Investigating the Impact of AI-powered Learning Tools on Academic Performance and Attitudes towards AI among College of Education Students

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Abstract

This study investigated the influence of integrating the AI-driven tool, Magic School AI, on the teaching practices of the TECH 329 courses within the College of Education at Kuwait University. Specifically, the primary objectives were to enhance perceptions of AI's usefulness and ease of use, evaluate the impact of AI learning tools on academic   performance. Furthermore, the study sought to understand the relationships between   these variables and to determine whether perceived usefulness and ease of use of AI could predict positive attitudes toward AI. A quasi-experimental one-treatment group design was utilized, using a sample comprising 66 female students enrolled in the College of Education at Kuwait University. The findings indicated a significant impact of the AI-empowered tool (Magic School AI) on all dependent variables. Specifically, the perceived usefulness of AI and the ease of use of AI were significant predictors of positive attitudes toward AI. Students' perceptions of the impact of AI tools on their course performance were notably positive based on the mean scores. Therefore, the AI-empowered tool (Magic School AI) has a significant impact on all dependent variables. For practitioners, it is recommended to evaluate the alignment of AI tools with course objectives, consider the pedagogical implications of AI tools to explore how AI tools can enhance student engagement, motivation, and critical thinking skills, and consider different pedagogical approaches that can leverage AI tools effectively, such as personalized learning, adaptive learning, or intelligent tutoring systems.

Keywords: AI-powered Tools, Attitudes towards AI, Academic Performance, Perceived usefulness, Perceived ease of use.

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فاعلية أدوات التعلم المدعومة بالذكاء الاصطناعي على الأداء الأكاديمي بين طلاب كلية التربية

د.أميمة عيد السويحل

المستخلص

هدفت هذه الدراسة إلى التحقق من مدى فاعلية استخدام الأدوات المدعومة بالذكاء الاصطناعي، وتحديداً Magic School AI على ممارسات التدريس في مقررات TECH 329 في كلية التربية بجامعة الكويت. كما هدفت الدراسة إلى تعزيز تصورات فائدة الذكاء الاصطناعي وسهولة استخدامه، وتقييم فاعلية أدوات التعلم بالذكاء الاصطناعي على الأداء الأكاديمي. واستخدمت الدراسة المنهج شبه التجريبي لمجموعة تجريبية واحدة بعينة تكونت من 66 طالبة مسجلة في مقرر TECH 329 في كلية التربية بجامعة الكويت. وأشارت النتائج إلى وجود تأثير كبير للأداة المدعومة بالذكاء الاصطناعي (Magic School AI) على جميع المتغيرات. كما أظهرت النتائج تأثير أدوات الذكاء الاصطناعي الإيجابي على أداء الطلبة في المقررات بناءً على متوسط الدرجات. وتوصي الدراسة بقيام التربويين بتقييم مدى توافق أدوات الذكاء الاصطناعي مع أهداف المقررات الدراسية، والنظر في الآثار التربوية لها لاكتشاف كيفية تعزيز مشاركة الطلاب وتحفيزهم وتقوية مهارات التفكير النقدي لديهم، والنظر في مختلف المناهج التربوية التي يمكنها الاستفادة من أدوات الذكاء الاصطناعي بفعالية، مثل التعلم الشخصي، والتعلم التكيفي، وأنظمة التدريس الذكي.

الكلمات المفتاحية: الأدوات المدعومة بالذكاء الاصطناعي، الأداء الأكاديمي، الفائدة المتصورة، سهولة الاستخدام.

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Introduction

Using technology in learning is an enriching experience. Modern technology has the potential to provide individualised teaching aids in the field of Education in general and particularly in learning, teaching, and assessment (Kashive et al., 2021). The massive amounts of learning materials stored on the internet would be worthwhile if we teach students the habits of reading and how to digest information included in these sources in a critical manner and in doing so, quality education is guaranteed (Kumar, 2023). Using technology captures the significant benefits of integrating technology into education. It emphasizes the potential for personalized learning and improved teaching methods, which are crucial for modern educational practices. Additionally, the emphasis on developing students' critical reading skills is particularly important. By fostering these habits, students can better navigate and evaluate the vast amount of information available online, ensuring that the use of technology truly enhances the quality of education.

Introducing AI in education offers both short-term and long-term advantages (Kumar, 2023). AI solutions offer a new range of possibilities for teaching and learning in higher education. Nevertheless, it is essential to acknowledge the current limitations of technology and recognize that AI is not yet capable of replacing teachers, but it does offer a genuine opportunity to enhance their roles (Popenici & Kerr, 2017). While AI technology has made significant strides, it is not yet advanced enough to replace the nuanced and multifaceted role of teachers. However, AI does present a valuable opportunity to augment and enhance the educational experience. By leveraging AI, teachers can access tools that support personalized learning, streamline administrative tasks, and provide data-driven insights into student performance. This allows educators to focus more on the human aspects of teaching, such as fostering critical thinking, creativity, and emotional intelligence, ultimately enriching the overall learning environment.

The term AI was first coined by John McCarthy, a computer scientist in 1955. He organised the first Artificial Intelligence conference in 1956. AI is a sophisticated intelligent computerized system capable of making decisions and executing tasks typically handled by humans. Artificial intelligence is changing our world (Ukani, 2023). and its rapid use and expansion of Artificial intelligence (AI) in the domains of daily life and world of jobs is indisputable (Olhede & Wolfe, 2018; Schepman & Rodway, 2020). The rapid adoption

and expansion of AI technologies are transforming various sectors, from healthcare and education to finance and manufacturing. AI's ability to automate tasks, analyze vast amounts of data, and provide intelligent solutions is revolutionizing how we work and live. While the benefits are undeniable, it is also crucial to address the challenges and ethical considerations that come with AI's widespread use. Ensuring responsible development and deployment of AI will be key to maximizing its positive impact on society. AI focuses on enhancing machine intelligence to enable it to operate effectively and foreseeably within its surroundings (Nilsson, 2010). As a result, it alleviates our workload by automating routine processes and ordinary activities (Anderson, 2019). This allows us to dedicate more time and energy to complex problem-solving and creative endeavors, ultimately driving innovation and progress.

Integrating AI into education has exploded in the past decade (Blikstein, 2018). "Students are more interested in learning when it involves technology" (Anderson, 2019, p. 55). Therefore, numerous recent studies (Grájeda, et al., 2023; Khalaf, 2024; Kelly et al., 2023) emphasised the importance of promoting the utilization of beneficial AI-driven learning opportunities, among university students for their academic pursuits.

AI is the cutting-edge technology of the next few years because of its capacity to enhance human potential with less cost (Kelly et al., 2023; Liu, 2017). According to (Grájeda, et al., 2023), it is crucial for educators and students to not only be skilled in utilizing AI tools but also to incorporate them into educational practices. AI has no longer seen as a mere technological innovation, but rather it serves as an effective method for instruction.

Relatedly, in educational institutions, AI has demonstrated adequate effectiveness in teaching and learning processes from primary schooling to university education level. Basically, it has the capability to provide personalized learning experience, digitize administrative complex tasks, and provide predictive analysis of big data (Grájeda, et al., 2023). This transformative potential not only enhances educational outcomes but also streamlines operations, allowing educators to focus more on student engagement and innovative teaching methods.

As a result, AI-driven learning tools will be the prevailing technique soon. However, AI cannot replace human contact (Kelly et al., 2023). According to (Anderson,

2019), human teachers cannot be fully replaced by AI virtual assistants or tools, but rather these AI-empowered tools will provide invaluable extension to enable teachers work more properly and efficiently to maximize students' learning opportunities and achieve intended learning outcomes.

Numerous studies explored the impact of artificial intelligence on teaching and learning in higher education and found that the use of AI tools requires a reconsideration of instructors' role and pedagogies in higher education (Popenici & Kerr, 2017; Grájeda, et al., 2023; Khalaf, 2024; Kumar, 2023). Vargas-Murillo et al. (2023) reviewed the existing literature on the use, impact, opportunities, and challenges of AI tools (ChatGPT) in higher education, discovering that they could potentially improve academic processes. However, it is crucial to reevaluate the ethical implications of harnessing AI tools in educational purposes.

On the opposite flip side, people held mixed general attitudes towards artificial intelligence because participants advocated slightly positive views on the enthusiasm and perceived utility of AI (Schepman & Rodway, 2020). Although AI tools offer unique opportunities and numerous advantages in the field of education, they also involve some difficulties and challenges (Popenici & Kerr, 2017). AI tools might present some challenges which, in some cases, hinder students from developing their critical thinking skills (Vargas-Murillo et al., 2023). AI tools might increase the incidence of plagiarism and Aigiraism (i.e., plagiarism using AI tools) in universities (Khalaf, 2024). Accordingly, to sustain academic honesty, the proper and responsible application of AI-empowered learning tools in higher education must be carefully evaluated (Vargas-Murillo et al., 2023). This includes continuous monitoring to ensure these tools are used ethically and effectively, fostering a learning environment that upholds integrity and promotes genuine academic growth.

Definitions:

- AI-powered learning refers to the use of artificial intelligence technologies to enhance educational experiences by providing personalized learning paths, real-time feedback, adaptive assessments, and intelligent tutoring systems (Crompton & Burke, 2023, p. 92).
- Attitude is defined as "psychological tendency, expressed by evaluating a particular entity with some degree of favor or disfavor" (Eagly & Chaiken, 1993).

- Perceived Usefulness is defined as the degree to which a person believes that using a particular technology will enhance their job performance (Davis, 1989).

- Perceived ease of use is defined as the degree to which a person believes that using a particular technology will be free of effort (Davis, 1989).

- Academic performance of students can be defined as "the knowledge gained by the student which is assessed by marks by a teacher and/or educational goals set by students and teachers to be achieved over a specified period of time" (Kumar, Agarwal, & Agarwal, 2021, p. 3092).

Research Problem:

While AI tools represent significant technological progress in the field of education and smart learning, there remains a polarizing debate among researchers about their benefits (Vargas-Murillo et al., 2023). This study aims to investigate this gap by examining the perceived impact of AI-powered learning tools on the performance of the TECH 329 courses and attitudes towards AI before and after the implementation of Magic School AI. Additionally, the study will explore the utility of perceived usefulness and ease of use of AI in predicting positive attitudes towards AI.

The integration of AI-empowered learning tools in educational settings, specifically within the College of Education, presents a unique opportunity to enhance student performance. However, there is a need to systematically investigate the impact of these tools on student outcomes, the differences in learning constructs before and after their implementation, and the relationships between these constructs. Understanding the predictors of positive attitudes towards AI, such as perceived usefulness and ease of use, is crucial for successful adoption and implementation. This study aims to address these gaps by examining the effects of AI tools on student performance, changes in learning constructs, correlations among these constructs, and factors influencing positive attitudes towards AI in education.

Literature REVIEW

According to the robust theory presented in technology acceptance model (TAM) presented by (Davis, 1989), the factors influencing an individual's motivation to adopt a new technology or shift to an alternative one depends mainly on their perception of its benefits and whether they consider it worthwhile to invest time in

learning it or not (Sadriwala & Sadriwala, 2022). TAM posits that two primary factors influence an individual's decision to use a technology: perceived usefulness and perceived ease of use. These factors, in turn, affect the user's attitude towards using the technology and their behavioral intention to use it.

AI-powered Learning Tools

AI tools and products are widespread and integrated into daily life activities (Brill et al., 2019; Manoharan, 2019; Johnson et al., 2021; Hong et al., 2021). Basically, there are three major paradigms identifying the students' interaction with Artificial Intelligence in Educational settings: (a) AI-directed, learner-as-recipient, (b) AI-supported, learner-as-collaborator, and (c) AI-empowered, learner-as-leader (Ouyang & Jiao, 2021).

According to (Ouyang & Jiao, 2021), in AI-empowered learning paradigm, learner acts as a leader. Students actively engage and take control of their learning. It enables students to reflect on their learning experiences and provide feedback to AI systems for adaptation, leading to a cyclical enhancement of learner-centred education.

Introducing AI-empowered learning technologies can create student-centred teaching-learning environments and processes. AI-empowered learning tools are different from AI-supported learning as the former involves the collaboration of both teachers and learners while in the latter students learn with the help of AI machine collaboration. In the AI-empowered learning environment, teachers provide authentic feedback and practical advice. In AI-supported learning, students can direct the machine to adjust the difficulty level, creating an optimal personalized and customized learning experience for the student (Kumar, 2023).

The overall aim of incorporating AI in education is to boost learner agency and personalization (Ouyang & Jiao, 2021). Yet, the integration of AI technologies in Education grows slowly due to the shortage of resources and lack of evidence for its effectiveness (Grájeda et al., 2024).

The future of education depends on the collaborative coexistence of human intellectuality and artificial intelligence (León and Viña, 2017). The incorporation of Artificial Intelligence in education improves educational effectiveness (Grájeda et al., 2024) because it reshapes higher education via tailoring individualized learning

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experiences to meet the individual differences in students' styles of learning (Ocaña-Fernández et al., 2019).

Prior research has highlighted the difficulty of integrating technology into teaching and learning. It is, thus, essential to address the factors associated with and contributing to teachers' acceptance to adopt emerging technologies in education settings (Geng et al., 2021; An et al., 2022).

ATTITUDES TOWARDS AI

The swift development of AI tools and applications has heightened the necessity for assessing public attitudes towards AI to facilitate research and practice in AI filed (Grassini, 2023). Assessing public attitudes and perceptions towards AI tools is vital for regulating their development, and responsible adoption and reasonable use (Araujo et al., 2020; Grassini, 2023; O'Shaughnessy et al., 2022).

Attitudes and skills towards modern technological advancements like AI-empowered tools are key factor in shaping digital literacy of students. These dispositions are required to enable students use these tools productively and ethically (Grájeda et al., 2024). Digital literacy and critical media literacy are crucial in today's digital age (Desjardins et al., 2023). In this essence, it is necessary to maintain ethical considerations during the integration of AI tools in education (García et al., 2020; Memarian & Doleck, 2023; Shehata et al., 2023). Unfortunately, positive attitudes towards plagiarism positively associated with positive attitudes towards aigiarism (plagiarism using AI-generative tools) in university students (Khalaf, 2024).

It is well-documented in Psychology that the attitude consists of three components: behavioural, cognitive and affective. Attitude is simple terms is defined as"psychological tendency, expressed by evaluating a particular entity with some degree of favor or disfavor" (Eagly & Chaiken, 1993). Empirical research examining the behavioural intentions towards using AI is scarce (Duan et al., 2019; Dwivedi et al., 2021; Cao et al., 2021). Relatedly, the Unified Theory of Acceptance and Use of Technology (UTAUT) was extensively used in research to interpret the behavioural intentions of individuals to use AI-empowered technology in learning and teaching (Venkatesh et al., 2003; An et al., 2022). There is very limited empirical research focusing on

understanding managers' behavioural intentions towards using AI from a human centered perspective (Duan et al., 2019; Dwivedi et al., 2021)

Until recently emotional aspects in human learning were not considered when designing AI applications and tools (Moridis, 2011; Reindl, 2021). Reindl (2021) concluded that emotion-based enhancements in AI-based learning environments show great potential, but they face a significant challenge: delivering suitable responses to the emotions identified. Emotional aspect in AI applications is not less important the cognitive aspect. Since more than a decade ago, Moridis (2011) investigated the affective artificial intelligence in education and concluded that creating an intelligent agent that can recognize, and express emotions has long been viewed as a significant challenge for AI researchers. Relatedly, Kim et al. (2018) proposed a technological and operational emotionally aware AI smart classroom that delivers automated real-time and adaptive emotional AI feedback in educational setting.

Concerning the behavioural component of Attitudes towards AI-based tools in teaching English, An et al. (2022) investigated EFL teachers' behavioural intention to use AI-supported language learning in middle school in China. Findings indicated a positive association between the seven factors of AI-TPACK (AI- Technological Pedagogical and Content Knowledge) and the teachers' Behavioural Intentions to use AI-empowered tools in English education.

Magic school AI

The magic school AI is one of the advanced learning platforms. The mission of the magic school AI is to reduce the teacher's burnout that they face in their daily lives through crafting more than 50 tools to resolve the problems encountered by the teachers. It is intended to help teachers in a plethora of tasks such as lesson planning, individualized learning, communicating with parents, drafting reports, and customizing learning experiences according to the diverse learners. In brief, the magic school AI increases enjoyment in teaching, save time and effort, and boost overall teaching experience via presenting practical solutions of instructional problems (Desjardins et al., 2023).

The magic school AI platform was used in this study owing to the diverse features and options that it provides. Take for example, it offers personalized learning experiences and interactive lessons with corrective and instructive guidelines.

The platform itself is so easy to use and follow up. It assists learners via its AI tutoring assistants and lesson planning. It also has the service of communicating messages and announcements which help learners to receive instant and immediate feedback. To support educators, Magic School offers more than 80 AI-powered tools for tasks such as lesson planning, assessments, and the creation of individualized education plans (Magic School, 2025). Moreover, it ensures educators are well-prepared by providing comprehensive training resources, including certification courses and video tutorials for effective platform use.

Research Questions

1. What is the impact of using AI-empowered learning tools on the performance of the TECH 329 courses?
2. Are there significant differences between the pretest and post-test of the study constructs before and after implementing the Magic school AI in teaching the TECH 329 courses?
3. Are there significant correlations between the study constructs?
4. Are usefulness of AI and ease of use of AI significant predictors of positive attitudes towards AI?

Method

Quasi-experimental methods using one-treatment group design was utilized in the present study to examine how the utilization of AI-driven tools, specifically Magic School AI, influences various aspects related to the teaching of the TECH 329 courses within the College of Education at Kuwait University. A single group of participants who are enrolled in TECH 329 courses will be assessed before and after the implementation of the intervention. This pre-test/post-test approach within one group allows for the examination of changes following exposure to the treatment.

PARTICIPANTS

The research used a sample comprising 66 female students enrolled in the College of Education at Kuwait University. Among them, 21 students were studying science majors, while 45 were enrolled in humanities divisions. The participants' ages ranged from 20 to 31 years, with a mean age of 23.64 and a standard deviation of 6.35.

Their GPAs varied between 2.31 and 3.92, with a mean score of 3.28 and a standard deviation of 0.39.

Questionnaire:

The questionnaire was designed to gather data on the impact of AI-powered learning tools on academic performance and attitudes towards AI among College of Education students. It was chosen for its ability to efficiently collect information from students enrolled in three TECH 329 courses. The questions were formulated based on the Technology Acceptance Model (TAM).

The questionnaire was distributed online to participants based on their enrolment in the TECH 329 course. It consists of six sections:

1. Participation Agreement: obtain consent from participants.

2. General Information: Collect demographic data (age, gender, GPA, academic year).

3. Perceived Usefulness (16 questions)

4. Perceived Ease of Use (21 questions)

5. Student Attitudes Toward AI (26 questions)

6. Impact of AI on Academic Performance (11 questions).

PROCEDURE:

THE PROCEDURE INVOLVED THE FOLLOWING STEPS FOR THE TREATMENT GROUP:

1. Pre-Test Administration: Participants completed a questionnaire assessing their baseline levels of perceived usefulness, perceived ease of use, positive attitudes towards AI, negative attitudes towards AI, cognitive component of AI, affective component of AI, behavioural component of AI, and impact of AI on academic performance.

2. Intervention Implementation: Following the pre-test, the participants engaged in the intervention, which consisted of an eight-week period where they were introduced to the AI tools of the 'Magic School' AI model and actively used them in assigned tasks related to assisting learners with lesson planning and affective component of AI. Magic

School AI tools prepare TECH 329 students to become teachers by providing them with resources for lesson planning, assessment creation, and classroom management. These tools enhance their ability to design engaging and effective lessons, fostering creativity and critical thinking. Additionally, TECH 329 students will learn to use AI tools to differentiate instruction and meet diverse learner needs, which is crucial for modern classrooms. By integrating these tools into the TECH 329 course, students are better equipped to utilize AI in their teaching practices, improving educational outcomes and academic achievements.

3. Post-Test Administration: Upon completion of the intervention period, the same participants completed the same questionnaire to assess their levels of perceived usefulness, perceived ease of use, positive attitudes towards AI, negative attitudes towards AI, cognitive component of AI, affective component of AI, behavioral component of AI, and impact of AI on academic performance after their experience with the 'Magic School' AI model.

MEASURES

Perceived usefulness and perceived ease of use (Davis, 1989)

Perceived usefulness means to what extent people believe that modern technology will help them achieve their jobs better. Perceived ease of use means that this technology does not require to exert a great effort to use and adopt. The perceived usefulness and perceived ease of use are thought to be two fundamental determinants of technology use, adoption, and acceptance (Davis, 1989). Although the model of the technology acceptance theory is grounded in two main variables: perceived usefulness and perceived ease of use, the relationship between perceived usefulness and perceived ease of use of Artificial Intelligence has not been investigated much in the past (Sadriwala & Sadriwala, 2022). This measure was developed and validated to assess the perceived usefulness, perceived ease of use, and user acceptance of information technology. It was intended to measure and predict user acceptance and usage of modern technology. It was validated using 152 participants. Internal consistency reliability was .98 for the perceived usefulness (6 items), and .94 for the perceived ease of use (6 items). The scale showed adequate factorial, discriminant, and convergent validity using multitrait-multimethod (MTMM) analysis. The items of this measure were reworded using the term AI instead of technology to suit the aims of the current study because the original scale focused mainly

on the measurement of people's acceptance of technology. It has 7-point Likert scale ranging from extremely likely to extremely unlikely.

AI Attitude scale (AIAS) (Grassini, 2023)

The general attitudes towards AI were assessed using the brief self-report questionnaire consisting of 4 items developed by (Grassini, 2023). It explores users' public perceptions of AI technology and people's perspectives on the perceived utility of AI and how AI impacts people's lives, jobs, and humanity. The structural validity of the AIAS was verified using exploratory and confirmatory factor analysis. Cronbach's Alpha reliability was .830 and MacDonald's Omega was .860. The AIAS was adopted because it was easy and quick to administer. It is a 10-point Likert scale ranging from Not at all = 1 to Completely Agree = 10.

The general attitudes towards artificial intelligence Scale (GAAIS) (Schepman & Rodway, 2020)

This scale comprised to assess the general attitudes towards artificial intelligence. It consisted of 21 items measuring two factors: positive attitudes towards AI and negative attitudes towards AI. Exploratory Factor Analysis resulted in two positive and negative subscales. The overall scale exhibited high convergent and discriminant validity. Item 13 was used as an attention check. Internal consistency reliability using Cronbach's Alpha showed that positive attitudes towards AI ($\alpha = 0.88$) and negative attitudes towards AI ($\alpha = 0.83$). The responses should not be merged into an overall composite scale score; therefore, the two subscales were treated separately. The items with negative wording are 3, 6, 8, 9, 10, 15, 19.

Students' attitudes towards AI scale (Suh & Ahn, 2022)

Students' attitudes towards AI scale consisted of 26 items measuring student attitudes toward artificial intelligence. It was selected because it has three components: cognitive, affective, and behavioural components. The behavioural component reflected the actual use of AI tools. This subscale manifests the behavioural intentions and current usages of AI tools. It uses a five-point Likert scale ranging from strongly agree to strongly disagree. The cognitive component of AI attitudes included items (1-4), the affective component items (5–14), and the behavioural component, items (15–26).

MEASURING THE IMPACT OF AI ON ACADEMIC PERFORMANCE

To measure the impact of AI on academic performance in TECH 329 courses, the questionnaire included 11 items. The questionnaire will assess various dimensions such as how AI-empowered tools help with improving the understanding of difficult concepts, changing study habits and learning strategies, and enhancing creativity and critical thinking skills. Data on students' grades, project outcomes, and overall performance will be collected before and after the implementation of AI tools. Statistical analysis will be conducted to compare pre- and post-implementation results, highlighting improvements in academic performance. Additionally, qualitative feedback will be gathered to understand how AI tools have enhanced students' learning experiences and project quality, providing a comprehensive view of the impact on their academic achievements. It is worth noting that course performance was assessed by the final exam in Spring 2024 semester of the course titled "instructional media and technology" (TECH 329). Students' scores on a pretest and the final test were used to explore the effectiveness of instruction via the Magic school AI on improving students' performance in the assigned courses.

Reliability of Measures

Table(1) Alpha and Omega reliability, standard errors, and confidence intervals

Measures	Coefficient	items	Value	SE	95% CI. Lower	CI. Upper
Perceived usefulness of AI	Alpha	6	.928	.027	.852	.960
	Omega		.930	.028	.853	.962
Perceived ease of use of AI	Alpha	6	.941	.017	.896	.963
	Omega		.942	.018	.896	.966
Positive attitudes towards AI	Alpha	12	.911	.025	.848	.945
	Omega		.915	.026	.847	.952
Negative attitudes towards AI	Alpha	8	.910	.028	.835	.942
	Omega		.909	.031	.823	.944
General attitude towards AI	Alpha	4	.729	.059	.588	.821
	Omega		.850	.034	.769	.897
Cognitive component of AI	Alpha	4	.975	.016	.915	.974
	Omega		.958	.016	.918	.975
Affective component of AI	Alpha	10	.926	.018	.879	.951
	Omega		.927	.017	.883	.950
Behavioral component of AI	Alpha	12	.931	.013	.897	.951
	Omega		.929	.015	.893	.950
AI-APQ	Alpha	11	.943	.014	.907	.963
	Omega		.944	.015	.904	.963

Note. SE = standard error, CI = confidence intervals

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Both McDonald's Omega and Cronbach's Alpha were used to estimate the internal consistency reliability of the utilized measures. According to the recommendations of numerous prior psychometric studies, McDonald's Omega can be regarded as a proper alternative to Cronbach's Alpha (Deng & Chan, 2017; Dunn et al., 2014; Zhang & Yuan, 2016). It is obvious that values of Cronbach's Alpha are remarkably close to those of McDonald's Omega indicating that both coefficients refer to the adequate reliability of the utilized measures (Khalaf and Abulela, 2021; Abulela and Khalaf, 2024).

RESULTS

Table (2) Correlation matrix among subscales (*N* =66)

Measures	1	2	3	4	5	6	7	8
Perceived usefulness of AI	1							
Perceived ease of use of AI	.836[**]	1						
Positive attitudes towards AI	.789[**]	.787[**]	1					
Negative attitudes towards AI	-.430[**]	-.474[**]	-.507[**]	1				
General attitude towards AI	.870[**]	.755[**]	.811[**]	-.385[**]	1			
Cognitive component of AI	.677[**]	.552[**]	.747[**]	-.291[*]	.728[**]	1		
Affective component of AI	.711[**]	.620[**]	.887[**]	-.473[**]	.776[**]	.840[**]	1	
Behavioral component of AI	.644[**]	.622[**]	.810[**]	-.473[**]	.691[**]	.725[**]	.886[**]	1
AI-APQ	.685[**]	.587[**]	.817[**]	-.387[**]	.755[**]	.819[**]	.870[**]	.836[**]

Note: AI-APQ = Impact of AI on Academic performance questionnaire. ** significant at 0.01 level, correlations in bold are insignificant, values in bold are insignificant.

Table (3) Results of paired sample t-test (*N* =66, *df* = 65)

Subscales	Pretest		Post-test		t	P	Cohen's d
	M	SD	M	SD			
Perceived usefulness of AI	23.97	8.39	33.27	7.85	-6.536	0.01	1.14
Perceived ease of use of AI	23.12	8.07	32.42	7.81	-6.968	0.01	1.15
Positive attitudes towards AI	37.03	8.70	47.45	8.71	7.570	0.01	1.20
Negative attitudes towards AI	24.72	4.70	20.82	6.47	-4.122	0.01	0.60
General attitude towards AI	20.77	9.66	31.79	7.53	-7.340	0.01	1.14
Cognitive component of AI	13.45	3.81	16.44	4.35	4.410	0.01	0.69
Affective component of AI	30.45	7.73	38.56	8.74	-5.720	0.01	0.93
Behavioral component of AI	34.82	9.11	44.58	10.49	-5.540	0.01	0.93
Course Performance	13.32	1.19	14.15	0.907	-11.464	0.01	0.69
AI-APQ	33.83	7.48	43.59	9.11	-6.781	0.01	1.07

Note: AI-APQ = Impact of AI on Academic performance questionnaire, Cohen's d (small = 0.2, Medium = 0.5, Large = 0.8) (Goulet-Pelletier & Cousineau, 2018; Cohen, 1988).

Table 3 shows that There is an increase in scores of the posttest compared with the pretest suggesting that the AI-empowered learning tools may have been effective in enhancing the learners' understanding or skills of AI in academic performance. This improvement might be interpreted as a positive outcome of the experimental treatment involving these tools. The decline in negative attitudes refers to the adequate confidence and high satisfaction of the AI-empowered learning tools. This shift in attitudes is evidenced by the significant decrease in mean scores from 24.72 in the pretest to 20.82 in the posttest.

Table (4) ANOVA of simple linear regression model.

Model		Sum of Squares	df	Mean Square	F	P
1	Regression	3334.574	2	1667.287	65.658	.000
	Residual	1599.790	63	25.393		
	Total	4934.364	65			

Dependent Variable: Positive attitudes towards AI, Predictors: Perceived usefulness of AI and Perceived ease of use of AI

Linear Regression Analysis

We used SPSS software version 26 to perform simple linear regression analysis (see table 5) to test if perceived usefulness of AI and perceived ease of use of AI significantly predicted positive attitudes towards AI. The four assumptions of simple linear regression analysis (linearity, homoscedasticity, independence, and normality) were verified before conducting the analysis. The overall regression was statistically significant (R^2 = .676), F (2.63) = (65.66), p = .01). It was found that perceived usefulness of AI and perceived ease of use of AI significantly predicted positive attitudes towards AI (β = (.434), p = 0.01). The first fitted regression model was: positive attitudes towards AI = 16.085 + 0.482 × (Perceived usefulness of AI). The second fitted regression model was: positive attitudes towards AI = 16.085 + 0.473 × (perceived ease of use of AI).

Table (5) Simple linear regression analysis model.

Model	B	SE	β	t	P	Lo 95% CI	Up 95% CI
Constant	16.085	2.808		5.728	0.000	10.473	21.696
Perceived usefulness of AI	0.482	0.145	0.434	3.318	0.001	0.192	0.772
Perceived ease of use of AI	0.473	0.146	0.424	3.235	0.002	0.181	0.765

Note: Predictors: Perceived usefulness of AI and Perceived ease of use of AI, Dependent variable: Positive attitudes towards AI, N = 66

Discussion

This study reports the significant differences between pretest and post-test in various measures to reflect the effectiveness of the Magic school AI as a new instructional approach in improving students' perceived usefulness of AI, ease of use of AI, cognitive, affective, and behavioural components of attitudes towards AI.

Results of linear regression analysis proved that perceived usefulness of AI and perceived ease of use of AI significantly predicted positive attitudes towards AI. This finding is in line with findings reported by recent studies which found that perceived usefulness of AI and attitudes towards AI significantly and positively predicted behavioural intention, willingness, and use behaviour of AI (Kelly et al., 2023; Sadriwala & Sadriwala, 2022). This result implies that students find AI tools as useful, beneficial and

easy to use. As the AI revolution continues to develop and provide more functions and options, it is possible that students will increasingly use AI tools in learning and performing academic assignments and tasks (Grájeda, et al., 2024; Salido, 2023).

From a psychological perspective, a potential explanation of the significant differences between the pretest and post-test scores might be that AI attractive tools encourages students to get more involved in learning tasks and be more motivated to do academic activities in an innovative manner. This possible interpretation is supported by researchers who found that AI-empowered tools attract students and enable them to better complete their academic tasks and assignments (Salido, 2023). Moreover, AI tools were effective in improving English language proficiency and providing enriching and corrective feedback (Yakhina et al., 2024).

Not to mention that the AI tools cannot replace human teachers. Thus, it is recommended that teachers should effectively integrate AI innovative educational technologies in classrooms to guarantee the successful instruction and learners' positive engagement. This perspective is supported by Grájeda, et al. (2023) who highlighted the importance of integrating AI-learning tools in higher education institutions as a pedagogical evolution rather than just a technological advancement.

It is possible to adopt AI tools across various fields of knowledge and different academic disciplines owing to the various options and tools available in AI applications (Grájeda, et al., 2024). However, numerous studies (García, 2023; Khalaf, 2024) focused on the necessity of crafting an ethical code of conduct while using AI tools in education to ensure educational integrity and constrain academic dishonesty.

The decline in negative attitudes implies students' enjoyment and emotional acceptance of the AI-empowered learning tools. The Magic school AI instruction facilitated learning experience. Likewise, the increase of students' scores in positive attitudes refers to the fact that they found no or less   difficulty in using the tools, they properly perceived its relevance to their major of study. The learning environment provided by the Magic school AI is completely different from the traditional learning classroom. With this in mind, changes in the learning environment might lead to possible gains either in cognitive, affective, or behavioral aspects of attitudes. This finding enables us to conclude that the user-friendly Magic school AI better meets learners' needs and

expectations in ways that effectively contribute to achieve the intended learning outcomes.

Mean scores of the AI-APQ ranged between 3.70 and 4.23 indicating high perception of the role that AI-empowered learning tools play in improving academic performance of college students on the specified course (TECH 329). This result is confirmed by a plethora of relevant studies (Popenici & Kerr, 2017; Kumar, 2023; Vargas-Murillo et al., 2023). Different studies investigated the impact of AI tools on educational experience of university students and found a significant and positive impact on students' academic experiences (Grájeda, et al., 2024; Khalaf, 2024).

Students believe that AI affects their learning and ways of understanding the subject matter and helps them to accomplish their academic duties. This perspective is supported by Sadriwala & Sadriwala, (2022) who concluded that the perceived usefulness of artificial intelligence technologies relies on how the users view the benefits of adoption of artificial intelligence tools. In the case of university students, they see that AI tools are more effective than traditional teaching methods because AI-empowered learning tools can easily personalize learning experiences and help them in doing assignments and homework tasks. This belief is expressed by Vargas-Murillo et al. (2023) who argued that students across different disciplines all over the world use this AI tools such as ChatGPT to assist with their academic homework.

Regarding the positive association between the course performance (TECH 329) and the cognitive, affective, and behavioural components of attitudes towards AI, it is possible that high achievers might develop positive attitudes towards AI-empowered learning tools as they recognize the capabilities of AI tools which assist them in their academic work (essay writing, assignments, homework, quizzes, etc.) which in turn help them learn and comprehend difficult areas in the course and accordingly raise their cumulative grade point averages. This is not surprising because AI tools provide corrective, remedial, and enriching feedback for students' academic works (e.g., Bancoro, 2024). The present finding is contradictory with other studies that found an insignificant relationship between AI use and academic performance among business administration students. However, AI tools offer individualized learning experiences, direct feedback, and cooperative activities (Bancoro, 2024).

In the light of social constructivism and social learning theories (Adams, 2006), AI tools have the capacity to enhance collaborative learning (Zhou & Schofield, 2024). Peer influences in adopting and acceptance of AI tools cannot be denied. Likewise, positive attitudes towards AI-empowered learning tools can be reinforced through interactions among students in classrooms. Certain students might observe and imitate their peers who successfully utilized AI tools to accomplish their tasks and support their learning.

Limitations

One limitation of this study lies in the predominantly female sample. The participants were exclusively female, reflecting the higher proportion of female students in the original population. This gender imbalance could potentially limit the study's findings because the sample used in this study is purposive one and not representative of the original population. Therefore, future research should recruit a balanced number of both genders to gain a deeper and more comprehensive insight into gender differences in the variables under investigation. In addition to the improvements derived from the quantitative analysis, it is imperative to gather qualitative feedback (interviews, focus groups) from learners about their experiences with the AI tools which might provide deeper insights into students perceived usefulness and acceptance of AI learning tools. In this context, Grájeda, et al. (2024) recommended to incorporate "qualitative methods like interviews and focus groups so as to deepen our understanding of AI 's role and perception among educational stakeholders" (p.22). This study investigated the AI-learning tools in a university setting, other studies in broader educational contexts such as high schools should be implemented.

The significant positive association between the perceived usefulness of AI and ease of using and positive attitudes towards AI tools among university students and their negative association with negative attitudes towards AI can be interpreted by students' previous positive experience with AI-generative tools and chatbots like ChatGPT (Khalaf, 2024; Jalilibaleh, 2023; Zhang, 2023; Mintz, 2023; Lund and Wang, 2023). Those tools are attractive to university students because they provide individualized learning opportunities that are suitable for students needs and harmonious with their abilities (Baker, 2021).

Conclusions

To enhance the teaching of instructional media and technology course (TECH 329), this paper restructured the course utilizing the AI Magic school AI model, employing various AI-powered learning tools. The effectiveness of this approach was confirmed through the comparison of pretest and post-test mean scores. Results indicated improvements in positive attitudes towards AI, perceived usefulness, ease of use, and academic performance. Additionally, there were increases across the three domains of attitudes towards AI and a significant reduction in negative attitudes towards AI.

Given that most relevant prior studies have relied on samples of university students, further studies involving high school participants are necessary to better understand the factors that explain and predict the adoption and acceptance of AI technologies at a young age.

Given that AI tools will be utilized in different aspects of education in the near future, teachers and students should receive adequate training in using AI tools and smoothly complementing traditional teaching methods leading to boosting positive attitudes towards AI-empowered learning and reduce negative attitudes within the course of time.

Recommendations

- Evaluate the alignment of AI tools with course objectives to ensure that the AI tools' capabilities align with the content, activities, and assessments.
- Consider the pedagogical implications of AI tools to explore how AI tools can enhance student engagement, motivation, and critical thinking skills.
- Different pedagogical approaches can be considered that can leverage AI tools effectively, such as personalized learning, adaptive learning, or intelligent tutoring systems.
- Additional comparative studies between traditional and AI-teaching methods are needed to evaluate the effectiveness of AI tools in improving student learning outcomes.
- Utilizing AI tools can help access quality education for all students.

- Investigating the potential of AI creates personalized learning experiences that supply to the diverse needs and learning styles of all students, including those with disabilities.

- Future research should recruit a balanced number of both genders to gain a deeper and more comprehensive insight into gender differences in the variables under investigation. Upcoming research will explore how AI tools can be implemented to create personalized learning experiences that cater to individual student needs and learning styles.

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