International Journal of Modern Education IJMOE
EISSN: 2637-0905
Volume 6 Issue 22 (September 2024) PP. 57-67
DOI: 10.35631/IJMOE.622005

INTERNATIONAL JOURNAL OF MODERN EDUCATION (IJMOE)
www.ijmoe.com

GLOBAL ACADEMIC EXCELLENCE

IMPACT OF USING ARTIFICIAL INTELLIGENCE TOWARDS ACADEMIC PERFORMANCE

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Article Info:

Article history:
Received date: 27.06.2024
Revised date: 15.07.2024
Accepted date: 28.07.2024
Published date: 15.09.2024

To cite this document:

Zakaria, A., Ahmad, S. S., Zainal, N. N., & Syed Ahmad Alhady, S. M. A. (2024) Impact Of Using Artificial Intelligence Towards Academic Performance. *International Journal of Modern Education, 6* (22), 57-67.

DOI: 10.35631/IJMOE.622005

Abstract:

Artificial intelligence (AI) is increasingly recognized as a transformative force in education It offers enhance learning experiences by enabling students to attempt complex problems through personalized learning, adaptive tools, and collaborative platforms. This study aims to investigate the impact of AI on academic performance among students at Universiti Teknologi Mara (UiTM) Kedah. The study examines various effects of AI, such as the delivery of smarter content, enhanced support and assistance, and improved attitudes towards learning and motivation, on students' academic outcomes. A total of 354 students participated in the study, providing data through self-administered questionnaires. Statistical analysis using SPSS revealed that three AI variables significantly influence students' academic performance. Consequently, educational institutions are encouraged to prioritize the integration of AI-powered learning solutions into their classroom activities, as this approach has the potential to revolutionize learning by providing smarter content, adaptive support, and improved motivation and attitudes towards learning.

Keywords:

Academic Performance, Artificial Intelligence, Attitude Improvement Smarter Content, Support And Assistance

International Journal of Modern Education
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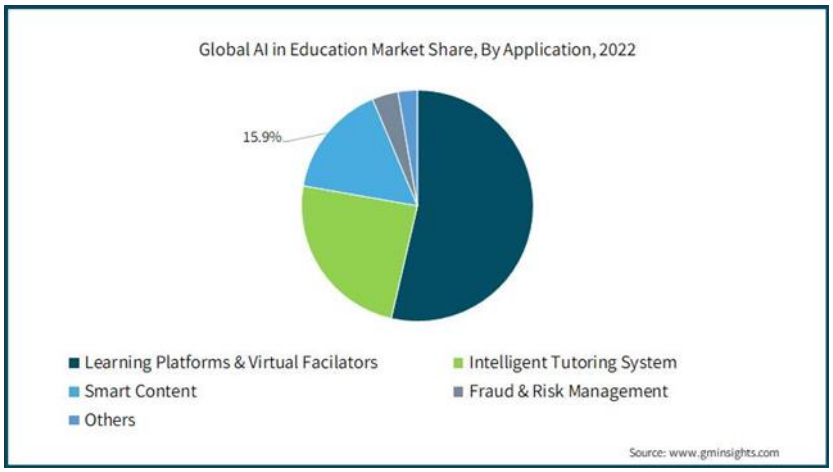
Introduction

Artificial Intelligence (AI) has acquired significant attention in educational settings due to the increased opportunities for communication which transpires between educators and students while utilizing virtual information assistants. The tendency of adjusting to new technological communities of interaction has given rise to a range of technologies that facilitate user-to-user communication. These include "virtual assistants," which simulate human intelligence through computer algorithms, giving users the impression that they are speaking with a real person. According to Yang (2021), "Artificial intelligence" (AI) is the term used to describe the said idea. Therefore, the current advancements in computational science and artificial intelligence are moving towards human-centered AI, which takes into account people's characteristics and environments to reduce potential biases in algorithm handling and processing. According to UNESCO (n.d.., 2023), there are three ways that artificial intelligence (AI) and education are related in 2019: learning with AI (using AI tools in the classroom), learning about AI (its technologies and methodologies), and preparing for AI (helping all citizens grasp the possible influence of AI on human life). Thus, artificial intelligence (AI) as a technology tool for education may offer creative ICT-based methodologies and approaches that enhance the teaching and learning process from both the teacher's and the student's point of view.

In today's rapidly evolving world, education and learning do benefits from artificial intelligence more and more, primarily due to technological advancements that indicate technology can improve learning outcomes. With the use of artificial intelligence technology, learning materials can be customized to meet the needs of each learner and enabling specific learning strategies they wanted (Alzahrani, 2023).



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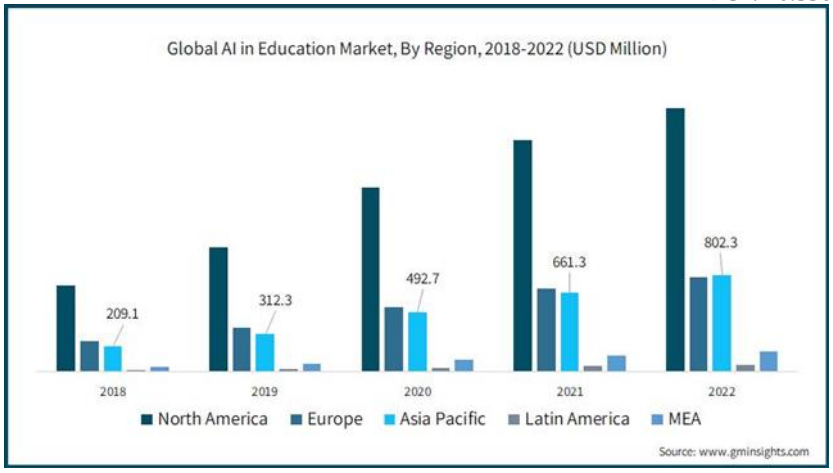

Source: Global Market Insights, 2023

The above statistic indicates the usage of artificial intelligence (AI) which shows an increase from 2018 to 2022 and mostly been used as a learning platform & virtual facilitator. Besides it also proves that Al is being used more frequently since it offers advanced and adaptable assessment methods (Global Market Insights., 2023) and artificial intelligence has the potential to improve student academic performance. Hence, this study, will look into the relationship between implication of artificial intelligence and its usage on student's performance, specifically focusing on the areas of smarter content delivery, support and assistance, attitude improvement towards learning and motivation enhancement.

According to Chaudhry, M., & Kazim, E. (2021), Artificial Intelligence Education (AIEd) will assist in determining each learner's areas of knowledge weakness, providing recommendations for content based on the findings, and later will provide detailed answers to issues raised. Furthermore, according to Ouyang et al., (2023), students, supported with the integrated AI and Learning Analytic (LA) techniques, will successfully write lengthy and will receive more helpful feedback comments This will eventually improve students learning effects and final performances. In addition, according to García-Martínez et al. (2023), Artificial Intelligence (AI) improves students' motivation and attitude towards learning, particularly in the fields of science, technology, engineering, and mathematics. Nevertheless, not many studies have been done on attitude improvement towards learning and motivation. Therefore, this study will identify whether attitudes improvement towards learning and motivation does have a significant impact on the student's academic performance.

Since academic performance is focal for a student's overall achievements, therefore the objective of this study is to (1) identify the relationship between smarter content and academic performance among UiTM Kedah students, (2) identify the relationship between provide support and assistance and academic performance among UiTM Kedah students, and (3) identify the relationship between attitude improvement towards learning and motivation and academic performances among UiTM Kedah students.

Academic Performance

Academic performance, as defined by Kamara, S. S., & Sundari Dadhabai., (2022) refers to their ability to evaluate students' abilities based on the attainment of specific objectives. According to Alshahrani, (2023), the data on the academic performance context was collected through the use of focus groups and an assessment of academic achievement. This inquiry

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involved analysing the conversations that students had with the chatbot. According to a study conducted by Alshahrani in 2023, students who engaged with the chatbot achieved much higher academic performance compared to those who communicated with the course instructor. Additionally, Alshahrani (2023) suggests that there may be a correlation between the frequency of interaction with the chatbot and the academic achievement of students. A comparison can be made between students who interacted with the chatbot more frequently and those who dealt with it less frequently.

In addition, Alshahrani (2023) has highlighted the efficacy of Intelligent Tutoring Systems (ITS) in providing students with pertinent knowledge, fostering their engagement, and improving their academic achievement, despite potential limitations in domain coverage. According to Ouyang et al. (2023), the use of Artificial Intelligence in Education (AIEd) can help predict academic performance. This is important because it allows us to identify students who are likely to fail, personalise learning paths for individual students to improve their learning outcomes, and optimise the design and development of instructional materials. Hence, scholars propose that the use of Artificial Intelligence (AI) can aid in eradicating barriers to student learning and enhancing educational capacity (Hwang, 2022).

Furthermore, unlike conventional computer technologies which follows a predetermined sequence without taking into account the individual's needs and knowledge, Artificial Intelligence (AI) analyses patterns of gathered information, such as student comprehension and mistakes, and makes informed decisions to offer subsequent tasks and optimise results (Paek, S., & Kim, N. , 2021). Furthermore, utilising a perpetual process of learning and analysis, Artificial Intelligence (AI) assesses the results of previous methods and formulates novel ones. Hence, it is probable that Artificial Intelligence (AI) will have a beneficial impact on students' academic performance, creative thinking talents, and problem-solving aptitude (Paek & Kim, 2021). In addition, artificial intelligence has the capacity to enhance academic performance through the provision of tailored learning experiences and immediate assistance to students. According to Martínez et al., (2023), academic performance is defined as an indicator of a student's capacity, which demonstrates the knowledge acquired by the student during their schooling.

Smarter Content, Support and Assistance, and Attitude Improvement Towards Learning and Motivation

Artificial Intelligence Education (AIEd) can assist in identifying the specific areas of knowledge in which each student is weak, offering content recommendations based on these discoveries, and delivering comprehensive solutions to challenging problems (Muhammad Ali Chaudhry et al., 2022). Consequently, the conventional educational paradigm, which focused on problem-solving and the transmission of knowledge, is undergoing a transformation towards a more innovative and integrative approach to education (Hwang, 2022) . The public education system, which adopted a collective-style approach throughout the industrialization era, is currently undergoing a shift towards a more personalised approach in the era of artificial intelligence. This transformation involves concurrent modifications in educational goals, curriculum, and teaching methods (Hwang, 2022). In addition, Alshahrani (2023) emphasises the utilisation of Learning Management Systems (LMS) or other web-based platforms to access online instructional materials, in accordance with the changing educational environment. These platforms facilitate independent learning, revision, or act as supplementary resources to conventional classroom instruction (Alshahrani, 2023). Online resources can be generated

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within the local learning management system (LMS) and sent to students, or professors can guide students to other platforms such as YouTube and other websites (Alshahrani, 2023).

Furthermore, as stated by Igbokwe (2023), Artificial Intelligence (AI) has had a substantial influence on education, resulting in improved efficiency and effectiveness in school administration and worldwide learning. It has enabled individualised and tailored learning, boosted the quality of content, and overall increased efficiency (Chan, 2023) .In addition, artificial intelligence models are utilised to construct a knowledge map that includes distinct learning elements such as expert knowledge, instructions for addressing common student errors, and explanations for resolving misunderstandings (Chen et al., 2020) Furthermore, as stated by Chen et al. (2020), the utilisation of chatbots and the incorporation of Artificial Intelligence (AI) enhance students' learning encounters by utilising machine learning algorithms to deliver tailored information that corresponds to individual students' learning needs and skills. By adopting a personalised approach, engagement is increased, and the students' individual skills are utilised, resulting in greater absorption and retention (Chen et al., 2020). In the context of an Exploratory Learning Environment (ELE), automatic feedback is essential for correcting learners' misconceptions in a constructive manner, as stated by Hwang (2022). This methodology promotes learner autonomy by engaging them in active knowledge construction through exploration and manipulation of items within the learning environment, rather than adhering to a strict, linear schedule. Exploratory Learning Environments (ELE) are characterised by their unconventional and unrestricted nature, enabling learners to freely investigate according to their own preferences (Chen et al., 2020).

Nevertheless, the implementation of Artificial Intelligence (AI) in education may give rise to concerns regarding human decision-making and the role of individuals in the learning process (Al-Tkhayneh et al., 2023). Concerns have been expressed over the security and privacy of the student data used to construct artificial intelligence algorithms (Al-Tkhayneh et al., 2023). Hence, in the context of employing Artificial Intelligence (AI), an individual's perception of their own proficiency, autonomy, and authority, along with their assessment of the system's effectiveness and user-friendliness, collectively influence their perception of how effortless it is to use (Gado et al., 2021). Therefore, despite the mentioned obstacles, Artificial Intelligence (AI) has the capacity to enhance accessibility and efficacy in education for all pupils (Gado et al., 2021). Ouyang et al. (2023) utilised Artificial Intelligence (AI) prediction models to gauge students' comprehension levels in relation to the challenges posed by the learning materials. In addition, the AI model is utilised to aid in determining the factors that lead students to abandon the pursuit of solving a certain problem, as well as assessing students' abilities to discover problem-solving approaches (Ouyang et al., 2023).

Additionally, Darvishi et al. (2022) developed a peer assessment system that combines Artificial Intelligence (AI) and Learning Analytics (LA) to improve its reliability. Their research shows that integrating an AI-assisted and analytical approach significantly enhances the accuracy of task assignments for instructors. Overall, the combination of AI and LA has the potential to transform how students learn (Darvishi et al., 2022). AI-integrated Learning Analytics strategies improve student learning by providing personalized feedback and support, resulting in increased effectiveness and efficiency. Consequently, AI can automatically record and analyze learners' psychological states during the learning process, while LA offers valuable feedback and recommendations from educators or practitioners regarding cognitive processes, social interactions, and emotional or metacognitive states (Ouyang et al., 2023). Moreover,

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within the realm of AI, the predominant forms used in education include the Intelligent Tutoring System (ITS), adaptive learning systems (ALS), and robotics (Hwang, 2022). In mathematics education, these AI forms have been extensively utilized to enhance teaching and learning outcomes (Hwang, 2022). The Intelligent Tutoring System (ITS) assesses individual students' mathematical understanding and preferences, providing personalized feedback and instruction at their preferred pace (Hwang, S., 2022).

Moreover, as stated by Chaudhry & Kazim (2021), teachers can allocate additional time towards delivering personalised student assistance and education by delegating administrative duties, grading, and data analysis to AI systems. Artificial intelligence (AI) is unable of fully substituting the vital role of instructors in providing personalised education, fostering social interaction, and offering emotional assistance to students (Kafai & Burke, 2020). Chiawa (2023) suggests that teachers can effectively enhance personalised education and support for a larger student population by leveraging Artificial Intelligence (AI) technologies as valuable resources. Artificial Intelligence (AI) is a potent instrument that can enhance student learning outcomes. Through the utilisation of Artificial Intelligence (AI), educators may gather, scrutinise, and decipher data, enabling them to acquire profound understandings of student learning and make well-informed choices regarding instruction and assistance. In addition, Artificial Intelligence (AI) systems possess the ability to analyse vast quantities of student data, tracking the progress of each individual student and pinpointing areas where additional assistance is needed (García-Martínez et al., 2023). Furthermore, as stated by Ahmad et al. (2023), Artificial Intelligence (AI) plays a crucial role in facilitating decision-making, aiding educators and learners in various tasks, and streamlining several processes.

Despite that, AI voice chatbots have been shown to help increase interaction and enhance language usage, which assist students to communicate more effectively in English language. This shows that, chatbots do increase students' motivation, self-assurance, and willingness to learn English (Wang et al., 2023). Besides, research consistently shows that personalised learning promotes efficient and effective learning results. When specific areas of difficulty are addressed and individual learning styles are taken into consideration, students are more likely to participate, retain information, and succeed academically. In order to create learning environments that encourage students to participate actively in their education, educators must be aware of the possible detrimental impacts of artificial intelligence (AI) on students' motivation, according to Ahmad et al., 2023). It is likely that instructors and students may become more dependent on AI systems and get disinterested in learning new skills or methods. This might lead to a decline in educational standards and a lack of interpersonal development (Ahmad et al., 2023).

In addition, Chatbots like ChatGPT allow users to get instant feedback and assistance, which is a huge advantage for educators. This may lead to an increase in student motivation, retention rates, and engagement (Ahmad et al., 2023). Ahmad et al. (2023) claim that when students have access to ChatGPT's interactive and conversational elements, which improve the learning experience, they are more motivated to actively participate in their learning. This connection may lead to better learning outcomes and increased knowledge of the subject matter. Signs of AI's effect include better learning outcomes, time and money savings, and universal access to high-quality education, among other benefits. Intelligent tutoring programmes and individualised learning can improve students' learning outcomes, especially for students from disadvantaged backgrounds. Because of artificial intelligence's global reach and scalability,

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students in both wealthy and poor nations will be able to benefit from enhanced learning experiences (Kamalov F, 2023)

From the literature and findings discussed above, the theoretical framework in Figure 2 was developed. The constructs consist of three independent variables which are smarter content, support and assistance, and improvement towards learning and motivation. And one dependent variable which is the focal of this research is academic performance.

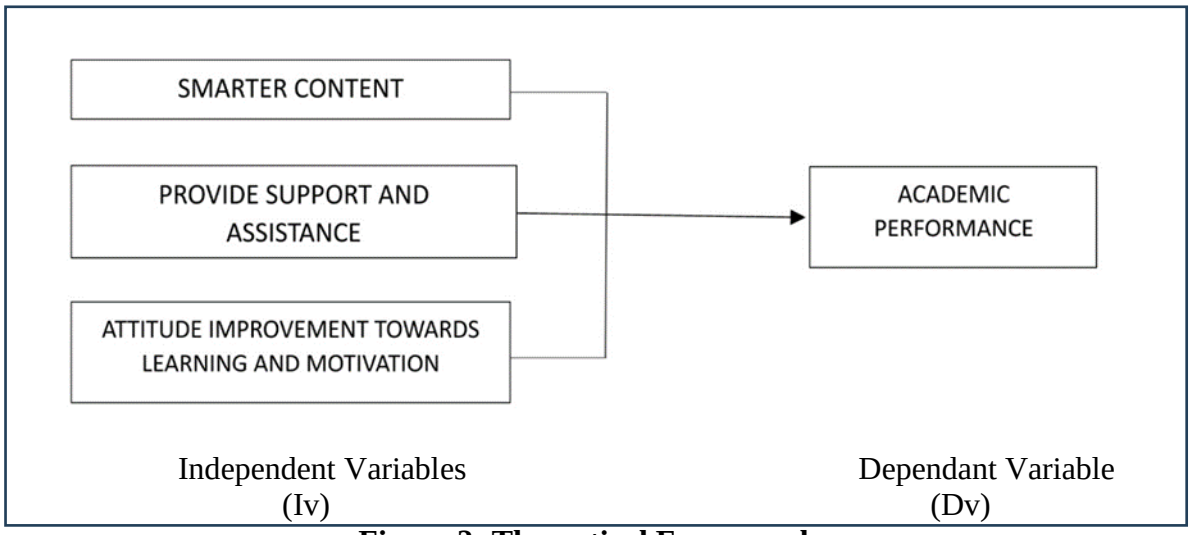

Figure 2: Theoretical Framework

Data Collection and Analysis Method

This research was carried out with students from UiTM Kedah as participants, as time and budget constraints prevented a wider selection.

The data were collected from 354 students from a total population of 4500 degree students of UiTM Kedah. The number is based on the table of Krejcie, & Morgan, (1970). Convenience sampling was employed for this quantitative investigation and as the sample approach to collect the data. Individual analysis was the unit of analysis, and students participated in the data collection as themselves. Data was collected in the month of October and November 2023.

This study used a quantitative approach with a descriptive research methodology. A descriptive research study was chosen as the research strategy because it allows researchers to give an overview of the phenomenon of interest or to highlight relevant aspects of it from a variety of viewpoints, including academic, organisational, and personal ones. A cross-sectional survey was carried out on intelligent content, support and help, and attitude improvement towards learning and motivation. This relates to how improved learning and motivational attitudes, supportive and helpful environments, and more intelligent content affect students' academic success.

The statistical software package SPS, version 26.0, was used to examine the data for this investigation. In order to assess the quality of the data for this study, the researcher used multiple regression analysis, frequency analysis, correlation analysis, and reliability analysis to examine the effects of each factor on academic performance, the dependent variable.

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Results and Discussion

Frequency Analysis

There were 354 number of respondents in this sample that is gathered for data analysis. According to the respondents' demographic information on gender, the sample consisted of more women (83.7%) than men (16.3%). The majority of the respondents consisting of 30.9%, were in the age of 22 years old, and 18.7% were in the 21 years old, according to the age factor. The outcomes differ across all categories in terms of semesters. According to the data, the respondents with a cumulative grade point average (CGPA) of 3.1–3.5 represent over half of the total respondents, or 52.8%.

Reliability Analysis

The reliability analysis was conducted using Cronbach Alpha to determine the internal consistency of the item evaluating the variables with subjective measures. The Cronbach Alpha was used to examine the reliability of the item variable of this study which are Smarter Content, Support and Assistance, Attitude Improvement Towards Learning and Motivation and Academic Performance.

Table 1 indicate reliability analysis results and all of the Cronbach Alpha values was greater than 0.7, indicating that the overall measure was acceptable. Therefore, each item for this variable is preserved.

Table 1: Reliability Analysis

Variable	Total Items	Items Deleted	Cronbach's Alpha
Smarter Content	6	None	0.897
Support Assistance	6	None	0.839
Learning Motivation	6	None	0.885
Academic Performance	6	None	0.902

Table 2: Multiple Regression Analysis

Model	Standardized Coefficients Beta	Sig.
Smarter Content	0.468	0.001
Support Assistance	0.049	0.596
Learning Motivation	0.393	0.001

Dependent Variable: Academic Performance
R^2 = 72.3%
Sig: 0.00

The results of the multiple regression analysis are shown in Table 2. To determine whether there is a significant correlation between the variables of PBL influencing the academic performance, a multiple regression analysis was carried out. The R^2 score of 72.3% indicates that independent variables have a higher potential to explain dependent variables (academic performance). Additionally, this study emphasized how the independent variables of smarter

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content, support and assistance and learning motivation have a big impact on how students' academic performance. Smarter content is the most important independent variable influencing academic performance, according to the highest standardized beta value of 0.468. Table 3 shows the summary of hypotheses and its results.

Table 3: Summary of Hypotheses

Hypothesis		Result
H_1:	There is a relationship between smarter content and academic performance of students.	Accepted
H_2:	There is a relationship between provide support and assistance and academic performance of students.	Accepted
H_3:	There is a relationship between attitude improvement towards learning and motivation and academic performance of students.	Accepted

Discussion and Conclusion

The empirical evidence from the present study identified that three independent variables which are smarter content, support and assistance and attitude improvement towards learning improvement towards learning and motivation contributes to academic performance. This demonstrates that each independent variable has significant statistical influence on the dependent variable, which is academic performance. Thus, the results are consistent with the previous research conducted by Chaundry & Kazim (2021), Alshahrani (2023), Ouyang et. al (2023), and Hwang (2022).

The first independent variable is the smarter content. The study's findings demonstrate an association between the smarter content derived from Artificial Intelligence (AI) and academic success. This demonstrates the statistical efficacy of intellectually superior material about academic achievement. Thus, these findings validate the previous research conducted by Chaundry & Kazim (2021), which asserts that Artificial Intelligence Education (AIEd) can assist in identifying learners' specific areas of knowledge deficiency, offering content recommendations based on these findings, and providing comprehensive solutions to challenging problems. In addition, these current findings are consistent with the study conducted by Alshahrani (2023), which highlights the effectiveness of Chat GPT, an Artificial Intelligence platform, in content creation and assisting students.

The second independent variable utilised in this study is the support and assistance. Hence, the research findings indicate a significant association between the support and assistance offered by Artificial Intelligence (AI) and students' academic achievement, demonstrating a strong statistical power. In addition, these findings are consistent with the study conducted by Ouyang et al. (2023), which found that Artificial Intelligence (AI) models were employed to assess students' comprehension levels in relation to the challenges posed by learning materials. Furthermore, AI was utilised to identify the factors leading to student disengagement with specific problems, as well as to evaluate students' problem-solving abilities. Besides, these findings are consistent with the research conducted by Darvishi et al. (2022), which utilised Artificial Intelligence (AI) to enhance the precision of instructional tasks through the integration of AI-assisted and analytical methodologies. Therefore, it is evident that Artificial Intelligence (AI) offers aid and support to academic achievement, particularly among students. The final independent variable is the improvement of attitude towards learning and motivation. Consequently, the results indicate a correlation between the enhancement of attitudes towards

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learning and motivation. This implies that there is a significant relationship between the improvement of attitudes towards learning and motivation towards academic achievement. This finding is consistent with a previous study conducted by Hwang (2022) which asserts that the utilisation of Artificial Intelligence (AI) enhances students' focus and motivation in mathematics education. AI fosters a favourable disposition towards mathematics and encourages active engagement in the learning process. In addition, this study is consistent with the research conducted by Lin, Y., & Yu, Z., (2023), which emphasises that students have the ability to engage in interactive dialogues with Artificial Intelligence (AI), hence enhancing the entertainment value and dynamism of the learning process.

With that, the study would shed light and provide a general rule to better understand the impact of artificial intelligence towards learning and motivation that affects the academic performance of students at Universiti Teknologi MARA (UiTM) Kedah.

Acknowledgement
Thank you to the team Nurul Izati, Nur Amirah, Siti Rajihah, Nurul Shafiqah and Muhammad Yaqub for conducting the data collection stage, literature review search and analyses. The effort and time dedicated in completing this paper is greatly appreciated.

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