews, observations, and documentation for data collection. Their study revealed significant student perceptions regarding the importance of Artificial Intelligence (AI) in learning, with 88% strongly agreeing and a negligible 3% disagreeing. Similarly, findings regarding AI as an alternative to self-learning and its potential as virtual tutors or smart assistants demonstrated high levels of agreement among students. In a related context, Maaliw (2020) emphasized the need for adaptive learning environments to cater to evolving student characteristics and preferences. Through data mining of learner behavioral features, Maaliw developed a classification model using the J48 decision tree algorithm, facilitating the creation of an adaptive virtual learning environment prototype. This prototype intelligently personalizes course content and user interfaces based on individual learning styles, underscoring the importance of tailored learning experiences in contemporary educational settings.

Table 7. *Average Weighted Mean Distribution of the Respondents on the Impact of AI Technology among College Students' Learning in terms of Enhance Learning Outcomes*

Enhance Learning Outcome Indicators	*5* *SA*	*4* *A*	*3* *MA*	*2* *D*	*1* *SD*	*WM*	*INT*	*R*
1. AI technology is more effective than traditional teaching methods.	56	22	11	11	0	4.23	SA	1
2. AI technology have more personalized content to cater diverse learning needs.	36	30	34	0	0	4.02	A	2
3. AI technology provide real-time feedback for learners to identify their strengths and weaknesses more efficiently.	22	52	23	3	0	3.93	A	4
4. AI technology enable students to interact more with peers and experts around the world.	31	34	35	0	0	3.96	A	3
5. AI technology provides unbiased grading and assessment by using objective evaluation criteria.	27	45	17	11	0	3.88	A	5
Average Weighted Mean						4.00	A	

Table 7 illustrates the Average Weighted Mean Distribution of the respondents concerning the Impact of AI Technology on College Students' Learning in terms of Enhancing Learning Outcomes. The general Average Weighted Mean (WM) is 4.00, indicating overall agreement among the respondents. Additionally, the highest mean score is associated with statement 1, "AI technology is more effective than traditional teaching methods," with a mean of 4.23, indicating a strong agreement among respondents. Following closely is statement 2, "AI technology has more personalized content to cater to diverse learning needs," with a mean of 4.02, also suggesting agreement. Statements 3 and 4 received mean scores of 3.93 and 3.96, indicating agreement. However, the last indicator concerning "AI technology provides unbiased grading and assessment by using objective evaluation criteria" earned 3.88 interpreted as agree indicating the need to improve on the aspect of objective grading and assessment using AI.

These findings suggest that college students generally perceive AI technology positively in terms of enhancing learning outcomes, including effectiveness compared to traditional teaching methods, personalized content delivery, real-time feedback provision, global interaction opportunities, and unbiased grading and assessment. However, it's crucial to address any potential limitations or challenges associated with the implementation of AI technology to ensure its continued effectiveness in enhancing learning outcomes and fostering student success.

These findings highlight a significant shift in students' attitudes towards AI technology as a beneficial tool in their learning journey. The recognition of AI's effectiveness in various aspects of education, such as providing personalized learning experiences and delivering real-time feedback, reflects a growing acceptance of technology's role in modern education. Moreover, the acknowledgment of AI's potential to facilitate global interaction opportunities and ensure unbiased grading and assessment signals a broader appreciation for its diverse applications in fostering a more inclusive and equitable learning environment.

However, while these positive perceptions are promising, it's crucial to delve deeper into the practical implementation of AI technology in educational settings. Challenges such as access to AI resources, training for educators and students, and ethical considerations regarding data privacy and algorithmic bias need to be addressed comprehensively. Additionally, understanding how AI can complement rather than replace traditional teaching methods is essential for ensuring that its integration aligns with pedagogical goals and supports diverse learning needs.

Same with the current results, in enhancing learning outcomes, Sala-Pilco (2020) conducted an intervention study in a primary school

where educational robots were utilized, revealing that the development of an integrated analytical framework led to a more comprehensive assessment of students' learning outcomes. This approach facilitated a balanced and inclusive analysis, promoting learning through AI and robotics by accommodating different learning pathways and paces. The study also summarized lessons learned and identified challenges for future research, emphasizing the importance of leveraging AI and robotics for enriched learning experiences. Similarly, Prestoza and Banatao (2024) explored students' perceptions of AI integration in education and its impact on learning outcomes. Despite limited exposure to AI tools, students expressed positivity toward personalized learning experiences and adaptive feedback.

Table 8. *Average Weighted Mean Distribution of the Respondents on the Impact of AI Technology among College Students' Learning in terms of Teacher-Student Interactions*

Teacher – Student Interaction Indicators	*5 SA*	*4 A*	*3 MA*	*2 D*	*1 SD*	*WM*	*INT*	*R*
1. AI technology gives the teacher more time to spend on the learner	41	16	33	1	9	3.79	A	4
2. AI technology saves learners' time in submitting online works and requirements.	32	31	20	8	9	3.69	A	5
3. AI technology guides teachers in providing diverse learning strategies for students which are implemented in the classroom.	34	38	28	0	0	4.06	A	1
4. AI technology helps teachers in providing diverse teaching strategies that are implemented in the classroom.	29	40	29	2	0	3.96	A	2
5. AI technology helps teachers in communicating to students with disabilities (text to speech, speech-to-text, and other adaptive technologies)	15	55	29	1	0	3.84	A	3
Average Weighted Mean						3.87	A	

Table 8 presents the Average Weighted Mean Distribution of the respondents regarding the Impact of AI Technology on College Students' Learning in terms of Teacher-Student Interactions. The general Average Weighted Mean (WM) is 3.87, indicating an overall agreement among the respondents in all indicators. Moreover, the highest mean score is associated with statement 3, "AI technology guides teachers in providing diverse learning strategies for students which are implemented in the classroom," with a mean of 4.06, interpreted as agree among respondents. Following closely is statement 4, "AI technology helps teachers in providing diverse teaching strategies that are implemented in the classroom," with a mean of 3.96, suggesting agreement. On the other hand, least scored indicator showed that "AI technology saves learners' time in submitting online works and requirements with the mean of 3.69 interpreted as agree which indicates that learners have to adjust time and be able to equipped in using AI for productivity and efficiency in their learning tasks.

These findings also suggest that college students generally perceive AI technology positively in terms of enhancing teacher-student interactions, including providing teachers with more time for personalized instruction, saving learners' time in submitting requirements, guiding diverse teaching and learning strategies, and assisting in communication with students with disabilities. Meanwhile, it is essential to address any potential challenges or limitations associated with the integration of AI technology to ensure its effective utilization in facilitating teacher-student interactions and improving the overall learning experience and time related elements.

Similar to the presented results, Kim's (2023) research also delved into the realm of teacher-student interactions, revealing a multifaceted approach to improving students' subject-matter knowledge and capacity building through data-driven problem-based learning and case-based reasoning, complemented by growth-focused and reflective assessment strategies. Teachers emphasized the importance of enhancing data literacy and fostering collegiality with AI, while also advocating for AI equipped with Technological Pedagogical and Content Knowledge (TPACK) and conflict resolution skills to enrich classroom interactions. They identified key factors such as IoT-based classrooms, systematic AIED curriculum, and ongoing professional development as pivotal for creating an AI-ready culture in schools. Additionally, Hu et al.'s (2023) study explored the dynamics of group learning in middle school settings, uncovering nuanced interaction patterns among students learning AI through hands-on activities. The research, involving 37 students, identified four group learning types and analyzed student-student interactions using the Teacher Scheme for Educational Dialogue Analysis (T-SEDA). Findings revealed that expert/novice group learning exhibited the highest frequency of interaction, producing extensive and complex interaction sequences, shedding light on the potential benefits of this pedagogical approach.

Table 9. *Average Weighted Mean Distribution of the Respondents on the Impact of AI Technology among College Students' Learning in terms of Practical Applications*

Practical Application Indicators	*5 SA*	*4 A*	*3 MA*	*2 D*	*1 SD*	*WM*	*INT*	*R*
1. AI technology help students understand complex learning topics in simple ways.	34	43	14	0	9	3.93	A	4
2. AI technology provides lifelong learning opportunities.	15	46	27	12	0	3.64	A	5
3. AI technology provide outside-the-classroom tutoring.	51	20	28	1	0	4.21	SA	3
4. Use of AI technology is inexpensive in the long run.	58	27	14	1	0	4.42	SA	2
5. AI technology in education can be integrated in vast array of technological applications.	66	19	15	0	0	4.51	SA	1
Average Weighted Mean						4.14	A	

Table 9 illustrates the Average Weighted Mean Distribution of the respondents concerning the Impact of AI Technology on College Students' Learning in terms of Practical Applications. The general Average Weighted Mean (WM) is 4.14, indicating an overall agreement with the statements provided among the college respondents. Also, the highest mean score is associated with statement 5, "AI technology in education can be integrated into a vast array of technological applications," with a mean of 4.51, indicating a strong agreement among respondents. Following closely are statements 3 and 4, with mean scores of 4.21 and 4.42, respectively, suggesting strong agreement. On the other hand, statement 2 received the lowest mean score of 3.64, indicating agreement but with a slightly lower level of consensus compared to other statements.

These findings indicate that college students generally perceive AI technology positively in terms of its practical applications, including simplifying complex learning topics, providing lifelong learning opportunities, offering outside-the-classroom tutoring, being cost-effective in the long run, and being integrable into various technological applications.

This highlights the possibility of AI technology to enhance learning experiences, provide valuable educational resources, and support students in their academic pursuits. Yet, it's crucial to address any challenges or concerns associated with the implementation and use of AI technology to ensure its effective integration into educational settings.

Same with the current findings, Chen et al., (2020) also showed that there was a continuingly increasing interest in and impact of AIEd research; little work had been conducted to bring deep learning technologies into educational contexts; traditional AI technologies, such as natural language processing were commonly adopted in educational contexts.

Table 10. *Average Weighted Mean Distribution of the Respondents on the Impact of AI Technology among College Students' Learning in All Areas*

	Impact of AI Indicators	*Average Weighted Mean*	*Scale Description*	*Rank*
1.	Access and Equity	3.91	A	4
2.	Personalize Learning Experience	4.02	A	2
3.	Enhance Learning Outcome	4.00	A	3
4.	Teacher – Student Interactions	3.87	A	5
5.	Practical Applications	4.14	A	1
	Average Weighted Mean	3.99	A	

Table 10 presents the Average Weighted Mean Distribution of the respondents' perceptions regarding the Impact of AI Technology on College Students' Learning across all areas. The general Average Weighted Mean (AWM) is calculated as 3.99, indicating an overall agreement among respondents with the impact of AI technology on student learning. In terms of scale description, all areas received an "Agree" rating, suggesting general agreement with the statements provided across the board. The practical applications of AI technology received the highest AWM and ranked first among the areas assessed, with a mean of 4.14. Personalized learning experience followed closely, with a mean of 4.02, ranking second. Enhancing learning outcomes ranked third, with a mean of 4.00. Access and equity ranked fourth, with a mean of 3.91, and teacher-student interactions ranked fifth, with the lowest mean of 3.87.

These findings imply that college students generally perceive AI technology positively across various aspects of their learning experiences, highlighting its significant possible contribution to improve access, personalized learning, enhance outcomes, facilitate interactions between teachers and students, and offer practical applications to support learning. The findings also underscore the importance of integrating AI technology thoughtfully and effectively into educational practices to maximize its benefits for student learning and success.

Concurring to the research results, Jabar et al. (2024) also explore students' application of these AI technologies which showed the importance of integrating discussions on technology ethics into higher education curricula, emphasizing their broader implications on social, environmental, health, and economic domains. Additionally, the studies conducted by Estrellado and Miranda (2023), Maaliw (2020), Prestoza and Banatao (2024), and Kim (2023) collectively highlight various dimensions of AI integration in education and its impact on learning outcomes and teacher-student interactions.

Estrellado and Miranda emphasize the necessity for a robust technological infrastructure and policy frameworks to address concerns such as data privacy and the digital divide while leveraging AI benefits for equitable access to quality learning. Maaliw's research underscores the importance of adaptive learning environments tailored to students' evolving characteristics and preferences, demonstrating the potential of AI in personalizing course content and improving user interfaces. Prestoza and Banatao's findings reveal students' positive perceptions of AI's potential for enhancing personalized learning experiences and academic performance, particularly among female students, emphasizing the need for educational initiatives to educate students about AI tools and provide tailored training.

Finally, Kim's study sheds light on teachers' goals to improve students' subject-matter knowledge through data-driven teaching approaches, highlighting the importance of enhancing teachers' data literacy and fostering a culture of continuous learning and AI readiness in educational settings. These findings collectively underscore the transformative potential of AI in education while emphasizing the importance of addressing ethical, technological, and pedagogical considerations for its effective implementation.

Table 11. *One-Way ANOVA Results on Test for Significant Difference on the Perceived Impacts of Artificial Intelligence in Students Learning when Respondents are Grouped according to Age Profile.*

Artificial Intelligence	*Age and Grade Level*	*Mean*	*h-value*	*p-value*	*Decision*	*Interpretation*
Accessibility and Equity	17-18 years old	4.25	0.144	0.934	Accept Ho	No difference
	19-20 years old	4.13				
	21-22 years old	4.11				
	23-24 years old	4.21				
Enhanced Learning Outcome	17-18 years old	4.11	0.686	0.563	Accept Ho	No difference
	19-20 years old	4.25				
	21-22 years old	4.15				
	23-24 years old	4.57				
Personalized Learning Experience	17-18 years old	4.18	0.397	0.755	Accept Ho	No difference
	19-20 years old	4.34				
	21-22 years old	4.35				
	23-24 years old	4.29				
Teacher-student Interaction	17-18 years old	4.00	0.527	0.665	Accept Ho	No difference
	19-20 years old	3.78				
	21-22 years old	3.73				
	23-24 years old	3.50				
Practical Application	17-18 years old	3.93	0.025	0.995	Accept Ho	No difference
	19-20 years old	3.87				
	21-22 years old	3.88				
	23-24 years old	3.93				

Table 11 presents the results of a One-Way ANOVA test conducted to determine if there are significant differences in the perceived impacts of Artificial Intelligence (AI) in student learning across different age profiles. The table includes the mean scores for each AI area, along with the corresponding h-value, p-value, decision, and interpretation.

For Accessibility and Equity, the h-value is 0.144 and the p-value is 0.934 that is higher than alpha 0.05 level of significance, indicating that there is no significant difference in perceived impacts across different age profiles. Therefore, the null hypothesis (Ho) is accepted, suggesting that there is no difference in the perception of Accessibility and Equity among students of different age groups.

Similarly, for Enhanced Learning Outcome, Personalized Learning Experience, and Teacher-student Interaction, the h-values are 0.686, 0.397, and 0.527, respectively, and the corresponding p-values of 0.563, 0.755, and 0.665 that are all greater than 0.05. Hence, the null hypothesis is accepted for these areas as well, indicating no significant difference in perceived impacts across age profiles.

However, for Practical Application, the h-value is 0.025 and the p-value is 0.995, which is greater than 0.05. Despite the h-value being statistically significant, the p-value exceeds the threshold for significance, leading to the acceptance of the null hypothesis. Still, this suggests that there is no significant difference in perceived impacts of Practical Application across different age profiles.

Generally, the One-Way ANOVA results indicate that there are no significant differences in the perceived impacts of AI in student learning across different age profiles for Accessibility and Equity, Enhanced Learning Outcome, Personalized Learning Experience, Teacher-student Interaction, and Practical Application.

The findings elucidate the perceived impacts of Artificial Intelligence (AI) on student learning across various age profiles. The acceptance of the null hypothesis across these areas suggests a uniform perception of AI's effects on student learning regardless of age. Although the h-value for Practical Application is statistically significant, the p-value exceeds the significance level, leading to the acceptance of the null hypothesis. This implies that despite statistical significance, there is no notable difference in perceived impacts of Practical Application across age profiles.

Unlike the current findings, the study of Escamos et al., (2023) acknowledge acceptability of Artificial Intelligence (AI) applications in preparing and implementing activities/quizzes of English lessons at Tuntungin-Putho Integrated National High School in Los Baños, Laguna. It was found that the demographic profile has a significant relationship to the Artificial Intelligence applications used in lesson preparation, implementation.

Table 12. *One-Way ANOVA Results on Test for Significant Difference on the Perceived Impacts of Artificial Intelligence in Students Learning when Respondents are Grouped according to Sex Profile.*

Artificial Intelligence	*Gender*	*Mean*	*F-value*	*p-value*	*Decision*	*Interpretation*
Accessibility and Equity	Male	4.00	1.819	0.181	Accept Ho	No difference
	Female	4.25				
Enhanced Learning Outcome	Male	4.15	0.282	0.597	Accept Ho	No difference
	Female	4.27				
Personalized Learning Experience	Male	4.30	0.019	0.890	Accept Ho	No difference

	Female	4.28				
Teacher-student Interaction	Male	3.76	0.033	0.857	Accept Ho	No difference
	Female	3.81				
Practical Application	Male	3.97	0.059	0.808	Accept Ho	No difference
	Female	3.91				

Table 12 presents the results of a One-Way ANOVA test conducted to assess if there are significant differences in the perceived impacts of Artificial Intelligence (AI) in student learning based on sex profiles. The table includes the mean scores for each AI area, along with the corresponding F-value, p-value, decision, and interpretation.

Analysis of data reveals that in terms of Accessibility and Equity, there is no significant difference in the perceived impacts of AI in student learning between male and female respondents, as indicated by the h value of 0.144 and p-value of 0.181, which is greater than 0.05. Therefore, the null hypothesis (Ho) is accepted, suggesting no difference in perception regarding accessibility and equity based on gender. Additionally, as to Enhanced Learning Outcome, there is no significant difference in perceived impacts between male and female respondents, with the h-value of 0.686 and p-value of 0.597, accepting the null hypothesis. Both genders perceive AI's impact on enhancing learning outcomes similarly. Also, in terms of Personalized Learning Experience, the p-value of 0.890 and h-value of 0.397 suggests no significant difference in perceived impacts between genders regarding personalized learning experiences. The null hypothesis is accepted.

In addition, as to Teacher-Student Interaction, with a p-value of 0.857 and h-value of 0.527, there is no significant difference in perceived impacts between male and female respondents regarding teacher-student interaction facilitated by AI. The null hypothesis is accepted, implying no gender-based disparity in this aspect. Lastly, concerning Practical Application, the h-value of 0.025 and the p-value of 0.808 indicates no significant difference in perceived impacts of practical applications of AI between male and female respondents. The null hypothesis is likewise accepted.

The findings suggest that there are no significant differences in the perceived impacts of Artificial Intelligence (AI) on student learning based on sex profiles. Across various aspects such as Accessibility and Equity, Enhanced Learning Outcome, Personalized Learning Experience, Teacher-Student Interaction, and Practical Application, both male and female respondents showed similar perceptions. The acceptance of the null hypothesis in each case indicates that gender does not influence how AI is perceived to affect student learning. This also implies that both male and female college students recognize and appreciate the potential benefits of AI in education similarly, highlighting a uniformity in their views irrespective of gender differences. As such, efforts to integrate AI into educational practices should consider the collective perspectives of all students, regardless of gender, to ensure equitable access and utilization of AI-driven learning technologies.

Unlike the study of Prestoza and Banatao (2024) in an analysis of pre-test and post-test data reveals a noteworthy enhancement in academic performance, especially among female students. It is suggested that students be educated about AI tools and provided with enhanced training to proficiently utilize them in forthcoming educational endeavors. Significant difference was found between the scores of the students.

Also, the study of Cheddadi and Bouache (2021) addressed the access and inequity in higher education, which is a long-standing issue, that is depriving many skilled people of the fundamental right of education due to their background, gender, race, ethnicity or social class. Research has shown that deprived groups in terms of their demographics are more likely to fail. In this regard, the researchers propose to use a deep neural network (DNN) that aims to predict students' final results. The obtained results are promising and show that deep learning could be an effective tool to promote equity in higher education. Moreover, they reveal that this latter is also a powerful tool for exploring big data within learning analytics, provided that deep neural networks become more accurate when they are provided with additional data within the age and sex profiles.

Table 13. *One-Way ANOVA Results on Test for Significant Difference on the Perceived Impacts of Artificial Intelligence in Students Learning when Respondents are Grouped according to College Level Profile.*

Artificial Intelligence	*College Level*	*Mean*	*F-value*	*p-value*	*Decision*	*Interpretation*
Accessibility and Equity	First Year	4.25	0.144	0.934	Accept Ho	No difference
	Second Year	4.13				
	Third Year	4.11				
	Fourth Year	4.21				
Enhanced Learning Outcome	First Year	4.11	0.686	0.563	Accept Ho	No difference
	Second Year	4.25				
	Third Year	4.15				
	Fourth Year	4.57				
Personalized Learning Experience	First Year	4.18	0.397	0.755	Accept Ho	No difference
	Second Year	4.34				
	Third Year	4.35				
	Fourth Year	4.29				
Teacher-student Interaction	First Year	4.00	0.527	0.665	Accept Ho	No difference

	Second Year	3.78				
	Third Year	3.73				
	Fourth Year	3.50				
Practical Application	First Year	3.93	0.025	0.995	Accept Ho	No difference
	Second Year	3.87				
	Third Year	3.88				
	Fourth Year	3.93				

Table 13 illustrates the outcomes of a One-Way ANOVA test aimed at exploring potential discrepancies in the perceived impacts of Artificial Intelligence (AI) on student learning based on college-level profiles. For the Accessibility and Equity indicator, the F-value is 0.144 with a corresponding p-value of 0.934, indicating no significant difference in perceived impacts across different college levels. Therefore, the null hypothesis (Ho) is accepted, suggesting no discrepancy in the perception of accessibility and equity among students across various academic years. Similarly, for Enhanced Learning Outcome, Personalized Learning Experience, and Teacher-student Interaction, the F-values are 0.686, 0.397, and 0.527, respectively, with corresponding p-values of 0.563, 0.755, and 0.665, all exceeding the significance level of 0.05. Hence, the null hypothesis is accepted for these areas as well, suggesting no significant differences in perceived impacts across college levels. Lastly, for Practical Application, although the F-value is statistically significant at 0.025, the p-value of 0.995 surpasses the threshold for significance, leading to the acceptance of the null hypothesis. Generally, the One-Way ANOVA results indicate no substantial differences in perceived impacts of AI in student learning across various college levels for all areas assessed.

The results imply that regardless of their academic year, students perceive AI technology to have similar effects on their learning experiences and outcomes. Consequently, educational institutions can develop AI-integrated strategies and programs without considering students' college year levels, promoting consistent implementation and equitable access to AI-driven learning initiatives across all levels of higher education. Additionally, educators can also focus on integrating AI tools and resources into teaching practices and curriculum development without concerns about variations in students' perceptions based on their academic progression.

Additionally, findings show that educational institutions can adopt AI-integrated strategies and programs uniformly across all levels of higher education, irrespective of students' academic progression. The institutions can ensure consistent implementation and equitable access to AI-driven learning initiatives for all students. Moreover, educators can confidently integrate AI tools and resources into their teaching practices and curriculum development without worrying about variations in students' perceptions based on their academic year.

In contrast to the present findings, the research conducted by Escamos et al. (2023) acknowledges the acceptance of Artificial Intelligence (AI) applications in the preparation and execution of English lesson activities/quizzes at Tuntungin-Putho Integrated National High School in Los Baños, Laguna. Their study revealed a significant relationship between demographic profiles and the utilization of AI applications in lesson preparation and implementation.

Table 14. *Proposed Content of the Action Plan on the Use of AI for Students Learning*

Impact of AI	*Lowest Scored Indicators*	*Proposed Actions*	*Activity Title*
Access and Equity	AI technology supplements the development of 21st-century skills	Develop training programs to enhance critical-thinking, problem-solving, and creativity skills among students using AI technology	21st Century Skills Development
Personalize Learning Experience	AI technology can identify students who are struggling and at risk of falling behind	Implement AI-powered student monitoring systems to identify struggling students and provide timely interventions	Student Progress Monitoring
Enhance Learning Outcome	AI technology provides unbiased grading and assessment	Implement AI-based grading systems to ensure fair and objective evaluation of student performance	Objective Grading Implementation
Teacher – Student Interactions	AI technology saves learners' time in submitting online works and requirements	Integrate AI-driven tools to streamline online assignment submission processes, saving time for both teachers and students	Efficient Assignment Submission
Practical Applications	AI technology provides lifelong learning opportunities	Develop AI-powered adaptive learning platforms to offer personalized and continuous learning experiences beyond traditional classroom settings	Lifelong Learning Platform

Table 10 shows the overview of the contents of action plan to maximize the integration of AI in College Education. The action plan is generally titled "AiMAGinE" which stands for Artificial Intelligence in Maximizing Academic Gains in Education.

In this proposed intervention, the researcher endeavors to revolutionize education by integrating artificial intelligence (AI) technologies across various educational domains. Firstly, the initiative action, titled "Unlocking 21st Century Skills," will develop comprehensive training programs utilizing AI to enhance critical-thinking, problem-solving, and creativity skills among students, ensuring they are well-prepared for the demands of the modern world. Concurrently, "Insightful Student Support" system will implement AI-powered

student monitoring tools to promptly identify struggling learners and provide personalized interventions, fostering a supportive learning environment for all. To enhance learning outcomes, the plan includes the implementation of AI-based grading systems, ensuring fair and unbiased evaluation of student performance in the "Fair and Impartial Evaluation" program. Furthermore, with the integration of AI-driven tools to streamline online assignment submissions in "Streamlined Interactions" initiative, both teachers and students will save valuable time, enabling greater focus on learning engagement. Finally, "Beyond the Classroom" program will develop AI-powered adaptive learning platforms, offering lifelong learning opportunities beyond traditional educational settings, thus empowering learners to continue their educational journey seamlessly. Through these integrated efforts, the action plan aspires to transform education, preparing students for success in an AI-driven future in the very context of college education in Gumaca, Quezon.

Conclusions

Based on the research findings, this study arrived at the following conclusions: Most of the respondents are 19–20 years old, females, and second-year college students. All the students use ChatGPT, but not everyone uses Google Meet and Google Classroom. The respondents agree on the positive impact of using AI in student learning in terms of access and equity, personalized learning experience, enhanced learning outcomes, teacher-student interactions, and practical applications. However, there is a need to improve the use of AI for 21st-century skills development, student progress monitoring, objective grade computation, efficiency in assignment submissions, and providing lifelong learning opportunities. There is no significant difference in the perceived impacts of artificial intelligence on student learning when respondents are grouped according to their profiles.

As a result of the study, the researcher would like to suggest the following: To the parents, they may guide the students in their actual use of AI to avoid misuse of the technology, as well as provide moral and academic inputs on how to maximize AI for education and lifelong learning purposes. To the teachers, they are suggested to serve as actual models on how to properly, objectively, and positively integrate AI in education. They can also motivate the students on what AI can contribute to their academic journey and beyond as they finish their studies. To the students, they may search for other AI tools that are available in the digital world, not only for academics but also for presentation, video editing, and other areas that can widely contribute to their personal and professional growth. They are also suggested to observe ethical considerations in the use of AI for positive influence and purposes. To the future researcher, they are suggested to consider conducting a study that will provide an in-depth analysis of gender roles in AI and how it can thoroughly affect learners in their academics through a qualitative lens.

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