

Exploring the Role of Artificial Intelligence on Academic Performance Among Pupil Under Secondary School Students of Paschim Medinipur District in West Bengal


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Abstract

This research investigates how artificial intelligence (AI) affects the academic performance of secondary school students in the Paschim Medinipur district of West Bengal. It delves into students' views on AI tools, particularly their influence on academic results, comprehension of complex topics, motivation, confidence, and future aspirations. By employing a structured questionnaire given to 200 students, the study finds a strong consensus that AI boosts overall academic performance, notably through personalized learning, formative feedback, and increased efficiency. However, students exhibit more reserved opinions regarding AI's direct impact on exam scores and its varied effects on motivation. The results highlight AI's importance as a supportive educational resource that promotes customized learning experiences and practical academic support, while also pointing out areas for further enhancement to fully leverage its advantages in secondary education ([Ali et al., 2025](#)).

Key Word: *Artificial Intelligence, Academic Performance.*

I.Introduction

Aristotle (384–322 B.C.), whose likeness is featured on this book's cover, was the pioneer in establishing a clear set of principles for the rational aspect of the mind. He created an informal framework of syllogisms for sound reasoning, which theoretically enabled the mechanical derivation of conclusions from given premises. The journey of artificial intelligence (AI) commenced in the 1950s, with its roots in Alan Turing's exploration of machine intelligence. The phrase "artificial intelligence" was introduced in 1956 during the Dartmouth Conference, and the field has evolved from initial symbolic logic and expert systems to today's era of machine learning and generative AI, fueled by vast computing power and data. In 1950, Alan Turing released "Computer Machinery and Intelligence," suggesting the Turing Test as a benchmark for machine intelligence. In 1956, John McCarthy introduced the term "artificial intelligence" at the Dartmouth Workshop. By 1966, the first chatbot, ELIZA, was developed to mimic conversations. The 1980s saw a surge

in "expert systems" that replicated human decision-making. Carnap's 1928 book, "The Logical Structure of the World," outlined a specific computational method for deriving knowledge from basic experiences, likely the first theory of mind as a computational process (Norvig, 2010). Artificial intelligence (AI) is a scientific field focused on enabling machines to solve intricate problems in a manner akin to human reasoning. This typically involves adopting traits from human intelligence and translating them into algorithms suitable for computers. Depending on the set requirements, a more adaptable or efficient strategy can be employed, affecting the perceived artificiality of intelligent behavior. While AI is primarily linked to computer science, it also has significant connections with other disciplines such as mathematics, psychology, cognition, biology, and philosophy, among others. Our ability to integrate insights from these various fields will ultimately advance our efforts in developing intelligent artificial entities. Defining a discipline in a way that satisfies all its practitioners is often challenging. AI research covers a range of related subjects. Broadly, AI involves the computer-based investigation of techniques for tackling complex tasks that have traditionally relied on human solutions. These tasks include intricate logical reasoning, diagnosis, visual recognition, understanding natural language, gaming, explanation, and planning (Kana.).

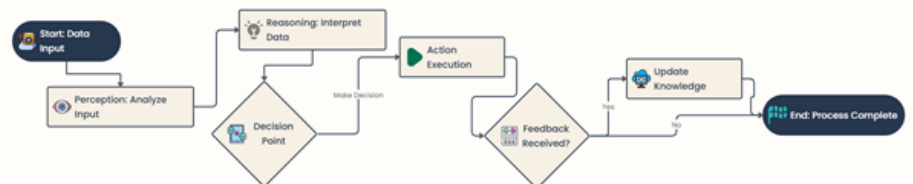
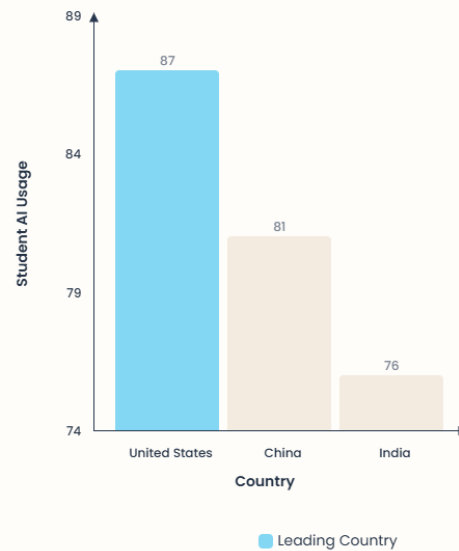
The importance of AI is rooted in its capacity to boost efficiency, precision, and creativity across a range of sectors. AI systems are capable of swiftly analyzing vast amounts of data, recognizing patterns, and automating intricate tasks, thereby aiding decision-making and problem-solving in academic writing, research, and other areas. By utilizing specialized AI models, including proprietary generative AI, tools like Paperpal help users create high-quality written content and enhance clarity, coherence, and compliance with academic standards. This results in increased productivity and facilitates the advancement of knowledge through more effective communication (Traga Philippakos & Rocconi, 2025).

AI applications in education are primarily focused on three main areas. Firstly, in Educational Assessment, AI systems evaluate student performance data to offer comprehensive, real-time feedback on their learning progress.

These systems can automate the grading process for assignments and exams, particularly for objective or standardized tests, enhancing both efficiency and consistency. Moreover, advanced AI tools facilitate formative assessment by pinpointing knowledge gaps and misconceptions, allowing for targeted interventions. This aids educators in making informed, data-driven decisions to improve learning outcomes. Secondly, in Personalized Learning, AI utilizes extensive datasets of student behaviors and performance to customize educational content and pacing according to individual needs. Adaptive learning platforms, such as, adapt the level of difficulty, suggest resources, and tailor learning paths according to ongoing evaluations. This customization enhances learning effectiveness and efficiency by catering to various learning styles and capabilities, allowing students to grasp concepts at their own speed. Third, Administrative Support - AI-powered educational platforms handle routine administrative tasks like scheduling, tracking attendance, and managing resources. They facilitate communication among students, educators, and administrators and improve the management of learning systems. By alleviating administrative tasks, AI allows educators to concentrate more on mentorship, instructional design, and engaging with students. These applications collectively encourage innovation,

Top Student AI Usage Countries

US, China, and India lead in student AI adoption for education worldwide.



accessibility, and advancements in teaching and learning methods. Tools such as Paperpal, which utilize specialized and generative AI models, support these applications by improving the quality of academic writing and communication in educational settings ([Akavova et al., 2023](#)).

Objectives

1. Assessing the impact of AI tools on academic performance
2. Evaluating the effectiveness of AI-based learning resources and personalized learning.
3. Understanding students' confidence, motivation, and future outlook regarding AI in education.

Research Question

1. How do Paschim Medinipur district secondary school students perceive the impact of artificial intelligence (AI) tools on their overall academic performance and exam outcomes?
2. To what extent do AI-based learning resources and personalized AI tools facilitate students' understanding of complex subjects and cater to their individual learning needs?
3. What are the levels of students' confidence, motivation, and future expectations regarding the use of AI technologies in their academic tasks and success?

Statement of the Problem

The statement of the problem for this study is to investigate how artificial intelligence (AI) tools influence the academic performance of secondary school students in the Paschim Medinipur district of West Bengal. Specifically, it aims to address the gap in understanding students' perceptions regarding the effectiveness of AI-based learning resources, personalized learning, and the impact of AI on their motivation, confidence, exam outcomes, and overall academic success. The study seeks to clarify the extent to which AI supports learning processes and academic achievement, while identifying challenges and areas where AI integration in secondary education can be improved to maximize its benefits ([Klarin et al., 2024](#)).

Theoretical Framework

The theoretical framework of this study integrates key perspectives to examine the role of AI in secondary education in the Paschim Medinipur district. It draws on the technology acceptance model (TAM) to understand how perceived usefulness and ease of use influence students' and educators' adoption of AI tools. Constructivist learning theory supports the premise that AI-driven personalized learning enhances knowledge construction through adaptive content and pacing. Diffusion of innovations theory explains the social and organizational factors affecting AI integration in schools. Cognitive load theory highlights how AI can reduce cognitive burden by automating routine tasks, thereby allowing focus on higher-order thinking. Finally, sociotechnical systems theory emphasizes the alignment needed between AI technologies, users, and institutional contexts for effective implementation. Together, these theories provide a comprehensive lens to explore AI's impact on academic performance and the conditions for successful adoption in secondary education.

II. Literature Review

Naz (2025) investigates how artificial intelligence can enhance the adjustment of secondary school students to their educational environment. This adjustment is vital for the comprehensive development and well-being of students, influencing their academic achievements, social interactions, and emotional health. Integrating artificial intelligence into the educational system offers a new method to support students during this critical transition. The research indicates that

students' adjustment levels differ among various educational boards. Those in CBSE and ICSE boards show better adjustment compared to students in the U. P. board, mainly due to the insufficient learning resources available in U. P. board schools. The study finds a moderate link between artificial intelligence and school adjustment, highlighting its potential to foster a supportive and inclusive environment for secondary school students.

In 2025, Yadav explored how artificial intelligence can enhance emotional well-being among secondary school students. The research suggested that improving AI literacy and ethics education could benefit these students. Moreover, developing "social-emotional learning (SEL)" skills was shown to boost students' well-being. Keywords: artificial intelligence, emotional well-being, secondary school students, chatbots, social-emotional learning (SEL), and data privacy. Bello (2022) investigated the relationship between emotional intelligence and academic performance among junior secondary school students in the Katsina metropolis. It is advised that initiatives should focus on training to foster and maintain positive motivation. Ultimately, it is crucial to highlight the importance of cultivating self-awareness in learners to create emotionally stable individuals who can manage their emotions, withstand stress, think logically, adapt to different situations, have self-confidence, and maintain a positive outlook on themselves and their capabilities.

In 2025, Qashoua investigates how artificial intelligence influences the academic performance of faculty members at Palestinian universities. The study's objective was to assess AI's role in academic improvement from the faculty's perspective. Findings indicated that the conditions necessary for leveraging AI to enhance academic performance received high ratings. Moreover, there were statistically significant variations in faculty members' average responses regarding AI's role and its implementation requirements, with differences based on gender (favoring males) and years of service (favoring those with more than a decade of experience). However, no notable differences were found concerning academic rank. This research stands out as one of the pioneering studies to explore AI's impact on academic performance enhancement in Palestinian universities from the faculty's viewpoint, addressing various facets such as service, academic, and research performance.

Abdellatif (2022) explores the connection between moral intelligence and both academic entitlement and academic performance among secondary school students. The study aims to uncover the relationships between these variables and to examine how academic entitlement might mediate the link between moral intelligence and academic performance. The findings from this research could be instrumental in designing programs and strategies to enhance moral intelligence and reduce behaviors and beliefs associated with academic entitlement, thereby addressing challenges faced by secondary school students.

Reis et al. (2020) utilized artificial intelligence to forecast academic performance. Various factors can influence the academic success of higher education students, and higher education institutions (HEIs) often have initiatives to prevent failure or dropout, such as tutoring, mentoring, remedial classes, and summer schools. Identifying students at risk is crucial for timely intervention. This position paper discusses an ongoing project at the University of Trás-os-Montes e Alto Douro (UTAD), which leverages student data and artificial intelligence algorithms to develop models for predicting student and class performance. The primary goal of the IA.EDU project is to investigate the application of data, artificial intelligence, and data science to create AI solutions, including models and applications that provide predictive insights to enhance student success and reduce dropout rates by enabling proactive measures for at-risk students, course directors, and course designers.

Tran (2024) presents a groundbreaking approach to encouraging environmentally friendly behaviors through the AI-Eco Collaborative Educational Psychology Model in Education 5.0. This study introduces a novel AI-driven educational psychology framework designed to enhance pro-environmental actions. By merging AI technology with educational psychology concepts, the model seeks to offer tailored, captivating, and interactive learning experiences that raise environmental consciousness and inspire action. It includes elements such as customized interventions, virtual reality

experiences, and ethical guidelines to ensure its effective and responsible use. The research delves into the potential of AI-driven educational psychology to contribute to a sustainable future through case studies and future prospects.

Wang (2026) explores the role of student-perceived teacher AI literacy in boosting student innovation from a behavioral analysis viewpoint within educational psychology. As educational technology evolves, AI is transforming educators' understanding and influence on student behavior. This research investigates how students' perceptions of their teachers' AI literacy affect their innovative actions, using educational psychology and behavior analysis theories, alongside the conservation of resources theory. The study's results indicate that when students perceive their teachers as AI literate, it significantly boosts their innovative behavior and positive emotions. Positive emotions in students act as a crucial mediating factor, while organizational support enhances the beneficial effects of perceived teacher AI literacy on student outcomes. This study highlights that teachers' AI skills can create emotionally and behaviorally engaging learning environments, thereby enhancing student innovation. It offers practical insights for incorporating AI into teaching methods and adds to the expanding field of AI-focused educational psychology.

In their 2025 study, Ruohan and colleagues explore how educational philosophy is evolving in the context of artificial intelligence. The paper delves into the transformation of educational philosophy by focusing on five main areas: objectives, techniques, principles, ethical considerations, and fairness in education. It presents a thorough perspective on theoretical progress in educational philosophy during the AI era.

Parekh (2022) *Intelligence of Artificial Intelligence: Philosophy*. The proliferation of artificial intelligence (AI) across the human world is akin to the spread of a virus. AI is involved in a wide range of activities, from conducting basic web searches to driving vehicles, creating human-like robots, and even launching space shuttles. This raises the question of whether AI is a complete replication of human intelligence. Philosophy addresses this by emphasizing the concept of 'consciousness,' which AI lacks. Additionally, AI and pre-programmed machines often overlook the virtues and morals inherent in humans. To address these gaps in operational contexts, human involvement becomes essential. Various philosophical debates, ethical theories, and scientific, technological, and fictional experiments provide evidence supporting the notion that human intelligence is superior to artificial intelligence.

Dai (2020) explores the link between artificial intelligence and philosophy. The latest wave of artificial intelligence is gaining significant momentum and attention. This surge is driven not only by the unavoidable progress in technology but also by substantial financial investments. This research offers a dialectical examination of the factors that connect philosophy and artificial intelligence, their reciprocal influence, and ways to enhance their interaction.

In her 2024 work, Belikova delves into essential questions within the realm of artificial intelligence philosophy. This area of study arises at the intersection of multiple humanities disciplines, concentrating on the philosophical dimensions of AI and the issues it seeks to address. The author emphasizes the primary traditional questions that this philosophical branch has aimed to answer. It is noted that the development of AI philosophy has been significantly influenced by the long-standing absence of "strong" artificial intelligence, which has yet to be achieved over the years. This absence has caused a shift in the research focus of AI philosophy, leading it to explore new questions. These include the reasons for the failure to create "strong" AI that completely replicates human cognition, whether computers can think differently from humans, the distinctions between human and machine thought processes, and the responsibility for AI's decisions and actions. The challenges faced by AI philosophy are constantly changing.

III. Methodology

The data collection instrument used in this study is a structured questionnaire designed to gather secondary school students' perceptions regarding the role of Artificial Intelligence (AI) in their academic performance. The questionnaire comprised ten closed-ended items, each measured on a Likert scale with response options ranging from "strongly agree" to "strongly disagree."

The use of a Likert scale enables the quantification of attitudes and perceptions, facilitating both descriptive and inferential statistical analyses. The instrument’s design ensures comprehensive coverage of cognitive, affective, and behavioral aspects related to AI usage in education, allowing for a nuanced understanding of students’ experiences and outlooks. The questionnaire’s structured format also supports ease of administration and ensures consistency in data collection among the secondary school student population in the Paschim Medinipur district.

Sampling

200 data were collected through purposive sampling from four secondary schools in Paschim Medinipur district in West Bengal.

IV. Results and Discussion

Tab.-1: Data regarding Role of Artificial Intelligence on Academic Performance among Pupil under Secondary School Students of Paschim Medinipur District.

S l. N o.	Questions	Str ong ly agr ee	Ag ree	Neut ral	Disa gree	Stron gly disag ree
1	I find that using Artificial Intelligence (AI) tools improves my academic performance in secondary school.	0	191	0	9	0
2	AI-based learning resources help me understand complex subjects more easily.	52	63	59	26	0
3	I feel more motivated to study when I use AI technologies for my academic tasks.	0	79	52	0	69
4	The use of AI in my studies has positively affected my exam scores.	15	25	159	1	0
5	I am confident in using AI applications to complete my school assignments effectively.	82	27	55	31	5
6	AI tools provide personalized learning experiences that suit my individual needs.	97	23	80	0	0
7	I find it easier to complete homework and projects with the help of AI technologies.	93	65	42	0	0
8	AI-based feedback helps me identify and improve my academic weaknesses.	159	38	3	0	0
9	Using AI in my studies saves me time compared to traditional learning methods.	109	39	52	0	0

1	I believe that AI will play an important role in my future academic success.	151	32	10	7	0
0						

The data (Table-1) reflect responses from secondary school students regarding the role of artificial intelligence (AI) in their academic performance, measured using a set of 10 questionnaire items.

According to the first objective, Academic Performance Impact, the data Q1 show overwhelming agreement that AI tools improve academic performance (95.5%; 191 out of 200 agreeing), with only 4.5% disagreeing. Q4, regarding AI’s positive effect on exam scores, shows a more cautious stance: 20% agree or strongly agree, while the majority (79.5%) remain neutral, indicating uncertainty or a less perceived direct impact on formal assessments (Al Nabhani et al., 2025).

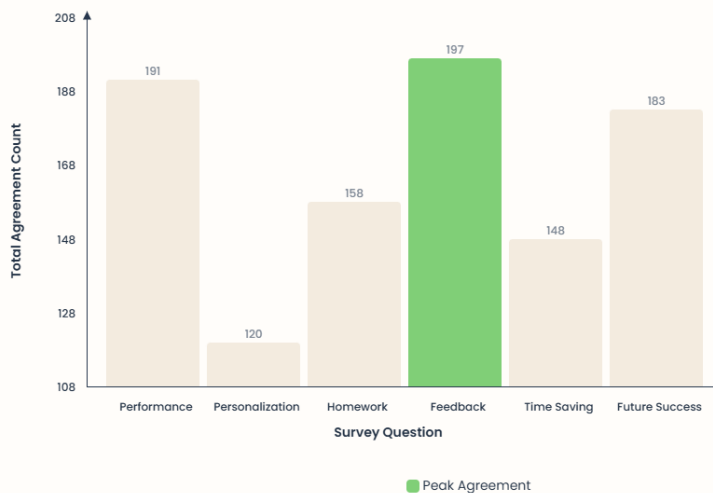
According to the second objective, Effectiveness of AI Learning Resources and Personalization, the data of Q2, 57.5% agree or strongly agree that AI resources aid understanding complex subjects; however, 29.5% are neutral and 13% disagree, suggesting mixed perceptions. Q6 reveals strong positive responses (60% agree/strongly agree) with no disagreement, highlighting clear recognition of personalized learning benefits through AI (Hasibuan & Azizah, 2023).

According to the third objective, Confidence Motivation and Future Outlook, data shows that motivation (Q3) is divided: 39.5% agree that AI motivates them, but a significant 34.5% disagree, and 26% are neutral, showing a varied motivational impact. Confidence in using AI for assignments (Q5) is relatively high at 54.5% positive responses, although 18% disagree or strongly disagree. The future outlook (Q10) is strongly positive: 91.5% believe that AI will be important for their future academic success.

According to the fourth objective Additional Practical Benefits, the data shows that AI is seen as helpful for completing homework/projects (Q7), with 79% positive agreement. AI-based feedback is highly valued for identifying and improving weaknesses (Q8), with 98.5% agreement. In addition, the time-saving benefits of AI (Q9) are also well recognized, with 74% agreeing that AI saves time compared to traditional methods.

Fig.-3: Role of Artificial Intelligence on Academic Performance among Pupil under Secondary School Students of Paschim Medinipur District.

Students perceive AI as a valuable academic aid that enhances learning efficiency and personalization. The strong consensus on AI improving academic performance (Q1) contrasts with the more reserved views on its direct influence on exam scores (Q4), suggesting that students see AI as a learning support rather than a guaranteed exam booster.



The mixed responses to AI's role in understanding complex subjects (Q2) may reflect variability in AI tool quality, accessibility, or individual learning preferences. However, the unanimous absence of disagreement on personalized learning (Q6) underscores a broad appreciation for AI's adaptability to individual needs.

Motivation responses (Q3) reveal that AI does not universally inspire students, possibly due to differences in engagement or familiarity with AI technologies. Confidence levels (Q5) indicate that most students are comfortable using AI for academic tasks, although some reservations persist.

Students expressed strong optimism about AI's future role in education (Q10), highlighting a forward-looking acceptance of AI as integral to academic success. The high appreciation for AI's practical help with homework, feedback, and time management (Q7, Q8, Q9) reinforced the view of AI as a functional and supportive educational tool.

Overall, the data suggest that AI's greatest perceived value lies in personalized learning, formative feedback, and efficiency gains, whereas its motivational impact and direct exam benefits are less definitive.

Discussion

The analysis reveals that secondary school students in Paschim Medinipur District generally perceive artificial intelligence (AI) as a beneficial academic tool, particularly for enhancing learning efficiency and personalized education. There is strong consensus that AI improves overall academic performance, although students are more cautious about its direct impact on exam scores, suggesting that they view AI primarily as a supportive learning aid rather than a guaranteed means to higher exam results ([Hanshaw et al., 2024](#)).

Students recognize AI-based learning resources as helpful for understanding complex subjects; however, responses are mixed, indicating variability in AI tool effectiveness or accessibility. Personalized learning through AI is widely appreciated, with no disagreement, highlighting its value in catering to individual student needs.

The motivation to study when using AI is divided, suggesting that AI does not universally increase student engagement. Confidence in using AI for assignments is relatively high, although some students have expressed reservations. The future outlook on AI is strongly positive, with most students believing that AI will play a significant role in their academic success ([Sharma, 2024](#)).

Additionally, students value AI's practical benefits, such as aiding homework and project completion, providing feedback to identify and improve weaknesses, and saving time compared to traditional learning methods. Overall, AI's greatest perceived strengths lie in personalization, formative feedback, and efficiency gains, whereas its effects on motivation and direct exam performance remain less definitive.

V. Conclusion

The findings indicate that secondary school students in Paschim Medinipur District generally perceive artificial intelligence (AI) as a valuable academic support tool that enhances overall learning performance. Although there is strong agreement on AI's positive influence on academic work, students remain cautious about its direct impact on exam scores, suggesting that AI is primarily seen as an aid to learning rather than a guaranteed enhancer of formal assessment outcomes. AI-based learning resources are recognized for facilitating the comprehension of complex subjects; perceptions vary, reflecting differences in tool effectiveness or accessibility. Personalized learning through AI has received widespread appreciation, underscoring its importance in meeting individual student needs.

The motivational effects of AI use are mixed, indicating that AI does not uniformly increase student engagement; in contrast, confidence in utilizing AI applications for assignments is relatively high, albeit with some reservations. The future outlook on AI is strongly optimistic, with most students anticipating that AI will play a significant role in their academic success. Additionally, students value AI's practical benefits, including assistance with homework and projects, targeted feedback for academic improvement, and time-saving advantages compared to traditional methods.

Overall, AI's most pronounced strengths lie in personalization, formative feedback, and efficiency gains, whereas its influence on motivation and direct exam performance remains less definitive. These insights highlight the potential of AI to support tailored and effective learning experiences, suggesting avenues for further integration and development of AI tools in secondary education.

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