Artificial Intelligence Consumption and the State of Learning Engagement among Grade 11 Senior High School Learners in Malaybalay City

Celia B. Capio

Master of Arts in Teaching (MAT) Valencia Colleges (Bukidnon), Inc. Hagkol, Valencia City, Bukidnon Philippines

DOI: https://doi.org/10.47772/IJRISS.2026.1026EDU0099

Received: 13 February 2026; Accepted: 19 February 2026; Published: 27 February 2026

ABSTRACT

This study examined the relationship between Artificial Intelligence (AI) consumption and learning engagement among Grade 11 senior high school learners in selected public secondary schools in Malaybalay City. Using a quantitative cross-sectional design, data were collected from 120 respondents through a structured survey consisting of an AI Usage Questionnaire and Hart's Learning Engagement Tool. Instruments underwent content validation and internal consistency reliability testing prior to data collection.

Descriptive findings indicated that learners sometimes used AI-powered educational tools and reported moderate perceptions of both the benefits and challenges of AI-driven learning. In contrast, learners demonstrated high levels of emotional, behavioral, and cognitive engagement. Pearson product-moment correlation analysis revealed statistically significant but low-to-moderate positive associations between AI tool usage ($r = .291$, $p = .001$), perceived AI benefits and challenges ($r = .280$, $p = .002$), and overall learning engagement. Effect size estimates suggest that AI consumption accounts for a modest proportion of variance in engagement outcomes.

The findings indicate that AI use functions as a supplementary learning support rather than a primary determinant of student engagement. Results underscore the importance of structured, guided, and context sensitive AI integration to maximize educational benefits while mitigating risks such as overreliance and reduced critical engagement. Future research employing longitudinal or mixed-methods designs is recommended to clarify causal pathways and examine long-term academic outcomes.

Keywords: Artificial Intelligence, Learning Engagement, Senior High School, Educational Technology, Student Perception

INTRODUCTION

Artificial intelligence (AI) has rapidly transformed educational environments by reshaping how learners access, process, and interact with learning materials. AI-driven tools such as intelligent tutoring systems, adaptive learning platforms, and automated assessment technologies are increasingly embedded in instructional delivery (Luckin et al., 2016). Although AI adoption in Philippine education remains in its early stages, its presence is expanding, particularly in urban and semi-urban areas such as Malaybalay City. While AI offers enhanced access to digital resources and personalized feedback, concerns persist regarding whether these technologies promote active cognitive engagement or foster passive learning behaviors (Selwyn, 2019). Understanding this balance is essential to ensuring that AI integration supports meaningful educational development.

In Malaybalay City, Bukidnon, educational institutions are gradually incorporating AI applications such as chatbots, virtual tutors, and automated writing assistants into academic processes. These technologies are designed to provide real-time feedback, scaffold learning, and promote autonomous problem-solving (ZawackiRichter et al., 2019). However, alongside these potential benefits are emerging challenges, including overreliance on technology, diminished peer interaction, and possible reductions in critical thinking engagement. As secondary schools continue integrating AI tools, evaluating their actual influence on learner participation and cognitive involvement becomes increasingly important. Despite emerging literature on AI integration, limited empirical evidence exists within Philippine public secondary schools examining how AI consumption relates to multidimensional learning engagement.

This study examines the relationship between AI consumption and learning engagement among senior high school learners in Malaybalay City, particularly in selected public secondary schools. Using a cross-sectional design, the research investigates patterns of AI usage and their association with levels of behavioral, emotional, and cognitive engagement. Situated within the broader digital transformation of Philippine education, the study aims to generate empirical evidence that informs responsible AI integration, ensuring that technological advancement enhances active learning rather than reinforcing passive educational experiences.

THEORETICAL FRAMEWORK

This study is grounded in an integrative theoretical framework that conceptualizes Artificial Intelligence (AI) consumption as a contextual learning variable whose influence on engagement is mediated and moderated by motivational and cognitive processes rather than functioning as a direct causal determinant.

First, the framework draws from Social Cognitive Theory (Bandura, 1986, 1997), which posits that learning occurs through reciprocal interactions among personal factors, behaviors, and environmental influences. Within this model, AI-based tools represent environmental stimuli that may shape students' behavioral engagement (e.g., effort, persistence), cognitive engagement (e.g., strategy use, knowledge integration), and emotional engagement (e.g., enthusiasm toward learning). However, consistent with reciprocal determinism, AI consumption does not independently determine engagement; rather, its association depends on learners' self-efficacy, technological competence, and regulatory behaviors. This perspective supports the interpretation of modest correlations, recognizing AI as one contributing factor among multiple interacting influences.

Second, the framework incorporates Self-Determination Theory (SDT) (Deci & Ryan, 2000; Ryan & Deci, 2020), which explains engagement as emerging from the satisfaction of three psychological needs: autonomy, competence, and relatedness. AI tools may enhance autonomy by allowing self-paced exploration, competence through immediate feedback and adaptive scaffolding, and relatedness through digital interaction. However, excessive reliance on AI could undermine intrinsic motivation if automated assistance replaces self regulated cognitive effort. Thus, AI consumption may either support or weaken engagement depending on how it affects motivational need satisfaction.

Third, the framework is informed by Constructivist Learning Theory (Vygotsky, 1978), which emphasizes active knowledge construction through scaffolding within the learner's Zone of Proximal Development. AI applications can function as digital scaffolds that guide students through increasingly complex tasks. Nevertheless, constructivist principles suggest that meaningful engagement occurs only when learners actively process and integrate information rather than passively receiving AI-generated outputs. Therefore, AI's effectiveness is contingent upon its role as a cognitive support rather than a cognitive substitute.

Integrating these perspectives, the present study conceptualizes AI consumption as a contextual and behavioral variable associated with engagement outcomes, while recognizing that engagement is also shaped by motivational, instructional, and socio-environmental conditions. This theoretical positioning aligns with the cross-sectional design of the study, which examines statistical associations rather than causal effects. Furthermore, the framework allows for potential moderating influences—such as gender, academic strand, socioeconomic status, and digital access—that may condition how AI consumption relates to engagement in both Philippine and international educational settings.

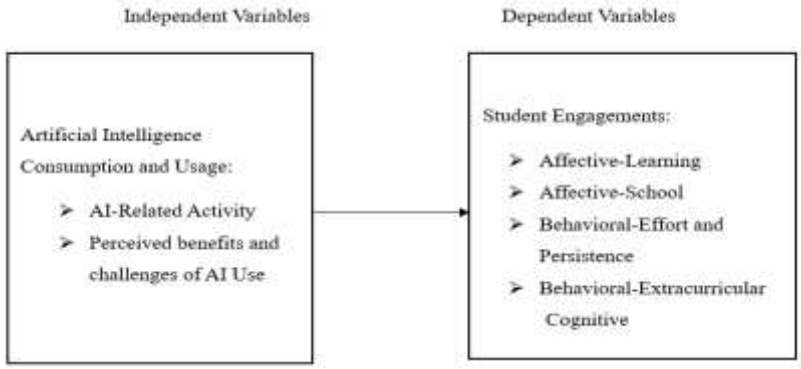

Figure 1. Schematic diagram showing relationships of variables.

Scope

This study examines the relationship between Artificial Intelligence (AI) consumption and learning engagement among senior high school learners enrolled in selected public secondary schools in Malaybalay City, Bukidnon, specifically Casisang National High School, Malaybalay City National High School, and Managok National High School. The investigation focuses on learners' academic use of AI-based tools—such as chatbots, automated writing assistants, and adaptive learning platforms—and their levels of behavioral, emotional, and cognitive engagement. Using a cross-sectional design and self-reported survey data, the study determines the association between AI consumption patterns and engagement during the specified academic period. The research is limited to public senior high school learners within Malaybalay City and does not include private institutions, other educational levels, or direct measures of academic performance and long-term outcomes.

REVIEW OF THE LITERATURE

The integration of Artificial Intelligence (AI) in education has gained substantial scholarly attention due to its potential to transform instructional delivery and learner interaction. AI-powered systems such as intelligent tutoring platforms, adaptive learning environments, and automated assessment tools provide personalized feedback and customized learning pathways (Luckin et al., 2016). These systems analyze learner behavior and performance data to adjust content difficulty and pacing, thereby supporting individualized instruction. Research suggests that AI-enhanced platforms can improve efficiency in content delivery and provide immediate corrective feedback, which may strengthen learners' understanding of complex concepts. However, while AI demonstrates strong instructional potential, its broader impact on students' engagement remains an area requiring further empirical exploration.

Learning engagement, conceptualized as a multidimensional construct encompassing behavioral, emotional, and cognitive components, is strongly associated with academic achievement and persistence (Fredricks et al., 2004). Behavioral engagement refers to participation in academic activities; emotional engagement involves affective reactions toward learning tasks; and cognitive engagement reflects investment in higher-order thinking and self-regulated learning. Emerging research indicates that technology-mediated learning environments can enhance engagement when they promote interactivity, autonomy, and meaningful feedback (Bond et al., 2020). However, engagement outcomes vary depending on how digital tools are implemented and the degree to which learners actively interact with content rather than passively consuming information.

Several studies highlight the role of AI in fostering personalized and self-directed learning. Zawacki-Richter et al. (2019) noted that AI applications in education are primarily used to support adaptive instruction, predictive analytics, and automated feedback systems. These tools may enhance students' sense of competence and autonomy by offering tailored assistance aligned with their learning needs. Similarly, Holmes et al. (2019) argue that AI has the capacity to scaffold learners within their zone of proximal development by identifying gaps in understanding and providing targeted support. When effectively integrated, AI may therefore function as a digital facilitator that strengthens cognitive engagement and promotes independent problem-solving.

Despite these advantages, concerns have emerged regarding the potential negative consequences of excessive AI reliance. Selwyn (2019) cautions that over-dependence on automated systems may reduce opportunities for critical thinking, collaboration, and deep learning. Some scholars argue that when students rely heavily on AI-generated responses, they may engage in surface-level learning rather than actively constructing knowledge. Furthermore, issues related to digital equity, technological literacy, and ethical use of AI tools influence how effectively students engage with these systems. Without proper guidance and digital competence, AI tools may inadvertently encourage passive learning behaviors rather than active intellectual engagement.

Within the Philippine educational context, AI adoption is still in its developmental stage, particularly in public secondary schools. Urban and semi-urban areas are gradually incorporating AI-driven applications to support instruction, yet empirical evidence on their influence on student engagement remains limited. As digital transformation accelerates in Philippine education, examining the relationship between AI consumption and learning engagement becomes increasingly important. Understanding whether AI enhances behavioral, emotional, and cognitive involvement or contributes to passive dependence will provide evidence-based insights for responsible AI integration in secondary education settings.

RESEARCH METHODOLOGY

This study employed a quantitative cross-sectional research design to examine the relationship between Artificial Intelligence (AI) consumption and learning engagement among senior high school learners in Malaybalay City. The cross-sectional approach was appropriate as it allowed the researcher to measure both variables at a single point in time and determine their statistical association without manipulating any conditions. The design enabled the identification of prevailing patterns of AI usage and corresponding levels of behavioral, emotional, and cognitive engagement within the natural school setting.

The respondents consisted of senior high school learners enrolled in selected public secondary schools in Malaybalay City, specifically Casisang National High School, Malaybalay City National High School, and Managok National High School. A structured questionnaire was utilized to collect data. The instrument contained two main sections: one measuring AI consumption in terms of frequency and academic utilization of AI-based tools (e.g., chatbots, automated writing assistants, adaptive learning platforms), and another measuring learning engagement across behavioral, emotional, and cognitive dimensions. Items were rated using a Likert-scale format. Prior to data collection, necessary permissions were secured from school administrators, and ethical considerations such as voluntary participation and confidentiality were strictly observed.

The study utilized a stratified convenience sampling approach across three public senior high schools in Malaybalay City. Grade 11 learners were proportionally selected based on enrollment size per school. Inclusion criteria required active enrollment and prior exposure to AI-enabled tools for academic purposes. The final sample consisted of 120 respondents, which meets minimum sample size recommendations for correlation analysis at $\alpha = .05$ with medium effect size (Cohen, 1988).

The AI Usage Questionnaire underwent content validation by three experts in educational technology and psychometrics. Items were evaluated for clarity, relevance, and construct alignment. Revisions were incorporated prior to pilot testing.

A pilot test involving 30 Grade 11 learners outside the study sample was conducted to assess internal consistency reliability. Cronbach's alpha coefficients were computed to reveal 0.921, which indicates reliability for the instrument used.

Data were analyzed using descriptive and inferential statistical techniques. Frequency, mean, and standard deviation were computed to describe the level of AI consumption and learning engagement. To determine the relationship between the variables, Pearson product-moment correlation was employed, with the level of significance set at $\alpha = .05$. This statistical procedure allowed the researcher to assess whether a significant association existed between learners' patterns of AI use and their reported levels of engagement in learning activities.

FINDINGS

The findings of the study present the overall levels of Artificial Intelligence (AI) consumption and learning engagement among senior high school learners in selected public schools in Malaybalay City, as well as the statistical relationship between these variables. Descriptive results reveal the prevailing patterns of AI use for academic purposes and the extent of learners' behavioral, emotional, and cognitive engagement in learning. Inferential analysis further determines whether a significant association exists between AI consumption and learning engagement, thereby providing empirical evidence on how AI integration relates to learners' active participation and involvement in the learning process.

Table 1 Most commonly used AI-powered educational tools among 11th-grade Senior High School learners.

Indicator	Mean	SD	Interpretation
I have been introduced to AI tools by my teachers or classmates.	3.38	1.063	Sometimes

I use YouTube's AI-generated suggestions to help me find educational videos.	3.25	0.941	Sometimes
I have tried using AI-based math solvers like Photomath or Mathway.	3.23	1.165	Sometimes
I prefer using AI-based apps over textbooks or printed materials when studying.	3.21	1.020	Sometimes
I use AI voice assistants (e.g., Siri, Google Assistant) for searching academic content.	3.20	1.074	Sometimes
AI tools help me study more efficiently than traditional study methods.	3.18	1.061	Sometimes
I use AI-powered grammar or writing tools like Grammarly for my written outputs.	3.16	1.195	Sometimes
I explore different AI tools to support my learning needs.	3.13	1.173	Sometimes
I regularly use ChatGPT or other AI chatbots to help with school assignments.	3.09	1.000	Sometimes
I use AI-driven study platforms like Quizlet, Khan Academy (Khanmigo AI feature), or similar apps.	2.95	1.136	Sometimes
Overall	3.18	0.620	Sometimes

Table 1 presents the most commonly used AI-powered educational tools among Grade 11 learners. The overall mean of 3.18 (SD = 0.620) indicates that students *sometimes* use AI tools in their academic activities. The highest-rated indicator shows that learners are sometimes introduced to AI tools by teachers or classmates (M = 3.38, SD = 1.063), followed by the use of YouTube's AI-generated suggestions and AI-based math solvers. Meanwhile, AI-driven study platforms and chatbot use obtained relatively lower means, though still within the "sometimes" range. Overall, the findings suggest moderate exposure and utilization of AI tools among learners rather than consistent or habitual use.

Table 2 Perceived benefits and challenges of AI-driven learning among 11th-grade Senior High school learners.

Indicator	Mean	SD	Interpretation
I worry that AI tools might give incorrect or misleading information.	3.83	1.155	High
AI tools save me time when completing assignments or reviewing for exams.	3.69	1.136	High
I feel more confident in my schoolwork because of AI tools.	3.52	0.970	High
AI learning tools help me become more independent in studying.	3.44	0.986	High

I find it easier to understand difficult lessons with the help of AI tools.	3.28	1.107	Moderate
I'm concerned that using AI too much may affect my critical thinking skills.	3.23	1.098	Moderate
I sometimes rely too much on AI tools and neglect learning on my own.	3.20	0.984	Moderate
AI tools make learning more engaging and interactive.	3.14	0.981	Moderate
I believe AI tools should be integrated more into our school activities.	3.06	1.056	Moderate
I have difficulty accessing AI tools due to a lack of internet or devices.	3.04	1.239	Moderate
Overall	3.34	0.652	Moderate

Table 2 presents the perceived benefits and challenges of AI-driven learning among Grade 11 learners. The overall mean of 3.34 (SD = 0.652) indicates a *moderate* perception of AI's impact. Learners highly agreed that they worry about AI providing incorrect information (M = 3.83, SD = 1.155) and that AI tools save time and boost confidence in schoolwork. However, moderate ratings were observed regarding concerns about overreliance, reduced critical thinking, engagement, and accessibility issues. These findings suggest that while learners recognize the practical advantages of AI, they remain cautious about its potential drawbacks and limitations in academic settings.

Table 3 Level of state of learning engagement among 11th-grade Senior High school learners in terms of emotional engagement.

Indicator	Mean	SD	Interpretation
I enjoy learning new things in class.	4.33	0.596	Very High
I like what I am learning in school.	4.21	0.685	Very High
I think what we are learning in school is interesting.	4.07	0.742	High
I am proud to be at this school.	4.03	0.761	High
I look forward to going to school.	4.02	0.830	High
I do not think learning is boring.	3.93	0.857	High
I am happy to be at this school.	3.92	0.953	High
I like my school.	3.84	0.917	High
Overall	4.04	0.506	High

Table 3 presents the level of emotional engagement among Grade 11 learners. The overall mean of 4.04 (SD = 0.506) indicates a *high* level of emotional engagement. Learners reported very high enjoyment in learning new things (M = 4.33, SD = 0.596) and strong positive feelings toward what they are learning in school. Other indicators, such as pride in their school, happiness in attending, and perceiving learning as interesting rather than boring, were rated high. These results suggest that learners generally demonstrate positive emotional attachment and enthusiasm toward their school and academic experiences.

Table 4 Level of state of learning engagement among 11th-grade Senior High school learners in terms of behavioral engagement.

Indicator	Mean	SD	Interpretation
I try hard to do well in school.	4.14	0.802	High

I work as hard as I can.	4.05	0.878	High
I participate in class activities.	3.99	0.825	High
I pay attention in class.	3.85	0.806	High
If I have trouble understanding a problem, I go over it again.	3.79	0.943	High
When I'm in class, I like to indulge in work.	3.78	0.825	High
When I run into a difficult homework problem, I keep working at it until I think I've solved it.	3.76	1.045	High
In school, I do enough to get by in school	3.75	0.882	High
I take an active role in extracurricular activities at my school.	3.68	0.907	High
I am an active participant in school activities such as sports day and the school picnic.	3.58	1.082	High
I volunteer to help with school activities such as sports day and parent day.	3.57	1.035	High
When I'm in class, my mind does not wander.	3.41	1.000	High
Overall	3.78	0.567	High

Table 4 shows the level of behavioral engagement among Grade 11 learners, with an overall mean of 3.78 (SD = 0.567), interpreted as *high*. Students reported strong effort and persistence in academic tasks, particularly in trying hard to do well (M = 4.14, SD = 0.802) and working as hard as they can (M = 4.05, SD = 0.878). Participation in class activities, sustained attention, and persistence in solving difficult problems were also rated high. Although slightly lower means were observed in extracurricular involvement and maintaining full concentration in class, these remained within the high range. Overall, the findings indicate that learners demonstrate consistent active participation and effort in both academic and school-related activities.

Table 5 Level of state of learning engagement among 11th-grade Senior High school learners in terms of cognitive engagement.

Indicator	Mean	SD	Interpretation
When I study, I try to connect what I am learning with my own experiences.	4.07	0.686	High
I make up my own examples to help me understand the important concepts I learn in school.	4.04	0.814	High
I try to match what I already know with things I am trying to learn for school.	4.04	0.706	High
When learning new information, I try to put the ideas in my own words.	3.98	0.727	High
When I study, I figure out how the information might be useful in the real world.	3.95	0.708	High
When I study, I try to understand the material better by relating it to things I already know.	3.93	0.758	High
When learning things for school, I try to see how they fit together with other things I already know.	3.93	0.786	High
I try to see the similarities and differences between things I am learning for school and things I already know.	3.93	0.764	High

When learning things for school, I often try to associate them with what I learnt in other classes about the same or similar things.	3.91	0.698	High
I try to think through topics and decide what I'm supposed to learn from them, rather than studying topics just by reading over notes.	3.90	0.887	High
I try to understand how the things I learn in school fit together with each other.	3.84	0.799	High
Overall	3.96	0.484	High

Table 5 presents the level of cognitive engagement among Grade 11 learners, with an overall mean of 3.96 (SD = 0.484), interpreted as *high*. Students reported strong tendencies to connect new knowledge with prior experiences (M = 4.07, SD = 0.686) and to generate their own examples to deepen understanding. Other indicators, including paraphrasing concepts, relating ideas across subjects, and applying learning to real-world contexts, were consistently rated high. These findings indicate that learners actively employ higher-order thinking strategies and meaningful learning processes, reflecting strong cognitive involvement in their academic tasks.

Table 6 Test of the significant relationship between the most commonly used AI-Powered educational tools, perceived benefits and challenges of AI-driven learning, and the level of state of learning engagement among 11th-grade Senior High school learners.

Variable	r	p-value	Interpretation
Most commonly used AI-powered educational tools.	.291	.001	Significant
Perceived benefits and challenges of AI-driven learning	.280	.002	Significant

Table 6 presents the test of the significant relationship between AI-related variables and the level of learning engagement among Grade 11 learners. The results show a statistically significant positive relationship between the most commonly used AI-powered educational tools and learning engagement ($r = .291$, $p = .001$), as well as between perceived benefits and challenges of AI-driven learning and engagement ($r = .280$, $p = .002$). Although the correlations are low to moderate in strength, the findings indicate that greater exposure to and more favorable perceptions of AI tools are significantly associated with higher levels of student learning engagement. Although statistically significant, the correlation coefficients ($r = .280–.291$) fall within the low-to-moderate range according to Cohen's (1988) guidelines. These values indicate modest associative strength, suggesting that AI consumption explains only a limited proportion of variance in learning engagement.

The coefficient of determination (r^2) indicates that AI tool usage accounts for approximately 8.5% of the variance in learning engagement, while perceived benefits and challenges account for approximately 7.8% of the variance. These values suggest that additional factors beyond AI consumption contribute substantially to engagement outcomes.

The present findings of this paper align with international research indicating that artificial intelligence functions as a supportive learning tool rather than a transformative determinant of student engagement. Systematic reviews have shown that AI-powered platforms can enhance autonomy, feedback responsiveness, and personalized scaffolding, which are associated with improved behavioral and cognitive engagement (Wang et al., 2023; Crompton & Burke, 2023). However, similar to the modest correlations observed in this study ($r \approx .28–.29$),

international evidence suggests that AI integration typically accounts for only a limited proportion of variance in engagement outcomes, as engagement remains influenced by broader pedagogical, motivational, and contextual factors. Within the Philippine setting, particularly in public secondary schools in semi-urban areas such as Malaybalay City, AI adoption occurs amid infrastructural constraints, digital access inequalities, and varying levels of technological readiness (Mallillin, 2021; Mallillin, 2022). The moderate AI utilization reported in this study reflects this transitional phase of digital integration in Philippine education, where students are exposed to AI tools but do not yet rely on them extensively. Consequently, the high levels of emotional, behavioral, and cognitive engagement observed may be attributed not solely to AI consumption but also to traditional instructional structures, cultural emphasis on academic persistence, and teacher-mediated guidance. Taken together, these findings suggest that while AI can complement active learning processes in both global and Philippine contexts, its influence remains supplementary and contingent upon equitable access, pedagogical framing, and responsible implementation.

CONCLUSIONS AND RECOMMENDATIONS

The findings of the study conclude that Grade 11 senior high school learners in selected public schools in Malaybalay City demonstrate moderate utilization of AI-powered educational tools and moderate perceptions regarding the benefits and challenges of AI-driven learning. At the same time, learners exhibit high levels of emotional, behavioral, and cognitive engagement. These results indicate that while AI use is not yet habitual or intensive, students remain actively engaged in their academic tasks. Furthermore, the statistically significant positive relationships between AI tool usage, perceived AI benefits and challenges, and learning engagement suggest that responsible and purposeful AI consumption demonstrates a modest but statistically significant association with learning engagement, suggesting it may function as a supportive rather than primary determinant of active learning.

The study further concludes that AI consumption, when accompanied by awareness of both its advantages and limitations, is associated with improved learning engagement. Although the correlations were low to moderate in strength, they were statistically significant, indicating that AI AI tools appear to function as supplementary learning supports, with modest associations to engagement rather than transformative influence.

Learners appear capable of maintaining strong engagement even as they integrate AI tools into their academic routines, provided that usage remains balanced and guided.

In light of these findings, it is recommended that schools develop structured guidelines for the ethical and effective use of AI in academic tasks to maximize its benefits while minimizing risks such as overreliance and reduced critical thinking. Teachers should receive training on integrating AI tools into instructional strategies that promote higher-order thinking and active participation. Additionally, schools should address accessibility concerns to ensure equitable access to AI resources. Future research may explore longitudinal designs to determine causal relationships and examine how AI consumption influences academic performance and longterm learning outcomes.

REFERENCES

1. Ahmad, M., & Iqbal, S. (2023). Impact of artificial intelligence on students' critical thinking in secondary schools. Journal of Educational Research, 26(1), 89–105.
2. Alhumaid, K., Ali, S., Waheed, A., Zahid, E., & Habes, M. (2020). COVID-19 & e-learning: Perceptions of university students in the UAE. Journal of Information Technology Education: Research, 19, 731–753. Retrieved from: https://doi.org/10.28945/4626
3. Aljabri, D., & Alotebi, A. (2023). The impact of AI-based tools on student learning in higher education.
4. Education and Information Technologies, 28(2), 2055–2072. Retrieved from: https://doi.org/10.1007/s10639-022-11178-2
5. Altememy, H., Alshammari, M., & Al-Husain, A. (2023). Intelligent tutoring systems in blended learning environments: A systematic review. Computers and Education: Artificial Intelligence, 4, 100147. Retrieved from: https://doi.org/10.1016/j.caeai.2023.100147
6. Bada, S. O. (2015). Constructivism learning theory: A paradigm for teaching and learning. Journal of Research & Method in Education, 5(6), 66–70. Retrieved from: https://doi.org/10.9790/7388-05616670

7. Bandura, A. (1997). Self-efficacy: The exercise of control. W. H. Freeman.
8. Chiu, T. K. F., Xia, B. S., & Zhou, W. (2023). Academic integrity and AI-assisted learning: Challenges and opportunities. Computers & Education, 194, 104674. Retrieved from: https://doi.org/10.1016/j.compedu.2022.104674
9. Crompton, H., & Burke, D. (2023). Artificial intelligence and mobile learning: Affordances for student engagement. Interactive Learning Environments, 31(1), 64–81. Retrieved from: https://doi.org/10.1080/10494820.2020.1807390
10. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319–340.
11. Deci, E. L., & Ryan, R. M. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. American Psychologist, 55(1), 68–78. Retrieved from: https://doi.org/10.1037/0003-066X.55.1.68
12. Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. Review of Educational Research, 74(1), 59–109. Retrieved from: https://doi.org/10.3102/00346543074001059
13. Fullan, M., & Langworthy, M. (2014). A rich seam: How new pedagogies find deep learning. Pearson.
14. Gao, X., & Zhang, W. (2022). Artificial intelligence in education: A review of learning engagement.
15. Education and Information Technologies, 27(9), 12345–12363. Retrieved from: https://doi.org/10.1007/s10639-022-10987-9
16. Garrison, D. R., Anderson, T., & Archer, W. (2010). The first decade of the community of inquiry
17. framework. The Internet and Higher Education, 13(1–2), 5–9. Retrieved from: https://doi.org/10.1016/j.iheduc.2009.10.003
18. Guo, Y., & Yang, L. (2022). Students' perceptions of AI writing tools in academic learning. Journal of Educational Technology Development and Exchange, 15(1), 1–16.
19. Hart, S. (2011). Student engagement on the school questionnaire. International Journal of Scientific & Engineering Research.
20. Huang, R., Lu, Z., & Yang, J. (2023). The effects of AI integration on collaborative learning in high schools. Computers in Human Behavior, 139, 107567. Retrieved from: https://doi.org/10.1016/j.chb.2022.107567
21. Duay, K. D., & Doble, R. G. (2022). AI in education: Impacts on student learning engagement. International Journal of Scientific & Engineering Research.
22. Kim, Y. (2023). Teacher roles in AI-mediated classrooms: Balancing automation and pedagogy. Teaching and Teacher Education, 122, 103955. Retrieved from: https://doi.org/10.1016/j.tate.2023.103955
23. Liu, J., Xu, H., & Wang, L. (2023). Data privacy in AI-driven education: Risks and safeguards. Educational Technology Research and Development, 71(3), 1123–1144. Retrieved from: https://doi.org/10.1007/s11423-023-10156-y
24. Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). Intelligence unleashed: An argument for AI in education. Pearson.
25. Mallillin, L. L. D. (2021). Online learning and engagement of Filipino learners in the new normal. International Journal of Educational Management and Development Studies, 2(1), 1–12.
26. Mallillin, L. L. D. (2022). Bridging the digital divide: Access to AI and technology in Philippine education. Journal of Education and Learning, 16(4), 112–124.
27. Mallillin, L. L. D., & Carag, E. A. (2020). AI in education and student engagement: A Philippine perspective. International Journal of Advanced Research in Technology and Innovation, 2(1), 45–55.
28. Mallillin, L. L. D., & Mallillin, J. B. (2023). AI, self-directed learning, and the study habits of students. International Journal of Multidisciplinary Research and Analysis, 6(5), 1205–1215.
29. OECD. (2021). AI and the future of skills, volume 1: Capabilities and assessments. OECD Publishing. Retrieved from: https://doi.org/10.1787/5ee4b4bf-en
30. Panigrahi, R., Srivastava, P. R., & Sharma, D. (2021). Online learning: Adoption, continuance, and learning outcome—A review of literature. International Journal of Information Management, 37, 1–14. Retrieved from: https://doi.org/10.1016/j.ijinfomgt.2021.102399
31. Piaget, J. (1952). The origins of intelligence in children. Norton.
32. Rahman, M. M. (2023). ChatGPT in education: Opportunities, challenges, and ethical implications. Education and Information Technologies, 28(5), 5515–5532. Retrieved from: https://doi.org/10.1007/s10639-023-11859-1

33. Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective. Contemporary Educational Psychology, 61, 101860. Retrieved from: https://doi.org/10.1016/j.cedpsych.2020.101860
34. Schunk, D. H. (2012). Learning theories: An educational perspective (6th ed.). Pearson.
35. Selwyn, N. (2019). Should robots replace teachers? AI and the future of education. Polity Press.
36. Shaffer, D. W., & Gee, J. P. (2022). Artificial intelligence, ethics, and the future of learning. Harvard Educational Review, 92(2), 145–166.
37. Siemens, G. (2005). Connectivism: A learning theory for the digital age. International Journal of Instructional Technology and Distance Learning, 2(1), 3–10.
38. Sweller, J. (1988). Cognitive load during problem solving: Effects on learning. Cognitive Science, 12(2), 257–285.
39. Vygotsky, L. S. (1978). Mind in society: The development of higher psychological processes. Harvard University Press.
40. Wang, Y., Sun, L., & Chen, Y. (2023). AI-powered learning platforms and student engagement: A systematic review. British Journal of Educational Technology, 54(2), 367–385. Retrieved from: https://doi.org/10.1111/bjet.13256
41. Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education – Where are the educators? International Journal of Educational Technology in Higher Education, 16(39).