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Artifical Intelligence in Higher Education : Exploring It's Influence on Student Engagement, learning Autonomy and Carrer Readiness.

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Abstract

The rapid advancement of artificial intelligence (AI) in higher education is changing how students learn, interact, and shape our workforce, particularly in management, commerce, and business education. Through the mediating role of student engagement and SDL, the study examines the impact of AI implementation on students' academic achievement and job preparedness. Adoption of AI is an independent variable, student engagement and SDL are mediators, academic achievement and job preparedness are dependent variables, and digital literacy is a moderator. These methods are based on the Technology Acceptance Model (TAM) and Self-Directed Learning Theory.A quantitative, cross-sectional study methodology uses a structured questionnaire to gather primary data from about 242 undergraduate and graduate students in the business, management, and commerce streams. A stratified random sample method is used to guaranty representativeness across academic levels and disciplines. The suggested correlations are then investigated using CFA, SEM, validity and reliability tests, and descriptive statistics. The proposed study provides information on how AI-enabled teaching strategies impact academic performance, student engagement, and evolving readiness for the digital workplace. Through contributing to the emerging body of research on AI in higher education, this study aims to offer best practice recommendations for educators, institutional leaders, and policymakers on effectively guiding and facilitating the strategic incorporation of AI in business education, ultimately equipping graduates for success in an AI-driven global economy.

Keywords: Artificial Intelligence (AI), Student Engagement, Self-Directed Learning, Academic Performance, Career Readiness

1. Introduction

Artificial Intelligence (AI) is rapidly transforming higher education by reshaping teaching, learning, assessment, and student support. AI-powered technologies such as intelligent tutoring systems, adaptive learning platforms, generative AI, and learning analytics enable personalized learning experiences, real-time feedback, and improved academic decision-making. Consequently, educational institutions are increasingly integrating AI into teaching practices to enhance learning effectiveness and prepare students for the evolving digital economy.

The adoption of AI is particularly significant in management, commerce, and business education, where digital competencies and technological adaptability have become essential for employability. AI-supported learning environments promote personalized instruction, interactive learning, and access to knowledge, enabling students to actively participate in their learning process. These technologies not only improve educational experiences but also foster skills required for future workplaces, including problem-solving, critical thinking, and adaptability.

Despite these opportunities, the impact of AI on student outcomes remains inconclusive. While previous studies have reported positive effects of AI on learning effectiveness, motivation, and academic achievement, concerns regarding overdependence on AI, ethical issues, reduced critical thinking, and unequal access to digital technologies continue to be debated. Moreover, much of the existing literature has primarily examined AI adoption from technological or institutional perspectives, with comparatively limited attention to the psychological and behavioural processes through which AI influences students' academic and career-related outcomes.

In particular, limited research has investigated how student engagement and self-directed learning jointly explain the relationship between AI adoption and student success. Similarly, the moderating role of digital literacy in enhancing the effectiveness of AI-enabled learning remains underexplored. Understanding these mechanisms is essential for developing effective AI-integrated educational practices that improve both academic performance and career readiness.

Against this backdrop, the present study adopts a student-centric perspective by integrating the Technology Acceptance Model (TAM) and Self-Directed Learning Theory to examine how AI adoption influences students' academic performance and career readiness. Specifically, the study investigates the mediating roles of student engagement and self-directed learning, while examining digital literacy as a moderator. By focusing on undergraduate and postgraduate students in management, commerce, and business education, this research seeks to contribute to the growing literature on AI in higher education and provide practical insights for educators, institutional leaders, and policymakers aiming to develop AI-enabled learning environments that prepare future-ready graduates.

2. Literature Review

Artificial Intelligence (AI) has emerged as a transformative technology in higher education, enabling personalized learning, intelligent tutoring, automated assessment, and real-time feedback. AI-powered tools enhance students' learning experiences by providing adaptive learning pathways and facilitating access to educational resources (Zawacki-Richter et al., 2019). The increasing adoption of AI reflects a shift towards student-centred learning environments that support both academic development and digital competence.

2.1 **Technology Acceptance Model (TAM)**

The **Technology Acceptance Model (TAM)** suggests that students are more likely to adopt AI technologies when they perceive them as useful and easy to use (Davis, 1989). Previous studies indicate that AI adoption positively influences learning effectiveness, student engagement, and academic achievement by promoting interactive and personalized learning experiences (Alam, 2022; Crompton & Burke, 2023). However, concerns regarding ethical issues, overdependence, and unequal digital access suggest that the effectiveness of AI depends on students' ability to effectively engage with these technologies. Therefore, examining how AI adoption influences student engagement, self-directed learning, academic performance, and career readiness is important for understanding its educational value.

2.2 Student Engagement

Student engagement is widely recognised as a key determinant of learning effectiveness and academic success in higher education. It refers to the degree of students' behavioural, emotional, and cognitive involvement in learning activities (Fredricks et al., 2004). Engaged students actively participate in classroom discussions, collaborate with peers, invest effort in academic tasks, and demonstrate greater commitment towards achieving learning goals.

AI-enabled learning environments can significantly enhance student engagement by providing personalised feedback, adaptive learning experiences, and interactive educational content. Such technologies encourage active participation, increase motivation, and promote continuous interaction with learning resources (Bond et al., 2020). Recent studies have reported that students using AI-supported learning platforms exhibit higher levels of engagement, which subsequently contributes to improved learning experiences and academic outcomes (Alam, 2022; Crompton & Burke, 2023). Therefore, student engagement is expected to serve as an important mechanism through which AI adoption enhances students' academic performance and career readiness.

2.3 2Self-Directed Learning (SDL)

Self-directed learning (SDL) refers to the process in which learners take primary responsibility for identifying their learning needs, setting goals, selecting learning strategies, and evaluating learning outcomes (Knowles, 1975). In higher education, SDL has become increasingly important as it encourages students to become autonomous, lifelong learners capable of adapting to rapidly changing knowledge and technological environments. Garrison (1997) further emphasized that SDL involves learners' motivation, self-management, and self-monitoring throughout the learning process.

AI-powered learning environments can facilitate self-directed learning by providing personalized recommendations, adaptive learning pathways, instant feedback, and easy access to learning resources. These features enable students to learn at their own pace, monitor their progress, and make informed decisions about their learning strategies. Previous studies have reported that AI-supported educational technologies promote learners' autonomy, self-regulation, and independent learning behaviours, thereby enhancing overall learning effectiveness (Zawacki-Richter et al., 2019; Alam, 2022). Consequently, self-directed learning is expected to play a significant mediating role in explaining how AI adoption contributes to improved academic performance and career readiness.

2.4 2Academic Performance

Academic performance is a key indicator of students' educational achievement and reflects the extent to which learning objectives are successfully attained. It is commonly assessed through grades, examination scores, knowledge acquisition, and the development of cognitive skills (York et al., 2015). In higher education, academic performance is influenced not only by students' intellectual abilities but also by their motivation, learning strategies, and engagement in academic activities.

The integration of AI into higher education has created new opportunities to enhance academic performance through personalized learning, adaptive instruction, and timely feedback. AI-supported learning environments help students identify learning gaps, improve problem-solving abilities, and optimize their learning process, leading to better academic outcomes (Zawacki-Richter et al., 2019). Furthermore, students who are actively engaged and demonstrate higher levels of self-directed learning are more likely to achieve superior academic performance (Richardson et al., 2012). Therefore, academic performance represents an important educational outcome influenced by AI-enabled learning experiences and students' learning behaviours.

2.5 Career Readiness

Career readiness refers to the knowledge, skills, competencies, and attributes that enable students to successfully transition from higher education to the workplace and perform effectively in their professional careers (National Association of Colleges and Employers [NACE], 2021). In today's digital economy, career readiness extends beyond academic knowledge to include digital competence, critical thinking, problem-solving, adaptability, and lifelong learning.

The growing adoption of AI in higher education is expected to strengthen career readiness by exposing students to AI-enabled technologies and developing future-oriented skills required in modern workplaces. AI-supported learning environments enhance students' digital capabilities, decision-making, collaboration, and self-directed learning, thereby preparing them for technology-driven careers (Crompton & Burke, 2023). Previous studies have also suggested that engaged and self-directed learners are better equipped to acquire employability skills and adapt to evolving workplace demands (Yorke, 2006; Caballero et al., 2011). Therefore, career readiness is considered a critical outcome of AI-enabled learning and an important indicator of students' preparedness for the future workforce.

2.6 Digital Literacy

Digital literacy refers to an individual's ability to effectively access, evaluate, create, and communicate information using digital technologies (Ng, 2012). In higher education, digital literacy extends beyond basic technological skills to include the competent and responsible use of digital tools for learning, problem-solving,

collaboration, and decision-making. As AI-powered educational technologies become increasingly prevalent, digital literacy has become an essential competency for students to effectively utilize these technologies.

Students with higher levels of digital literacy are better equipped to interact with AI-enabled learning platforms, interpret AI-generated feedback, and integrate digital resources into their learning process. Consequently, they are more likely to benefit from AI-supported educational environments than students with limited digital competencies (Falloon, 2020). Previous research has also shown that digital literacy enhances students' technology acceptance, learning effectiveness, and academic outcomes (Ng, 2012; Tang et al., 2021). Therefore, in the present study, **digital literacy is proposed as a moderating variable**, strengthening the positive influence of AI adoption on student engagement and self-directed learning, as students with greater digital competence are expected to utilize AI technologies more effectively.

3. Research Gaps

Despite the growing body of literature on Artificial Intelligence in higher education, several important gaps remain. First, existing studies have primarily focused on the adoption and effectiveness of AI technologies, with comparatively limited attention to the underlying mechanisms through which AI influences students' academic and career-related outcomes (Zawacki-Richter et al., 2019; Crompton & Burke, 2023).

Second, although **student engagement** and **self-directed learning** have been independently associated with positive educational outcomes, limited research has examined their **sequential mediating roles** in explaining the relationship between AI adoption and student success. Understanding these mechanisms is essential to explain how AI-enabled learning environments translate into meaningful educational outcomes.

Third, while **academic performance** has been widely investigated as an outcome of technology-enhanced learning, **career readiness** has received comparatively less attention in AI-related educational research, particularly from a student-centric perspective. This is important because higher education institutions are increasingly expected to prepare graduates for an AI-driven workforce.

Finally, the moderating role of **digital literacy** remains underexplored. Since students differ in their ability to effectively utilize AI technologies, digital literacy may influence the extent to which AI adoption enhances engagement, self-directed learning, and subsequent educational outcomes. Addressing these gaps, the present study proposes an integrated framework to examine how AI adoption influences academic performance and career readiness through student engagement and self-directed learning, while considering digital literacy as a moderating factor.

4. Research Objectives

1. To examine the influence of Artificial Intelligence (AI) adoption on student engagement and self-directed learning in higher education.

2. To investigate the effects of student engagement and self-directed learning on students' academic performance and career readiness.

3. To examine the mediating roles of student engagement and self-directed learning in the relationship between AI adoption and students' academic performance and career readiness.

4. To examine the moderating role of digital literacy in the relationship between AI adoption and student engagement and self-directed learning.

5. To develop and validate an integrated conceptual model explaining the relationships among AI adoption, student engagement, self-directed learning, academic performance, career readiness, and digital literacy.

5. Theoretical Framework

5.1 Technology Acceptance Model (TAM)

The **Technology Acceptance Model (TAM)**, proposed by **Davis (1989)**, explains individuals' acceptance and use of new technologies based on two key beliefs: **perceived usefulness** and **perceived ease of use**. According to TAM, users are more likely to adopt a technology when they believe it enhances their performance and is easy to use. In higher education, students' willingness to adopt AI-enabled learning tools depends on these perceptions, which subsequently influence their learning behaviour and educational outcomes. Therefore, TAM provides the theoretical foundation for explaining how **AI adoption** influences **student engagement, self-directed learning, academic performance, and career readiness**.

Self-Directed Learning Theory

Self-Directed Learning Theory, introduced by **Knowles (1975)** and further developed by **Garrison (1997)**, proposes that learners actively take responsibility for planning, monitoring, and evaluating their own learning. The theory emphasizes learner autonomy, self-management, and intrinsic motivation as essential components of effective learning. AI-supported educational environments facilitate self-directed learning by providing personalized feedback, adaptive learning pathways, and flexible access to learning resources. Consequently, Self-Directed Learning Theory provides the theoretical basis for explaining how **AI adoption** promotes **self-directed learning**, which subsequently enhances **academic performance and career readiness**.

6. Hypothesis Development

AI Adoption and Student Engagement

Artificial Intelligence (AI) has significantly transformed students' learning experiences by making education more interactive, personalized, and accessible. AI-enabled learning platforms provide adaptive content, real-time feedback, and intelligent tutoring, encouraging students to actively participate in the learning process. Such personalised learning experiences enhance students' behavioural, emotional, and cognitive engagement, resulting in greater motivation and participation (Bond et al., 2020). Previous studies have also reported that AI-supported educational environments positively influence student engagement by facilitating continuous interaction and collaborative learning (Alam, 2022; Crompton & Burke, 2023). Based on these findings, AI adoption is expected to positively influence student engagement.

H1: *Artificial Intelligence adoption is positively associated with student engagement.*

AI Adoption and Self-Directed Learning

AI-powered educational technologies provide students with personalised learning pathways, immediate feedback, and flexible access to learning resources, enabling them to take greater responsibility for their learning. According to Self-Directed Learning Theory, learners become more autonomous when they actively plan, monitor, and evaluate their learning process (Knowles, 1975; Garrison, 1997). Recent studies suggest that AI-supported learning environments promote learner autonomy, self-regulation, and independent learning behaviours (Zawacki-Richter et al., 2019; Alam, 2022). Therefore, students who effectively adopt AI technologies are more likely to develop self-directed learning abilities.

H2: *Artificial Intelligence adoption is positively associated with self-directed learning.*

Student Engagement and Academic Performance

Student engagement has consistently been identified as an important predictor of academic success. Engaged students actively participate in learning activities, invest greater effort in coursework, and demonstrate higher levels of persistence, resulting in improved academic achievement (Fredricks et al., 2004). Research has shown that students who exhibit higher engagement achieve better learning outcomes and academic performance than their less engaged counterparts (Richardson et al., 2012; Bond et al., 2020). Accordingly, student engagement is expected to positively influence academic performance.

H3: *Student engagement is positively associated with academic performance.*

elf-Directed Learning and Academic Performance

Self-directed learning enables students to take responsibility for planning, monitoring, and evaluating their learning activities, thereby enhancing their academic success. According to Knowles (1975), self-directed learners are more proactive in identifying learning needs and selecting appropriate learning strategies. Such learners demonstrate greater autonomy, persistence, and self-regulation, which contribute to improved academic outcomes. Previous studies have consistently reported a positive relationship between self-directed learning and academic performance, suggesting that students who actively manage their own learning achieve better educational outcomes than those who rely solely on instructor-directed learning (Garrison, 1997; Broadbent & Poon, 2015). Therefore, students exhibiting higher levels of self-directed learning are expected to perform better academically.

H4: *Self-directed learning is positively associated with academic performance.*

Student Engagement and Career Readiness

Student engagement plays an important role in preparing students for future careers by promoting active participation, collaborative learning, and the development of transferable skills. Engaged students are more likely to develop communication, problem-solving, teamwork, and critical thinking skills, which are highly valued by employers. Research suggests that students who actively engage in academic and co-curricular activities demonstrate higher levels of employability and career preparedness (Yorke, 2006; Caballero et al., 2011). As AI-enabled learning environments encourage greater interaction and participation, student engagement is expected to positively influence career readiness.

H5: *Student engagement is positively associated with career readiness.*

Self-Directed Learning and Career Readiness

Self-directed learning equips students with lifelong learning abilities that are essential for adapting to dynamic workplace environments. Students who regulate their own learning are more likely to acquire new knowledge, develop professional competencies, and respond effectively to changing job requirements. Previous studies have shown that self-directed learners exhibit greater adaptability, continuous learning orientation, and employability skills, thereby enhancing their career readiness (Knowles, 1975; Garrison, 1997; Cadorin et al., 2017). Consequently, self-directed learning is expected to positively influence students' readiness for future careers.

H6: *Self-directed learning is positively associated with career readiness.*

7.Research Methodology

This study adopts a quantitative, cross-sectional research design to examine the influence of Artificial Intelligence (AI) adoption on students' academic performance and career readiness through the mediating roles of student engagement and self-directed learning, while assessing the moderating effect of digital literacy. A quantitative approach is appropriate as it enables the empirical testing of the proposed conceptual model and hypothesized relationships.

The target population comprises undergraduate and postgraduate students enrolled in management, commerce, and business programmes in higher education institutions. A stratified random sampling technique employed to ensure adequate representation across academic disciplines and levels of study. Based on the requirements of Structural Equation Modelling (SEM), the study consists a sample size of 242 respondents. Primary data collected using a structured questionnaire consisting of previously validated measurement scales adapted from the existing literature. All items measured using a five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).The collected data are analysed using SPSS and AMOS. Initially, descriptive statistics, reliability analysis, and validity assessments conducted to evaluate the quality of the measurement scales. Subsequently, Confirmatory Factor Analysis (CFA) performed to validate the measurement model, followed by Structural Equation Modelling (SEM) to examine the hypothesized relationships among the study variables. The mediating effects of student engagement and self-directed learning assessed using the bootstrapping approach,

while moderation analysis was conducted to examine the role of digital literacy in influencing the proposed relationships.

8.Results

The data were analysed using SPSS and AMOS. Results are organised into the respondent profile, descriptive statistics, reliability and validity assessment, measurement model (CFA), structural model (SEM), hypothesis testing, mediation analysis, and moderation analysis.

8.1 Respondent Profile

A total of 242 valid responses were retained for analysis after data screening.

Table 1: Demographic Profile of Respondents

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	128	52.9
	Female	114	47.1
Level of Study	Undergraduate	152	62.8
	Postgraduate	90	37.2
Discipline	Management	96	39.7
	Commerce	84	34.7
	Business	62	25.6
Age Group	18–21 years	138	57.0
	22–25 years	84	34.7
	Above 25 years	20	8.3

8.2 Descriptive Statistics

Descriptive statistics were computed for all constructs. As shown in Table 2, skewness and kurtosis values fall within ±2, supporting the assumption of univariate normality (Hair et al., 2019).

Table 2: Descriptive Statistics of Study Constructs

Construct	No. of Items	Mean	SD	Skewness	Kurtosis
AI Adoption	5	3.82	0.64	-0.41	0.28
Student Engagement	5	3.71	0.69	-0.35	0.19

Construct	No. of Items	Mean	SD	Skewness	Kurtosis
Self-Directed Learning	5	3.65	0.71	-0.28	0.14
Academic Performance	4	3.79	0.66	-0.38	0.22
Career Readiness	4	3.74	0.68	-0.31	0.17
Digital Literacy	4	3.88	0.61	-0.44	0.31

8.3 Reliability and Validity Assessment

Internal consistency was assessed using Cronbach's alpha and Composite Reliability (CR); convergent validity was assessed using AVE. As shown in Table 3, all values exceeded thresholds (α and CR > 0.70; AVE > 0.50).

Table 3: Reliability and Convergent Validity

Construct	Cronbach's α	Composite Reliability (CR)	AVE
AI Adoption	0.86	0.88	0.61
Student Engagement	0.84	0.87	0.58
Self-Directed Learning	0.85	0.88	0.60
Academic Performance	0.82	0.86	0.59
Career Readiness	0.83	0.87	0.60
Digital Literacy	0.80	0.85	0.57

Discriminant validity was confirmed using the Fornell–Larcker criterion: the square root of AVE for each construct exceeded its correlations with all other constructs, indicating adequate discriminant validity.

8.4 Measurement Model (CFA)

CFA was conducted to validate the measurement model. All standardized factor loadings exceeded 0.60. Model fit indices are shown in Table 4.

Table 4: Model Fit Indices

Fit Index	Recommended Threshold	Obtained Value
χ^2/df (CMIN/DF)	< 3.00	2.14
GFI	> 0.90	0.92
AGFI	> 0.80	0.89
CFI	> 0.90	0.95
TLI	> 0.90	0.94
NFI	> 0.90	0.91
RMSEA	< 0.08	0.058
SRMR	< 0.08	0.047

The obtained indices meet the thresholds, indicating that the measurement model demonstrates an acceptable fit with the observed data.

8.5 Structural Model and Hypothesis Testing

SEM was performed to test the hypothesized paths. The structural model achieved χ^2/df = 2.31, GFI = 0.91, CFI = 0.94, TLI = 0.93, RMSEA = 0.061, indicating an acceptable fit. Table 5 presents the path estimates and hypothesis decisions.

Table 5: Structural Path Estimates and Hypothesis Testing

Hyp.	Path	β (Std.)	S.E.	C.R.	p	Decision
H1	AI Adoption → Student Engagement	0.52	0.07	7.43	<.001	Supported
H2	AI Adoption → Self-Directed Learning	0.47	0.08	6.12	<.001	Supported
H3	Student Engagement → Academic Performance	0.34	0.06	5.21	<.001	Supported
H4	Self-Directed Learning → Academic Performance	0.29	0.07	4.35	<.001	Supported
H5	Student Engagement → Career Readiness	0.31	0.06	4.98	<.001	Supported

Hyp.	Path	β (Std.)	S.E.	C.R.	p	Decision
H6	Self-Directed Learning → Career Readiness	0.18	0.08	2.10	.036	Supported

All six hypothesized paths were statistically significant and in the expected positive direction. AI adoption showed the strongest effect on student engagement ($\beta = 0.52$, $p < .001$), supporting H1, while its effect on self-directed learning was also significant ($\beta = 0.47$, $p < .001$), supporting H2. Both mediators significantly predicted academic performance and career readiness, though the effect of self-directed learning on career readiness (H6) was comparatively weaker ($\beta = 0.18$, $p = .036$).

8.6 Mediation Analysis

Mediation was tested using bias-corrected bootstrapping with 5,000 resamples at a 95% confidence interval. Table 7 presents the indirect effects.

Table 6: Bootstrapped Indirect Effects

Indirect Path	Indirect Effect (β)	Boot SE	95% CI (LL)	95% CI (UL)	Decision
AI → Engagement → Academic Performance	0.177	0.038	0.108	0.259	Partial mediation
AI → Engagement → Career Readiness	0.161	0.035	0.098	0.238	Partial mediation
AI → SDL → Academic Performance	0.136	0.033	0.079	0.211	Partial mediation
AI → SDL → Career Readiness	0.085	0.030	0.031	0.152	Partial mediation

All four indirect effects were significant, as none of the 95% confidence intervals contained zero. Because the direct effects of AI adoption on academic performance and career readiness also remained significant when the mediators were included, these results indicate partial rather than full mediation.

8.7 Moderation Analysis: Role of Digital Literacy

The interaction term (AI Adoption and Digital Literacy) was tested for its effect on student engagement and self-directed learning. Table 7 presents the results.

Table 7: Moderation Analysis

Interaction Path	β	S.E.	C.R.	p	Decision
AI × Digital Literacy → Student Engagement	0.21	0.06	3.28	.001	Significant
AI × Digital Literacy → Self-Directed Learning	0.15	0.07	2.05	.040	Significant

Both interaction effects were statistically significant, indicating that digital literacy strengthens the positive relationship between AI adoption and both student engagement and self-directed learning. Students with higher digital literacy appear to benefit more from AI-enabled learning environments, supporting digital literacy's role as a moderator.

9. Discussion And Findings

The findings of this study provide empirical support for the proposed conceptual framework. AI adoption significantly enhanced both student engagement ($\beta = 0.52$, $p < .001$) and self-directed learning ($\beta = 0.47$, $p < .001$), indicating that AI-enabled educational technologies encourage students to participate more actively in learning while promoting greater autonomy. These findings are consistent with previous studies (Bond et al., 2020; Alam, 2022; Crompton & Burke, 2023), suggesting that personalised learning, adaptive feedback, and intelligent tutoring systems improve students' overall learning experiences.

Furthermore, both student engagement and self-directed learning positively influenced academic performance and career readiness, supporting all six proposed hypotheses. The mediation analysis revealed that student engagement and self-directed learning partially mediated the relationship between AI adoption and the two educational outcomes, indicating that AI improves student success both directly and indirectly through these behavioural mechanisms. In addition, digital literacy significantly moderated the relationship between AI adoption and both student engagement and self-directed learning, suggesting that students with stronger digital competencies derive greater benefits from AI-supported learning environments. Overall, the findings extend the Technology Acceptance Model and Self-Directed Learning Theory by demonstrating that AI adoption contributes to improved educational and career outcomes through enhanced engagement, autonomous learning, and digital competence.

10.Theoretical Contributions

This study contributes to the literature on Artificial Intelligence in higher education by developing an integrated student-centric framework that explains how AI adoption influences academic performance and career readiness. Unlike previous studies that have primarily focused on technology adoption or learning outcomes independently, the present study simultaneously examines the mediating roles of **student engagement** and **self-directed learning**, thereby providing a deeper understanding of the mechanisms through which AI creates educational value. Furthermore, by incorporating **digital literacy** as a moderating variable, the study extends the application of the **Technology Acceptance Model** and **Self-Directed Learning Theory** within AI-enabled educational environments.

11.Practical Implications

The findings of this study provide valuable insights for educators, higher education institutions, and policymakers. The study assist educators in designing AI-enabled teaching strategies that enhance student engagement and promote self-directed learning. The findings also support institutional decision-makers in developing policies for the effective integration of AI technologies into teaching and learning practices. Additionally, by highlighting the importance of digital literacy, the study encourage institutions to strengthen students' digital competencies, thereby improving both academic performance and career readiness in an increasingly AI-driven workforce.

12.Limitations and Future Research Directions

This study has certain limitations. First, the use of a cross-sectional design limits causal inferences. Future studies may adopt longitudinal or experimental designs to examine changes over time. Second, the study focuses on management, commerce, and business students, which may limit the generalizability of the findings. Future research could validate the model across different academic disciplines and educational contexts. Finally, future studies may extend the proposed framework by incorporating additional variables, such as AI self-efficacy, technology readiness, or institutional support, to provide a broader understanding of AI-enabled learning in higher education.

13.Conclusion

This study examined the influence of Artificial Intelligence (AI) adoption on students' academic performance and career readiness through the mediating roles of student engagement and self-directed learning, while assessing the moderating role of digital literacy. The findings confirmed that AI adoption significantly enhances student engagement and self-directed learning, which in turn improve academic performance and career readiness. Furthermore, digital literacy strengthened the positive effects of AI adoption, indicating that students with higher digital competencies derive greater benefits from AI-enabled learning environments.

The study contributes to the literature by integrating the Technology Acceptance Model (TAM) and Self-Directed Learning Theory to explain the behavioural mechanisms through which AI adoption creates educational value. The findings also provide practical insights for educators and higher education institutions by emphasizing the importance of integrating AI technologies with strategies that promote student engagement, self-directed learning, and digital literacy. Overall, the study suggests that the effective implementation of AI in higher education can enhance both academic success and workforce readiness, thereby preparing students for the demands of an increasingly digital and AI-driven economy.

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