




## Factors Influencing Secondary School Students' Readiness to Learn in the Age of Artificial Intelligence in Saudi Arabia

Mishari M. Q. Al-Mutairi<sup>1\*</sup>, Mohammed H. Albahiri<sup>2</sup>, Ali A. M. Alhaj<sup>3</sup>

<sup>1</sup> King Khalid University, Saudi Arabia

<sup>2</sup> King Khalid University, Saudi Arabia

<sup>3</sup> King Khalid University, Saudi Arabia

\*Corresponding Author: [alalhaj@kku.edu.sa](mailto:alalhaj@kku.edu.sa)

**Citation:** Al-Mutairi, M. M. Q., Albahiri, M. H., & Alhaj, A. A. M. (2026). Factors influencing secondary school students' readiness to learn in the age of artificial intelligence in Saudi Arabia. *Journal of Cultural Analysis and Social Change*, 11(1), 563-576. <https://doi.org/10.64753/jcasc.v11i1.3914>

**Published:** January 02, 2026

### ABSTRACT

By the time students reach secondary education, artificial intelligence (AI) technologies are changing teaching practices, learning environments, and ways of engaging students through flexible, data-driven, and personalized learning systems. Thus, students' readiness to learn in AI-supported contexts has emerged as a serious education issue, particularly in the context of secondary school, an acute juncture of cognitive, emotional, and social growth. This study employs a descriptive–analytic empirical design to investigate the impact of social, familial, and personal factors on secondary school students' readiness for learning in the AI era. Data were collected using a structured questionnaire administered to high school students and the data were analysed by descriptive statistics: frequencies, percentages, means, and standard deviations based on participation in a three-point Likert scale. The results show that students are prepared for AI-enhanced learning to a moderate degree. Peer collaboration was identified as the most important social factor, whereas family-related factors, notably parental views of technology as a distraction and a lack of guidance when learning difficulties occurred, negatively impacted readiness. At a micro level, they reported having difficulty with excessive electronic workloads, time management, sustained attention and self-regulation. Overall, students' readiness for AI-based learning is determined by a combined and moderate degree of social, familial and personal influences, reinforcing the point that a balanced, holistic approach must incorporate technological innovation with supportive social environments, informed family involvement, and the development of the learners' self-regulatory skills.

**Keywords:** Readiness to learn, artificial intelligence, secondary school students, readiness to learn, factors

### INTRODUCTION

Artificial intelligence (AI) represents a pivotal vehicle in modern educational transformation, facilitating customized education, adaptive learning processes, and data-driven feedback loops (Luckin et al., 2016; UNESCO, 2021). In the Saudi context, this change aligns closely with Vision 2030, which focuses on digital innovation and the preparation of future-ready learners. AI-enabled systems have the potential to further learner-centered pedagogies and address individual differences across school education. However, the effectiveness of AI in education extends beyond technological infrastructure or system prowess; it requires that students be ready and willing to interact with AI-facilitated learning environments. From a learning sciences

standpoint, readiness to learn in an AI environment is a multifaceted construct including technological ability, motivational orientation, psychological preparedness, and pedagogical fit (Zimmerman, 2002; Teo, 2011).

Some empirical studies have shown that, although students play an active role in using learning technologies, the ability to engage does not automatically lead to readiness for deeper learning. Research highlights that learners' readiness for higher-order learning processes (e.g., critical thinking, planning, reading, writing, and academic discussion) is often inadequate compared to their level of technological engagement (Parkes et al., 2015). This significant disconnect occasionally results in minimal cognitive engagement and superficial technology use. No significant relationships exist between students' readiness to learn and their level of engagement in e-learning environments (Al-Anzi, 2023), and researchers have been observed similar trends in Saudi secondary education. These findings suggest that, as opposed to pure "integration," effective learning outcomes depend on purposeful AI-integrated learning. Genuine AI adoption occurs only through thorough psychological, cognitive, and technical preparation supported by sociocultural and pedagogical fit. Previous research highlights the need for structured student preparation and contextualized support within AI-enhanced learning environments (Hassan & Wahbah, 2022; Al-Malki & Qazzaq, 2017). Consequently, investigating the barriers to readiness of secondary school students to learn within AI-supported settings is necessary.

## **LITERATURE REVIEW**

### **Learning Readiness in the Age of AI Technologies**

Learning readiness in the age of AI refers to the overall readiness of students to participate effectively within an intelligent, technology-based learning environment. This construct includes existing knowledge, as well as technological literacy, psychological readiness, motivational orientation, and the commitment to use AI-supported tools appropriately in educational settings. Within these contexts, preparedness encompasses a learner's willingness to responsibly adapt AI tools, personalize educational programs, receive feedback via data-driven suggestions, and utilize responsive teaching supports to adjust to the curriculum. In contemporary AI-informed learning, readiness represents a multifaceted construct involving cognitive, affective, technological, and social dimensions. The success of AI in education depends on the degree to which a student is prepared to engage in complex learning processes, such as critical thinking, self-regulation, and autonomous learning. Consequently, evaluating and improving student readiness has emerged as a fundamental prerequisite for the successful implementation of AI.

### **Concept of Learning Readiness and Its Importance**

Learning readiness constitutes a multidimensional construct comprising learners' cognitive, psychological, motivational, technological, and social readiness for engaging in learning in a meaningful way and achieving educational goals. Well beyond what students already know, it has elements of intrinsic motivation, self-regulation, emotional stability, organizational skills, and the ethical use of digital and AI technologies. Current learning theory argues that readiness is a necessary component of deep learning, critical thinking, and knowledge transfer, especially within technology-enabled environments (Zimmerman, 2002; Teo, 2011). Learners exhibiting high readiness typically demonstrate greater involvement, autonomy, and perseverance; conversely, low readiness results in superficial learning and academic underachievement (Parkes et al., 2015; Selwyn, 2019). In the age of digital transformation and AI-supported education, learning readiness is increasingly crucial. The pedagogical value of intelligent devices is not determined by their availability but depends on the abilities, motivation, and moral sensibility of learners to use them responsibly for meaningful tasks (Luckin et al., 2016; UNESCO, 2021).

### **Objectives of Learning Readiness**

Learning readiness serves as a theoretical framework to ensure that learners are cognitively, psychologically, motivationally, and technologically prepared to participate actively in the learning process, particularly within AI-mediated contexts. This construct aims to assess the background knowledge, skills, and attitudes of learners to facilitate learner-responsive instructional design and appropriate educational interventions. Furthermore, learning readiness fosters self-regulation, student autonomy, and the ethical use of digital technologies and AI applications. In addition, this preparation minimizes learning difficulties, boosts academic performance, and realizes the pedagogical potential of contemporary technologies by aligning learner abilities with instructional requirements (Luckin et al., 2016; UNESCO, 2021; Zimmerman, 2002).

## Components of Learning Readiness

The study of learning readiness involves an integrated system of interdependent components that empower learners to engage effectively in educational contexts and achieve high-quality outcomes. These components include the cognitive component, which comprises the knowledge and skills necessary to comprehend new content and construct understanding based on prior experiences; the psychological and affective component encompasses emotional stability, self-confidence, and self-regulation, whereas the motivational component stems from intrinsic drive, curiosity, and the desire to succeed ( Parkes et al., 2015; Selwyn, 2019). Learning readiness also incorporates skill-based and organizational elements (e.g., time management, planning, and perseverance) alongside technological components involving the ability to navigate digital environments with ethical responsibility. Finally, the social component—consisting of familial and school support, positive interaction, and collaboration—reinforce these factors to sustain and enhance learning effectiveness.

## Types of Learning Readiness

Learning readiness consists of several integrated dimensions that collectively determine a learner's competence in engaging with educational settings, particularly those supported by digital and AI technologies. Cognitive readiness involves preexisting knowledge and high-level thinking skills; psychological and affective readiness includes emotional health, self-assurance, and a positive attitude toward learning; and motivational readiness relates to internal motivation, interest, and continued engagement. Skill-based readiness encompasses fundamental learning competencies (e.g., reading, writing, critical thinking, self-regulation, and time management), whereas technological readiness describes the proficiency with which learners use AI applications effectively, safely, and ethically. Finally, social readiness reflects learners' capacity to interact meaningfully with peers and teachers while receiving positive family and school support—two key determinants for successful and sustained learning (Zimmerman, 2002; Teo, 2011; UNESCO, 2021).

## Assessing Learning Readiness

Assessing learning readiness involves a systematic educational measurement procedure to monitor student preparedness for specific learning endeavors. This process ascertains cognitive, psychological, motivational, skill-based, technological, and social components (Zimmerman, 2002; Pintrich, 2004). Consequently, the assessment must also diagnose readiness for effective engagement in the learning process. Such evaluation identifies learner strengths, needs, and areas for targeted support, helping inform the design of teaching strategies tailored individual traits and requirements (Parkes et al., 2015). Researchers and educators measure learner readiness through various instruments, such as questionnaires, psychological scales, observation checklists, interviews, and performance analysis (Pintrich, 2004). Within modern educational environments—including digital and AI-enabled settings—measuring learning readiness is important for driving learner-centered education (Luckin et al., 2016). This practice enhances learning outcomes and prevents academic difficulties by aligning instruction with the student's current level of readiness (Luckin et al., 2016; UNESCO, 2021).

## Factors Influencing Secondary School Students' Readiness to Learn

Secondary school students' readiness to learn is influenced by various elements. This readiness depends on the interconnectedness of cognitive, psychological, motivational, skill-related, technological, social, and pedagogical factors. These elements interact to determine a student's actual level of preparedness within existing educational contexts. At the cognitive and study levels, prior knowledge, a fundamental understanding of content, and the ability to analyze and think critically support the construction of new knowledge on a solid foundation (Power et al., 2022). Individual psychological and emotional well-being (e.g., self-esteem, self-confidence, emotional stability, self-worth, and stress management) relates directly to motivation, attention, and determination. Furthermore, intrinsic motivation, enthusiasm for learning, expectations for success, and future goal achievement constitute the primary drivers of positive learning readiness.

## Concept of Social Factors and Their Importance

Social factors refer to an integrated system of influences stemming from a learner's social environment, including family, peers, school, and the local community. These factors, along with the cultural values and norms they embody, collectively shape individual behavior, attitudes, and motivation toward learning. These influences hold central importance in the educational field because they directly affect learner readiness, engagement in educational situations, and the quality of interaction with teachers and classmates. Additionally, family and community support enhance self-confidence, foster intrinsic motivation, and reduce academic anxiety (Power et al., 2022). Positive social relationships also reinforce values of cooperation, discipline, and responsibility while supporting collaborative learning and communication skills. In contemporary educational environments—

particularly those supported by digital technologies and AI—the importance of social factors is amplified. These factors play a decisive role in guiding the effective and ethical use of technology and in achieving balanced, sustainable learning.

### **Other Social Factors**

The involvement of multiple social influences shapes a student's ability to learn in secondary school, particularly regarding family support for motivation and self-discipline. A family's socioeconomic position determines access to educational resources, which subsequently affects a student's mental health and academic goals. Peer groups also significantly influence this process, either facilitating or hindering learning readiness. Furthermore, establishing positive relationships with teachers is essential for fostering a secure sense of self-belief (See et al., 2021). A school climate characterized by belonging, support, and clear direction promotes academic preparedness. Furthermore, a prevailing culture that values education plays a crucial role in developing student aspirations and general readiness to learn.

### **Concept and Importance of Family Factors**

Family factors represent an assemblage of educational, psychological, and social influences originating within the learner's home environment. These dimensions include parental education levels, socialization patterns, emotional support, academic monitoring, family stability, and economic status, as well as family attitudes toward education and modern technologies. The family serves as the primary institution for foraging a learner's personality and instilling values regarding learning, discipline, and academic success (Yilmaz, 2017). These aspects are critically important because they directly influence motivation, psychological, and cognitive readiness, and the capacity for focus and persistence. Positive family support correlates with higher self-esteem, better educational attitudes, and increased academic achievement. In addition, a stable, supportive home environment—combined with the monitoring of digital technology and AI application usage—contributes significantly to effective learning. This is particularly vital in secondary education, given the high cognitive, psychological, and social sensitivity of students during this developmental stage.

### **Personal Factors**

Personal factors encompass a broad group of individual attributes and traits that identify learners and shape their behaviors and educational responses. These dimensions include cognitive ability, emotional stability, motivation, attitudes, values, and learning styles, alongside self-confidence, self-regulation skills, and personal interests. These internal elements guide how learners respond to academic situations, the extent of their involvement in the learning process, and the types of educational opportunities they find appealing within a school context (Zheng et al., 2021). These determinants significantly influence a learner's readiness, motivation, concentration, and academic ownership. High intrinsic motivation and self-confidence promote deep learning and positive attitudes, which foster academic performance and the ability to overcome difficulties. Furthermore, self-regulatory behaviors and time management serve as strong indicators of success within contemporary learning environments where autonomy is essential. Emotional factors are also vital for managing academic anxiety and achieving psychological stability. Within digital and AI-underpinned learning spaces (e.g., online courses and mobile applications), personal factors determine effective engagement with technology and responsible decision-making. Consequently, addressing these factors is a key element in designing learner-centered education tailored to individual needs to enhance performance and sustainability.

### **Other Personal Factors**

Specific personal attributes, such as age, gender, cognitive level, and emotional maturity, set students apart and further determine their readiness and attitudes toward education. Key predictors within this domain include self-efficacy and the ability to use self-regulation and time management. These individual characteristics exert an immediate influence on a learner's style, level of involvement, and capacity for concentration and persistence. In addition, past experiences and educational backgrounds shape a learner's perception and expectations of the learning experience, ultimately influencing their view of achievement. Modern learning environments, particularly those leveraged by AI, elevate the importance of individual psychological factors regarding the effective and ethical use of technology. Therefore, considering these factors helps educators address individual differences and facilitate more successful, sustainable learning experiences.

## **PREVIOUS STUDIES**

The section provides a review of related literature and previous empirical research. The primary objective is to elucidate the fields, aims, methods, instruments, and principal findings of these investigations. This synthesis

offers scientifically relevant information and identifies points of convergence or divergence with the current work. The reviewed studies are categorized under the following themes:

- Studies addressing learning readiness.
- Studies addressing factors influencing learning readiness

### **Theme One: Studies Addressing Learning Readiness**

In a study by Al-Malki and Qazzaq (2017), researchers assessed the readiness level among students at Umm Al-Qura University to implement e-learning within academic education. Utilizing a descriptive survey and a questionnaire encompassing four domains, the researchers examined a population of approximately 45,000 students at the Al-Abdiyyah and Al-Zahir branches in Makkah during the 1445–1446 AH academic year. The study involved a sample of 1,000 students selected through simple random sampling. Findings indicated that the students' readiness for e-learning application within the personal factor's domain remained at a moderate level (mean score = 3.38).

Similarly, Al-Saadi (2021) examined digital learning readiness among school teachers in northern Jordan during the COVID-19 pandemic. This descriptive–analytical study employed a questionnaire to measure preparedness levels. The sample included 233 male and female teachers from public schools in the Irbid Qasabah District. Mean scores for the digital learning readiness domains ranged from 3.26 to 4.37, indicating a moderate overall level. Notably, the domain “curriculum suitability for digital learning” received the highest average, whereas “students' abilities and skills in dealing with digital technology” received the lowest. Furthermore, Karatas and Arpacı (2021) investigated the explanatory value of self-directed learning skills, metacognitive awareness, and 21st-century competencies in predicting online learning readiness during the COVID-19 pandemic. Using a survey method with three scales, the researchers sampled 834 male and female teachers from a public university in Turkey. Findings revealed that self-directed learning skills, metacognitive awareness, and 21st-century competencies accounted for 39% of the variance in online learning readiness.

### **Theme Two: Research and Studies Addressing Factors Influencing Learning**

Al-Harbi's study (2015) identified the social factors influencing female students' Internet usage. Adopting a descriptive–analytical methodology and utilizing a questionnaire as the primary data collection instrument, the researchers examined a sample of 800 students selected randomly from a population of approximately 11,000 at Princess Nourah bint Abdulrahman University. The findings revealed that academic achievement and the level of social interaction represent the most influential factors shaping Internet usage patterns. These patterns, in turn, directly affect educational practices and engagement with university learning requirements.

Similarly, Al-Gharbawi and Shehata (2023) examined the factors affecting Saudi university students' adoption of e-learning during the COVID-19 pandemic, employing an inductive/deductive approach. The researchers designed a 42-item questionnaire to achieve the study objectives. Although the study population included approximately two million students in 2022, the sample consisted of 338 students. The results indicated a statistically significant effect of expected effort, support, facilitation, and social influence on perceived ease of use, perceived usefulness, and the intention to adopt e-learning. These findings underscore the pivotal role of social and organizational factors in enhancing learning readiness within digital educational environments.

### **Commentary on Previous Research and Studies**

Examining available prior research indicates that various educational researchers now prioritize learning readiness in the era of AI technologies. Various studies have addressed its dimensions within educational contexts, illustrating an alignment with the current research regarding theoretical frameworks and methodological approaches.

#### ***Points of Agreement***

This study echoes prior work concerning student learning in the digital age, emphasizing the necessity of integrating scientific and technological advancements into the educational process. Like previous literature, this research focuses on the causes, contributors, and obstacles to learning with 21st-century technology. Furthermore, the present study utilizes a questionnaire as the primary instrument, aligning its objectives and data collection methods with established academic practices.

#### ***Points of Difference***

Although prior analyses predominantly depended on central variables of readiness, this study focuses on primary variables that contribute to the formation of multiple subordinate variables. Previous studies have often addressed specific variables rather than treating learning readiness as a holistic construct. Furthermore, this study focuses exclusively on the secondary school student population, distinguishing it from research conducted at

other educational stages. In addition, the current study uniquely categorizes the distinct factors influencing learning readiness—specifically isolating social and family factors—whereas previous studies have often combined these elements without clarifying their distinctions.

### ***Aspects of Benefit***

The existing study benefits from access to scientific references and previous research, which facilitates a comprehensive understanding of the topic. The research methodologies and measurement tools used in earlier studies informed the design of the current research instrument, ensuring it rests upon solid scientific foundations. Furthermore, analyzing the results of previous studies helped identify research gaps, which improved the originality and academic focus of this investigation.

## **RESEARCH METHODOLOGY**

### **Research Design**

Given the nature of this investigation, the study utilized a descriptive survey research design to determine the factors influencing secondary school students' readiness to learn in the era of AI technologies in Saudi Arabia. This design facilitates the investigation of preexisting learning contexts, practices, and student attitudes within AI-supported environments without distorting the research site. Consequently, this approach provides the opportunity to analyze and measure the cognitive, psychological, motivational, technological, and social aspects affecting the academic readiness of secondary students. The researchers selected the descriptive methodology for its capacity to realistically represent educational situations. Given that the study collected data on trends, relationships, and learning needs, the design yields empirical evidence suitable for forming valid conclusions and recommendations to strengthen student preparedness for AI-integrated learning in Saudi secondary schools.

### **Research Population and Sample**

The study population consists of 258 night-shift students attending secondary schools supervised by the Al-Hamdaniyah Education Office in Jeddah Governorate. Because a single secondary school, Zaid Al-Khair Secondary School, provides evening education within this jurisdiction, the survey sample covered the entire population. Consequently, the researchers utilized a census sampling method, ensuring that the respondents represent demographic characteristics of the population as a whole. Each student completed the research instrument during the survey period. Following data screening and validation processes, 133 responses were collected, all of which were considered appropriate for statistical analysis. This sampling approach enhances the reliability of data interpretation, accurately mirroring the characteristics of the targeted population.

### **Research Instrument**

The questionnaire served as the primary data measurement tool to determine the factors influencing the readiness of secondary school students for AI-integrated learning. The researchers developed this instrument following a comprehensive review of theoretical and empirical literature concerning learning readiness, specifically focusing on the educational development and learning styles of secondary students. The instrument utilized a three-point Likert scale (Agree = 3, Moderately Agree = 2, Disagree = 1) to ensure clarity and minimize response ambiguity. Data analysis relied on a class width formula  $[(3 - 1) \div 3 = 0.67]$  to categorize the results. On the basis of this calculation, the researchers applied the following interpretive ranges: 1.00–1.67 for disagree, 1.68–2.33 for moderately agree, and 2.34–3.00 for agree. This categorization facilitates an accurate interpretation of student beliefs regarding AI-powered educational environments.

### **Validity of the Instrument**

To ensure the instrument's accuracy, the researchers established validity through face validity and internal consistency measures.

### ***Face Validity***

Several expert judges evaluated the scale items to determine if each item accurately represented its intended dimension, if the allocated response score were appropriate, and if the linguistic formulation was precise. The judges also provided recommendations on whether specific items should be included or omitted. Some experts suggested rephrasing questions to begin with first-person present-tense verbs. They also recommended that the scale dimensions explicitly reference AI technologies to ensure more accurate data inference regarding readiness

in this specific context. The researchers established an item selection criterion requiring 80%–100% agreement among the judges for an item to be retained.

### **Internal Consistency Validity**

Internal consistency coefficients were computed using Pearson correlation coefficients to measure the relationship between each item score and the total score of its corresponding dimension. The results are shown in Table 1.

**Table 1:** Pearson Correlation Coefficients for Internal Consistency between the Items of the Study Domains and the Total Score of Each Domain

Domain	Item No.	Correlation Coefficient	Item No.	Correlation Coefficient
Social Factors	1	0.641**	6	0.805**
	2	0.491**	7	0.737**
	3	0.684**	8	0.443*
	4	0.749**	9	0.568**
	5	0.723**	10	0.788**
Family Factors	11	0.686**	16	0.467**
	12	0.459**	17	0.698**
	13	0.471**	18	0.662**
	14	0.604**	19	0.717**
	15	0.633**	20	0.692**
Personal Factors	21	0.708**	26	0.649**
	22	0.712**	27	0.634**
	23	0.583**	28	0.603**
	24	0.614**	29	0.426*
	25	0.605**	30	0.650**

#### **Note:**

\* Significant at the 0.05 level ( $p \leq 0.05$ )

\*\* Significant at the 0.01 level ( $p \leq 0.01$ )

Table 1 indicates that all items within the social, familial, and personal domains exhibit positive and significant Pearson correlation coefficients with their respective domain total scores. These moderate-to-high correlation values demonstrate strong internal consistency and alignment between the items and their constructs. Although most items reached significance at the 0.01 level, a small number reached significance at the 0.05 level without compromising scale reliability. Furthermore, significant correlations between each domain score and the total scale score provide additional validation of the instrument's internal consistency. Collectively, these findings indicate that the scale's psychometric characteristics are suitable for studying the antecedents of student readiness in the AI era.

Table 2 presents the correlation coefficients between the scale domains and the total score. The findings show positive and statistically significant correlations at the 0.01 level across all domains. The correlation coefficient for social factors was 0.852, followed by family factors (0.835) and personal factors (0.818). Such high correlation values indicate robust internal consistency. These findings validate that the scale domains effectively measure the overall construct, confirming that the instrument is appropriate for investigating factors related to AI-age learning readiness. Consequently, the data reveal that the total scores for the social, familial, and personal domains correlate positively with the global scale. These results demonstrate that the scale is resilient to internal variations and serves as a robust tool for evaluating student readiness.

Table 2: Correlation Coefficients between the Scale Domains and the Total Scale Score

Domain	Number of Items	Correlation Coefficient
Social Factors	10	0.852**
Family Factors	10	0.835**
Personal Factors	10	0.818**

### **Reliability of the Scale**

Four researchers examined the reliability of the scale by distributing the instrument to 30 students excluded from the main study sample. They calculated Cronbach's alpha coefficients to ensure the internal consistency of the constructs. This process provided evidence to estimate the stability of the instrument. The instrument reliability coefficients are presented as follows

Table 3: Cronbach's Alpha Coefficient for Assessing the Reliability of the Research Instrument

Domain	Number of Items	Cronbach's Alpha Reliability Coefficient
Social Factors	10	0.860
Family Factors	10	0.780
Personal Factors	10	0.823
Overall Scale Reliability	30	0.907

The internal consistency reliability of the research instrument is reported in Table 3. For the 38-item scale, the overall Cronbach's alpha coefficient reached 0.907, indicating excellent reliability. The reliability coefficients for the subscales ranged between 0.780 and 0.860, suggesting acceptable to high reliability across all domains. Social factors demonstrated the highest reliability among the subscales, followed by personal factors, whereas family factors showed a satisfactory level. All coefficients within the tool exceed the accepted threshold of 0.70, which confirms the strong reliability of the measure and demonstrates that the instrument is appropriate for practical use and further statistical evaluation.

## RESULTS AND DISCUSSION

### Presentation, Discussion, and Interpretation of Results

This section presents the data analysis results, underpinned by the proposed theoretical framework and related literature. The results are discussed and interpreted in relation to the specific research questions.

### Results Related to the First Research Question

Descriptive statistical analyses were employed to address the first research question regarding the social factors that influence secondary school students' readiness to learn in the era of AI technologies. The researchers computed frequencies, percentages, means, and standard deviations for all items within the social factor's domain. This strategy ascertained the level of student agreement regarding social influences on learning readiness in AI-supported educational contexts. The results, summarized in Table 4, provide a clear representation of the dominant social influences and their relative significance.

Table 4: Participants' Responses to the Items of the Social Factors Domain Influencing Learning Readiness in the Age of AI among Secondary School Students

Items	Frequency	Level of Agreement			Mean	Standard Deviation	Level of Agreement	Rank
		Disagree	Moderately Agree	Agree				
	%							
I agree with another person to help prepare my school assignments	F	17	33	83	2.50	0.714	Agree	1
	%	12.8	24.8	76				
Free offers are available for courses that develop learning skills.	F	19	38	76	2.43	0.731	Agree	2
	%	14.3	28.3	57.1				
My friends teach me how to use technology for learning purposes	F	18	44	71	2.40	0.717	Agree	3
	%	13.5	33.1	53.4				
I receive community announcements inviting participation in educational courses.	F	19	44	70	2.38	0.725	Agree	4
	%	14.3	33.1	52.6				
My classmates organize study groups during examination periods	F	31	38	64	2.25	0.811	Moderately Agree	5
	%	23.3	28.6	48.1				
The community	F	33	50	50	2.17	0.786	Moderately Agree	6
	%	24.8	37.6	37.6				

requires me to complete volunteer hours in technological and educational fields								
I am able to prepare for learning without the need for a private tutor outside school. The high cost of educational courses prevents enrollment in them.	F	39	42	52	2.10	0.824	Moderately Agree	7
	%	29.3	31.6	39.1				
The high cost of educational courses prevents enrollment in them.	F	36	55	42	2.95	0.767	Moderately Agree	8
	%	27.1	41.4	31.6				
There is a lack of programs in our residential environment that encourage learning, despite my efforts to find them	F	58	41	34	1.82	0.815	Moderately Agree	9
	%	43.6	30.8	25.6				
The school offers preparatory courses for university readiness and choosing an appropriate academic major	K	68	26	39	1.78	0.873	Moderately Agree	10
	%	51.1	19.5	29.3				
Overall Mean:					2.18	0.782	Moderately Agree	

Aggregate results from the table indicate that participants generally agreed to a moderate extent that social factors determine learning readiness for the age of AI (mean score = 2.18/3.00; SD = 0.782. This mean falls within the second level of the three-point scale (1.68–2.33). Mean scores ranging from 1.78 to 2.50 further reflect moderate-to-high levels of agreement. These findings highlight the importance of students' social environment, including peer interaction, community involvement, and social support, in fostering readiness for positive learning outcomes. Notably, the highest-ranking item, "I agree with another person to complete my school assignments" (M = 2.50), indicates a strong leaning toward reliance. This suggests a potential lack of individual assistance for promoting independent, self-directed learning, which may diminish preparation for authentic learning. This finding resonates with previous research indicating that subpar collaboration can impede academic integrity and genuine knowledge acquisition. Conversely, the lowest-ranking item, "The school offers preparatory courses for the university stage and for choosing an appropriate specialization" (M = 1.78), suggests that the influence of such programs is minimal. This result likely stems from contextual barriers, specifically the limitations of evening school and a lack of specialized teaching strategies. Although peer support, free courses, and community projects remain valuable, critical deficiencies in institutional and environmental support continue to affect readiness. Consequently, the results emphasize the necessity of strengthening school–community programs to balance the principles of cooperative learning with the need for learner autonomy in AI-driven educational contexts.

### Results Related to the Second Research Question

To address the second research question, the researchers conducted descriptive statistical analyses regarding the family factors influencing secondary school students' readiness to learn in the age of AI technologies. Frequencies, percentages, means, and standard deviations, were computed for all items within this domain to evaluate student agreement. These results offer a clear description of prominent familial effects and their relative significance. The findings indicate varying student perceptions regarding family support and the home learning environment. Collectively, this evidence suggests that familial dimensions shape student preparedness for AI-enhanced education. The results are shown in [Table 5](#).

**Table 5:** Participants' Responses to Family Factors Influencing Learning Readiness among Secondary School Students in the Age of AI

Items	Frequency	Level of Agreement			Mean	Standard Deviation	Level of Agreement	Rank
		Disagree	Moderately Agree	Agree				
	%							
I think technology draws my attention away from education from my family	F	14	18	101	2.65	0.663	Agree	1
	%	10.5	12.5	75.9				
I lack guidance from my parents when I encounter learning-related issues	F	10	29	94	2.63	0.621	Agree	2
	%	7.5	21.8	70.7				
Learning is about practice and hard work and family has taught me	F	12	31	90	2.59	0.653	Agree	3
	%	9.0	23.3	67.7				
I feel appreciated by my parents when I learn something new	F	16	44	73	2.43	0.699	Agree	4
	%	12	33.1	54.9				
My family deals with technical difficulties I face during learning.	F	26	42	65	2.29	0.776	Moderately Agree	5
	%	19.5	31.6	48.9				
I do not have the financial ability that facilitates learning in the age of artificial intelligence technologies	F	26	47	60	2.26	0.765	Moderately Agree	6
	%	19.5	35.3	45.1				
My parents interact with every step I take in my learning process	F	42	35	56	2.11	0.855	Moderately Agree	7
	%	31.6	26.3	21.1				
I experience feelings of pessimism and frustration due to the absence of my parents' guidance	F	50	47	36	1.89	0.800	Moderately Agree	8
	%	37.6	35.3	27.1				
My brothers and sisters ask me about my progress in learning	F	76	27	30	1.65	0.826	Disagree	9
	%	57.1	20.3	22.6				
My family considers my psychological and physical readiness for learning	F	77	27	29	1.64	0.821	Disagree	10
	%							
Overall Mean:					2.21	0.753	Moderately Agree	

Table 5 indicates that secondary school students perceive the influence of family factors on learning readiness to be at a moderate level ( $M = 2.21$ ,  $SD = 0.753$ ). This overall mean falls within the second category of the three-point scale (1.68–2.33). At the item level, students agreed most strongly that their families view technology as a distraction from learning ( $M = 2.65$ ) and reported limited parental guidance when facing academic difficulties ( $M = 2.63$ ). These scores reflect ambivalent or negative parental attitudes toward technology-enhanced education. Conversely, positive parental behaviors, such as valuing academic success and emphasizing effort, received a higher degree of consensus, indicating a foundational level of support. However, items regarding sustained parental interaction, sibling follow-up, and psychological and physical readiness of the student ranked lowest. This suggests a considerable gap in consistent emotional and affective family support. In addition, moderate agreement regarding financial and technical constraints highlights structural barriers that prevent families from fully contributing to AI-based learning. Taken together, these results demonstrate that while familial support significantly affects readiness, it remains uneven and incomplete. Consequently, enhanced parental counseling, guidance, and active involvement are necessary to foster effective learning in the age of AI.

### Results Related to the Third Research Question

To address the third research question regarding the effect of personal factors on secondary school students' learning readiness in the era of AI, frequencies, percentages, means, and standard deviations for the items within the personal factor's domain were calculated. Generally, the mean scores for student responses ranged from moderate to relatively high. These insights demonstrate that individual attributes—specifically self-motivation, time-management skills, self-confidence, and adaptability to modern technologies—represent critical factors in developing readiness for AI-supported learning ecosystems.

**Table 6:** Participants’ Responses to the Items of the Personal Factors Domain Influencing Learning Readiness in the Age of AI among Secondary School Students

Items	Frequency	Level of Agreement			Mean	Standard Deviation	Level of Agreement	Rank
		Disagree	Moderately Agree	Agree				
I think that electronic tasks need to be cut	F	2	21	110	2.81	0.429	Agree	1
	%	1.5	15.8	82.7				
I believe that poor time management is one of the main reasons for weak learning through artificial intelligence technologies	F	15	33	85	2.53	0.692	Agree	2
	%	11.3	24.8	63.9				
I feel that I am not always able to learn with the help of artificial intelligence.	F	11	44	78	2.50	0.647	Agree	3
	%	8.3	33.1	58.6				
During lessons taught and delivered using artificial intelligence, it's hard for me to pay attention	F	13	42	78	2.49	0.670	agree	4
	%	9.8	31.6	58.6				
I track social media accounts that focus on integrating technology into education.	F	8	53	72	2.48	0.611	agree	5
	%	6.0	39.8	54.1				
I feel anxious when I rely on myself while learning through artificial intelligence technologies	F	25	32	76	2.38	0.785	agree	6
	%	18.8	24.1	57.1				
I have the ability to summarize and clearly articulate course content	F	27	45	61	2.26	0.775	Moderately Agree	7
	%	20.3	33.8	45.9				
I am not able to perform advanced or distinguished technical tasks.	F	41	44	48	2.05	0.819	Moderately Agree	8
	%	30.8	33.1	36.1				
Thinking about future career opportunities motivates	F	49	48	36	1.90	0.796	Moderately Agree	9
	%	36.8	36.1	27.1				

me to engage in learning.								
I can learn efficiently without previous preparation	F	60	37	36				
	%	45.1	27.8	27.1	1.82	0.32	Moderately Agree	10
Overall Mean:					2.32	0.791	Moderately Agree	

As illustrated in Table 6, secondary school students demonstrated moderate agreement regarding the individual aspects that support preparation for learning in the AI era ( $M = 2.32$ ,  $SD = 0.791$ ), placing this domain within the second section of the three-point scale. The highest-scoring “I think that electronic assignments should be reduced” ( $M = 2.81$ ), suggests that an excessive electronic workload likely reduces student motivation and engagement. Frequent reports of poor time allocation, limited perceived effectiveness of AI-supported learning, and difficulty maintaining focus during AI-based lessons indicate challenges with self-regulation, attention, and independent learning. These findings suggest that personal characteristics, such as beliefs about AI, self-confidence, and organizational capability, underpin the internal incentives necessary for engaging in learning tasks. This is particularly significant at the secondary school level, where students frequently navigate psychological pressure and personal transitions. Conversely, low mean scores for items regarding learning without prior preparation imply that students lack readiness to engage deeply with material. This deficiency may stem from low awareness of necessity of preparation for academic and future career success, or from an overreliance on mechanical learning approaches. Collectively, the results indicate that individual predispositions and competencies exert a dominant, yet moderate, influence on learners’ preparedness within AI-enabled learning environments.

## CONCLUSION

This study explored the social, familial, and individual characteristics influencing the readiness of secondary school students to learn in the age of AI. The findings indicate that students’ readiness is not merely a product of individual ability but emerges from a complex interplay of social context, family support, and personal attributes. Across these domains, students demonstrate a moderate level of readiness, suggesting existing potential and significant areas for improvement. Although peer interaction and community-based opportunities serve as valuable social foundations, their influence remains limited in the absence of structured institutional programs. Similarly, family factors are fundamentally important; however, their influence diminishes without appropriate parental guidance, emotional support, and positive attitudes toward technology. At the individual level, factors such as time management, self-regulation, and intrinsic motivation emerged as critical yet inconsistent predictors of readiness. This inconsistency highlights the need for more holistic educational approaches that foster learner independence while increasing parental awareness of AI applications. Ultimately, sustainable learning readiness results from the seamless integration of technological innovation and human support systems. The effective implementation of AI in secondary schools depends on a balanced strategy where automated systems complement human interaction. By aligning institutional, familial, and individual support, educators can significantly facilitate self-directed and successful learning for students in the AI era.

## Educational Implications

The present study offers several pedagogical implications for improving the preparedness of secondary school students within AI-facilitated learning environments. First, educators must balance collaborative and individualist learning, ensuring that peer assistance complements rather than replaces the development of independent, self-regulated learning styles. Second, the curriculum should include explicit instruction in self-regulation skills, such as time management, goal setting, and concentration, to address current student deficiencies. Third, schools should provide clear guidelines on the ethical and appropriate use of AI tools to ensure students view technology as a driver of learning rather than a source of dependency. Fourth, teachers require pedagogical training to facilitate AI implementation while maintaining human interaction and promoting academic integrity. Fifth, schools must establish active partnerships with families to foster a positive outlook on AI-supported learning. By providing parents with ongoing information and emotional support strategies, schools can ensure parents remain engaged and supportive of their children’s technological transitions. Finally, school- and community-oriented enrichment programs (e.g., preparatory technology courses) are essential for building learning ecosystems that promote student competence and.

## STUDY RECOMMENDATIONS

To align educational practices with the rapid advancement of AI, this study offers several strategic recommendations. First, educational institutions should implement practices that foster student autonomy and self-organization, ensuring that learners can efficiently manage and complete academic tasks independently. Second, providing robust school counseling services is also essential, as these services offer ongoing support for general learning and targeted assistance for specific academic difficulties. Third, schools should further organize workshops for students and families to facilitate a deeper understanding of AI-integrated learning requirement. Fourth, raising awareness among families regarding the specific advantages of AI tools will help bridge the gap between home and school environments. Fifth, Educators should also prioritize the design of personalized adaptive, adaptive learning tasks that allow students to select subjects aligned with their personal interests, thereby fostering intrinsic motivation. Finally, the development of comprehensive digital libraries—featuring instructional videos, summaries, and explanatory materials—is recommended to support students in their advance preparation for classroom lessons.

## RESEARCH SUGGESTIONS

On the basis of the current findings, further research is suggested to investigate secondary school students' readiness for learning in the AI era. Future should explore the social dimensions of AI preparedness, specifically focusing on peer collaboration and school-level measures that facilitate self-directed learning. In addition, research should investigate the extent to which family interaction patterns and the balance between supportive engagement and resistance to technological affect learning. Further studies should also examine how students' readiness responds to an increased awareness of educational goals. Finally, empirical investigations are recommended to evaluate the effects of reducing electronic assignment volumes on students' motivation, engagement, and overall readiness within AI-enhanced secondary education.

### Funding Source

This research is funded by the Deanship of Scientific Research at King Khalid University, Saudi Arabia.

## ACKNOWLEDGMENTS

The authors extend their appreciation to the deanship of scientific research at king khalid university for funding this study through the large research group under grant number g.r.p-1/180/1446.

## REFERENCES

- Al-Anzi, A. A. (2023). Secondary school students' readiness for learning and its relationship to engagement in e-learning environments. *Journal of Educational and Psychological Studies*, 17(2), 245–268.
- Al-Malki, A. M., & Qazzaq, S. A. (2017). Students' readiness for e-learning and its implications for effective digital learning environments. *International Journal of Educational Technology*, 12(3), 55–72.
- Al-Harbi, D. M. (2015). Social factors related to Internet use among female students at Princess Nourah bint Abdulrahman University. *Journal of the College of Education*, 26(103), 243-260.
- Al-Gharbawi, M. A. A., & Shehata, S. M. (2023). Factors affecting Saudi university students' adoption of e-learning during the COVID-19 pandemic. *Scientific Journal of Commercial Research (Menoufia University)*, 50(3), 9–58.
- Al-Saadi, M. M. (2021). Degree of digital learning readiness in Jordan during the COVID-19 pandemic from the perspective of school teachers in northern Jordan. *Journal of the Faculty of Education*, 37(4), 61–90
- Hassan, M. A., & Wahbah, A. R. (2022). Preparing students for learning in the age of artificial intelligence: Karataş, K., & Arpacı, İ. (2021). The role of self-directed learning, metacognition, and 21st-century skills in predicting readiness for online learning. *Contemporary Educational Technology*. <https://doi.org/10.30935/cedtech/10786>
- Luckin, R., Holmes, W., Griffiths, M., & Forcier, L (2016). *Intelligence unleashed: An argument for AI in education*.

- Parkes, M., Stein, S., & Reading, C. (2015). Student preparedness for university e-learning environments. *The Internet and Higher Education*, 25, 1–10. <https://doi.org/10.1016/j.iheduc.2014.10.002>
- Pintrich, P. R. (2004). A conceptual framework for assessing motivation and self-regulated learning in college students. *Educational Psychology Review*, 16(4), 385–407. <https://doi.org/10.1007/s10648-004-0006-x>
- Power, J., Conway, P., Ó Gallchóir, C., Young, A. M., & Hayes, M. (2022). Illusions of online readiness: The counter-intuitive impact of rapid immersion in digital learning due to COVID-19. *Irish Educational Studies*, 43(2), 263–280. <https://doi.org/10.1080/03323315.2022.2061565>
- See, B. H., Gorard, S., El-Soufi, N., Lu, B., Siddiqui, N., & Dong, L. (2021). A systematic review of the impact of technology-mediated parental engagement on student outcomes. *Educational Research and Evaluation*, 26(3–4), 150–181. <https://doi.org/10.1080/13803611.2021.1924791>
- Selwyn, N. (2019). *Should robots replace teachers? AI and the future of education*. Polity Press.
- Teo, T. (2011). Factors influencing teachers' intention to use technology: Model development and test. *Computers & Education*, 57(4), 2432–2440. <https://doi.org/10.1016/j.compedu.2011.06.008>
- UNESCO. (2021). *AI and education: Guidance for policy-makers*. UNESCO Publishing.
- Yilmaz, R. (2017). Exploring the role of e-learning readiness on student satisfaction and motivation in a flipped classroom. *Computers in Human Behavior*, 70, 251–260. <https://doi.org/10.1016/j.chb.2016.12.085>
- Zheng, L., Niu, J., Zhong, L., & Gyasi, J. F. (2021). The effectiveness of artificial intelligence on learning achievement and learning perception: A meta-analysis. *Interactive Learning Environments*. <https://doi.org/10.1080/10494820.2021.1872811>
- Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory Into Practice*, 41(2), 64–70. [https://doi.org/10.1207/s15430421tip4102\\_2](https://doi.org/10.1207/s15430421tip4102_2)