Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

# Robotics Instruction Through the Use if Artificial Intelligence Tools in Marian Learning Center and Science Highschool, Inc.

Levi Jazer L. Ebora [1]
1 – Golden Gate Colleges– Graduate School
maestrongsingkit12@gmail.com

Publication Date: July 6, 2026 DOI: **10.5281/zenodo.21213468**

**Abstract**

This study explored the integration of Artificial Intelligence (AI) tools in Grade 6 robotics education and examined how these tools influenced classroom instruction, student learning strategies, engagement, collaboration, and enrichment opportunities. Data were collected from teachers and students through interviews, observations, and reflective responses, focusing on learning content, classroom activities, assessment practices, and AI-supported projects. Findings indicate that AI tools enhanced learning content by providing personalized, adaptive, and clearly structured guidance, enabling students to understand programming concepts, sequencing, and troubleshooting more effectively. Classroom activities became more interactive and collaborative, as AI-supported real-time feedback encouraged experimentation, peer learning, and inquiry-based problem-solving. Assessment practices were improved through immediate, actionable feedback that allowed learners to correct errors, reflect on outcomes, and track progress systematically. Students reported increased engagement, motivation, self-directed learning, and confidence in tackling robotics tasks. Collaboration skills were strengthened through AI-supported group work, fostering communication, teamwork, and collective problem-solving. Additionally, AI provided opportunities for advanced challenges, creative experimentation, and iterative learning without fear of mistakes. The study recommends regular AI integration, student utilization of AI tools, administrative support, and further research to maximize instructional benefits. Overall, AI-supported robotics instruction promotes learner-centered, strategic, and skill-oriented experiences, preparing students for 21st-century competencies.

**Keywords:** *Artificial Intelligence (AI), Robotics Education, Student Engagement, Collaborative Learning, STEM Education*

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

## Introduction

Robotics education has become a vital component of the 21st-century curriculum, particularly in promoting science, technology, engineering, and mathematics (STEM) competencies among learners. At Marian Learning Center and Science High School, Inc., the Grade 6 Robotics program provides students with foundational knowledge in robotics concepts, programming, and automation through hands-on learning activities that develop problem-solving, logical reasoning, and collaboration skills.

In recent years, Artificial Intelligence (AI) has emerged as an important educational technology that enhances classroom instruction through personalized learning experiences, adaptive guidance, interactive simulations, and immediate feedback. In Robotics education, AI tools help students better understand programming concepts, sequencing, troubleshooting, and logical processes by allowing them to experiment, test commands, and receive real-time responses. AI also supports differentiated instruction by providing advanced challenges for skilled learners while offering step-by-step guidance for students who require additional support.

Furthermore, AI integration promotes self-directed learning, critical thinking, communication, and collaboration during robotics activities. Learners become more engaged in classroom tasks as they work collaboratively in designing, programming, and evaluating robotic systems. Despite these potential benefits, limited local studies have examined the integration of AI tools in elementary robotics instruction. Therefore, this study explores the influence of Artificial Intelligence tools on classroom instruction and learners' experiences in Grade 6 Robotics education at Marian Learning Center and Science High School, Inc.

Several studies emphasized the positive impact of Artificial Intelligence (AI) in education. UNESCO (2023) explained that AI systems provide adaptive learning pathways, personalized instruction, and immediate feedback that improve teaching and learning processes. Holmes, Bialik, and Fadel (2022) noted that AI integration supports the development of 21st-century skills such as critical thinking, creativity, collaboration, and self-directed learning.

Research further showed that AI enhances student engagement, motivation, collaboration skills, and strategic learning approaches by encouraging learners to actively participate, explore solutions, and reflect on their learning experiences. However, most studies focus on higher education and general ICT integration, with limited research on AI-supported robotics instruction in elementary education. This gap in the literature supports the need for the present study.

This study aims to examine the influence of Artificial Intelligence (AI) tools on classroom instruction and learners' experiences in Grade 6 Robotics education at Marian Learning Center and Science High School, Inc. Specifically, this study seeks to answer the following questions:

1, How does the use of Artificial Intelligence (AI) tools by the learners influence classroom instruction relative to the following:

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

1.1 Learning Content
1.2 Classroom Activities
1.3 Assessment Tasks

2. How may the learners' experiences in using Artificial Intelligence tools strengthen Robotics instruction in terms of:
2.1 Student Engagement
2.2 Self-Directed Learning Activities
2.3 Collaboration Skills
3. How do learners perceive changes in their learning strategies after integrating AI tools?
4. What opportunities do learners experience when using AI tools in the classroom?
5. Based on the findings, what enrichment activities may be proposed?

# Methodology

## Research Design

The study employed a descriptive qualitative research design. This design involved the systematic description and analysis of data gathered to address the research questions of the study. Using this approach, the researcher collected data through classroom observations, interviews, and an analysis of students' interactions with AI-supported robotics activities. These methods allowed the researcher to gain deeper insights into the instructional processes and learners' experiences in the AI-assisted robotics learning environment.

## Participants

The participants of this study were the eight (8) Grade 6 learners enrolled in the Robotics subject at Marian Learning Center and Science High School, Inc., along with their robotics teacher. The participants used AI tools in the classroom and could provide useful insights about their impact on learning and teaching.

## Research Instrument

A researcher-made observation and interview guides were the primary instruments used by the researcher to obtain detailed information on the use of AI tools in robotics education. The observation guide allowed the researcher to systematically record classroom interactions, instructional methods, student participation, and the integration of AI tools during robotics lessons.

## Data Collection Procedure

Data were gathered after securing permission from the school head of Marian Learning Center and Science High School, Inc. and obtaining informed consent from the participants and their parents or guardians. The researcher conducted classroom observations and individual interviews with eight (8) Grade 6 learners during AI-supported robotics activities. Responses and

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

observations were recorded, organized, and analyzed to determine the influence of Artificial Intelligence (AI) tools on classroom instruction and learners' experiences.

### Data Analysis

Qualitative analysis was employed to interpret the data gathered from classroom observations and individual interviews. The data were organized, coded, and categorized based on recurring themes related to learning content, classroom activities, assessment tasks, student engagement, self-directed learning, collaboration skills, and learning strategies to determine the influence of Artificial Intelligence (AI) tools on Grade 6 Robotics instruction.

## Results

The findings of the study revealed that the integration of Artificial Intelligence (AI) tools positively influenced Grade 6 Robotics instruction at Marian Learning Center and Science High School, Inc. in terms of learning content, classroom activities, and assessment tasks. AI-supported instruction provided personalized learning experiences, immediate feedback, and interactive simulations that helped learners better understand robotics concepts such as programming logic, sequencing, and troubleshooting. Students demonstrated improved mastery of concepts as they were able to learn at their own pace and independently correct errors through AI guidance.

In classroom activities, AI tools transformed robotics lessons into more interactive, collaborative, and student-centered experiences. Learners actively participated in problem-solving tasks, experimented with different programming solutions, and collaborated effectively with peers. Real-time feedback from AI systems encouraged students to take intellectual risks, explore multiple solutions, and engage in reflective learning. Students became more motivated, confident, and persistent in completing robotics tasks.

The findings also showed that AI tools strengthened assessment practices by providing immediate and actionable feedback. Students were able to identify mistakes, revise their work, and improve programming outputs without waiting for teacher intervention. AI-supported assessment promoted self-monitoring, reflective learning, and independent problem-solving while helping teachers track student progress more efficiently.

Furthermore, learners' experiences with AI tools enhanced student engagement, self-directed learning, and collaboration skills. Students became more active, responsible, and independent learners who could plan, test, and revise programming strategies systematically. AI-supported group activities also improved communication, teamwork, and peer learning. Observations and interview responses indicated that students developed more strategic and analytical learning approaches, becoming more deliberate and reflective in solving robotics problems.

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

Lastly, the study identified several opportunities provided by AI integration, including differentiated learning, creative experimentation, independent learning, and collaborative problem-solving. Based on the findings, proposed enrichment activities such as advanced coding challenges, collaborative robotics projects, reflection journals, and creative robotics design tasks were recommended to further enhance students' technical, cognitive, and collaborative skills.

## Discussion

The results of the study demonstrate that Artificial Intelligence (AI) tools play a significant role in enhancing robotics instruction among Grade 6 learners. The integration of AI created a more engaging, interactive, and learner-centered environment that supported both instructional practices and student learning experiences. Consistent with the studies of UNESCO (2023), Holmes et al. (2022), and Chiu (2023), AI-supported instruction provided adaptive learning opportunities, immediate feedback, and personalized guidance that improved students' understanding of robotics concepts and programming tasks.

The findings further revealed that AI-supported classroom activities encouraged active participation, experimentation, and collaboration among learners. Students became more willing to explore multiple solutions, discuss strategies with peers, and solve problems independently. This supports the findings of Luckin et al. (2022) and Ouyang and Jiao (2021), who emphasized that AI technologies promote inquiry-based learning, collaboration, and reflective problem-solving through interactive and adaptive learning experiences.

In terms of assessment practices, AI tools enhanced formative assessment by allowing students to receive instant feedback and revise their work immediately. Learners became more reflective and responsible for their own progress, while teachers were able to monitor learning outcomes more effectively. These findings align with Holmes et al. (2022) and Zawacki-Richter et al. (2021), which highlighted the importance of AI-driven assessment systems in improving feedback delivery and supporting self-regulated learning.

Overall, the findings confirm that AI tools can significantly enhance robotics education by supporting differentiated instruction, promoting critical thinking, fostering collaboration, and encouraging independent learning. The integration of AI technologies not only improves technical knowledge and programming skills but also develops important 21st-century competencies necessary for future STEM-related learning and problem-solving situations.

## Conclusion

Based on the major findings of the study, the researcher drew the following conclusions:

1. The findings revealed that Artificial Intelligence (AI) tools significantly enhanced classroom instruction in Grade 6 robotics education by improving learning content, classroom activities, and assessment tasks through personalized instruction, interactive learning experiences, and immediate feedback.

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

2. The findings indicated that learners' experiences with AI tools strengthened robotics instruction by increasing student engagement, promoting self-directed learning, and improving collaboration skills through active participation, independence, and teamwork.

3. The findings showed that the integration of AI tools improved learners' learning strategies by encouraging systematic, reflective, and strategic approaches to programming tasks through planning, testing, revising, and analytical thinking.

4. The findings revealed that AI tools provided learners with opportunities for creativity, exploration, differentiated learning, and independent problem-solving, helping students build confidence, innovation, and critical thinking skills.

5. The findings suggested that enrichment activities such as advanced programming challenges, collaborative robotics projects, reflection journals, and creative design tasks can further strengthen learners' critical thinking, independence, collaboration, and innovation in robotics education.

Based on the findings of this study, the following recommendations are proposed:

1. Teachers are encouraged to integrate Artificial Intelligence (AI) tools consistently in robotics lessons to support differentiated instruction and enhance student engagement.

2. Students may actively utilize AI tools as part of their learning process in robotics education.

3. Schools may ensure adequate access to AI-supported educational platforms and resources to strengthen robotics instruction.

4. Future studies may examine the impact of AI integration in robotics education with larger sample sizes, different grade levels, or other subject areas.

# References

**A. Books**

Bialik, M. (2023). Artificial intelligence and 21st-century skills. Center for Curriculum Redesign.

Fadel, C. (2023). Education for the age of artificial intelligence. Center for Curriculum Redesign.

Holmes, W., Bialik, M., & Fadel, C. (2022). Artificial intelligence in education: Promises and implications for teaching and learning. Center for Curriculum Redesign.

Luckin, R. (2022). Artificial intelligence and the future of learning. Pearson.

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2022). Intelligence unleashed: An argument for AI in education. Pearson.

Woolf, B. P. (2020). Building intelligent interactive tutors: Student-centered strategies for revolutionizing e-learning. Morgan Kaufmann.

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2021). Artificial intelligence in higher education. Springer.

**A. Unpublished Materials**

Chiu, T. K. F. (2023). *Artificial intelligence in STEM classrooms* (Unpublished conference paper).

Cukurova, M. (2024). *Artificial intelligence in assessment systems* (Unpublished manuscript).

Ferguson, R. (2024). *AI-enhanced feedback systems in classrooms* (Unpublished study).

Ifenthaler, D. (2024). *Predictive analytics in AI-supported education* (Unpublished research paper).

Johnson, W. L. (2021). *Artificial intelligence conversational agents in learning* (Unpublished manuscript).

Lester, J. C. (2021). *Pedagogical agents and engagement* (Unpublished research).

Ouyang, F. (2021). *Artificial intelligence paradigms in education* (Unpublished thesis).

Ramirez-Montoya, M. S. (2024). *Digital transformation using artificial intelligence* (Unpublished manuscript).

Shi, L. (2024). *AI-supported instructional design* (Unpublished manuscript).

Spector, J. M. (2023). *Artificial intelligence trends in education* (Unpublished report).

Zhang, L. (2024). *Artificial intelligence in STEM learning environments* (Unpublished study).

**B. Journals / Magazine Articles**

Baker, R. (2023). Artificial intelligence in education: Detecting and addressing student misconceptions. Journal of Educational Data Mining, 15(2), 45–60.

Chiu, T. K. F. (2023). The impact of AI on STEM learning and student motivation. Computers & Education, 195, 104724.

Hwang, G.-J. (2023). Applications of artificial intelligence in formative assessment. Educational Technology & Society, 26(1), 1–14.

Johnson, W. L., & Lester, J. C. (2021). Face-to-face interaction with pedagogical agents. International Journal of Artificial Intelligence in Education, 31(1), 1–23.

Kuo, Y.-C., et al. (2022). Effects of AI-based feedback on student persistence. Computers in Human Behavior, 127, 107062.

Li, S., et al. (2025). AI-supported personalized STEM education and student achievement. Journal of STEM Education Research, 8(1), 15–30.

Létourneau, A., et al. (2025). Intelligent tutoring systems in K–12 education. Educational Technology Research and Development, 73(2), 345–360.

Ouyang, F., & Jiao, P. (2021). Artificial intelligence in education: The three paradigms. Computers and Education: Artificial Intelligence, 2, 100020.

Ramirez-Montoya, M. S., et al. (2024). Artificial intelligence and personalized learning pathways. Educational Sciences, 14(3), 210.

Shi, L., & Choi, I. (2024). Artificial intelligence tools in teaching and learning. Journal of Educational Computing Research, 62(1), 89–110.

Zhang, L., et al. (2024). AI-driven personalized learning in STEM education. Computers & Education, 190, 104600.

### C. Electronic References

Brookings Institution. (2022). AI and education systems. https://www.brookings.edu

European Commission. (2022). Artificial intelligence in education and training. https://education.ec.europa.eu

McKinsey & Company. (2023). AI in education insights. https://www.mckinsey.com

OECD. (2024). Artificial intelligence in education and learning environments. https://www.oecd.org

OECD. (2024). Future of artificial intelligence in education. https://www.oecd.org

ResearchGate. (2023). Artificial intelligence in education publications. https://www.researchgate.net

SpringerOpen. (2023). Artificial intelligence research in education. https://www.springeropen.com

Stanford University. (2023). AI Index report. https://aiindex.stanford.edu

UNESCO. (2023). Guidance for generative artificial intelligence in education and research. https://www.unesco.org

UNICEF. (2022). Digital learning and artificial intelligence. https://www.unicef.org

World Bank. (2023). Education technology and artificial intelligence. https://www.worldbank.org