

Artificial Intelligence (AI) Aided Learning and Academic Performance of Students in Sirawai National High School: Basis for Instructional Development

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Abstract

This study examined the extent of Artificial Intelligence (AI)-aided learning and its relationship with the academic performance of Junior High School students at Sirawai National High School during School Year 2024–2025. Anchored in Cognitive Load Theory, Social Cultural Theory, and the Technology Acceptance Model, the study considered learning abilities, problem-solving skills, and critical-thinking abilities as dimensions of AI-aided learning. A quantitative descriptive-correlational design was employed with 247 purposively selected Grades 7–10 students who had experience using AI tools, particularly ChatGPT and Cici. Data were collected using a modified standardized 15-item questionnaire with a five-point Likert-type scale and a Cronbach's alpha of 0.928. Frequency, percentage, weighted mean, mean average, and Pearson Product Moment Correlation Coefficient were used for data analysis. AI-aided learning was experienced to a high extent overall ($M = 3.91$), including learning abilities ($M = 4.00$), problem-solving skills ($M = 3.96$), and critical-thinking skills ($M = 3.83$). Students obtained a mean academic grade of 86.52, indicating very satisfactory performance. No significant differences in AI-aided learning were found according to sex, age, and ethnicity, while a significant difference was identified according to grade level. Learning abilities and problem-solving skills were not significantly related to academic performance, whereas critical-thinking skills showed a very weak negative but significant relationship ($r = -0.204$, $p = 0.001$). Overall AI-aided learning also showed a very weak negative but significant relationship with academic performance ($r = -0.152$, $p = 0.017$). The study recommends appropriate AI integration and teacher training on effective and ethical AI use. It supports SDG 4—Quality Education and SDG 9—Industry, Innovation and Infrastructure through responsible educational technology integration. Its sustainability impact lies in supporting educational, technological, and institutional decision-making that balances AI assistance with independent learning, critical thinking, and problem-solving.

Keywords: Academic Performance, Artificial Intelligence (AI)-Aided Learning, Critical-Thinking Abilities, Junior High School Students, Learning Abilities, Problem-Solving Skills, Quality Education, Sustainable Development Goals

1. Introduction

Artificial Intelligence (AI) has increasingly influenced education by transforming conventional teaching and learning into more technology-supported processes. AI-powered tools can provide immediate information, personalized assistance, feedback, and support for students' learning. Artificial intelligence (AI) is a software that

uses human intelligence and is developed to function like humans (Fitria, 2021), while AI chatbots interact conversationally with users and provide relevant information in response to questions (Gupta et al., 2020). Despite these educational opportunities, research presents contrasting evidence regarding AI's influence on students' academic performance, particularly their learning abilities, problem-solving skills, and critical-thinking abilities. This study therefore examines the extent of Artificial Intelligence (AI) aided learning and its relationship with the academic performance of Junior High School students at Sirawai National High School. It focuses on students who use AI-aided learning tools such as ChatGPT and Cici and considers learning abilities, problem-solving skills, and critical-thinking abilities as dimensions of AI-aided learning. The study further provides a basis for developing an instructional intervention responsive to the opportunities and potential risks associated with AI use in education.

Technology has expanded the ways students access information and engage in learning. AI chatbots and other AI-powered applications provide immediate responses, explanations, and learning assistance that can potentially improve educational outcomes. Trisoni et al. (2023) found that AI significantly improves student-learning achievement, although excessive reliance on it may reduce students' interest in reading books and consequently requires teacher supervision (Trisoni, et al., 2023). Similarly, Salido in 2023 stated that AI-powered learning tools can improve students' performance across subjects and help them understand difficult concepts, while raising concerns regarding plagiarism and the possible weakening of critical-thinking skills through excessive reliance. Evidence also indicates benefits for specific learning competencies. Oyeyemi et al. in 2024, reported that AI tools positively affect students' learning abilities, problem-solving skills, and critical-thinking abilities. Conversely, Tanvir et al. (2023) found that AI chatbots, particularly ChatGPT, may negatively affect undergraduate students' creativity and motivation through factors associated with plagiarism, ultimately influencing academic performance. These conflicting findings demonstrate that the educational value of AI depends not simply on its availability but also on how students use it. While AI can support assignments, essays, activities, experiments, and other learning tasks, excessive dependence may potentially limit independent learning and the development of critical-thinking and problem-solving skills. Consequently, this study determines the extent of AI-aided learning in relation to students' academic performance, specifically through learning abilities, problem-solving skills, and critical-thinking abilities.

The literature consistently identifies personalization, immediate feedback, accessibility, and efficiency as important educational benefits of AI. Educators have explored AI for supporting students with special needs and diverse linguistic backgrounds, improving lesson planning, selecting learning materials, and providing immediate responses and feedback. However, inaccurate AI-generated information can also result in misinformation and misunderstanding (Cardona et al, 2023). AI chatbots use technologies such as natural language processing and machine learning to simulate human-like conversations, answer questions, and provide information (Gupta et al., 2020). Although AI can automate repetitive tasks and provide useful assistance, its outputs continue to require human interpretation, critical analysis, and theoretical insight (Wagner and Paré (2021). This reinforces the view that AI should support rather than replace human judgment in learning. AI-supported learning has also demonstrated potential in specific educational domains. Alhusaiyan (2025) found that AI-supported technology can enhance language learning through improvements in writing quality, scoring accuracy, and learner engagement, although teacher intervention remains important in pedagogical design. Similarly, Baig and Yadegaridehkordi (2024) found that Generative AI, particularly ChatGPT, can support personalized learning, problem solving, and automation across disciplines. However, variations in pedagogical requirements, ethical standards, privacy, accuracy, and technical applicability require institutions to adopt appropriate technology-integration models, ethical guidelines, and discipline-specific teaching approaches. Studies further associate AI with active and personalized learning. Das et al. (2023), stated that AI-supported learning can promote proficiency, ownership of learning, motivation, and accommodation of diverse learning styles and abilities. Shehri et al. (2023) likewise reported a positive relationship between ChatGPT use and academic performance, particularly when students used it for assignments, quizzes, research, and explanations of complex concepts. Problem-solving is another important dimension. AI tools can provide immediate feedback and support reflective decision-making, with students using AI demonstrating improved collaborative problem-solving and team creativity (Wei et al. 2025). However, Cela et al. (2024) found no significant difference in critical-thinking skills between students exposed and unexposed to AI, while greater reliance on AI for assignments was negatively associated with problem-solving skills. This suggests that AI may improve efficiency and perceived academic performance while excessive dependence may hinder independent problem-solving. Other research similarly emphasizes both opportunities and risks. Maamor et al., in 2024, found that AI use significantly influenced student engagement and academic performance. Capinding and Dumayas (2024) reported generally positive student perceptions of AI, including its contribution to personalized learning, engagement, critical thinking, identification of learning weaknesses, assignment improvement, progress monitoring, motivation, self-directed learning, collaboration, and peer interaction. Asio (2024), meanwhile, found moderately high AI literacy and highly satisfactory academic performance among college students, with a weak positive relationship between AI literacy and academic performance. Mallilin (2024) also reported that AI responds to individual academic needs, assists struggling students, supports intervention, improves attitudes and motivation toward learning, and provides adaptive

feedback. Collectively, these findings suggest that AI can facilitate learning when used as a complementary educational tool but may become counterproductive when it substitutes for students' independent cognitive effort. The educational implications therefore extend beyond AI use itself to the manner, frequency, purpose, and guidance associated with its use.

International literature shows that AI integration is expanding across educational settings and disciplines. AI applications support personalized learning, automated assistance, problem-solving, writing, and feedback, although concerns regarding accuracy, privacy, academic integrity, and overdependence remain. The literature consequently emphasizes responsible implementation in which AI supplements established teaching and learning rather than replacing teachers or students' independent intellectual work. In the Philippine context, AI has potential to improve learning experiences, administrative processes, curriculum design, teaching methods, and resource allocation. It may also extend educational opportunities to remote areas through online learning platforms and virtual classrooms (Estrellado & Miranda, 2023). However, Philippine educational institutions must address both technological opportunities and ethical and pedagogical challenges. Dalan (2023) identified potential benefits of AI in education, including enhanced learning outcomes, personalized experiences, adaptive assessment, and increased student engagement, while also highlighting technological limitations, ethical concerns, pedagogical considerations, and insufficient Philippine research on AI integration. Teacher preparation is therefore important for effective educational use. Funa and Gabay (2024) similarly recommended clear guidelines for ethical AI use, training for teachers and students, transparency regarding AI use, and appropriate procedures concerning AI-generated content and plagiarism. Within K to 12 education, Otero et al. (2023) found that many AI-learning experiences emphasize technical and applied skills without sufficiently evaluating student-learning outcomes. Their findings support incorporating AI literacy across existing curricula through interdisciplinary, competency-based and practical learning approaches, accompanied by teacher competence and collaboration with pedagogical and AI experts. Talili in 2024 likewise emphasized AI's potential to improve academic writing through idea generation, language improvement, and content modification, while stressing academic integrity and avoidance of excessive dependence. Philippine studies further demonstrate the importance of students' characteristics and educational contexts. Fabro et al. (2024) found that Filipino students generally hold neutral attitudes and beliefs toward AI in academic writing, with attitudes strongly associated with AI use and socio-demographic characteristics influencing perceptions. These findings indicate the need for strategies responsive to students' different backgrounds. Filipino educators and academic leaders have also used AI to support instruction, administrative processes, and research, although concerns persist regarding academic misconduct, data fabrication, reduced creativity, and weakened critical thinking (Giray et al., 2024). The present study narrows this context to Junior High School students of Sirawai National High School during School Year 2024–2025. Its focus on students actively using ChatGPT and Cici provides a school-specific examination of AI-aided learning in terms of learning abilities, problem-solving skills, and critical-thinking

The study is anchored in Cognitive Load Theory, Social Cultural Theory, and the Technology Acceptance Model, which collectively explain how AI may support learning processes and influence academic performance. According to Sweller in 1988, working memory has a limited capacity for processing information at a given time; consequently, effective teaching should avoid unnecessarily overloading it. AI can provide personalized learning experiences, immediate feedback, and content recommendations that reduce uncertainty and cognitive pressure. Such support may allow students to adjust their learning approaches and process information more effectively (Das et al., 2023). Social Cultural Theory emphasizes learning through interaction and guided assistance. Vygotsky (1978) stated that learning develops through interactions between learners and more experienced individuals, with appropriate guidance facilitating cognitive development. Students can learn effectively when supported by a more experienced individual (Tan et al., 2022). Within AI-aided learning, AI can perform a supportive role by providing individualized guidance, identifying areas requiring improvement, offering hints, asking leading questions, and giving feedback based on students' needs (Cardona et al., 2023). The Technology Acceptance Model (TAM), proposed by Davis in 1989, explains technology adoption through perceived usefulness and perceived ease of use. According to Marikyan and Papagiannidis (2023), information technologies can improve performance, efficiency, and convenience. Applied to the present study, students' use of AI may make learning tasks more convenient and efficient, potentially influencing their academic performance. Conceptually, the study examines Artificial Intelligence (AI) aided learning through learning abilities, problem-solving skills, and critical-thinking abilities in relation to students' academic performance. Students' profiles include age, sex, grade level, and ethnicity. The findings serve as a basis for an Instructional Development Plan intended to improve instructional practices at Sirawai National High School.

Existing research does not provide a uniform conclusion regarding AI and student outcomes. Some studies associate AI use with improved achievement, personalized learning, engagement, problem-solving, motivation, and learning efficiency, whereas others identify risks involving plagiarism, overreliance, reduced creativity, weakened critical thinking, and diminished independent problem-solving. The literature also indicates contextual gaps. Much of the cited empirical evidence involves university or college students, while research focusing on school-level learners remains comparatively necessary. Existing K to 12 literature has also identified limited

evaluation of student-learning outcomes despite growing attention to AI literacy. Philippine literature further identifies insufficiency in research concerning AI integration in education. These gaps justify examining AI-aided learning among Junior High School students in a specific Philippine public-school setting. The study determines the extent of AI-aided learning in terms of learning abilities, problem-solving skills, and critical-thinking abilities; identifies students' academic performance; examines differences according to profile; and determines whether AI-aided learning is significantly related to academic performance. The study is guided by the null hypotheses that there is no significant difference between Artificial Intelligence (AI) aided learning and students' academic performance when grouped according to profile and that there is no significant relationship between Artificial Intelligence (AI) aided learning and students' academic performance. The study is limited to Junior High School students of Sirawai National High School during School Year 2024–2025, aged 11–20, who actively use AI-aided learning tools such as ChatGPT and Cici. Academic performance refers to students' general average across all subjects for School Year 2024–2025. Learning abilities concern students' capacity to understand and comprehend instruction; problem-solving skills involve developing and applying strategies for solving learning tasks in a digital environment; and critical-thinking abilities involve accessing information and data, thinking creatively and critically, and independently examining lesson concepts. Because the investigation is specific to Sirawai National High School, its findings may not be directly generalizable to other educational settings.

The study aligns most directly with SDG 4 – Quality Education because it investigates how AI-aided learning relates to students' learning abilities, problem-solving skills, critical-thinking abilities, and academic performance. Its emphasis on determining both the educational benefits and possible risks of AI supports the pursuit of effective learning environments in which technology strengthens rather than substitutes essential student competencies. The study also has relevance to SDG 9 – Industry, Innovation and Infrastructure through its examination of AI as an emerging technological innovation applied to education. The responsible integration of digital technologies requires not only access to AI tools but also appropriate instructional strategies, teacher competence, ethical guidance, and institutional planning. In the Philippine context, AI may improve educational access and support learners in geographically remote areas through online platforms and virtual classrooms (Estrellado & Miranda, 2023). Thus, examining how AI functions within actual learning environments can contribute to informed and responsible educational technology integration.

The study contributes primarily to educational sustainability by examining whether AI-aided learning supports or potentially undermines competencies necessary for continued learning. Sustainable educational use of AI requires maintaining a balance between technological assistance and students' independent learning, critical thinking, and problem-solving. The findings can therefore help teachers determine how AI tools may be incorporated into instruction while preserving meaningful student participation in the learning process. The study also contributes to technological sustainability by emphasizing responsible and purposeful AI integration. Sustainable technology use in education requires more than adopting available tools; it involves ensuring that technology remains pedagogically useful, ethically applied, and appropriate to students' learning needs. Evidence concerning the relationship between AI-aided learning and academic performance can guide decisions about how AI tools are incorporated into classroom activities and instructional strategies. Finally, the research supports institutional sustainability by providing evidence relevant to educational decision-making at the school and system levels. The findings can assist the Department of Education, school administrators, supervisors, principals, and teachers in developing policies, instructional practices, training initiatives, and interventions concerning AI use. Parents can use the findings to guide students toward appropriate AI use, while students can better understand how AI may support their academic learning. The study can also provide a basis for future research on AI-aided learning and academic performance. Through these educational, technological, and institutional dimensions, the study positions AI not simply as a tool for completing academic tasks but as an educational technology whose sustainable value depends on responsible integration, appropriate guidance, and its capacity to support students' learning abilities, problem-solving skills, critical-thinking abilities, and academic performance.

2. Material and methods

2.1 Research Design

The study used a quantitative descriptive-correlational research design to determine the extent of Artificial Intelligence (AI)-aided learning and its relationship with the academic performance of Junior High School students at Sirawai National High School. The descriptive-correlational design was considered appropriate because it allows the relationship between variables to be examined in a non-experimental setting (Estrella et al., 2023). Specifically, the study examined AI-aided learning in terms of learning abilities, problem-solving skills, and critical-thinking abilities in relation to students' academic performance. A modified standardized questionnaire was used to collect the required data.

2.2 Locale of the Study

The study was conducted at Sirawai National High School, a public secondary school located in Barangay St. Mary, Sirawai, Zamboanga del Norte, Region IX, Zamboanga Peninsula, Philippines. The school offers both

Junior and Senior High School education and has a Junior High School population of 988 students. The locale was selected because it provided access to respondents who possessed the characteristics required for the study and enabled the researcher to obtain the necessary data.

2.3 Respondents of the Study

The respondents were 247 Junior High School students from Grades 7 to 10 at Sirawai National High School who had experience using AI tools, particularly ChatGPT and Cici, for learning-related activities. The respondents consisted of 77 Grade 7, 60 Grade 8, 50 Grade 9, and 60 Grade 10 students. In terms of age, 82 respondents were aged 11–12, 47 were aged 13–14, 97 were aged 15–16, and 21 were aged 17 and above. There were 83 male and 164 female respondents. In terms of ethnicity, 123 were Kalibugan, 35 were Tausug, 64 were Visayan, and 25 were Samal, Iranun, or Maranao. The largest groups were therefore students aged 15–16, female students, Grade 7 students, and Kalibugan students enrolled during School Year 2024–2025.

2.4 Sample and Sampling Procedure

The study used purposive sampling because respondents were required to possess specific characteristics relevant to the investigation, particularly experience using ChatGPT and Cici for learning. According to Arikunto (2010), purposive sampling selects participants according to specific characteristics rather than grade level or geographical area. Arikunto (2010) also stated that all subjects may be included when the population is below 100, while a portion may be selected from populations exceeding 100. From the total Junior High School population of 988 students, 25% were selected, resulting in 247 respondents. To provide representation across grade levels, 25% of the students from each grade were included, comprising 77 Grade 7, 60 Grade 8, 50 Grade 9, and 60 Grade 10 students. Participant selection was coordinated with the school administration and class advisers. Students who satisfied the inclusion criteria were invited to participate voluntarily, and parental or guardian consent was obtained where applicable. Respondents retained the right to withdraw from the study at any time.

2.5 Research Instrument

The study used a modified standardized survey questionnaire adapted from Oyeyemi et al., (2024). The first part gathered respondents' profile information, including optional name, age, grade level, sex, and ethnicity. The second part measured the extent of Artificial Intelligence (AI)-aided learning in relation to students' academic performance. The questionnaire contained 15 items measured using a five-point Likert-type scale ranging from Strongly Agree (5) to Strongly Disagree (1), with Agree, Neutral, and Disagree representing the intermediate responses. The modified instrument was evaluated and corrected by the research panelists, whose recommendations were incorporated into its final version. A pilot test was conducted to determine its validity, while Cronbach's alpha was used to assess internal consistency and reliability. The instrument obtained a Cronbach's alpha value of 0.928.

2.6 Data Gathering Procedure

Before data collection, the researcher obtained ethics clearance from the Graduate School of Universidad de Zamboanga, followed by permission from the Division Office of Zamboanga Del Norte and approval from the principal of Sirawai National High School. After securing the necessary approvals, purposive sampling was conducted to identify eligible Junior High School students. The modified standardized questionnaire was then distributed to respondents who voluntarily participated and retained the right to withdraw from the study. The researcher collected the completed questionnaires and obtained the students' general average grades from their respective advisers. The resulting data were analyzed using statistical software to determine the relationship between Artificial Intelligence (AI)-aided learning and students' academic performance. Collected data were stored securely and treated with confidentiality. Access was restricted to the researcher and designated statistician, while respondents' identities were protected through anonymity and privacy measures. The data were used solely for research purposes and were to be deleted, incinerated, and destroyed upon completion of the study.

2.7 Data Analysis Techniques

Frequency count and percentage were used to describe the respondents according to their profile characteristics. Weighted mean was employed to determine the effects of Artificial Intelligence (AI)-aided learning on students' learning abilities, problem-solving skills, and critical-thinking abilities, while mean average was used to determine students' general average across all subjects as an indicator of academic performance. Pearson Product Moment Correlation Coefficient was used to determine the significant relationship between Artificial Intelligence (AI)-aided learning and students' academic performance according to their profile and to establish the significant correlation between AI-aided learning and academic performance.

2.8 Ethical Considerations

The study observed informed consent, confidentiality, voluntary participation, anonymity, and privacy. Ethics clearance was obtained from the UZ Research Ethics Committee, together with approval from the Division Office of Zamboanga Del Norte and the principal of Sirawai National High School. Informed consent was secured from

respondents, who were informed of the collection and processing of their personal data and their right to withdraw, object to or withhold consent to data processing, and access the study results and information regarding data sharing. Respondents' information was handled confidentially, with access limited to the researcher and designated statistician. Their identities and names were not disclosed during data analysis or reporting, and all collected information was used exclusively for research purposes. After completion of the study, the collected data were to be deleted, incinerated, and destroyed.

3. Results and Discussion

3.1 Extent of Artificial Intelligence (AI)-Aided Learning

3.1.1 Learning Abilities

The respondents reported a high extent of AI-aided learning in terms of learning abilities, with an overall mean of 4.00. Improving students' comprehension of topics obtained the highest mean of 4.20, followed by providing immediate feedback that allows students to correct mistakes at 4.15 and providing educational materials that improve understanding at 4.08. Providing accurate answers obtained a mean of 3.92, while providing non-biased answers received the lowest mean of 3.67. All indicators were nevertheless interpreted as high extent. The findings indicate that AI-aided learning positively enhances respondents' learning abilities, particularly through improved comprehension, access to information, and immediate feedback. This supports Maamor et al., in 2024, who stated that AI enables students for information searching which supports better comprehension and thus improves their academic performance compared to traditional methods. In addition, Kaledio et al., in 2024 stated that Artificial Intelligence (AI) provides timely responses and constructive feedback to the learners, enabling improvements in academic outcomes. AI has also changed how students acquire and apply knowledge by supporting learning tasks and their application to real-world contexts (Das et al. 2023).

3.1.2 Problem-Solving Skills

AI-aided learning was also rated to a high extent in terms of problem-solving skills, with an overall mean of 3.96. Providing learning materials that help students develop effective problem-solving strategies obtained the highest mean of 4.19. This was followed by step-by-step guidance, hints, and suggestions at 3.94; improvement of problem-solving skills over time at 3.90; personalized guidance at 3.88; and opportunities to apply problem-solving skills in a safe digital environment at 3.86. The findings indicate that students perceive AI as useful in developing problem-solving skills through learning materials, immediate feedback, explanations, and guidance. This supports Wei et al., in 2025, who found that AI tools including ChatGPT has significantly enhances collaborative problem-solving skills of the students and allows learners to evaluate and modify their judgment regularly. Memis in 2025 similarly stated that integrating Artificial Intelligence (AI) in mathematical problem solving has demonstrated significant potential to enhance student learning and performance, while Szmyd and Mitera (2024) found that respondents had a moderate perception of AI's advantages in analysis and problem solving. However, AI should function as a learning aid rather than replace active participation and independent thinking. The comparatively lower rating for applying problem-solving skills in a safe digital environment suggests the importance of activities that require students to evaluate AI-generated responses, explain their reasoning, and independently apply appropriate solutions.

3.1.3 Critical-Thinking Skills

The respondents likewise reported a high extent of AI-aided learning in terms of critical-thinking skills, with an overall mean of 3.83. Generating thought-provoking questions and prompts that encourage deeper engagement with topics received the highest mean of 4.00. Speeding cognitive development and creating cognitive capabilities obtained 3.84, supporting independent thinking obtained 3.82, not limiting creative thinking obtained 3.79, and making students think critically received the lowest mean of 3.71. Despite these variations, all indicators were interpreted as high extent. The findings suggest that AI-aided learning can support critical-thinking development by encouraging deeper engagement with learning content and supporting cognitive and independent thinking processes. This is consistent with Kaledio et al in 2024, which stated that AI tools enhance active participation, enhances critical thinking and problem-solving skills, building a dynamic learning environment that mirrors real-world scenarios. Similarly, Malilin (2024) revealed that AI enhances students' learning experiences through personalized and adaptive mechanisms, supports essential learning tasks and expression of ideas, promotes critical thinking and motivation, and customizes learning plans according to individual needs.

3.1.4 Overall Extent of AI-Aided Learning

Overall, AI-aided learning obtained a grand mean of 3.91, indicating a high extent among the respondents. Learning abilities received the highest mean of 4.00, followed by problem-solving skills at 3.96 and critical-thinking skills at 3.83. Thus, all three dimensions were rated within the high-extent range. The overall result is consistent with Oyeyemi et al., (2024) which revealed that there was a significant effects of Artificial Intelligence tools on the learning abilities, problem solving skills and critical thinking skills of students in public universities in Anambra state. Kaledio et al., in 2024 likewise stated that Artificial Intelligence (AI) provides immediate answers and constructive feedback that enhance learning outcomes and can promote active participation, critical

thinking, and problem-solving, although excessive reliance may encourage passive learning. Memis in 2025 also identified the potential of AI for mathematical problem solving and student performance, while inaccurate AI-generated answers may produce misunderstanding because of limitations in interpreting visual information (Wei, 2024).

3.2 Academic Performance of the Students

The respondents obtained a mean academic grade of 86.52, with a standard deviation of 4.46 and grades ranging from 73.00 to 95.00. Of the 247 respondents, 105 or 42.5% demonstrated very satisfactory performance, 69 or 27.9% were outstanding, 55 or 22.3% were satisfactory, 17 or 6.9% were fairly satisfactory, and one or 0.4% did not meet expectations. The mean grade therefore indicated very satisfactory academic performance. The findings show that most respondents using AI-aided learning demonstrated very satisfactory or outstanding academic performance. Vieriu & Petrea in 2025 revealed that Artificial Intelligence (AI) improved academic outcomes and enhanced student engagement, with 82.4% of students believing that AI enhances academic performance. Sasikala and Ravichandran (2024) also came to the same conclusion and states that Artificial Intelligence (AI) enhances student engagement and improve student's academic performance, although overreliance, ethical concerns, and algorithmic bias remain potential negative effects.

3.3 Differences in AI-Aided Learning According to Respondents' Profile

3.3.1 Differences According to Sex

Male respondents obtained a mean score of 3.91, while female respondents obtained 3.94. The analysis produced a t-value of -0.379 and a p-value of 0.705, which was greater than the 0.05 level of significance. Therefore, the null hypothesis was not rejected, indicating no significant difference in the extent of AI-aided learning according to sex. The result is consistent with Iddrisu et al. (2025), who found no significant differences between male and female students in the perceived effectiveness of AI writing tools. However, Ampong (2023) found out that there is a significant difference in the overall perceptions of AI in terms of gender, with male participants exhibiting more positive attitudes. Men were also reported to be more interested in AI chatbots, whereas women used them for tasks such as text comprehension and translation and expressed concerns regarding critical and independent thinking (Mogelvang et al., 2024). Moreover, study of Gedik in 2024, showed significant differences in the use of AI tools between male and female students, with male students reporting more frequent use and more positive attitudes.

3.3.2 Differences According to Age

Respondents aged 11–12 obtained the highest mean score of 4.03, followed by those aged 13–14 at 3.90, those aged 17 and above at 3.89, and those aged 15–16 at 3.87. The analysis yielded an F-value of 1.617 and a p-value of 0.186, which exceeded the 0.05 significance level. The null hypothesis was therefore not rejected, indicating no significant difference in AI-aided learning according to age. The result is consistent with Lukic et al. (2023), who found no significant association between students' ages and their attitudes toward Artificial Intelligence (AI), with students sharing similar reservations about its practical application regardless of age. In contrast, Asio (2024) analyzed AI literacy and academic performance among college students and found out that there is significant difference between Artificial Intelligence literacy and academic performance of students in terms of grade level.

3.3.3 Differences According to Grade Level

Grade 7 respondents obtained the highest mean score of 4.16, followed by Grade 9 at 4.04, Grade 10 at 3.77, and Grade 8 at 3.70. The analysis yielded an F-value of 13.619 and a p-value of 0.000, below the 0.05 significance level. The null hypothesis was therefore rejected, demonstrating a significant difference in the extent of AI-aided learning across grade levels. The finding indicates that students' experience of AI-aided learning varies according to grade level, with Grade 7 students reporting the highest extent and Grade 8 students the lowest. This is consistent with Hwang (2022), whose meta-analysis showed a significant difference between the effect of AI and students' grade level and found AI to be moderately more effective in lower grades and certain mathematics topics.

3.3.4 Differences According to Ethnicity

The mean scores across ethnic groups were closely distributed: Samal, Iranun, and Maranao respondents obtained the highest mean of 3.97, followed by Visayan respondents at 3.94, Kalibugan respondents at 3.92, and Tausug respondents at 3.91. The analysis produced an F-value of 0.098 and a p-value of 0.961, which exceeded the 0.05 significance level. The null hypothesis was therefore not rejected, indicating no significant difference in the extent of AI-aided learning according to ethnicity. Although the present study found no significant ethnic differences, other research suggests that cultural factors may affect students' engagement with AI. Tsai et al. (2022) found different responses to AI-assisted programming among indigenous and Han Chinese students, while Korhonen (2025) found differences in perceptions of AI's educational effects among black, white, and Hispanic adults. In the present study, the closely grouped means suggest that respondents experienced AI-aided learning similarly regardless of ethnicity. Within the same school environment, access to commonly used AI tools and similar learning requirements may have had a stronger influence on AI-aided learning than ethnicity alone.

3.4 Relationship Between AI-Aided Learning and Academic Performance

The relationship between learning abilities and academic performance was a very weak negative correlation ($r = -0.094$, $p = 0.142$) and was not significant. Problem-solving skills similarly showed a very weak negative and non-significant relationship with academic performance ($r = -0.094$, $p = 0.139$). Critical-thinking skills demonstrated a very weak negative but significant relationship with academic performance ($r = -0.204$, $p = 0.001$). Overall, AI-aided learning showed a very weak negative but statistically significant correlation with academic performance ($r = -0.152$, $p = 0.017$). Thus, the null hypothesis was not rejected for learning abilities and problem-solving skills but was rejected for critical-thinking skills and the overall relationship between AI-aided learning and academic performance. The findings show that individual dimensions of AI-aided learning do not relate uniformly to academic performance. Bancoro (2024) similarly found no significant relationship between AI use and academic performance despite above-average student performance and recognized benefits from personalized learning, feedback, and collaboration. Potential limitations may help explain the findings: Wei (2024) found that Artificial Intelligence (AI) provides incorrect answers, which can cause misunderstandings, while Szmyd and Mitera (2024) reported that respondents recognized both AI's benefits and limitations in analysis and problem solving. Cela et al. (2024) stated that excessive dependence on AI could hinder the development of independent problem-solving skills. The overall significant relationship corresponds with Oyeyemi et al., (2024), which revealed that there was a positive significant relationship of Artificial Intelligence tools on the learning abilities, problem solving skills and critical thinking skills of students in public universities in Anambra state. Similarly, the study conducted by Shehri et al. in 2023, showed that there is a positive relationship between the use of ChatGPT and the academic performance of students.

3.5 Intervention Design Based on the Findings

Based on the findings, an intervention design was proposed because the overall extent of AI-aided learning showed a significant relationship with respondents' academic performance, while the majority of respondents demonstrated very satisfactory academic performance. The proposed interventions focus on integrating AI into teaching through the selection of appropriate AI tools based on students' needs and conducting teacher seminars or workshops on the effective use and integration of Artificial Intelligence (AI)-aided learning into teaching practices.

4. Conclusion & Recommendations

The study concluded that Artificial Intelligence (AI)-aided learning was experienced to a high extent in relation to the respondents' learning abilities, while the majority of students demonstrated very satisfactory academic performance, followed by outstanding, satisfactory, and fairly satisfactory performance, with only one respondent not meeting expectations. No significant differences in the extent of AI-aided learning were found according to sex, age, and ethnicity, whereas a significant difference was identified according to grade level. A significant relationship was also found between the extent of AI-aided learning and students' academic performance. Based on these findings, the study identified AI integration in teaching through the selection of appropriate AI tools for students' needs and seminars or workshops for teachers on effective AI integration as intervention designs.

The Department of Education and school administrators should provide training and orientations for teachers on AI integration, while school principals and supervisors should facilitate and support teacher training on the effective and ethical use of AI in classroom instruction. Teachers should encourage appropriate AI-aided learning while developing students' understanding of AI capabilities, limitations, ethical considerations, responsible use, and plagiarism prevention. Parents should discuss responsible and effective AI use with their children and support their access to technology, while students should use AI as a learning aid rather than as a shortcut to avoid learning. Future researchers should conduct longitudinal studies on the long-term effects of AI on learning outcomes, cognitive development, and academic integrity and replicate the study in other contexts, schools, regions, or cultures to reevaluate and expand its findings, framework, or model.

The study was limited to Junior High School students of Sirawai National High School during School Year 2024–2025, aged 11–20, who actively used AI-aided learning tools such as ChatGPT and Cici. Consequently, the findings are specific to this school and may not be directly generalizable to other schools. The study focused on AI-aided learning in relation to students' learning abilities, problem-solving skills, critical-thinking abilities, and academic performance; thus, further examination in different contexts, schools, regions, cultures, and over longer periods is warranted.

5. Compliance with ethical standards

The study was conducted in accordance with the ethical procedures established for the research. Ethics clearance and the necessary institutional and school approvals were secured before data collection. Participation was voluntary and based on informed consent, with respondents retaining the right to withdraw. Confidentiality,

anonymity, and privacy were maintained throughout the study, access to collected information was restricted to the researcher and designated statistician, and all data were used exclusively for research purposes and were to be appropriately disposed of upon completion of the study.

REFERENCES

- Alhusaiyan, E. (2025). A systematic review of current trends in artificial intelligence in foreign language learning. *Saudi Journal of Language Studies*, 5(1), 1–16.
- Ampong, K. O. (2023). Gender differences in perception of artificial intelligence-base tools. *Journal of Digital Art & Humanities*. DOI: 10.33847/2712-8149.4.2_6
- Arikunto, S. (2010). *Procedur penelitian suatu pendekatan praktik*. Jakarta. Rineka Cipta. Page 183. <https://repository.umko.ac.id/id/eprint/94/4/bab3tiara.pdf>. Accessed 30, May 2024.
- Asio, J. R. (2024). Artificial intelligence (AI) literacy and academic performance of tertiary level students: A preliminary analysis. *Social Sciences, Humanities and Education Journal*, 5(2), 309. Gordon College, Olongapo City, Philippines.
- Baig, M., & Yadegaridehkordi, E. (2024). ChatGPT in the higher education: A systematic literature review and research challenges. *International Journal of Educational Research*, 127(1), 102411. DOI: 10.1016/j.ijer.2024.102411.
- Bancoro, J. C. (2024). The relationship between artificial intelligence (AI) usage and academic performance of business administration students. *International Journal of Asian Business and Management*, 3(1).
- Capinding, A. T., & Dumayas, F. T. (2024). Transformative pedagogy in the digital age: Unraveling the impact of artificial intelligence on higher education students. *Problems of Education in the 21st Century*, 82(5). Nueva Ecija University of Science and Technology, Gabaldon Campus, Philippines.
- Cardona, M. C., Rodriguez, R. J., & Ishmael, K. (2023). Artificial intelligence and the future of teaching and learning insights and recommendations. U.S. Department of Education, Office of Educational Technology, Washington, DC.
- Cela, E., Fonkam, M., & Potluri, R. M. (2024). Risk of AI-AI-assisted learning on student critical thinking: A case study of Albania. *International Journal of Risk and Contingency Management*, 12(1).
- Dalan, J. L. (2023). Exploring the promise: A comprehensive review of artificial intelligence integration in language education in the Philippine context. *Institutional Multidisciplinary Research and Development Journal*, 1. Columban College Asinan, Olongapo City.
- Das, A., Malaviya, S., & Sing, M. (2023). The impact of AI-driven personalization on learners' performance. *International Journal of Computer Sciences and Engineering*, 11(8), 15–22.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
- Estrella, K. C., Mangay-Ayam, J., Tupas, T. G., Olipas, J. G., Nulud, A. B., Libag, S. J., Palma, K. J., Espinosa, K., Manangkil, J., Osorio, S., Calacsan, D. S., & Montero, K. (2023). Student engagement and academic performance among accountancy, business, and management (ABM) students of Tacurong National High School. Tacurong National High School, Tacurong City. Research Gate.
- Estrellado, C. P., & Miranda, J. C. (2023). Artificial intelligence in the Philippine educational context: Circumspection and future inquiries. *International Journal of Scientific Research Publications*, 13. University of the Philippines Open University, Tayabas, Western Academy, Quezon, Philippines.
- Fabro, R. B., Rivera, J. C., Sambrano, L. C., Dinoy, L. M., Alcozer, N. G., & Agustin, M. (2024). Perceptions and extent of utilization of generative artificial intelligence (AI) among Filipino students. *International Journal of Education and Research*, 12(7). Philippines.
- Fitria, T. N. (2021). The use technology based on artificial intelligence in English teaching and learning. *ELT: Echo The Journal of English Language Teaching in Foreign Language Context*. DOI: 10.24235/eltecho.v6i2.9299
- Funa, A. A., & Gabay, R. E. (2024). Policy guidelines and recommendations on AI use in teaching and learning: A meta-synthesis study. *Social Science & Humanities Open*, 11. Sorsogon State University, Sorsogon, Philippines.
- Gedik, E. (2024). A qualitative study on gender difference and the use of artificial intelligence applications among students.
- Giray, L., De Silos, P. Y., Adornado, A., Buelo, R. J., Galas, E., Chua, E. R., Santiago, C., & Ulanday, M. A. (2024). Use and impact of artificial intelligence in Philippine higher education: Reflections from instructors and administrators. *Internet Reference Services Quarterly*. DOI: 10.1080/10875301.2024.2352746
- Gupta, A., Hathwar, D., & Vijayakumar, A. (2020). Introduction to AI chatbots. *International Journal of Engineering Research & Technology (IJERT)*, 9(07). ISSN: 2278-0181.
- Hwang, S. (2022). Examining the effects of artificial intelligence on elementary student's mathematics achievement: A meta-analysis. *Sustainability*, 14(20). Department of Mathematics Education, Seoul National University of Education, Seoul.

- Iddrisu, H. M., Iddrisu, S. A., & Aminu, B. (2025). Gender differences in the adoption, usage, and perceived effectiveness of AI writing tools: A study among University for Development Studies students. *International Journal of Educational Innovation and Research*, 4(1). University for Development Studies, Tamale, Ghana.
- Kaledio, P., Robert, A., & Frank, L. (2024). The impact of artificial intelligence on students' learning experience. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.4716747>
- Korhonen, V. (2025). Adults' opinion on the effect of AI on education in the U.S. 2024, by ethnicity. *Society, Education & Science*.
- Lukic, A., Kudelic, N., Anticevic, V., Mosler, E. L., Gluncic, V., Hren, D., & Lukic, I. K. (2023). First year nursing students' attitudes towards artificial intelligence: Cross sectional multi-center study. *Nurse Education in Practice*, 71.
- Maamor, H., Achim, N., Ahmad, N. L., & Roszaman, N. S. (2024). The effect of artificial intelligence (AI) on students' learning. *Information Management and Business Review*.
- Mallilin, L. D. (2024). Artificial intelligence (AI) towards students' academic performance. *Innovare Journal of Education*, 12(4), 16–21. Faculty of Languages and Literature, Philippine Normal University, Manila, Philippines.
- Marikyan, D., & Papagiannidis, S. (2023). Technology acceptance model: A review. In S. Papagiannidis (Ed.), *TheoryHub Book*.
- Memis, Y. (2025). Examining the potential and pitfalls of AI in problem solving. *Journal of Pedagogical Research*, 9(2).
- Mogelvang, A., Bjelland, C., & Ludvigsen, K. (2024). Gender differences in the use of generative artificial intelligence chatbots in higher education: Characteristics and consequences. *Education Sciences*, 14(12).
- Otero, L. C., Catala, A., Morante, C. F., Taboada, M., & Cebreiro, Barro, S. (2023). *International Journal of Stem Education*, 10, Article 29.
- Oyeyemi, A. A., Okoye, A. T., Okenwa, F., & Ijeoma, A. F. (2024). Perceived effect of artificial intelligence tools on the academic performance of students in public universities in Anambra State. *International Journal of Innovative Research and Advanced Studies (IJIRAS)*, 11(2), 20–21. Department of Educational Foundations, Nnamdi Azikiwe University, Awka.
- Salido, V. (2023). Impact of AI-powered learning tools on student understanding and academic performance. College of Arts and Sciences, Cavite State University, Don Severino de las Alas Campus.
- Sasikala, P., & Ravichandran, R. (2024). Study on the impact of artificial intelligence on student learning outcomes. *Journal Digital Learning and Education*, 04(2).
- Shehri, F. A., Maham, R., Malik, A., & Saif, O. B. (2023). Effects of ChatGPT on students academic performance: Mediating role of prompt engineering. *The Asian Bulletin of Big Data*, 3(2).
- Szmyd, K., & Mitera, E. (2024). The impact of artificial intelligence on the development of critical thinking skills in students. *European Research Studies Journal*, 28(2).
- Talili, Z. B. (2024). Integrating artificial intelligence in academic writing. *International Multidisciplinary Journal of Research for Innovation, Sustainability and Excellence*, 1(8). Cebu Normal University.
- Tan, C. T., Lee, A. V., & Lee, M. (2022). A systematic review of artificial intelligence techniques for collaborative learning over the past two decades. National Institute of Education, Nanyang Technological University, 1 Nanyang Walk, Singapore, 637616, Singapore.
- Tanvir, K., Islam, M. S., Sezan, S. B. K., Sanad, Z. A., & Aatur, A. I. (2023). Impact of ChatGPT on academic performance among Bangladeshi undergraduate students. *International Journal of Research in Science & Engineering*, 03(05). Department of Computer Science, American International University-Kuratoli, Dhaka, Bangladesh.
- Trisoni, R., Ardiani, I., Herawati, S., Mudinillah, A., Mai-mori, R., Khairat, A., David, D., & Nazliati, N. (2023). The effect of artificial intelligence in improving student achievement in high schools. Indonesia.
- Tsai, C., Ma, Y., Chang, Y., & Lai, Y. (2022). Artificial intelligence-assisted programming lessons: Examining inter-ethnicity differences in learning expectancy, motivation and effectiveness. *Frontiers in Psychology*.
- Vieriu, A. M., & Petrea, G. (2025). The impact of artificial intelligence (AI) on students' academic development. *Education Sciences*, 15(3).
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes* (M. Cole, V. John-Steiner, S. Scribner, & E. Souberman, Eds.). Harvard University Press.
- Wagner, G., Lukyanenko, R., & Paré, G. (2021). Artificial intelligence and the conduct of literature reviews. *Journal of Information Technology*, 37(2). <https://doi.org/10.1177/02683962211048201>
- Wei, X. (2024). Evaluating ChatGPT-4 and ChatGPT-4o: Performance insights from NAEP mathematics problem solving. *Frontiers in Education*, 9, 1452570. <https://doi.org/10.3389/feduc.2024.1452570>
- Wei, X., Wang, L., Lee, L. K., & Liu, R. (2025). The effects of generative AI on collaborative problem-solving and team creativity performance in digital story creation: An experimental study. *International Journal of Educational Technology in Higher Education*, Article 23.