

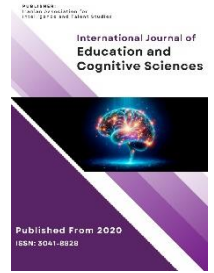


Journal Website

Article history:  
Received 06 August 2025  
Revised 15 December 2025  
Accepted 23 December 2025  
Initial Publication 29 May 2026  
Final Publication 01 September 2026

# International Journal of Education and Cognitive Sciences

Volume 7, Issue 3, pp 1-11



E-ISSN: 3041-8828

## The Relationship Between Attitudes Toward E-Learning and Information Literacy: The Mediating Role of Academic Resilience

Sara. Maleki Aghjekandi<sup>1</sup>, Mojgan. Sepahmansour<sup>1\*</sup>, Masoud. Karimloo<sup>2</sup>

<sup>1</sup> Department of Educational Psychology, CT.C., Islamic Azad University, Tehran, Iran

<sup>2</sup> Department of Epidemiology and Biostatistics, TeMS.C., Islamic Azad University, Tehran, Iran

\* Corresponding author email address: 0041304365@iau.ir

### Article Info

#### Article type:

Original Research

#### How to cite this article:

Maleki Aghjekandi, S., Sepahmansour, M., & Karimloo, M. (2026). The Relationship Between Attitudes Toward E-Learning and Information Literacy: The Mediating Role of Academic Resilience. *International Journal of Education and Cognitive Sciences*, 7(3), 1-11.

<https://doi.org/10.61838/kman.ijecs.331>



© 2026 the authors. Published by Iranian Association for Intelligence and Talent Studies, Tehran, Iran. This is an open access article under the terms of the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) License.

### ABSTRACT

**Purpose:** This study aimed to examine the relationship between information literacy and attitudes toward e-learning, with the mediating role of academic resilience, among undergraduate psychology students.

**Methods and Materials:** The study employed an applied, descriptive–correlational design using structural equation modeling. The statistical population consisted of undergraduate psychology students aged 18–25 at Islamic Azad University, Tehran Central Branch, during the 2024–2025 academic year, from whom 250 students were selected through convenience sampling. Data were collected using standardized questionnaires measuring attitudes toward e-learning, information literacy, and academic resilience. Descriptive statistics and inferential analyses, including Pearson correlation and structural equation modeling, were conducted using SPSS version 27 and AMOS version 27.

**Findings:** The results of structural equation modeling indicated that information literacy had a significant direct effect on attitudes toward e-learning ( $\beta = 0.18, p < .05$ ). In addition, information literacy exerted a significant indirect effect on attitudes toward e-learning through academic resilience ( $\beta = 0.21, p < .01$ ). Model fit indices demonstrated an acceptable fit of the proposed model to the data, and all factor loadings in the measurement models were statistically significant.

**Conclusion:** The findings suggest that information literacy plays a crucial role in shaping students' attitudes toward e-learning both directly and indirectly by enhancing academic resilience, highlighting the importance of simultaneously strengthening cognitive competencies and psychological resources to promote positive engagement with e-learning environments in higher education.

**Keywords:** attitudes toward e-learning; information literacy; academic resilience; structural equation modeling; undergraduate students

### 1. Introduction

The rapid expansion of digital technologies and their integration into higher education systems has fundamentally transformed teaching–learning processes

worldwide, positioning e-learning as a central component of contemporary educational environments. E-learning is no longer viewed merely as an auxiliary mode of instruction but rather as a strategic mechanism for enhancing educational

quality, accessibility, and sustainability in higher education institutions (Oulamine et al., 2025; Pathak & Jain, 2025). This transformation has been accelerated by global challenges such as technological globalization, changing learner expectations, and the increasing demand for flexible and learner-centered educational models. Within this context, understanding students' attitudes toward e-learning has become a critical research priority, as attitudes play a decisive role in determining learners' acceptance, engagement, and sustained use of digital learning platforms (Pilli et al., 2014; Sondakh et al., 2023). Positive attitudes toward e-learning are associated with higher motivation, greater persistence, and improved learning outcomes, whereas negative attitudes can hinder effective implementation regardless of technological sophistication.

Attitudes toward e-learning are multidimensional constructs shaped by cognitive, affective, and behavioral components, encompassing learners' perceptions of usefulness, ease of use, satisfaction, and willingness to engage with digital learning systems (Maruyama, 2024; Mokaram et al., 2023). Prior research has demonstrated that students' attitudes are influenced by a complex interplay of technological, pedagogical, and individual factors, including system quality, instructional design, institutional support, and personal competencies (Razzaghi et al., 2023; Tahat et al., 2024). Among individual competencies, information literacy has emerged as a particularly salient predictor of successful e-learning experiences, as it equips learners with the skills necessary to locate, evaluate, process, and ethically use digital information within online learning environments (Adriaanse & Goosen, 2024; Suorsa et al., 2021).

Information literacy is widely recognized as a foundational competence for learning in the digital age and a prerequisite for meaningful participation in e-learning systems. It extends beyond basic technical skills to include critical thinking, evaluative judgment, and reflective knowledge construction (Suorsa et al., 2021). In higher education contexts, students with higher levels of information literacy are better able to navigate complex digital resources, engage in self-directed learning, and manage cognitive demands associated with online instruction (Li et al., 2023; Liu & Yu, 2023). Empirical studies have consistently shown that information literacy positively predicts e-learning readiness, engagement, and acceptance, underscoring its central role in shaping learners' educational experiences in virtual settings (Parsaian & Gholamizadeh, 2022; Shahbazi et al., 2024).

Despite the well-documented importance of information literacy, evidence suggests that its influence on attitudes toward e-learning is not purely direct but may operate through underlying psychological and motivational mechanisms. Recent scholarship has increasingly emphasized the need to examine mediating variables that explain how and why information literacy translates into positive learning attitudes and behaviors (Asadi & Sajadi Nejad, 2022; Li et al., 2023). One such construct that has gained growing attention in educational psychology is academic resilience, defined as students' capacity to effectively cope with academic challenges, adapt to adverse learning conditions, and sustain motivation and performance despite stressors and setbacks. In digitally mediated learning environments, where learners often face challenges such as reduced social interaction, increased self-regulation demands, and technological difficulties, academic resilience becomes particularly critical (Oulamine et al., 2025; Schröder et al., 2025).

Academic resilience is conceptualized as a dynamic and developable psychological resource that enables learners to maintain engagement and persistence in the face of academic adversity. Research indicates that resilient students demonstrate greater adaptability, higher self-efficacy, and more positive emotional regulation, all of which are essential for successful participation in e-learning contexts (Asadi & Sajadi Nejad, 2022; Mahboobi et al., 2021). Moreover, resilience has been linked to positive academic emotions, sustained learning vitality, and constructive attitudes toward educational innovations, suggesting that it may serve as a key mechanism through which cognitive competencies such as information literacy exert their influence on learning-related outcomes (Asadi & Sajadi Nejad, 2022; Dortaj et al., 2021).

The interrelationship between information literacy and academic resilience is theoretically grounded in self-regulated learning and socio-cognitive frameworks, which posit that learners' cognitive skills interact with motivational and emotional resources to shape learning behaviors and attitudes. Students who possess strong information literacy skills are more likely to experience a sense of control and competence in online learning environments, thereby reducing anxiety and fostering adaptive coping strategies when encountering academic challenges (Li et al., 2023; Revanifar, 2023). This enhanced sense of agency can, in turn, strengthen academic resilience, enabling learners to persist and maintain positive attitudes toward e-learning even under demanding conditions (Schröder et al., 2025).

However, empirical investigations explicitly modeling this mediating relationship remain limited, particularly in non-Western higher education contexts.

The COVID-19 pandemic further highlighted the critical interplay between information literacy, resilience, and attitudes toward e-learning, as universities worldwide were compelled to transition rapidly to fully online or blended instructional modes. Studies conducted during and after the pandemic revealed substantial variability in students' adaptation to e-learning, with information literacy and psychological resilience emerging as key differentiators of successful adjustment (Shahbazi et al., 2024; Sondakh et al., 2023). These findings underscore the importance of adopting integrative models that simultaneously consider technological competencies and psychological resources when examining students' attitudes toward e-learning.

In addition to resilience, contemporary research has increasingly linked attitudes toward e-learning to broader constructs such as academic engagement, enthusiasm, and value creation in higher education. Engagement-oriented perspectives suggest that positive attitudes toward digital learning environments are associated with higher levels of vigor, dedication, and absorption in academic activities, which are essential for sustainable learning and long-term educational development (Pattnaik et al., 2024; Ramón-Jerónimo et al., 2025). From this perspective, fostering favorable attitudes toward e-learning is not merely a technological concern but a strategic imperative for enhancing students' holistic educational experiences and preparing them for knowledge-based societies.

Although a growing body of literature has examined the direct relationships among information literacy, attitudes toward e-learning, and related constructs, several gaps remain evident. First, many studies have focused on bivariate associations, neglecting the complex causal pathways through which cognitive and psychological variables interact. Second, limited attention has been paid to the mediating role of academic resilience in explaining how information literacy influences attitudes toward e-learning. Third, empirical evidence from Middle Eastern and developing higher education contexts remains comparatively scarce, despite distinct cultural, institutional, and technological characteristics that may shape students' learning experiences (Parsaian & Gholamizadeh, 2022; Shahbazi et al., 2024). Addressing these gaps is essential for developing context-sensitive models that can inform both theory and practice in e-learning implementation.

Furthermore, advances in intelligent e-learning systems, multimedia instructional design, and AI-supported learning environments have increased the cognitive demands placed on learners, thereby amplifying the importance of information literacy and resilience as complementary competencies (Liu & Yu, 2023; Pei-Chen & Hsing Kenny, 2025). As higher education institutions continue to invest in technologically enriched learning ecosystems, understanding the psychological processes that facilitate positive learner attitudes becomes increasingly critical for ensuring the effectiveness and sustainability of these innovations (Ajlouni et al., 2023; Pathak & Jain, 2025).

In light of these considerations, the present study is grounded in an integrative framework that conceptualizes attitudes toward e-learning as an outcome influenced by both cognitive competencies and psychological resources. By examining information literacy as a core predictor and academic resilience as a mediating mechanism, the study seeks to contribute to a more nuanced understanding of the factors that shape students' attitudes toward e-learning in higher education. Such an approach aligns with contemporary calls for multidimensional models that bridge technological, cognitive, and affective perspectives in educational research (Adriaanse & Goosen, 2024; Schröder et al., 2025).

Accordingly, the aim of this study is to examine the relationship between information literacy and attitudes toward e-learning, with the mediating role of academic resilience, among undergraduate psychology students.

## 2. Methods and Materials

### 2.1. Study Design and Participants

Based on its objective, the present study is classified as applied research, because it aims to analyze and explain the relationship between attitudes toward e-learning and information literacy, as well as to examine the mediating role of academic resilience. The findings of this study can be practically used to improve educational planning, enhance the quality of e-learning, and strengthen students' informational and psychological skills. Based on the research paradigm, this study falls within the framework of quantitative research grounded in the positivist paradigm, because it relies on theoretical concepts, the development of a conceptual model, and hypothesis testing through statistical analysis and the use of structural equation modeling. Based on the type of data, the study is quantitative, as the data were collected in numerical form

using standardized questionnaires based on measurement scales assessing attitudes toward e-learning, information literacy, and academic resilience, and the relationships among variables were analyzed using structural equation modeling. Based on its nature (data collection method), the study is classified as descriptive–analytical correlational research. A correlational design was used to determine the relationships among the main variables and to examine the mediating role of academic resilience in the relationship between attitudes toward e-learning and information literacy. Based on the time dimension of data collection, the study is cross-sectional, because the data were collected from the study sample at a single, specific time point, and the research did not aim to examine longitudinal changes or trends. Based on the research setting, the study employed a combination of library-based and field methods. In the library-based section, theoretical foundations, domestic and international studies, the theoretical framework, and the conceptual model were compiled using credible sources. In the field section, data were collected directly from the statistical population through questionnaires and subsequently analyzed.

The statistical population included all female and male undergraduate psychology students aged 18 to 25 at Islamic Azad University, Tehran Central Branch, during the 2024–2025 academic year. Sampling was conducted using the convenience sampling method. To estimate the sample size, the formula proposed by Tabachnick and Fidell (2000) was used. Based on this formula, a total of 250 students were selected through convenience sampling.

## 2.2. Measures

**Attitudes Toward E-Learning Questionnaire:** This questionnaire was developed and validated in 2014 by Pilli et al., based on the earlier work of Davis (1989), with the aim of focusing on factors influencing learners' attitudes toward e-learning. The questionnaire consists of 15 items and three subscales: perceived usefulness, perceived ease of use, and attitude toward use, with each subscale containing five items. Responses are scored using a five-point Likert scale. Davis (1989) examined and confirmed content validity, construct validity, and reliability on a sample of 152 participants and reported Cronbach's alpha coefficients of 0.98 for perceived usefulness and 0.94 for perceived ease of use. This questionnaire was first administered in Iran by Modarresi et al. (2017), and the reliability of the instrument

for the total scale was reported as 0.89 using Cronbach's alpha.

**Information Literacy Questionnaire:** This questionnaire was designed by Shokouhi (2012) to assess information literacy among university students and consists of 16 items. Information literacy is measured across three dimensions: computer literacy (items 1–4), library literacy (items 5–11), and internet literacy (items 12–16). Scoring is based on a five-point Likert scale. Shokouhi (2012) reported the validity of the questionnaire among students as 0.89. Reliability coefficients using Cronbach's alpha were reported as 0.93 for the total questionnaire and 0.83, 0.76, and 0.81 for the computer literacy, library literacy, and internet literacy subscales, respectively.

**Academic Resilience Questionnaire:** This questionnaire was developed by Samuels in 2004 and was later published in 2009 in collaboration with Wu following the expansion of the study. The final version consists of 40 items, asking participants to rate their level of academic resilience on a five-point scale. The short form of this questionnaire includes 29 items and three factors: communication skills, future orientation, and problem-focused and positive orientation. Validity was established through factor analysis as well as convergent and discriminant validity, and reliability was confirmed using test–retest methods and Cronbach's alpha by the test developers across different groups (normal and at-risk). The developers reported a reliability coefficient of 0.92, indicating excellent internal consistency.

## 2.3. Data Analysis

Data analysis was conducted in two sections: descriptive and inferential.

**Descriptive Analysis:** In this section, percentages, frequency distributions, tables, charts, and figures were used to describe demographic characteristics. In addition, means, standard deviations, skewness, and kurtosis were used to describe the research variables.

**Inferential Analysis:** In the inferential section, structural equation modeling was used in accordance with the nature of the research hypotheses. It should be noted that SPSS version 27 and AMOS version 27 were used for data analysis.

### 3. Findings and Results

In this section, the research data are analyzed and evaluated using scientific methods. First, data preprocessing is examined.

In this study, based on the data collected through questionnaires, the descriptive statistics of demographic characteristics in the quantitative section, including age and gender, are presented in the table below.

**Table 1**

*Descriptive Statistics of Demographic Characteristics*

Demographic Variable	Category	Frequency	Percentage
Age	18–21 years	159	63.6
	22–25 years	91	36.4
	Total	250	100
Gender	Female	191	76.4
	Male	59	23.6
	Total	250	100

Based on Table 1, the majority of the sample consisted of female students aged 18 to 21 years.

**Table 2**

*Means and Standard Deviations of Study Variables and Their Components*

Variable	Component	M	SD
Attitudes Toward E-Learning	Total Score	3.71	0.62
	Perceived Usefulness	3.84	0.66
	Perceived Ease of Use	3.69	0.71
	Attitude Toward Use	3.61	0.68
Information Literacy	Total Score	3.58	0.57
	Computer Literacy	3.76	0.63
	Library Literacy	3.49	0.60
Academic Resilience	Internet Literacy	3.52	0.65
	Total Score	3.64	0.59
	Communication Skills	3.71	0.61
Academic Engagement	Future Orientation	3.68	0.64
	Positive Orientation	3.54	0.66
	Total Score	3.66	0.56
	Vigor	3.72	0.60
	Dedication	3.69	0.58
	Absorption	3.57	0.62

The descriptive statistics indicated that students reported generally moderate to moderately high levels across all study variables. The mean score for attitudes toward e-learning ( $M = 3.71$ ,  $SD = 0.62$ ) suggested an overall positive orientation toward digital learning environments, with perceived usefulness showing the highest mean among its components, reflecting students' recognition of the functional value of e-learning systems. Information literacy demonstrated a comparable mean level ( $M = 3.58$ ,  $SD = 0.57$ ), with computer literacy scoring higher than library and internet literacy, indicating stronger confidence in technical skills relative to information navigation and evaluation. The mean score for academic resilience ( $M = 3.64$ ,  $SD = 0.59$ ) reflected

a generally adaptive psychological profile, with communication skills and future orientation exceeding positive orientation. Similarly, academic engagement showed a moderately high mean ( $M = 3.66$ ,  $SD = 0.56$ ), with vigor and dedication exceeding absorption, suggesting that students were more behaviorally and motivationally engaged than cognitively immersed. Overall, the pattern of means and standard deviations reflects adequate variability and favorable central tendencies, supporting the suitability of the data for subsequent inferential and structural equation modeling analyses.

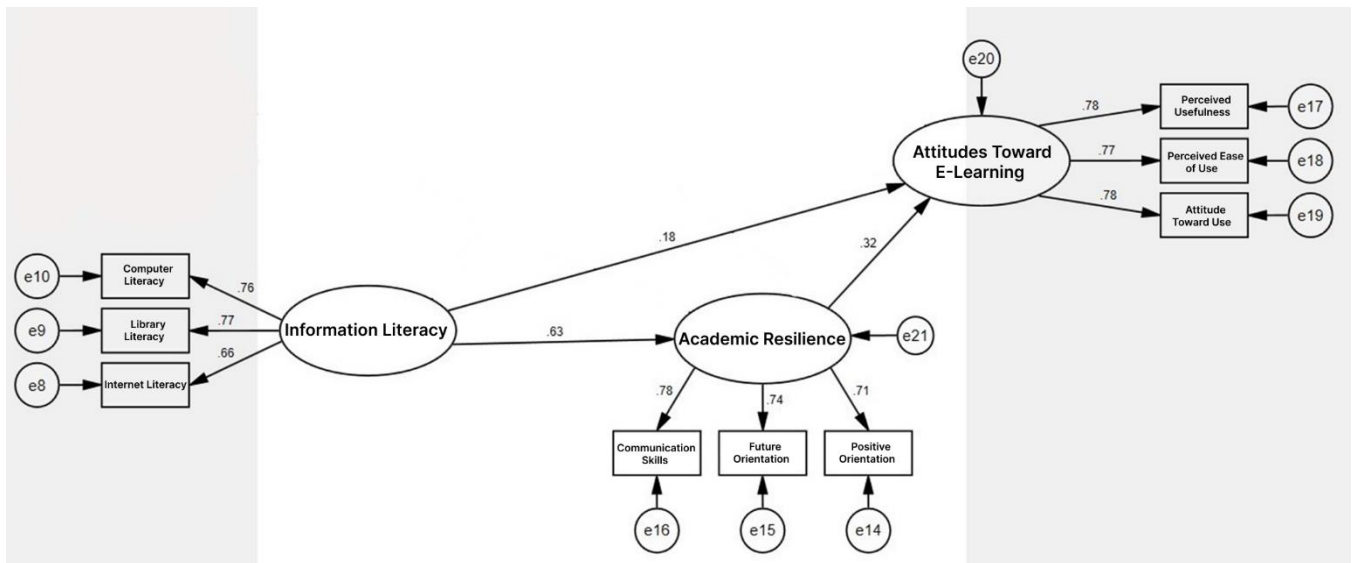
The first research hypothesis stated that information literacy influences attitudes toward e-learning through the mediating role of academic resilience.

The graphical representation of the path coefficients clearly illustrates the relationships among these latent variables and their effects on one another. These path coefficients indicate the magnitude and direction of the

effects of the independent and mediating variables on the dependent variable. Analyzing these coefficients helps to achieve a clearer understanding of the relative importance of each influencing factor on students' attitudes toward e-learning. Accordingly, the path coefficients of the structural model of the study are presented in the figure below.

**Figure 1**

Graphical representation of path coefficients in the structural model of the main research hypothesis.



In this study, the objective was to examine the causal relationship model of attitudes toward e-learning based on information literacy, with the mediating roles of academic

engagement and academic resilience. Accordingly, the model fit indices are reported below.

**Table 3**

Model Fit Indices

Fit Index	Obtained Value	Acceptable Threshold
$\chi^2/df$	1.33	< 3
RMSEA	0.04	< 0.10
CFI	0.97	> 0.90
NFI	0.92	> 0.90
GFI	0.97	> 0.90
AGFI	0.96	> 0.90

In general, none of the obtained indices alone provides sufficient evidence for the goodness or lack of fit of the model; rather, these indices should be interpreted collectively. The obtained values for these indices indicate

that, overall, the model demonstrates an acceptable and appropriate level of explanatory power and goodness of fit. Next, the indices related to the measurement model are reported.

**Table 4**

Standardized Factor Loadings and Significance Levels of the Measurement Models

Construct	Subscale	Standardized Loading	p Value
Academic Resilience	Communication Skills	0.78	< .001
	Future Orientation	0.74	< .001
	Positive Orientation	0.71	< .001
Attitudes Toward E-Learning	Perceived Usefulness	0.78	< .001
	Perceived Ease of Use	0.77	< .001
	Attitude Toward Use	0.78	< .001
Academic Engagement	Vigor	0.80	< .001
	Dedication	0.74	< .001
	Absorption	0.69	< .001
Information Literacy	Computer Literacy	0.76	< .001
	Library Literacy	0.77	< .001
	Internet Literacy	0.66	< .001

The results presented in Table 4 indicate that the factors of all scales have statistically significant factor loadings at the 99% confidence level, and the measurement model of the study was confirmed ( $p < .001$ ). Therefore, it can be concluded that the constructs are well represented by their

respective subscales, their convergent validity is established at an acceptable level, and the measurement models of all three variables are supported in terms of the significance of factor loadings and the overall adequacy of the model structure.

**Table 5**

*Direct and Indirect Effects of Information Literacy on Attitudes Toward E-Learning*

Criterion Variable	Predictor Variable	Type of Effect	Standardized $\beta$	t Value	p Value
Attitudes Toward E-Learning	Information Literacy	Direct	0.18	2.01	.043
Attitudes Toward E-Learning	Information Literacy	Indirect (via Academic Resilience)	0.21	2.55	.002

The results presented in Table 5 indicate that information literacy has both a statistically significant direct and indirect effect on attitudes toward e-learning. Specifically, the direct path from information literacy to attitudes toward e-learning was positive and significant ( $\beta = 0.18$ ,  $t = 2.01$ ,  $p = .043$ ), demonstrating that higher levels of information literacy are directly associated with more favorable attitudes toward e-learning. In addition, information literacy exerted a significant indirect effect on attitudes toward e-learning through the mediating role of academic resilience ( $\beta = 0.21$ ,  $t = 2.55$ ,  $p = .002$ ), indicating that part of the influence of information literacy on students' attitudes toward e-learning operates by enhancing their academic resilience. Taken together, these findings support the hypothesized mediating role of academic resilience and highlight both the direct and mechanism-based contributions of information literacy to shaping attitudes toward e-learning.

#### 4. Discussion and Conclusion

The present study aimed to examine the relationship between information literacy and attitudes toward e-learning, with the mediating role of academic resilience, among undergraduate psychology students. The findings provide empirical support for the proposed structural model

and offer important theoretical and practical insights into how cognitive and psychological factors jointly shape students' perceptions and acceptance of e-learning environments. Overall, the results indicate that information literacy exerts both a direct and an indirect influence on attitudes toward e-learning, with academic resilience serving as a significant mediating mechanism. These findings align with contemporary perspectives that emphasize the multifaceted nature of e-learning adoption, in which technological competencies alone are insufficient without accompanying psychological resources.

The direct effect of information literacy on attitudes toward e-learning suggests that students who possess stronger abilities to search, evaluate, and use information effectively tend to hold more positive perceptions of e-learning systems. This result is consistent with earlier studies demonstrating that information literacy enhances learners' confidence and perceived control in digital learning environments, which in turn fosters more favorable attitudes toward online instruction (Adriaanse & Goosen, 2024; Shokohi, 2012). From a cognitive perspective, information-literate students are better equipped to manage the informational complexity inherent in e-learning platforms, reducing cognitive overload and increasing perceived

usefulness and ease of use. These outcomes resonate with prior findings showing that students' digital and informational competencies are key determinants of their acceptance and sustained use of e-learning technologies (Dortaj et al., 2021; Pilli et al., 2014).

The results also corroborate studies that have linked information literacy to broader indicators of e-learning readiness and engagement. For instance, research has shown that students with higher information literacy demonstrate greater online learning engagement and more positive academic emotions, which are closely associated with favorable attitudes toward e-learning (Li et al., 2023; Liu & Yu, 2023). Similarly, investigations conducted in higher education contexts during periods of rapid digital transition, such as the COVID-19 pandemic, highlighted information literacy as a critical factor enabling students to adapt more effectively to virtual learning environments (Shahbazi et al., 2024; Sondakh et al., 2023). The present findings extend this body of evidence by confirming that information literacy remains a robust predictor of attitudes toward e-learning even beyond crisis-driven adoption, underscoring its enduring relevance in digitally mediated education.

Beyond the direct relationship, one of the most salient contributions of this study lies in demonstrating the mediating role of academic resilience. The significant indirect effect indicates that information literacy enhances students' academic resilience, which in turn positively influences their attitudes toward e-learning. This finding supports theoretical models that conceptualize resilience as a key psychological resource enabling learners to cope with academic challenges, persist in the face of difficulties, and maintain adaptive attitudes toward learning innovations. In e-learning contexts, where learners often encounter challenges such as reduced instructor presence, increased self-regulation demands, and technical issues, academic resilience becomes particularly crucial (Oulamine et al., 2025; Schröder et al., 2025).

The mediating role of academic resilience is consistent with prior research suggesting that cognitive skills and psychological resources interact dynamically to shape learning outcomes. Asadi and Sajadi Nejad demonstrated that resilience and related constructs, such as academic vitality, play a pivotal role in translating e-learning skills into positive academic experiences (Asadi & Sajadi Nejad, 2022). Similarly, Mahboobi and colleagues highlighted the importance of psychological and contextual factors in shaping attitudes toward e-learning, suggesting that students' internal resources significantly influence their

responses to digital instruction (Mahboobi et al., 2021). The present study builds on these findings by empirically validating academic resilience as a key mechanism through which information literacy exerts its influence on attitudes toward e-learning.

From a socio-cognitive standpoint, information literacy may strengthen academic resilience by enhancing students' sense of competence and self-efficacy in managing learning tasks. When students are confident in their ability to locate and evaluate information, they are less likely to experience frustration or helplessness when encountering academic challenges, thereby fostering adaptive coping strategies and emotional regulation. This interpretation aligns with research linking information literacy to self-directed learning skills and positive academic emotions, both of which are integral components of resilience (Li et al., 2023; Suorsa et al., 2021). Consequently, resilient students are more likely to perceive e-learning as an opportunity rather than a burden, leading to more positive attitudes and higher acceptance.

The findings also resonate with broader discussions on student engagement and enthusiasm in higher education. Positive attitudes toward e-learning are closely associated with higher levels of academic engagement, including vigor, dedication, and absorption, which are essential for meaningful learning and long-term academic success (Ramón-Jerónimo et al., 2025). By fostering information literacy and resilience, educational institutions may indirectly promote deeper engagement with e-learning systems, thereby enhancing the overall quality of the learning experience. This perspective is particularly relevant in light of research emphasizing the role of universities in value creation through innovative pedagogical approaches and learner-centered digital environments (Pattnaik et al., 2024).

Moreover, the present results are consistent with empirical studies examining the interplay between literacy-related competencies and attitudes toward e-learning in diverse cultural contexts. For example, Parsaian and Gholamizadeh found that information literacy mediated the relationship between motivational beliefs and e-learning readiness, highlighting its integrative role in students' adaptation to online learning (Parsaian & Gholamizadeh, 2022). Similarly, Shahbazi and colleagues reported significant associations between information literacy, media literacy, and e-learning acceptance, underscoring the interconnectedness of cognitive and attitudinal factors in digital education (Shahbazi et al., 2024). The current study

extends these findings by incorporating academic resilience into the model, offering a more comprehensive explanation of how information literacy translates into positive attitudes.

The results should also be interpreted in the context of ongoing advancements in e-learning technologies and instructional design. As e-learning systems become increasingly sophisticated, incorporating multimedia, artificial intelligence, and adaptive learning features, the demands placed on students' cognitive and psychological capacities continue to grow (Liu & Yu, 2023; Pei-Chen & Hsing Kenny, 2025). In such environments, information literacy and resilience are not merely supportive skills but essential competencies that enable students to navigate complexity and maintain positive learning orientations. The present findings thus reinforce calls for holistic approaches to e-learning implementation that integrate skill development with psychological support (Ajlouni et al., 2023; Pathak & Jain, 2025).

Taken together, the results of this study support an integrative framework in which attitudes toward e-learning are shaped by both cognitive competencies and psychological resilience. By empirically demonstrating the direct and indirect pathways linking information literacy to attitudes toward e-learning, the study contributes to a more nuanced understanding of e-learning adoption in higher education. These findings not only corroborate existing literature but also extend it by highlighting the mediating role of academic resilience, thereby addressing a notable gap in prior research.

Despite its contributions, the present study has several limitations that should be acknowledged. First, the cross-sectional design limits the ability to draw causal inferences about the relationships among information literacy, academic resilience, and attitudes toward e-learning. Second, the use of self-report questionnaires may introduce response biases, such as social desirability or common method variance. Third, the sample was limited to undergraduate psychology students from a single university, which may restrict the generalizability of the findings to other disciplines, institutions, or cultural contexts.

Future studies could adopt longitudinal or experimental designs to examine causal relationships and changes in information literacy, resilience, and attitudes toward e-learning over time. Expanding the research to include students from different academic fields and universities would enhance generalizability and allow for comparative analyses. Additionally, future research may explore other potential mediators or moderators, such as academic

engagement, self-efficacy, or institutional support, to further elucidate the mechanisms underlying students' attitudes toward e-learning.

From a practical perspective, the findings highlight the importance of integrating information literacy training and resilience-building interventions into higher education curricula. Universities and instructors should design e-learning programs that not only focus on technological infrastructure but also actively support students' cognitive and psychological development. Providing targeted workshops, academic support services, and learner-centered instructional strategies may help strengthen students' resilience and foster more positive attitudes toward e-learning, ultimately enhancing the effectiveness and sustainability of digital education initiatives.

### Authors' Contributions

All authors significantly contributed to this study.

### Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

### Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

### Acknowledgments

We hereby thank all individuals for participating and cooperating us in this study.

### Declaration of Interest

The authors report no conflict of interest.

### Funding

According to the authors, this article has no financial support.

### Ethical Considerations

In this study, to observe ethical considerations, participants were informed about the goals and importance of the research before the start of the interview and participated in the research with informed consent.

## References

- Adriaanse, L. S., & Goosen, L. (2024). Research on Information Literacy at Academic Libraries: A Comprehensive Open Distance E-Learning Context. In *Examining Information Literacy in Academic Libraries* (pp. 196-214). IGI Global. <https://doi.org/10.4018/979-8-3693-1143-1.ch011>
- Ajlouni, A. O., Wahba, F. A. A., & Almahaireh, A. S. (2023). Students' Attitudes towards Using ChatGPT as a Learning Tool: The Case of the University of Jordan. *International Journal of Interactive Mobile Technologies*, 17(18). <https://doi.org/10.3991/ijim.v17i18.41753>
- Asadi, M., & Sajadi Nejad, M. S. (2022). Predicting Academic Vitality and Resilience Based on E-Learning Skills with the Mediation of Students' Academic Emotions in Virtual Education. *Journal of Research in School and Virtual Learning*, 10(2). [https://etl.journals.pnu.ac.ir/article\\_9296.html?lang=en](https://etl.journals.pnu.ac.ir/article_9296.html?lang=en)
- Dortaj, F., Rajabian Deh Zireh, M., & Allah Karami, A. (2021). Investigating the Role of Media Literacy in Predicting the Attitude Toward E-Learning Among Students and Professors During the COVID-19 Pandemic. *Research in Educational Systems*, 15(55), 85-97. [https://www.jiera.ir/article\\_145986.html?lang=en](https://www.jiera.ir/article_145986.html?lang=en)
- Li, H., Zhu, S., Wu, D., Yang, H. H., & Guo, Q. (2023). Impact of information literacy, self-directed learning skills, and academic emotions on high school students' online learning engagement: A structural equation modeling analysis. *Education and Information Technologies*, 28(10), 13485-13504. <https://doi.org/10.1007/s10639-023-11760-2>
- Liu, M., & Yu, D. (2023). Towards intelligent E-learning systems. *Education and Information Technologies*, 28(7), 7845-7876. <https://doi.org/10.1007/s10639-022-11479-6>
- Mahboobi, M., Zahedi, A., Rastegari Mehr, B., Ebraze, A., Siyar, S., & Pahlavanzadeh, B. (2021). A Study on the Relationship Between Classroom Management Styles and Attitude Toward E-Learning in Professors. *Health Image*, 12(4), 345-355. <https://doi.org/10.34172/doh.2021.33>
- Maruyama, M. (2024). *Network Analysis of Attitude Scale toward E-Learning 2024* IEEE 7th Eurasian Conference on Educational Innovation (ECEI).
- Mokaram, P., Karimian, Z., & Zarif Sanaiey, N. (2023). Investigating Dental Students' Perception of E-Learning and the Effectiveness of Interactive Blended Learning Tools; A Single-Group Study in Clinical Biochemistry. *Jundishapur Journal of Educational Development*, 14(3), 311-326. [https://edj.ajums.ac.ir/article\\_187136.html?lang=en](https://edj.ajums.ac.ir/article_187136.html?lang=en)
- Oulamane, A., El Gareh, F., Hattabou, & Elmenssouiri, A. (2025). The evolution of e-learning and its challenges in higher education: A theoretical review. *African Scientific Journal*, 3(28), 174-196. <http://africanscientificjournal.com>
- Parsaian, M., & Gholamizadeh, A. (2022). A Study on the Mediating Role of Information Literacy in the Relationship Between Motivational Beliefs and E-Learning Readiness of Farhangian University Students. *Journal of Technology and Knowledge in Learning and Education*, 2(3), 1-11. [https://t-edu.journals.pnu.ac.ir/article\\_9668.html?lang=en](https://t-edu.journals.pnu.ac.ir/article_9668.html?lang=en)
- Pathak, S., & Jain, V. (2025). Transformation of Quality Education through E-Learning for Sustainable Development. In *Transforming Vocational Education and Training Using AI* (pp. 211-248). IGI Global Scientific Publishing. <https://doi.org/10.4018/979-8-3693-8252-3.ch009>
- Pattnaik, S., Mmbaga, N., White, T. D., & Reger, R. K. (2024). To entrepreneur or not to entrepreneur? How identity discrepancies influence enthusiasm for academic entrepreneurship. *The Journal of Technology Transfer*, 49(4), 1444-1470. <https://doi.org/10.1007/s10961-023-09994-w>
- Pei-Chen, S., & Hsing Kenny, C. (2025). The design of instructional multimedia in e-learning: A media richness theory-based approach. <http://i-learn.uitm.edu.my/resources/journal/j3.pdf>. <https://www.researchgate.net/publication/222414548>
- Pilli, O., Fanaecian, Y., & Al-Momani, M. M. (2014). Investigating the students' attitude toward the use of e-learning in Girne American University. *International Journal of Business and Social Science*, 5(5). [https://www.researchgate.net/publication/283475962\\_Investigating\\_the\\_Students%27\\_Attitude\\_Toward\\_the\\_use\\_of\\_E-Learning\\_in\\_Girne\\_American\\_University](https://www.researchgate.net/publication/283475962_Investigating_the_Students%27_Attitude_Toward_the_use_of_E-Learning_in_Girne_American_University)
- Ramón-Jerónimo, M. Á., Vázquez-Carrasco, R., Olavarria-Jaraba, A., & Grott, E. M. (2025). The University as a Means for Value Creation. Service-learning for Service Orientation. *Sage Open*, 15(1). <https://doi.org/10.1177/21582440241311704>
- Razzaghi, M., Hedayati Khoshmehr, A., Ghasemzadeh Alishahi, A., & Shahbazi, R. (2023). Investigating the Role of Students' Attitude, System Quality, and Knowledge Management in E-Learning Usage Behavior with the Mediation of E-Learning Acceptance. *Information Management Sciences & Techniques*, 9(1), 17-44. [https://stim.qom.ac.ir/article\\_2226.html?lang=en](https://stim.qom.ac.ir/article_2226.html?lang=en)
- Revanifar, A. A. (2023). Analysis of Media Literacy Education and Its Impact on Critical Thinking Development. <https://doi.org/10.61838/jsied.3.2.1>
- Schröder, A., Cammann, F., Darge, K., Krepf, M., Weyers, J., & König, J. (2025). Development of student teachers' research competence in the context of research-based learning: a longitudinal study on the effects of an e-learning-supported intervention. *Zeitschrift Für Erziehungswissenschaft*. <https://doi.org/10.1007/s11618-025-01342-y>
- Shahbazi, R., Ghasemzadeh, A., Mehri, N., & Dadashzadeh, M. (2024). Structural Equation Modeling of the Relationship Between Media Literacy and Information Literacy with E-Learning Acceptance During the COVID-19 Pandemic (Case Study: Students of Tabriz Islamic Art University). *Journal of Information Management Sciences & Techniques*, 10(1), 61-88. [https://stim.qom.ac.ir/article\\_2326.html?lang=en](https://stim.qom.ac.ir/article_2326.html?lang=en)
- Shokohi, E. (2012). *The Effect of E-Learning Education on Interest in Learning, Satisfaction with Education, and Information Literacy of Payame Noor University Kerman Students* [Payame Noor University of Kerman Province].
- Sondakh, J., Asaloei, S., & Werang, B. (2023). Student behavioural intentions to use eLearning system in Indonesian higher education during the COVID-19 pandemic: A structural equation model. *Journal of University Teaching and Learning Practice*, 20(5). <https://doi.org/10.53761/1.20.5.08>
- Suorsa, A., Bossaller, J. S., & Budd, J. M. (2021). Information literacy, work, and knowledge creation: A hermeneutic phenomenological point of view. *The Library Quarterly*, 91(4). <https://doi.org/10.1086/715916>
- Tahat, Z. Y., Habes, M., Hailat, K. M., Al Jwaniat, M. I., Safori, A., & Kamarudin, S. (2024). Attitudes of Students towards Press Coverage of E-Learning: An Empirical Study. In *Business Analytical Capabilities and Artificial Intelligence-Enabled Analytics: Applications and Challenges in the Digital Era, Volume 1* (pp. 251-263). Springer Nature Switzerland. [https://doi.org/10.1007/978-3-031-56015-6\\_20](https://doi.org/10.1007/978-3-031-56015-6_20)