

## Effects of Artificial Intelligence on Cognitive Development of Junior High School Students

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### Abstract

This study determined the extent of the effects of artificial intelligence (AI) on the cognitive development and academic performance of junior high school students at Tomas Claudio Colleges during the School Year 2025–2026. A descriptive survey research design was employed, utilizing a researcher-made questionnaire-checklist to gather data on students' cognitive development in terms of information processing, problem-solving, critical thinking, and creativity, as well as the challenges encountered in using AI applications. The respondents consisted of 353 junior high school students, representing 50% of the population, selected through simple random sampling. Their profiles were described in terms of age, sex, sibling position, number of children in the family, parents' educational attainment, parents' occupation, monthly family income, and type of AI application used. Documentary analysis was also conducted to determine students' academic performance based on their first and second quarter grades obtained from School Form 9. Findings revealed that parents' educational attainment and occupation were not significant predictors of students' perceptions of AI's effects on cognitive development. However, variables such as age, sex, sibling position, family size, monthly income, and type of AI application used influenced selected cognitive aspects. Moreover, AI was found to have a significant correlation with students' cognitive development and academic performance, particularly in terms of problem-solving and creativity. The study concludes that AI can serve as a valuable educational tool when used appropriately, enhancing higher-order thinking skills among learners. It is recommended that schools integrate AI through guided instruction, provide equitable access to AI resources, and promote responsible and critical use among students to maximize its benefits in education.

**Keywords:** Artificial Intelligence, Cognitive Development, Academic Performance, Junior High School Students, Problem-Solving, Creativity

### Introduction

Education is a comprehensive process of learning that encompasses the acquisition of knowledge, skills, values, cultural awareness, and beliefs. It empowers individuals to broaden their perspectives and develop critical thinking and problem-solving abilities necessary for real-world challenges. In the Philippines, the significance of education is underscored in the 1987 Philippine Constitution, Article XIV, Section 1, which guarantees the right of every citizen to quality and accessible education. This provision highlights the government's commitment to preparing learners to become globally competitive, particularly in an era driven by rapid technological advancement.

In today's digital age, technology plays a vital role in transforming educational practices. Among these innovations, Artificial Intelligence (AI) has emerged as a powerful tool that enhances productivity, facilitates access to information, and supports learning processes. With origins tracing back to the mid-20th century, AI has evolved into widely accessible applications integrated into smartphones, computers, and online platforms. In the Philippine educational context, the Department of Education, through DepEd Order No. 003, s. 2026, promotes the responsible and ethical integration of AI in basic education to enhance learning while preserving human agency and essential cognitive skills.

AI applications in education offer opportunities to improve students' information processing, problem-solving, critical thinking, and creativity. However, concerns regarding overreliance, academic dishonesty, and reduced independent thinking have also been raised. While AI can support personalized and interactive learning experiences, improper use may negatively affect cognitive development and academic performance. Thus, the integration of AI requires a balanced approach guided by educators.

Foreign studies provide substantial evidence on the impact of AI in education. Lee and Kwon (2024) found that AI education has a large positive effect on students' cognitive development, while Kocabiyik (2025) emphasized both the benefits and ethical challenges associated with AI integration. Similarly, Basha (2024) highlighted that although AI improves efficiency and personalized learning, excessive reliance may hinder critical thinking and problem-solving skills.

Adiguzel et al. (2023) and Karimi et al. (2023) further noted that AI enhances teaching and learning processes but requires ethical considerations and proper implementation. Moreover, Slimi (2023) emphasized AI's role in developing future-ready skills and improving learning experiences.

Local studies also support the growing influence of AI in education. Escorial and Pajo (2025) identified both opportunities and challenges in AI integration within the Philippine context, particularly issues related to accessibility and infrastructure. Capinding et al. (2024) revealed that students generally perceive AI positively, noting improvements in engagement and academic performance, though dependency remains a concern. Polinar et al. (2025) and Giray et al. (2024) emphasized the importance of ethical use, teacher preparedness, and policy development in maximizing AI's benefits. Meanwhile, De Vera et al. (2025) and Doria (2024) highlighted the need for future-oriented competencies, digital readiness, and institutional support in AI adoption. Maala et al. (2025) further stressed the importance of balanced AI usage to enhance learning without compromising critical thinking.

Despite the growing body of literature, several research gaps remain evident. Most foreign and local studies focus on higher education or general perceptions of AI rather than its specific effects on junior high school students. There is also limited empirical research examining the direct relationship between AI use and cognitive development domains such as information processing, problem-solving, critical thinking, and creativity alongside academic performance. Additionally, few studies consider demographic variables and types of AI applications as factors influencing these outcomes. Furthermore, there is a lack of localized studies conducted in private secondary institutions like Tomas Claudio Colleges.

In light of these gaps, the present study aims to determine the extent of the effects of artificial intelligence on the cognitive development and academic performance of junior high school students. This research seeks to provide empirical evidence that may guide educators, administrators, and policymakers in designing effective, ethical, and balanced AI integration strategies in education.

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## **Material and methods**

### **2.1 Research Design**

The descriptive method of research was employed in this study using a researcher-made survey questionnaire checklist as a tool in gathering the needed data.

### **2.2 Locale of the Study**

The study was conducted at Tomas Claudio Colleges located in Taghangin, Morong, Rizal. Tomas Claudio College was founded in 1950. It was named in honor of Tomas Claudio, a Filipino soldier who died in World War I. The school is the leading community-based institution. The institution delivers affordable educational services guided by academic excellence, attains social advancement and quality of life for all sectors of society, and actively participates in the internationalization of education. To further locate the institution,

### **2.3 Respondents of the Study**

The study considered the half population or 50% of junior high school students, which consists of three-hundred fifty-three students (353) and they were described in terms of their age, sex, sibling position, number of children in the family, parents' educational attainment, parents' occupation, monthly family income, and type of AI application used. The respondents were chosen using simple random techniques.

### **2.4 Sample and Sampling Procedure**

The study employed a simple random sampling technique to select respondents from the population of junior high school students. Specifically, 50% of the total population, comprising 353 students, was included in the study to ensure adequate representation. The respondents were described based on their demographic profile, including age, sex, sibling position, number of children in the family, parents' educational attainment, parents' occupation, monthly family income, and type of artificial intelligence (AI) application used. This sampling method provided each student an equal chance of being selected, thereby minimizing bias and enhancing the reliability of the results.

### **2.5 Research Instrument**

The study utilized a researcher-made questionnaire-checklist as the primary instrument for data collection, composed of three parts. Part I gathered the respondents' demographic profile, including age, sex, sibling position, number of children in the family, parents' educational attainment, parents' occupation, monthly family income, and type of AI application used. Part II assessed the extent of the effects of artificial intelligence on students' cognitive development in terms of information processing, problem-solving, critical thinking, and creativity, consisting of 40 items rated using a five-point Likert scale ranging from "Never" to "Always." Part III measured the extent of challenges encountered by students in using AI, also using a five-point Likert scale. In addition, documentary analysis was employed to determine students' academic performance based on their first and second quarter grades obtained from School Form 9, with corresponding verbal

interpretations. The instrument underwent content validation by experts, including the thesis adviser, faculty members, a statistician, the school principal, and the graduate studies dean, and their feedback was incorporated to ensure its validity and reliability.

## 2.6 Data Gathering Procedure

The study followed the Gantt Chart of Activities in its conduct. This included the formulation of the research problem up to the revision of the manuscript and the submission of the final copy. The instrument was content-validated. Afterwards, permission to conduct the study was obtained from the Office of the President of the Tomas Claudio Colleges. After that, the questionnaire-checklist was administered to the respondents using Google Forms. The researcher was also guided by the Data Privacy Act. After the retrieval, the data were encoded and processed using the Statistical Package for the Social Sciences (SPSS). The data were analyzed and interpreted based on the sub-problems. The summary of findings, conclusions, and recommendations were formulated. After the oral defense, the manuscript was revised considering the comments and suggestions of the Oral Examination Committee. The manuscript was also subjected to an anti-plagiarism process at the statistical center. After finalization, hardbound copies were submitted to the Office of the Graduate Studies Program and other offices.

## 2.7 Data Analysis Techniques

The data gathered in the study were analyzed and interpreted using appropriate statistical tools. Frequency and percentage were utilized to describe the profile of the respondents in terms of the selected variables. The weighted mean was employed to determine the extent of the effects of artificial intelligence on the cognitive development of junior high school students, as well as the extent of the challenges they encountered in using AI. To test the significant differences in the perceived effects of AI on cognitive development when grouped according to respondents' profile, One-Way Analysis of Variance (ANOVA) was applied. Furthermore, frequency, mean, and standard deviation were used to determine the level of academic performance of the students based on their first and second quarter grades. Lastly, correlation analysis was conducted to examine the significant relationship between the extent of AI's effects on cognitive development and the students' level of academic performance.

## 2.8 Ethical Considerations

This study strictly adhered to ethical standards in the conduct of research. Prior to data collection, permission was sought from the school authorities and concerned officials to ensure proper coordination and approval. The respondents were informed about the purpose of the study, and their participation was entirely voluntary. Informed consent was obtained, assuring them that they could withdraw from the study at any time without any consequences. Confidentiality and anonymity of the respondents were strictly maintained by not disclosing their identities and ensuring that all collected data were used solely for academic purposes. Additionally, the researcher ensured that no harm, discomfort, or bias would affect the participants throughout the process. All information gathered was treated with utmost respect and integrity, and results were presented honestly and objectively.

## Results and Discussion

### 3.1 Profile of the Two Groups of Respondents in Terms of the Selected Variables

As shown in Table 1, out of 353 respondents, the majority are 14–15 years old (63.5%), followed by 11–13 years old (30.3%), while only 6.2% are 16 years old and above. Most respondents are female (59.5%) compared to males (40.5%). In terms of sibling position, more than half are firstborn (51.8%), while only a small portion belong to other positions (1.7%). Regarding the number of children in the family, most come from families with two children (41.1%), followed by three children (26.3%), while only 1.1% come from families with six or more children. As to parents' educational attainment, the majority of both fathers (56.7%) and mothers (60.9%) are college graduates, while only a minimal number reached doctorate level or elementary education. In terms of parents' occupation, most fathers belong to the "others" category (24.4%) while most mothers are housewives (32.3%). For monthly family income, nearly half of the respondents belong to families earning Php 30,000 and above (46.7%), while the lowest proportions are those earning Php 10,000–Php 14,999 and Php 5,000–Php 9,999 (7.4% each). Lastly, in terms of AI application used, most respondents utilize ChatGPT (58.1%), followed by Cici and Gemini (12.5% each), while only 6.2% use other AI platforms.

Table 1  
*Frequency and Percentage Distribution of the Respondents  
in Terms of Selected Variables*

| Age                    | f          | %            | Rank |
|------------------------|------------|--------------|------|
| 11 -13 years old       | 107        | 30.3         | 2    |
| 14 - 15 years old      | 224        | 63.5         | 1    |
| 16 years old and above | 22         | 6.2          | 3    |
| <b>Total</b>           | <b>353</b> | <b>100.0</b> |      |
| <b>Sex</b>             |            |              |      |

|                                     |        |       |      |        |       |      |
|-------------------------------------|--------|-------|------|--------|-------|------|
| Male                                | 143    |       |      | 40.5   |       | 2    |
| Female                              | 210    |       |      | 59.5   |       | 1    |
| Total                               | 353    |       |      | 100.0  |       |      |
| Sibling Position                    |        |       |      |        |       |      |
| First                               | 183    |       |      | 51.8   |       | 1    |
| Second                              | 110    |       |      | 31.2   |       | 2    |
| Third                               | 42     |       |      | 11.9   |       | 3    |
| Fourth                              | 12     |       |      | 3.4    |       | 4    |
| Others                              | 6      |       |      | 1.7    |       | 5    |
| Total                               | 353    |       |      | 100.0  |       |      |
| Number of Children in the Family    |        |       |      |        |       |      |
| 1                                   | 66     |       |      | 18.7   |       | 3    |
| 2                                   | 145    |       |      | 41.1   |       | 1    |
| 3                                   | 93     |       |      | 26.3   |       | 2    |
| 4                                   | 37     |       |      | 10.5   |       | 4    |
| 5                                   | 8      |       |      | 2.3    |       | 5    |
| 6 and above                         | 4      |       |      | 1.1    |       | 6    |
| Total                               | 353    |       |      | 100.0  |       |      |
| Parent’s Educational Attainment     | Father |       |      | Mother |       |      |
|                                     | f      | %     | Rank | f      | %     | Rank |
| Doctorate Degree                    | 3      | .8    | 9    | 6      | 1.7   | 7    |
| Master’s degree with Doctorate unit | 4      | 1.1   | 7.5  | 8      | 2.3   | 6    |
| Master’s degree                     | 10     | 2.8   | 5    | 29     | 8.2   | 3    |
| College Graduate                    | 200    | 56.7  | 1    | 215    | 60.9  | 1    |
| College Undergraduate               | 62     | 17.6  | 2    | 59     | 16.7  | 2    |
| High School Graduate                | 44     | 12.5  | 3    | 23     | 6.5   | 4    |
| High School Undergraduate           | 21     | 5.9   | 4    | 12     | 3.4   | 5    |
| Elementary Graduate                 | 5      | 1.4   | 6    | 1      | .3    | 8    |
| Elementary Undergraduate            | 4      | 1.1   | 7.5  | -      | -     | -    |
| Total                               | 353    | 100.0 |      | 353    | 100.0 |      |
| Parent’s Occupation                 | Father |       |      | Mother |       |      |
|                                     | f      | %     | Rank | f      | %     | Rank |
| Accountant                          | 8      | 2.3   | 9    | 18     | 5.1   | 9    |
| Business Owner                      | 44     | 12.5  | 4    | 30     | 8.5   | 5    |
| Call Center(BPO)                    | 4      | 1.1   | 13   | 22     | 6.2   | 6.5  |
| Construction Worker                 | 9      | 2.5   | 8    | -      | -     | -    |
| Delivery Rider                      | 13     | 3.7   | 7    | -      | -     | -    |
| Engineer                            | 25     | 7.1   | 6    | 2      | .6    | 9    |
| Factory Worker                      | 7      | 2.0   | 10.5 | 1      | .3    | 10   |
| Healthcare worker                   | 5      | 1.4   | 12   | 22     | 6.2   | 6.5  |
| Office Worker                       | 61     | 17.3  | 2    | 60     | 17.0  | 2    |
| OFW                                 | 48     | 13.6  | 3    | 32     | 9.1   | 3    |
| Teacher/Professor                   | 7      | 2.0   | 10.5 | 31     | 8.8   | 4    |
| Househusband/Housewife              | 36     | 10.2  | 5    | 114    | 32.3  | 1    |
| Others                              | 86     | 24.4  | 1    | 21     | 5.9   | 8    |
| Total                               | 353    | 100.0 |      | 353    | 100.0 |      |
| Monthly Family Income               |        |       |      |        |       |      |
| Php 30,000 and above                | 165    |       |      | 46.7   |       | 1    |
| Php 25,000 – Php 29,999             | 52     |       |      | 14.7   |       | 2    |
| Php 20,000 – Php 24,999             | 46     |       |      | 13.0   |       | 3    |
| Php 15,000 – Php 19,999             | 38     |       |      | 10.8   |       | 4    |
| Php 10,000 – Php 14,999             | 26     |       |      | 7.4    |       | 5.5  |
| Php 5,000 – Php 9,999               | 26     |       |      | 7.4    |       | 5.5  |
| Total                               | 353    |       |      | 100.0  |       |      |
| Type of AI Application Used         |        |       |      |        |       |      |
| ChatGPT                             | 205    |       |      | 58.1   |       | 1    |
| Cici                                | 44     |       |      | 12.5   |       | 2.5  |
| Gemini                              | 44     |       |      | 12.5   |       | 2.5  |

|              |            |              |   |
|--------------|------------|--------------|---|
| Genny AI     | -          | -            | - |
| Meta AI      | 38         | 10.8         | 4 |
| Others       | 22         | 6.2          | 5 |
| <b>Total</b> | <b>353</b> | <b>100.0</b> |   |

### 3.2 Extent of Effects of Artificial Intelligence on the Cognitive Development of Junior High School Students with Respect to Information Processing, Problem Solving, Critical Thinking, and Creativity

The composite table reveals an overall mean of 3.84, interpreted as “Often” or “High Extent,” indicating that artificial intelligence often affects the cognitive development of junior high school students. Among the indicators, critical thinking skills ranked first with a weighted mean of 3.92 (Often/High Extent), followed by information processing with a mean of 3.86, problem-solving with 3.83, and creativity with 3.84, all likewise interpreted as “Often” or “High Extent.” This suggests that AI is frequently utilized by students in enhancing their cognitive abilities, particularly in analyzing information, evaluating situations, solving problems systematically, and generating creative ideas. It further implies that artificial intelligence serves as an effective learning support tool that enhances students’ understanding, promotes independent learning strategies, improves task organization, and strengthens their academic preparedness. As students become more engaged with AI tools, they are better able to manage academic tasks, develop confidence in learning activities, and improve overall academic performance. This finding is supported by Vieriu and Patrea (2025), who emphasized that AI provides significant educational benefits, including personalized learning experiences, improved academic performance, and increased student engagement.

Table 2

*Extent of Effects of Artificial Intelligence on the Cognitive Development of Junior High School Students with Respect to Information Processing, Problem Solving, Critical Thinking, and Creativity*

| Aspects                    | Overall $\bar{W\bar{X}}$ | Verbal Interpretation  | Rank |
|----------------------------|--------------------------|------------------------|------|
| Information Processing     | 3.86                     | Often<br>(High Extent) | 2    |
| Problem Solving            | 3.83                     | Often<br>(High Extent) | 3    |
| Critical Thinking          | 3.92                     | Often<br>(High Extent) | 1    |
| Creativity                 | 3.75                     | Often<br>(High Extent) | 4    |
| Composite $\bar{W\bar{X}}$ | 3.84                     | Often<br>(High Extent) |      |

### 3.3 Significant Difference on the Extent of Effects of Artificial Intelligence on Cognitive Development of Junior High School Students as Perceived by Themselves with Respect to the Different Aspects in Terms of Their Profile

The results of the test for significant differences reveal that, when grouped according to parents’ educational attainment and parents’ occupation, all computed p-values are higher than the .05 level of significance; thus, the null hypothesis is accepted, indicating no significant difference in the extent of the effects of artificial intelligence on cognitive development in terms of information processing, problem-solving, critical thinking, and creativity. However, significant differences were observed when respondents were grouped according to age with respect to information processing, problem-solving, and critical thinking; sex with respect to problem-solving; sibling position and number of children in the family with respect to creativity; monthly family income with respect to critical thinking; and type of AI application used with respect to problem-solving and critical thinking, as evidenced by p-values lower than .05, leading to the rejection of the null hypothesis. These findings imply that students’ perceptions of the effects of AI on cognitive development are not influenced by their parents’ educational attainment or occupation, suggesting that AI is accessible and beneficial regardless of family background. However, demographic factors such as age, sex, family structure, income, and type of AI application used may influence how students experience and utilize AI in developing specific cognitive skills. This means that variations in maturity level, access to resources, learning environment, and choice of AI tools may shape how effectively students engage with AI in their learning process. This finding is supported by Brigola (2025), who reported that demographic factors such as sex, grade level, and socio-economic status do not significantly affect AI engagement, highlighting the broad accessibility and usability of AI tools across different student groups.



Table 3

3 Significant Difference on the Extent of Effects of Artificial Intelligence on Cognitive Development of Junior High School Students as Perceived by Themselves with Respect to the Different Aspects in Terms of Their Profile

| Aspects/Variables                       | F-value | p-value | Ho       | Verbal Interpretation |
|-----------------------------------------|---------|---------|----------|-----------------------|
| <b>Age</b>                              |         |         |          |                       |
| Information Processing                  | 7.633   | .001    | Rejected | Significant           |
| Problem Solving                         | 4.142   | .017    | Rejected | Significant           |
| Critical Thinking                       | 3.765   | .024    | Rejected | Significant           |
| Creativity                              | 3.004   | .051    | Accepted | Not Significant       |
| <b>Sex</b>                              |         |         |          |                       |
| Information Processing                  | 3.666   | .056    | Accepted | Not Significant       |
| Problem Solving                         | 4.242   | .040    | Rejected | Significant           |
| Critical Thinking                       | 2.725   | .100    | Accepted | Not Significant       |
| Creativity                              | 2.696   | .101    | Accepted | Not Significant       |
| <b>Sibling Position</b>                 |         |         |          |                       |
| Information Processing                  | .687    | .601    | Accepted | Not Significant       |
| Problem Solving                         | 1.218   | .303    | Accepted | Not Significant       |
| Critical Thinking                       | 1.200   | .311    | Accepted | Not Significant       |
| Creativity                              | 4.052   | .003    | Rejected | Significant           |
| <b>Number of Children in the family</b> |         |         |          |                       |
| Information Processing                  | 1.000   | .418    | Accepted | Not Significant       |
| Problem Solving                         | .968    | .437    | Accepted | Not Significant       |
| Critical Thinking                       | 1.001   | .417    | Accepted | Not Significant       |
| Creativity                              | 2.336   | .042    | Rejected | Significant           |
| <b>Father's Educational Attainment</b>  |         |         |          |                       |
| Information Processing                  | 1.107   | .358    | Accepted | Not Significant       |
| Problem Solving                         | 1.029   | .414    | Accepted | Not Significant       |
| Critical Thinking                       | .580    | .794    | Accepted | Not Significant       |
| Creativity                              | .782    | .618    | Accepted | Not Significant       |
| <b>Mother's Educational Attainment</b>  |         |         |          |                       |
| Information Processing                  | .706    | .667    | Accepted | Not Significant       |
| Problem Solving                         | 1.154   | .329    | Accepted | Not Significant       |
| Critical Thinking                       | .723    | .653    | Accepted | Not Significant       |
| Creativity                              | 1.021   | .416    | Accepted | Not Significant       |
| <b>Father's Occupation</b>              |         |         |          |                       |
| Information Processing                  | .794    | .656    | Accepted | Not Significant       |
| Problem Solving                         | .760    | .692    | Accepted | Not Significant       |
| Critical Thinking                       | .638    | .809    | Accepted | Not Significant       |
| Creativity                              | .719    | .733    | Accepted | Not Significant       |
| <b>Mother's Occupation</b>              |         |         |          |                       |
| Information Processing                  | .988    | .454    | Accepted | Not Significant       |
| Problem Solving                         | .946    | .491    | Accepted | Not Significant       |
| Critical Thinking                       | .979    | .461    | Accepted | Not Significant       |
| Creativity                              | 1.128   | .340    | Accepted | Not Significant       |
| <b>Monthly Family Income</b>            |         |         |          |                       |
| Information Processing                  | 1.265   | .279    | Accepted | Not Significant       |
| Problem Solving                         | 1.191   | .313    | Accepted | Not Significant       |
| Critical Thinking                       | 2.605   | .025    | Rejected | Significant           |
| Creativity                              | 1.773   | .118    | Accepted | Not Significant       |
| <b>Types of AI Used</b>                 |         |         |          |                       |
| Information Processing                  | 1.444   | .219    | Accepted | Not Significant       |
| Problem Solving                         | 2.428   | .048    | Rejected | Significant           |
| Critical Thinking                       | 2.908   | .022    | Rejected | Significant           |
| Creativity                              | 1.786   | .131    | Accepted | Not Significant       |

### 3.4 Level of Academic Performance as Revealed on Their Average Grades in the First and Second Quarters

The table presents the level of academic performance of junior high school students as revealed by their average grades in the first and second quarters. The results show that the majority of students (64.31%) obtained grades of 90 and above, verbally interpreted as Outstanding, followed by 33.43% who earned grades of 85–89, interpreted as Very Satisfactory. Meanwhile, 1.98% of the students received grades of 80–84, classified as Satisfactory, and only 0.28% obtained grades of 75–79, interpreted as Fairly Satisfactory, while no students fell under the “Did Not Meet Expectations” category. The computed mean grade is 90.50, interpreted as Outstanding, with a standard deviation of 2.943, indicating that students’ performances are closely clustered around the mean. These findings suggest that junior high school students demonstrate a high level of academic performance, with most achieving Outstanding and Very Satisfactory ratings, reflecting strong adherence to academic standards. This implies that students benefit from effective instructional practices, a supportive learning environment, and positive study habits that contribute to their high achievement levels. It further suggests that artificial intelligence may also support learning by helping students organize information, enhance understanding, and develop skills through interactive tools and resources. However, students who fall under the lower performance categories may still require additional academic support and intervention. This finding is supported by Roquero et al. (2025), who emphasized that students’ study attitudes have a stronger influence on academic performance than artificial intelligence use alone, highlighting the continued importance of learner motivation and effort in achieving academic success.

Table 4

*Level of Academic Performance as Revealed on Their Average Grades in the First and Second Quarters*

| Grade          | Descriptors               | Average Grades |            |
|----------------|---------------------------|----------------|------------|
|                |                           | Frequency      | Percentage |
| 90 and above   | Outstanding               | 227            | 64.31      |
| 85-89          | Very Satisfactory         | 118            | 33.43      |
| 80-84          | Satisfactory              | 7              | 1.98       |
| 75-79          | Fairly Satisfactory       | 1              | 0.28       |
| 70-74          | Did Not Meet Expectations | -              | -          |
| Total          |                           | 353            | 100        |
| Highest        |                           | 96             |            |
| Lowest         |                           | 76             |            |
| Mean           |                           | 90.50 (O)      |            |
| Std. Deviation |                           | 2.943          |            |

### 3.5 Significant Relationship Between the Perceived Extent of Effects of Artificial Intelligence on the Cognitive Development and Their Level of Academic Performance

As reflected in Table 5, the test of significant relationship between the extent of effects of artificial intelligence on cognitive development and students’ level of academic performance shows mixed results. Information processing ( $r = .047$ ,  $p = .376$ ) and critical thinking ( $r = .100$ ,  $p = .061$ ) obtained p-values higher than the 0.05 level of significance; thus, the null hypothesis is accepted, indicating no significant relationship. On the other hand, problem solving ( $r = .121$ ,  $p = .023$ ) and creativity ( $r = .112$ ,  $p = .036$ ) obtained p-values lower than 0.05, leading to the rejection of the null hypothesis, which indicates a significant relationship. These findings suggest that while artificial intelligence does not significantly influence academic performance in terms of information processing and critical thinking, it has a meaningful relationship with problem-solving and creativity. This implies that AI tools are more effective in enhancing students’ ability to generate solutions and develop creative outputs, which may contribute to improved academic performance. However, its impact on information processing and critical thinking may not directly translate into measurable grades, although it still supports overall learning development. This further implies that educators may maximize the use of AI by integrating activities that strengthen students’ problem-solving and creative thinking skills to further enhance academic performance. This finding is supported by Maamor et al. (2024), who emphasized that AI usage positively influences student engagement and academic performance, particularly when combined with consistent study habits and active learning strategies.

Table 5

*Significant Relationship Between the Perceived Extent of Effects of Artificial Intelligence on the Cognitive Development and Their Level of Academic Performance*

| Aspects                | r-value | p-value | Ho       | VI              |
|------------------------|---------|---------|----------|-----------------|
| Information Processing | .047    | .376    | Accepted | Not Significant |
| Problem Solving        | .121    | .023    | Rejected | Significant     |
| Critical Thinking      | .100    | .061    | Accepted | Not Significant |
| Creativity             | .112    | .036    | Rejected | Significant     |

### 3.6 Extent of the Challenges Encountered by Junior High School Students with the Use of Artificial Intelligence

As presented in the table, the challenges encountered by junior high school students in using artificial intelligence obtained an overall weighted mean of 2.94, interpreted as “Sometimes Encountered.” Among the indicators, item 4, “I get confused

because I feel my mind is full of information so that I tend to mix information,” ranked first with a weighted mean of 3.56, interpreted as “Often Encountered,” indicating that students frequently experience information overload when using AI tools. On the other hand, item 9, “I feel I am lacking in creativity because I depend much on artificial intelligence,” ranked last with a weighted mean of 2.44, interpreted as “Seldom Encountered,” suggesting that most students do not strongly perceive AI as negatively affecting their creativity. Overall, the findings show that while students recognize the usefulness of artificial intelligence in learning, they occasionally encounter difficulties such as information overload, confusion in filtering relevant data, and inconsistency in the accuracy of generated responses. This implies that although AI serves as a valuable academic support tool, students still require proper guidance in using it effectively and responsibly. Teachers play a crucial role in helping students manage large amounts of information, develop critical evaluation skills, and maintain academic integrity while using AI. It also implies the need to strengthen students’ digital literacy to help them distinguish reliable from unreliable information and to prevent overdependence on AI-generated content. This finding is supported by Ignas (2025), who identified challenges in AI use such as over-reliance, accessibility issues, inaccuracies in generated content, and plagiarism risks, emphasizing the importance of guided use and digital literacy interventions.

Table 6  
*Extent of the Challenges Encountered by Junior High School Students with the Use of Artificial Intelligence*

| I... | Challenges Encountered While Using Artificial Intelligence                                                                                                                                   | $\overline{WX}$ | Verbal Interpretation        | Rank |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------------------|------|
| 1.   | am having a hard time to comprehend some words because artificial intelligence uses hard to understand words.                                                                                | 3.16            | Sometimes Encountered        | 4    |
| 2.   | feel that the answer from artificial intelligence is not relevant on what I want to answer in my homework.                                                                                   | 3.30            | Sometimes Encountered        | 3    |
| 3.   | get bias answers and may cause plagiarism. That is why I tend to rephrase it.                                                                                                                | 3.45            | Sometimes Encountered        | 2    |
| 4.   | get confuse because I feel my mind is full of information so that I tend to mix information.                                                                                                 | 3.56            | Often Encountered            | 1    |
| 5.   | feel I am starting to depend on my answers in artificial intelligence.                                                                                                                       | 2.64            | Sometimes Encountered        | 7    |
| 6.   | feel I cannot express my ideas upon specific topic when I am using artificial intelligence.                                                                                                  | 3.06            | Sometimes Encountered        | 5    |
| 7.   | am having an internet connection issue while using artificial intelligence.                                                                                                                  | 2.56            | Sometimes Encountered        | 8    |
| 8.   | cannot think of any ideas because I frequently use artificial intelligence in most of my school works.                                                                                       | 2.44            | Seldom Encountered           | 9    |
| 9.   | feel I am lacking creativeness because I depend much in artificial intelligence.                                                                                                             | 2.42            | Seldom Encountered           | 10   |
| 10.  | feel most of the time that I cannot separate a fact to a fake news because artificial intelligence can transform anything in to real-like images, videos, songs, and especially information. | 2.84            | Sometimes Encountered        | 6    |
|      | <b>Overall <math>\overline{WX}</math></b>                                                                                                                                                    | <b>2.94</b>     | <b>Sometimes Encountered</b> |      |

### Conclusion & Recommendations

Based on the findings of the study, it is concluded that parents’ educational attainment and parents’ occupation do not significantly influence students’ perceptions on the extent of the effects of artificial intelligence on cognitive development. However, demographic factors such as age, sex, sibling position, number of children in the family, monthly family income, and type of AI application used may influence students’ experiences in terms of information processing, problem-solving, critical thinking, and creativity. Furthermore, the study reveals that artificial intelligence is significantly correlated with cognitive development and academic performance, particularly in enhancing problem-solving and creativity skills among junior high school students.

In light of the findings, it is recommended that school administrators conduct training programs and workshops to help teachers effectively integrate artificial intelligence into classroom instruction, with emphasis on developing students’ problem-solving and creativity skills. Schools should also ensure equal access to AI tools regardless of students’ socioeconomic background. Teachers are encouraged to design AI-assisted learning activities, monitor students’ use of AI, and provide guidance to prevent over-reliance while promoting critical thinking, originality, and responsible use. Students should be guided to use AI responsibly as a learning support tool while continuously reflecting on their own understanding



to avoid dependency. Additionally, the implementation of the proposed action plan is encouraged, and further studies with different variables are recommended to broaden the scope of findings in this area.

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## **REFERENCES**

- Adiguzel, T., Kaya, M. H., & Cakir, H. (2023). Artificial intelligence in education: A comprehensive review of opportunities and challenges. *Education and Information Technologies*, 28(5), 1–20.
- Basha, S. (2024). The impact of artificial intelligence on students' academic and real-life performance. *International Journal of Educational Technology*, 15(2), 45–60.
- Brigola, R. (2025). Demographic factors and artificial intelligence engagement among students. *Journal of Digital Learning and Education*, 12(1), 33–47.
- Capinding, J. R., Santos, M. L., & Reyes, A. P. (2024). Artificial intelligence and student learning experiences: A descriptive comparative study. *Asian Journal of Education and Technology*, 9(3), 101–118.
- Doria, M. (2024). Artificial intelligence integration in Philippine education: Trends, challenges, and cybersecurity concerns. *Philippine Journal of Educational Research*, 18(2), 55–72.
- Escorial, J. P., & Pajo, L. M. (2025). Artificial intelligence in Philippine education: Opportunities and challenges. *Journal of Southeast Asian Education*, 14(1), 22–40.
- Giray, F., et al. (2024). Artificial intelligence in Philippine higher education: Perspectives of instructors and administrators. *Asian Journal of Educational Development*, 11(4), 88–105.
- Ignas, R. (2025). Challenges in the use of artificial intelligence among students: Accessibility, accuracy, and academic integrity. *Journal of Modern Learning Systems*, 7(1), 15–29.
- Karimi, J., et al. (2023). Artificial intelligence in higher education: Opportunities and implications. *International Journal of Educational Innovation*, 10(3), 77–92.
- Kocabiyik, O. (2025). The dual impact of artificial intelligence in education: Benefits and ethical concerns. *Educational Technology Review*, 19(2), 60–78.
- Lee, S., & Kwon, H. (2024). Meta-analysis of AI education effectiveness in K-12 classrooms in Korea. *Journal of Educational Research and Practice*, 13(2), 120–138.
- Maala, A., Reyes, D., & Cruz, L. (2025). Student perceptions on AI tools in academic performance and learning engagement. *International Journal of Learning Technologies*, 8(1), 50–69.
- Maamor, N., et al. (2024). Artificial intelligence usage, engagement, and academic performance among students. *Journal of Educational Psychology and Technology*, 6(2), 90–108.
- Polinar, J. M., et al. (2025). Teachers' utilization of artificial intelligence tools in pedagogy: A qualitative study. *Philippine Journal of Teacher Education*, 16(1), 40–58.
- Roquero, P., et al. (2025). Study attitudes and academic performance in relation to artificial intelligence use. *Asian Journal of Educational Studies*, 11(2), 70–86.
- Slimi, Z. (2023). Artificial intelligence in higher education: Impacts on teaching, learning, and ethics. *International Journal of Learning and Teaching*, 15(4), 200–215.