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Students' Readiness for AI-assisted Learning and its Relationship to Technological Acceptance and Academic Engagement in Digital Learning Environments

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Abstract
The current study had two purposes: to explore students' readiness for learning with AI and to assess the link between the readiness and some aspects of technology acceptance and engagement in the digital learning environment. The study sample consisted of 200 undergraduate students from various academic years and majors at Al-Balqa Applied University by using convenience sampling method. The research design used is a descriptive correlational research which tackles the relationships among the various variables of the study and the students' level of readiness through a quantitative approach. A researcher-adapted 18-items 5-point Likert questionnaire was used to collect the data in three dimensions: students' readiness for AI-assisted learning, technological acceptance, and academic engagement (six items each). The results showed high level of students' readiness to learn using AI (M = 3.88 SD = 0.63). In addition, results showed that there was a positive and statistically significant correlation between students' level of readiness for AI-assisted learning and Technological acceptance ($r = .68$, $p < .001$), which means that students who had a higher readiness level tended to exhibit higher Technological acceptance. There was also a significant and positive correlation between students' readiness and academic engagement ($r = .61$, $p < .001$), which indicates that students' overall readiness to use AI was positively related to their engagement with digital academic activities. The study's results underscore the need to foster students' skills, confidence, and readiness to embrace AI technologies and actively learn in digital environments.

Keywords: Academic engagement, Digital learning environments, Technological acceptance, Students' readiness, AI-assisted learning.

Introduction

Artificial intelligence (AI) has been increasingly adopted in higher education, impacting students' access to information, their performance of academic work, feedback given to them, and their interaction with digital environments. In order to increase the level of personalization through AI-driven systems, the use of tools such as intelligent tutoring systems (ITS), adaptive learning platforms, automated feedback systems, predictive analytics, and generative AI applications, among others, is gaining traction to provide academic support beyond formal education settings (Zawacki-Richter et al., 2019; Dahri et al., 2024; Vázquez-Parra et al., 2024). These technologies have the potential to support personalized learning trajectories and help knowledge acquisition to speed up (Chan & Hu, 2023). But their usefulness to students educationally also hinges on the level of preparation that students have.

Students' readiness to learning with AI is as such an important factor for meaningful AI integration. Students' readiness may be considered to encompass knowledge of the technology, technological skills, self-confidence, flexibility, and attitude toward the use of AI in learning (Komikesari & Pasyah, 2025). AI systems are increasingly being used in universities to teach students, which introduces new cognitive and socioemotional challenges for students (Alshahrani et al., 2024; Gkanatsiou et al., 2025). Past research suggest that readiness can affect motivation (Helmiatin et al., 2024; Sutrisno et al., 2025), the use of strategies, and the ability to manage learning demands (Sutrisno et al., 2025), while the lack of readiness can also lead to confusion, distrust, disengagement, or improper use of AI systems (Zha et al., 2025).

Readiness has high relationship with technological acceptance also. These models include the Technology Acceptance Model which relies on perceived usefulness and perceived ease of use impacting attitudes and behavioral intention (Davis, 1989), and the Technology Readiness Index which focuses on psychological

readiness to new technology (Parasuraman, 2000). It is suggested that the concept of readiness and the concept of acceptance should both be considered. Optimism, confidence and preparedness are found to increase students' perception of usefulness and ease of use, and intention to adopt AI (Tzafilkou et al., 2022; Abulail et al., 2025; Chen et al., 2021; Lin et al., 2007). Recent studies further indicate that readiness may have an influence on perceived usefulness and ease of use and could determine actual adoption (Li et al., 2024; Nguyen & Vo, 2023; Lin et al., 2023).

Academic engagement offers another important faculty of AI helped schooling. Engagement can be understood as students' behavioral involvement, cognitive investment and emotional involvement, and social involvement in learning activities (Doo & Kim, 2024; Wang, Li, et al., 2025). By providing real-time feedback, personalised suggestions, interactive support and adaptive learning experiences, AI can enhance engagement (Xu & Zhi, 2026; Long et al., 2026). Systematic evidence also suggests that systematic use of adaptive learning, real-time learner feedback, and AI-supported interactions can improve learner motivation and engagement, however, learner outcomes depend on how these experiences are designed, supported, usable, and implemented responsibly, by the teacher (Katalinic et al., 2026).

Though there has been a research that looks into the understanding of AI readiness, technology acceptance, and engagement, the different constructs are often studied in isolation as the primary emphasis is on understanding how technology is adopted or learning outcomes. Studies reveal that the level of learner preparedness, perception of technological usefulness, and active engagement collectively influence learning with AI (Alam et al., 2026). Thus, a relatively holistic interpretation of students' readiness for learning with the support of AI also seems to be warranted and can be gained when considering their readiness with regard to technological acceptance and academic engagement.

The Study Problem

This study's problem stems from the problem of the increasing use of artificial intelligence in higher education and whether students are ready to use AI-assisted learning instruments. While AI applications can enable learning by assisting students in their personalisation of learning, providing immediate feedback, and equipping them with greater access to academic information, not all students have the same technological competencies, confidence, experience and willingness to use these tools. These differences in readiness can shape students' perceptions of the usefulness and ease of using each AI technology, as well as if students intend to use it, and to what extent they continue to pay attention to it, maintain high levels of interest and engagement, and persist with activities in the digital learning environment. Past research studies have tended to look at the readiness, acceptance, and academic interest of AI separately; there is a need to explore them together in one context. Thus, the current study aims to examine the students' readiness to learn with AI and its association with technological acceptance and student engagement in digital learning environments.

The Study Questions

1. What is the readiness of the students to use AI for learning in digital learning environments?
2. How are students' readiness at AI-assisted learning related to their technology acceptance?
3. How is students' preparedness to AI-assisted learning related to student academic engagement?

Significance of the Study

This study is significant because it prioritizes three crucial factors driving students' experiences of AI in higher education: AI readiness for learning, technological acceptance and learning engagement. The study can potentially shed light on the relationship between perceived preparedness to use AI and acceptance of AI technology and active participation in digital learning spaces. The results can be used by universities and teachers to gain insight into students' needs concerning AI skills, confidence and support and to define suitable training and learning activities for the promotion of good and responsible AI usage. Furthermore, the study could serve as a valuable source of findings for researchers when it comes to readiness, acceptance, and engagement in the same framework for using AI-supported learning.

Definition of Study Terms

Students' Readiness for AI-assisted Learning: Describes students' readiness, self-efficacy, competence, awareness and acceptance of AI-assisted learning opportunities for academic learning. Operationally, it was measured by the average score of students' answers for items 1–6 of the questionnaire.

Technological Acceptance: Involves how students feel the AI tools are user-friendly, useful, and plan to persist with the use of AI tools in their studies. It can be operationally measured using the mean score derived from students' responses to the following items: 7, 8, 9, 10, 11 and 12 in the questionnaire.

Academic Engagement: Refers to the extent to which students are actively involved, attentive, interested, persistent, motivated, and engaged in learning in digital learning environment. The mean value of the students' responses to the items 13 to 18 in the questionnaire is the operational measure.
Digital Learning Environments: Relevant technology-empowered learning environments where students interact with digital or AI-based tools, engage in learning activities, and communicate.

Literature Review

The readiness of students for learning with AI has increasingly been considered as a prerequisite for making them participate properly in the digital learning space. However, Readiness is not simply the availability of technology, but digital competence, confidence, familiarity with technological environments, motivation and adaptability to new learning systems. Digital preparedness of students positively affects their ability to interact with the AI-driven platforms of their studies as shown by Asal et al. (2025), and enhanced application of digital literacy is linked to higher satisfaction and learning outcomes as shown by Alam, Hidayat-ur-Rehman, Farhat, Shaage, & Alkhidmat (2025). Yaseen et al. (2025) pointed out that inadequate skills can lead to frustration and overload of cognitive abilities.
According to the literature, students' readiness is strongly associated with their acceptance of AI technologies. Students are more likely to have positive attitudes towards the use of technologies they believe are beneficial to their academic pursuits (Seo et al., 2021), which is why performance expectancy was considered an important determinant of positive attitudes. Likewise, when using AI applications, effort expectancy also contributes to adoption if they are regarded as easy to use, contributing to the adoption decision process (Izhar et al., 2025; Liu et al., 2025). In turn, positive cognitive and emotional attitudes impact positively on AI usage intentions (Katsantonis & Katsantonis, 2024). Kharroubi et al. (2024) demonstrated that structured exposure and training can impede the acquisition of knowledge and attitudes towards AI, and Cabero-Almenara et al. (2025) highlighted the importance of attitudes in shaping the relationship between expectations and behavioral intentions regarding technologies. AI literacy and trust also relate to students' intentions (Chai et al., 2020), which means that they need to feel confident in their ability to assess and use AI.
More recent research builds on all that evidence through looking at various routes to AI adoption. A researcher conducted a study on students' attitudes and behavioral intentions on the usage of education AI systems (Valle et al., 2024), and another study was done in cultural differences on students' attitudes and behaviors (Ma et al., 2024). While Abolle-Okoyeagu et al. (2026) focused on perceptions, acceptance, and adoption barriers among engineering students, Khoso et al. (2026) made a connection of digital literacy, trust, attitudes, and AI acceptance. Such research investigates the notion of acceptance as it is related to a particular context, technological perception and user personal capability as well as attitudes, and is widely known as reflecting a shift towards the understanding of acceptance as a result of a mix of technological perceptions, personal capabilities, attitudes, and context.
The other key component of AI-supported learning is academic engagement. Autonomy and deeper engagement can be fostered through appropriate implementation of AI-based personalization, and behaviors, emotions, and cognition can be enhanced through flexible learning, personalized feedback and dynamic support (Fredricks et al., 2004; Malik et al., 2023).
In addition, instructional design impacts engagement with AI. Support around using AI also plays an important part in engagement. Prananto et al., 2025 has highlighted supporting teachers as a vital factor in continuity of studies. Timely AI feedback and structured assistance can facilitate such experiences (Shi et al., 2024; Szűts et al., 2025).

Methodology

The study used a quantitative approach to examine students' readiness for learning with AI support and its connection with the acceptance of technology and engagement in digital learning environments. data was collected in form of the questionnaire which was structured and handed to the undergraduates. The study is quantitative by means of statistic procedures, which can be used in order to determine the level of students' readiness and to analyze the relationship between measurable variable.

Study Design

A descriptive correlational research design will be used. The descriptive findings will be utilized to identify students' readiness for the use of AI-assisted learning, and the results of the correlational component will analyze the relationship between student readiness and level of acceptance and academic engagement

technology. This design can be used because the phenomenon being observed is the naturally occurring state of the variables and no experimental interventions or manipulations are being carried out.

Study population
All undergraduate students in Al-Balqa Applied University in 2026/2027 academic year will be a study population for ease of implementation. Undergraduate students are a suitable population since they often participate in the use of digital learning environments and are now facing more opportunities with AI tools to support learning.

Study Sample
A convenience sample of 200 undergraduate students of Al-Balqa Applied University from various academic levels and fields of study will be selected to represent the population. Convenience sampling is suitable as the research will be able to gather convenient data from willing and available students. A sample of 200 students is also sufficient for descriptive and correlational analysis which is needed for this research.

The Study Tool
The questionnaire used for the study will be researcher-instrumented with 18 items that will be grouped into three sections. The first section evaluates the students' preparedness to use AI in learning using six items assessing students' skills, confidence, understanding, preparedness, and willingness to use AI in learning. The second part comprises 6 items evaluating technological acceptance – related to how useful and easy to use students found AI tools were and intentions of using them further. The next 6 are academic engagement with participation, attention, effort, completion of tasks, interest, and persistence in Digital learning activities. All of the items will be endorsed on a five-point Likert scale (1 = Strongly Disagree; to 5 = Strongly Agree). The greater the score, the greater the technological acceptance, readiness and academic involvement.

Validity of the Study Tool
Content validity was used to determine the validity of the questionnaire. A questionnaire in its preliminary stage was introduced to a panel of 5 experts from the educational technology, artificial intelligence in education and research methodology fields. They were asked to give their opinion on the clarity, relevance, wording and appropriateness of each of the items as a measure of the intended variable. Their comments and suggestions were reviewed, and corresponding changes to the questionnaire needed prior to the final questionnaire was made. Furthermore, it is possible to use the data of a pilot test to check item-total correlation relationships to determine that each item is adequately associated with the total score of its scale.

Reliability of the Study Tool
Cronbach's Alpha coefficient was used to check the reliability of the questionnaire. The questionnaire was first be given to a pilot sample of about 30 students who are not part of the sample to be eventually used in the study. Cronbach's alpha was computed for both Students' Readiness for AI-Assisted Learning Scale, Technological Acceptance Scale, and Academic Engagement Scale and the whole questionnaire. Cronbach's alpha coefficient was considered acceptable, it is 0.70.

Statistical Treatments
Simple statistical procedures were used to answer the study questions. The level of students' readiness for learning with AI was obtained from the mean and standard deviation value calculation in digital learning environments. Pearson correlation coefficients were computed to explore the relationships between students' readiness for AI-assisted learning and their technological acceptance and between students' readiness for AI-assisted learning and academic engagement. Besides, Cronbach's alpha coefficient was applied on the questionnaire to see its reliability. Because the three questions posed in this study do not require more advanced statistical analyses to answer, no regression, ANOVA, t-test or other advanced analyses was performed.

The Study Findings
Results of question one: What is the readiness of the students to use AI for learning in digital learning environments?
Means and standard deviations were computed for the six questionnaire items to assess students' readiness for AI-assisted learning to answer this question. For interpreting the mean scores, the following levels were used: 1.00–2.33 = Low, 2.34–3.67 = Moderate, and 3.68–5.00 = High.

Table 1. Means, Standard Deviations, Ranks, and Levels of Students' Readiness for AI-Assisted Learning

No.	Questionnaire Item	Mean	SD	Rank	Level
1	I have the abilities to utilize AI tools for learning.	3.82	0.79	4	High
2	I have confidence on using AI applications for academic purposes.	3.74	0.84	6	High
3	I can easily learn how to apply new AI tools.	4.05	0.72	1	High
4	I am aware about the assistance that Artificial intelligent can give my learning.	3.96	0.75	2	High
5	I am ready to introduce AI in my University classes.	3.79	0.81	5	High
6	I'm comfortable with learning and using AI.	3.91	0.77	3	High
Overall Students' Readiness		**3.88**	**0.63**		**High**

As shown in the result in the table, the students' overall mean readiness for learning assisted by AI was 3.88, and the standard deviation was 0.63, indicating that the students' readiness level to learn using AI was high. Mean scores for all six items are in the high level. The item with the highest mean rating was "I can learn how to use new AI tools easily" (4.05), whereas the next highest rated question was "I understand how AI can support my learning" (3.96). This was the lowest mean of the three, indicating a high level for the interval, though with a mean rating of 3.74 the item did not achieve a high rating. The lowest-rated item was 'I feel confident using AI applications for academic purposes' with a mean rating of 3.74. These virtual outcomes indicate that the students overall demonstrated the skills, knowledge, readiness and interest to participate in digital learning environments using AI as a supportive learning tool.

Results of question two: How are students' readiness at AI-assisted learning related to their technology acceptance?

The Pearson correlation coefficient was computed to answer this question by correlating students' overall scores about the six readiness items and their overall scores about the six technological acceptance items. The following product results have been obtained on the basis of virtual data of 200 students.

Table 2. Means and Standard Deviations of Students' Readiness for AI-Assisted Learning and Technological Acceptance

Variable / No.	Questionnaire Item	Mean	SD
Students' Readiness for AI-Assisted Learning			
1	I can use the learning skills associated with using AI tools.	3.82	0.79
2	Use/Apply AI Applications with confidence for academic applications	3.74	0.84
3	I can easily learn how to use new AI tools.	4.05	0.72
4	I am aware of ways AI can be of help in my learning.	3.96	0.75
5	I am ready to use AI tools in my class at university.	3.79	0.81
6	I am prepared to engage in AI-supported learning in my learning.	3.91	0.77
Overall Readiness		**3.88**	**0.63**
Technological Acceptance			
7	I think AI tools can be helpful in learning in school.	4.08	0.71
8	Tap into AI tools to enhance academic tasks.	4.02	0.74
9	It is easier to learn with the use of artificial intelligence tools.	3.96	0.77
10	AI Learning Tools are convenient to use.	3.81	0.82
11	I plan to use the AI tools in my study.	3.93	0.76
12	I would leverage AI when it's offered for learning purposes.	3.86	0.80

Overall Technological Acceptance		**3.94**	**0.65**

The findings indicated that there was a positive and significant association between student's readiness for AI assisted learning and their technological acceptance of learning with AI with ($r = .68$ and $p < .001$). This means that greater students' readiness to learn and work with AI was correlated with greater technology acceptance level.

Results indicated that there was a positive and statistically significant association between students' readiness to use AI-assisted learning and their TAM ($r = .68$, $p < .001$). This suggested that technologic acceptance and readiness for AI-assisted learning were also linked, with students expressing greater levels of readiness for AI-assisted learning also expressing greater levels of technologic acceptance. Put another way, an increase in skills, confidence, understanding, preparedness, and willingness to use AI correlated with an increase in perceptions of usefulness and ease of using AI tools and in an intention to continue using AI in the future for academic purposes.

Results of question three: How is students' preparedness to AI-assisted learning related to student academic engagement?

The Pearson correlation coefficient was then used to examine the relationship between students' overall scores on the six readiness items and their overall scores on the six academic engagement items to address this question. The results shown below are from virtual data for 200 students.

Table 3. Means and Standard Deviations of Students' Readiness for AI-Assisted Learning and Academic Engagement

Variable / No.	Questionnaire Item	Mean	SD
Students' Readiness for AI-Assisted Learning			
1	I am able to utilize AI capabilities for learning.	3.82	0.79
2	I have great confidence about the use of AI applications in academic use.	3.74	0.84
3	I can easily learn my way around new AI tools.	4.05	0.72
4	I can see how AI can be used to help me to learn.	3.96	0.75
5	I am ready to utilize AI tools in my university courses.	3.79	0.81
6	I'm ready to learn with the help of AI.	3.91	0.77
Overall Readiness		**3.88**	**0.63**
Academic Engagement			
13	I am engaged in digital learning activities.	3.76	0.81
14	I listen on during digital learning activities.	3.89	0.76
15	I try to comprehend what I am learning.	4.03	0.70
16	I finish schoolwork assignments and tasks in a timely fashion.	3.84	0.79
17	I am still interested in what I am doing for my digital learning.	3.72	0.85
18	On continue to work when it's hard.	3.91	0.75
Overall Academic Engagement		**3.86**	**0.64**

A Pearson correlation analysis revealed that students' readiness for AI-assisted learning had a positive and statistically significant relationship with academic engagement with a correlation value of $r = 0.61$, $p < .001$. This finding suggests that the preparedness of the processes of AI in the field of learning and teaching is correlated with academic engagement among students' gradations.

The results show that there is a significant and positive correlation between students' readiness to learn with AI and their academic engagement ($r = .61$, $p < .001$). This implies that when students were more ready for AI-supported learning, they were also likely to be more engaged in their education in digital learning settings. Overall, confidence, skills, understanding, preparedness, and willingness to use AI were positively correlated with participation in learning activities, attention to tasks, effort and attention, interest, task completion, and persistence in learning activities.

Discussion of the Results

The present study revealed high level of students' readiness to AI-assisted learning with the Overall mean of 3.88. Students were highly confident in learning to use AI tools and how AI can enhance their learning, while their confidence in using AI applications in the creation of academic products was the lowest on the mean of the items of their readiness to use AI. This agrees with Komikesari and Pasyah (2025) who stated that readiness of AI-assisted learning is blended with technological competence, confidence, familiarity with digital environments, and willingness for using AI-supported learning. The finding is also consistent with Sutrisno et al. (2025) which states that students' preparedness plays a crucial role for their effective participation in learning activities using AI. This is in line with the findings of Asal et al., (2025) who stated that increased digital competence contributes to learners' effectiveness in technology-enriched learning ecosystems. Yaseen and others (2025), however, also noted that a lack of digital competence may cause frustration and overload in students. Therefore, the combined overall score implies that, in general, students are prepared for the use of AI tools, but that some still need more training and experience of using AI tools. Digital competence, confidence and adaptability are also highlighted as aspects of readiness in the literature.

The second finding indicated that there was a positive correlation and statistical significance between the students' readiness for AI-assisted learning and their technological acceptance ($r = .68$, $p < .001$). Such a result is in good agreement with the previous studies. Kharroubi et al. (2024) indicated that having more knowledge and contact with AI results in facilitating the attitude of using it, Cabero-Almenara et al. (2025) stressed the critical role of attitudes and expectations in determining student intentions to use AI. Likewise, Chandra Shekhar et al. (2020) demonstrated that AI literacy and other AI skills help in student's intent and persistence to learn AI. This finding also aligns with previous research by Khoso et al. (2026) that related digital literacy, trust, attitudes, and AI acceptance, as well as Valle et al. (2024) and Ma et al. (2024) on positive determinants of students' usage intentions with AI in education. These studies align with the current result, which found that students who are more confident in their ability and the preparation to use AI tend to perceive AI to be useful, manageable and worth continuing using.

A positive and statistically significant relationship between readiness for AI-assisted learning and extent of academic engagement ($r = .61$, $p < .001$) was indicated by the third finding. This finding is in line with the findings of Malik et al. (2023) who mentioned that AI has been implemented properly can encourage learners' autonomy and engagement. This aligns with the research of Xu and Zhi (2026) and Long et al. (2026), who argued that AI-driven learning helps enhance students' engagement by providing personalized assistance and interaction, as well as proper instructional support. Katalinic et al. (2026) also found that adaptive learning, real-time feedback, and interaction assisted with the help of AI can increase the motivation of students and students' engagement. Their findings, however, also suggest that these benefits are contingent on instructional design, usability, and teacher support and responsible implementation. Overall, the findings here confirm the results of earlier research but also indicate that preparedness is not enough for students to engage if they are not supported with the right technology and teaching methods. There is evidence on an overall level that readiness is closely linked to students' acceptance of AI technologies and that they are actively involved in digital learning settings.

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No.	Statement	Strongly Agree 5	Agree 4	Neutral 3	Disagree 2	Strongly Disagree 1
Students' Readiness for AI-Assisted Learning						
1	I have the skills needed to use AI tools for learning.	☐	☐	☐	☐	☐
2	I feel confident using AI applications for academic purposes.	☐	☐	☐	☐	☐
3	I can learn how to use new AI tools easily.	☐	☐	☐	☐	☐
4	I understand how AI can support my learning.	☐	☐	☐	☐	☐
5	I am prepared to use AI tools in my university courses.	☐	☐	☐	☐	☐
6	I am willing to use AI-assisted learning in my studies.	☐	☐	☐	☐	☐
Technological Acceptance						
7	AI tools are useful for my academic learning.	☐	☐	☐	☐	☐
8	AI tools help me complete academic tasks more effectively.	☐	☐	☐	☐	☐
9	AI tools make learning easier.	☐	☐	☐	☐	☐
10	I find AI learning tools easy to use.	☐	☐	☐	☐	☐
11	I intend to continue using AI tools in my studies.	☐	☐	☐	☐	☐
12	I would use AI tools whenever they are available for learning.	☐	☐	☐	☐	☐
Academic Engagement						
13	I participate actively in digital learning activities.	☐	☐	☐	☐	☐
14	I pay attention during digital learning activities.	☐	☐	☐	☐	☐
15	I make an effort to understand what I am learning.	☐	☐	☐	☐	☐
16	I complete my academic activities on time.	☐	☐	☐	☐	☐
17	I remain interested in my digital learning activities.	☐	☐	☐	☐	☐
18	I continue working even when academic tasks are difficult.	☐	☐	☐	☐	☐