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Relationship between nursing students' critical thinking dispositions and their attitudes towards artificial intelligence

Eda Ünal¹, Elif Şahan^{2*}

¹ Department of Oncology Nursing, Gülhane Faculty of Nursing, University of Health Sciences. Ankara / Türkiye

 <https://orcid.org/0000-0002-6644-9850>

^{2*} Nursing Student. Department of Nursing, Faculty of Health Sciences, Kırşehir Ahi Evran University. Kırşehir / Türkiye

 <https://orcid.org/0009-0005-2785-8589>

Corresponding Author:

Eda Ünal, edaun10619@gmail.com

Abstract

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This study aimed to investigate the relationship between nursing students' critical thinking dispositions and their attitudes towards artificial intelligence. As artificial intelligence increasingly integrates into healthcare, understanding how future nurses will approach these technologies is increasingly important. Critical thinking, a key nursing competency, is vital for ensuring safe and ethical use of artificial intelligence in clinical practice. A descriptive cross-sectional study was conducted between March and June 2025 with 307 nursing students at Kırşehir Ahi Evran University. Data were collected using the Personal Information Form, the UF/EMI Critical Thinking Disposition Instrument, and the General Attitudes Towards Artificial Intelligence Scale. Ethical approval and institutional permissions were obtained. Data were analyzed with descriptive statistics, t-tests, ANOVA, and Pearson's correlation using SPSS 23.0, with significance set at $p < 0.05$. The mean total critical thinking disposition score was 91.16 ± 11.47 . Sub-dimension means were 41.33 ± 5.69 (engagement), 23.56 ± 3.18 (maturity), and 26.26 ± 3.57 (innovativeness). Students' mean positive attitudes towards artificial intelligence were 44.56 ± 7.25 , while the mean of negative attitudes was 23.42 ± 6.54 . Female students scored significantly higher in maturity ($p = 0.014$). Higher income, longer

internet usage, and prior knowledge of artificial intelligence were associated with higher critical thinking dispositions and more positive attitudes towards artificial intelligence ($p < 0.05$). Correlation analysis showed a moderate positive relationship between critical thinking dispositions and positive attitudes toward artificial intelligence ($r = 0.374, p < 0.01$). No significant association was found with negative attitudes towards artificial intelligence. Nursing students exhibited relatively high critical thinking dispositions and predominantly positive attitudes towards artificial intelligence. Stronger critical thinking was linked with more favorable perspectives, suggesting that analytical and reflective skills support readiness for technological innovations in healthcare. Sociodemographic factors also influenced the outcomes. These findings underscore the importance of integrating both critical thinking development and artificial intelligence content, including ethical and psychosocial dimensions, into nursing curricula.

Introduction

With the growing presence of artificial intelligence in everyday life and healthcare systems, technological developments are transforming many aspects of education and professional practice [1]. In recent years, artificial intelligence has received growing attention in many areas and has emerged as an innovative tool in multiple sectors, including healthcare [2]. In this context, nursing education plays an important role in development of healthcare services by preparing future nurses to use artificial intelligence effectively in practice [3].

Critical thinking skills enable individuals to question and evaluate information objectively, consider different perspectives, and make well-reasoned decisions [4]. In addition, critical thinking skills enable individuals to process information objectively, analyze problems concretely, and draw conclusions by integrating different sources of information [5]. Critical thinking forms the basis of nursing knowledge and plays a vital role in the theoretical and conceptual understanding of professional performance, adaptation, problem-solving ability and responsibilities [6].

Artificial intelligence, which is still evolving, offers solutions to many contemporary problems while simultaneously rising to new ethical and legal challenges [7]. Therefore, it is of great importance that nurses and other healthcare professionals adapt to these technologies and use them effectively [8]. Healthcare professionals, particularly nurses, must be aware of the risks posed by insufficient critical thinking when artificial intelligence technologies are misused in healthcare. Overreliance on artificial intelligence without a critical perspective may lead to severe consequences, including irreversible harm and psychological distress [9].

It is important to recognize that unpredictable variables often exist in healthcare settings. In this context, nurses must be able to critically evaluate artificial intelligence-driven solutions, detect errors or biases, and mitigate potential risks arising from both human and artificial intelligence errors, thereby ensuring patient safety [10]. Therefore, it is crucial to clarify the role of critical thinking, which is an integral component of the nursing profession and education, alongside the opportunities offered by artificial intelligence. The attitudes of nursing students, as future healthcare professionals, will determine the readiness of both the nursing workforce and the wider healthcare system for artificial intelligence [2].

Understanding nursing students' attitudes toward artificial intelligence is crucial, as these attitudes will influence their future interactions with these technologies and shape their integration into healthcare practice [11]. A review of the literature revealed that although various studies have examined nursing



students in relation to artificial intelligence and critical thinking [6,11-13], no research has specifically investigated the relationship between these two concepts. Considering the significance of artificial intelligence and critical thinking in nursing, this study aimed to investigate the relationship between nursing students' critical thinking dispositions and their attitudes toward artificial intelligence. The study aimed to address the following research questions:

1. What are the critical thinking dispositions of nursing students?
2. What are the attitudes of nursing students toward artificial intelligence?
3. Is there a significant relationship between the critical thinking dispositions of nursing students and their attitudes toward artificial intelligence?

Materials and Methods

Ethical considerations of the study

Ethical approval was obtained from the Ethics Committee of Kırşehir Ahi Evran University (Decision No: 2024/15/12) and permission was also obtained from Kırşehir Ahi Evran University Faculty of Health Sciences, where the study was conducted. Permission to use the scales was obtained via e-mail. All research processes were conducted in accordance with the Declaration of Helsinki. Participation was entirely voluntary, and students who agreed to participate were fully informed about the study aims and confidentiality policy, and their written consent for participation was obtained. They were clearly informed that they could withdraw from the study at any time.

Design

This study was carried out as descriptive cross-sectional research.

Population and sample

This study was conducted between March and June 2025 to examine the relationship between nursing students' critical thinking dispositions and their attitudes towards artificial intelligence. The study included nursing students who were in their 1st, 2nd, 3rd, and 4th years and who agreed to participate. Exclusion criteria included nursing students who were not continuing their education, did not agree to participate in the study, or were on sick leave or on leave on the day the data were collected.

The research was conducted during the spring semester of the 2024-2025 academic year in a classroom setting. The research population consisted of students studying in the Department of Nursing, Faculty of Health Sciences, at Kırşehir Ahi Evran University. No sampling method was used for the study. A total of 307 nursing students completed the study.

Data collection tools

Data were collected using the Personal Information Form, the UF/EMI Critical Thinking Disposition Instrument, and the General Attitudes Towards Artificial Intelligence Scale.

Personal information form: The researchers used a form developed from the literature to obtain demographic information about the participants [6,8,11-13]. This form includes information on the student's year of study, date of birth, gender, marital status, employment status, family type, where they spend most of their time, income level, general knowledge of artificial intelligence, and daily internet usage status.

UF/EMI critical thinking disposition instrument (CTDI): A 5-point Likert-type scale was developed by Irani et al. in 2007 to accurately measure critical thinking disposition (1=strongly disagree;



5=strongly agree) [14]. As the score obtained from the scale increases, it is accepted that critical thinking disposition of the individuals increases. The UF/EMI Scale consists of three sub-dimensions: "Engagement," "Maturity," and "Innovativeness." "Engagement" sub-dimension has 11 items, the "Maturity" sub-dimension has 7 items, and the "Innovativeness" sub-dimension has 7 items. The adaptation of the scale to Turkish and its validity and reliability study were conducted by Kılıç and Şen in 2014 [15]. The Cronbach's alpha coefficient for the scale was 0.94. The minimum score that can be obtained from the scale is 25 and the maximum is 125.

General attitudes towards artificial intelligence scale (GAAIS): The scale, developed by Schepman and Rodway (2020) [16], was adapted into Turkish by Kaya et al. (2024) [17]. The scale consists of two sub-dimensions: "Negative Attitudes towards Artificial Intelligence" and "Positive Attitudes towards Artificial Intelligence" and consists of a total of 20 items. Twelve of the 20 items are in the positive attitudes sub-dimension, and 8 are in the negative attitude sub-dimension. The 8 items in the negative attitudes dimension were reverse-coded. Positive attitudes sub-dimension minimum score is 12, maximum score is 60, negative attitudes sub-dimension minimum score is 8, maximum score is 40. The scale was rated with a 5-point Likert type. In the adaptation study, Cronbach's alpha values for the scale ranged from 0.82 to 0.88, and the reliability values were found to be 0.77 for positive attitudes and 0.83 for negative attitudes.

Data analysis

The SPSS 23.0 package program was used to analyze the research data. The sociodemographic characteristics of nursing students were calculated using numbers, percentage distributions, means, and standard deviations. The data's conformity to a normal distribution was determined based on skewness and kurtosis values, which were considered normal because they ranged between -1.5 and +1.5. Measurement values are presented as mean \pm standard deviation, while categorical data are presented as percentage tables. Independent samples t-tests and ANOVA tests were used to compare certain students' characteristics and their scale scores. Pearson's correlation analysis was also performed to assess relationships among the variables. Data were evaluated at a 95% confidence interval and a significance level of $p < 0.05$.

Results

Table 1 shows sociodemographic characteristics, artificial intelligence and internet usage status of the nursing students. Most of the nursing students participating in the study ($n=307$) were female (73.9%), single (98.4%), and had a mean age of 22.06 ± 2.06 years. 83.1% of the students reported having extended families, and 92.8% were unemployed. 73.6% of the participants reported that their income was equivalent to their expenses. In terms of location, more than half of the students (64.5%) lived most of their lives in the city center. 81.8% reported being knowledgeable about it. An evaluation of internet usage revealed that approximately one-third of the students (30.3%) reported using the Internet for 121–180 minutes per day. These findings suggest that nursing students are young, predominantly female, and highly integrated with digital technologies.

Table 1. Sociodemographic characteristics, artificial intelligence, and internet usage status of nursing students (n = 307).

Variables		
Age (years) (Mean ± SD)		22.06 ± 2.06
		n (%)
Year of Study	1st and 2nd year	131 (42.7)
	3rd and 4th year	176 (57.3)
Gender	Male	80 (26.1)
	Female	227 (73.9)
Marital Status	Married	5 (1.6)
	Single	302 (98.4)
Family Type	Extended	255 (83.1)
	Nuclear	52 (16.9)
Employment Status	Employed	7 (2.3)
	Unemployed	285 (92.8)
	Previously employed	15 (4.9)
Income Status	Income less than expenses	49 (16)
	Income equal to expenses	226 (73.6)
	Income more than expenses	32 (10.4)
Place Lived Most of Life	City center	198 (64.5)
	Town/district	69 (22.5)
	Village	40 (13)
Knowledge about AI	Yes	251 (81.8)
	No	56 (18.2)
Daily Internet Usage (min)	60-120 min	40 (13)
	121-180 min	93 (30.3)
	181-240 min	83 (27)
	241 min and above	91 (29.6)

SD: Standard Deviation.

The total critical thinking disposition score for nursing students was 91.16 ± 11.47 . Regarding the sub-dimensions, the mean scores were 41.33 ± 5.69 for engagement, 23.56 ± 3.18 for maturity, and 26.26 ± 3.57 for innovativeness. Regarding general attitudes toward artificial intelligence, the students' mean positive attitude score was 44.56 ± 7.25 , while the mean negative attitude score was 23.42 ± 6.54 . These results suggest that students' critical thinking dispositions were generally higher than the moderate level, and their positive attitudes toward artificial intelligence exceeded their negative attitudes (Table 2).

Table 2. The CTDI and GAAIS mean scores of the nursing students.

Variables	Mean ± SD	Min - Max	Skewness/Kurtosis
Critical Thinking Disposition			
Engagement	41.33 ± 5.69	20-55	-0.158/0.892
Maturity	23.56 ± 3.18	12-30	-0.602/1.491
Innovativeness	26.26 ± 3.57	14-35	-0.161/0.747
Total Critical Thinking Disposition	91.16 ± 11.47	48-120	-0.284/1.451
General Attitudes Towards Artificial Intelligence			
Positive Attitude	44.56 ± 7.25	16-60	-0.365/1.067
Negative Attitude	23.42 ± 6.54	8-40	0.036/-0.330

As shown in Table 3, a significant difference was found in the maturity sub-dimension by gender ($p=0.014$). The maturity score of male students (22.81 ± 3.54) was found lower than the score of female students (23.83 ± 3.01). This result suggests that female students tend to have greater maturity in their critical thinking. A significant difference was found in the engagement sub-dimension according to the income status variable ($p=0.024$). The engagement score of students whose income was more than their expenses (43.75 ± 5.21) was higher than the scores of students whose income was equal to their expenses (40.89 ± 5.77) and those whose income was less than their expenses (41.78 ± 5.22). Significant differences were also found between levels of knowledge about artificial intelligence and critical thinking dispositions. The total critical thinking disposition score of students who were knowledgeable about artificial intelligence (92.23 ± 11.03) was higher than that of those who were not knowledgeable (86.36 ± 12.26) ($p<0.001$). Similarly, the engagement (41.85 ± 5.58), maturity (23.77 ± 3.01) and innovativeness (26.61 ± 3.40) sub-dimension scores of the knowledgeable students were found to be significantly higher than those of the unknowledgeable students (39.00 ± 5.61 , 22.64 ± 3.77 and 24.71 ± 3.95 , respectively; $p<0.001$; $p=0.016$; $p<0.001$).

Table 3. The relationship between the demographic variables, CTDI and its sub-dimensions.

Demographic Variables	Critical Thinking Disposition Total		Engagement		Maturity		Innovativeness	
	Mean ± SD	p	Mean ± SD	p	Mean ± SD	p	Mean ± SD	p
Gender[†]								
Female	91.60 ± 11.16	0.251	41.46 ± 5.60	0.503	23.83 ± 3.01	0.014	26.32 ± 3.53	0.660
Male	89.89 ± 12.29		40.96 ± 5.94		22.81 ± 3.54		26.11 ± 3.70	
Age (years)*	22.06 ± 2.06	0.714	22.06 ± 2.06	0.772	22.06 ± 2.06	0.804	22.06 ± 2.06	0.622
Year of Study[†]								
1st and 2nd year	90.08 ± 11.14	0.158	40.71 ± 5.48	0.100	23.27 ± 3.21	0.159	26.11 ± 3.39	0.507
3 rd and 4th year	91.95 ± 11.68		41.79 ± 5.81		23.78 ± 3.15		26.38 ± 3.70	
Marital Status[†]								
Married	92.20 ± 3.49	0.838	41.60 ± 2.51	0.915	23.80 ± 0.45	0.867	26.80 ± 1.30	0.736
Single	91.14 ± 11.56		41.32 ± 5.73		23.56 ± 3.21		26.25 ± 3.60	
Family Type[†]								
Extended	91.88 ± 11.16	0.616	41.85 ± 5.31	0.473	23.60 ± 3.28	0.935	26.44 ± 3.46	0.693
Nuclear	91.01 ± 11.55		41.22 ± 5.76		23.56 ± 3.17		26.23 ± 3.60	
Employment Status[‡]								
Employed (a)	88.14 ± 8.67	0.764	39.57 ± 2.94	0.600	22.57 ± 4.47	0.573	26.00 ± 2.89	0.707
Unemployed (b)	91.26 ± 11.67		41.41 ± 5.80		23.61 ± 3.18		26.23 ± 3.64	
Previously employed (c)	90.60 ± 8.72		40.53 ± 4.26		23.07 ± 2.69		27.00 ± 2.59	
Income Status[‡]								
Income less than expenses (a)	91.24 ± 11.16	0.126	41.78 ± 5.22	0.024 a,b<c	23.16 ± 3.09	0.391	26.31 ± 3.83	0.366
Income equal to expenses (b)	90.59 ± 11.59		40.89 ± 5.77		23.57 ± 3.26		26.14 ± 3.50	
Income more than expenses (c)	95.00 ± 10.68		43.75 ± 5.21		24.16 ± 2.70		27.09 ± 3.71	
Place Lived Most of Life[‡]								
City center (a)	91.72 ± 11.34	0.079	41.68 ± 5.73	0.097	23.63 ± 3.14	0.122	26.41 ± 3.51	0.106
Town/district (b)	91.75 ± 10.30		41.36 ± 5.13		23.91 ± 2.76		26.48 ± 3.33	
Village (c)	87.35 ± 13.42		39.55 ± 6.18		22.65 ± 3.91		25.15 ± 4.16	



Daily Internet Usage (min) [‡]								
60-120 min (a)	90.90 ± 9.59	0.930	41.43 ± 5.06	0.933	23.48 ± 2.73	0.997	26.00 ± 3.18	0.646
121-180 min (b)	91.76 ± 11.44		41.62 ± 5.44		23.59 ± 3.18		26.55 ± 3.60	
181-240 min (c)	90.64 ± 10.87		41.12 ± 5.30		23.59 ± 3.10		25.93 ± 3.45	
241 min and above (d)	91.12 ± 12.86		41.18 ± 6.54		23.55 ± 3.48		26.40 ± 3.83	
Knowledge about AI[†]								
Yes	92.23 ± 11.03	<0.001	41.85 ± 5.58	<0.001	23.77 ± 3.01	0.016	26.61 ± 3.40	< 0.001
No	86.36 ± 12.26		39.00 ± 5.61		22.64 ± 3.77		24.71 ± 3.95	

[†] Independent sample t-test

[‡] One-way ANOVA test

*p values are based on Pearson correlation analysis between age and scale scores.

A significant difference in students' positive attitudes towards artificial intelligence was observed by income level ($p=0.002$). Students with higher incomes had a mean score of 48.63 ± 6.46 , compared to 44.31 ± 6.85 for those with similar incomes and 43.08 ± 8.66 for those with lower incomes. Positive attitudes also differed significantly by internet usage status ($p=0.018$). Students who used the internet for 121 minutes or more per day had higher positive attitude scores, whereas those who used it for 60-120 minutes had lower scores. However, daily internet usage duration was not significantly related to negative attitudes towards artificial intelligence (Table 4).

Knowledge about artificial intelligence was another factor associated with attitudes. Students with knowledge about artificial intelligence had a positive attitude score of 45.33 ± 6.62 , compared to 41.11 ± 8.84 among those without such knowledge ($p<0.001$). Likewise, knowledgeable students reported a higher negative attitude score (23.80 ± 6.67) than their counterparts without knowledge (21.71 ± 5.67) ($p=0.031$). These findings suggest that students with knowledge about artificial intelligence tend to hold more positive perspectives and are more aware of its potential negative aspects (Table 4).

Table 4. The relationship between the demographic variables and GAAIS subdimensions.

Demographic Variables	General Attitudes Towards Artificial Intelligence			
	Positive Attitude		Negative Attitude	
	Mean ± SD	<i>p</i>	Mean ± SD	<i>p</i>
Gender[†]				
Female	44.41 ± 7.04	0.529	23.58 ± 6.39	0.468
Male	45.00 ± 7.85		22.96 ± 6.97	
Age (years)*	22.06 ± 2.06	0.262	22.06 ± 2.06	0.686
Year of Study[†]				
1st and 2nd year	44.84 ± 6.04	0.561	23.34 ± 6.34	0.846
3rd and 4th year	44.35 ± 8.04		23.48 ± 6.70	
Marital Status[†]				
Married	46.40 ± 7.44	0.568	20.60 ± 6.88	0.332
Single	44.53 ± 7.26		23.47 ± 6.54	
Family Type[†]				
Extended	45.12 ± 7.01	0.546	22.08 ± 6.70	0.104
Nuclear	44.45 ± 7.31		23.69 ± 6.49	
Employment Status[‡]				
Employed (a)	42.43 ± 7.28	0.680	23.43 ± 6.11	0.985
Unemployed (b)	44.57 ± 7.27		23.44 ± 6.65	
Previously employed (c)	45.33 ± 7.23		23.13 ± 4.70	
Income Status[‡]				
Income less than expenses (a)	43.08 ± 8.66	0.002 a,b<c	22.33 ± 6.96	0.432
Income equal to expenses (b)	44.31 ± 6.85		23.66 ± 6.38	
Income more than expenses (c)	48.63 ± 6.46		21.38 ± 7.02	
Place Lived Most of Life[‡]				
City center (a)	44.89 ± 6.67	0.163	23.65 ± 6.68	0.686
Town/district (b)	44.80 ± 7.41		22.88 ± 6.14	
Village (c)	42.53 ± 9.33		23.20 ± 6.63	
Daily Internet Usage (min)[‡]				
60-120 min (a)	41.38 ± 7.46	0.018 a < b, c, d	21.65 ± 5.44	0.328
121-180 min (b)	45.58 ± 6.82		23.58 ± 6.72	
181-240 min (c)	44.46 ± 6.18		23.86 ± 6.40	
241 min and above (d)	44.46 ± 6.18		23.64 ± 6.93	
Knowledge about AI[†]				
Yes	45.33 ± 6.62	<0.001	23.80 ± 6.67	0.031
No	41.11 ± 8.84		21.71 ± 5.67	

[†] Independent sample *t*-test

[‡] One-way ANOVA test

**p* values are based on Pearson correlation analysis between age and scale scores.



A Pearson correlation analysis was conducted to examine the relationship between nursing students' critical thinking dispositions and their attitudes towards artificial intelligence (Table 5). The results showed a positive, and moderately significant correlation between overall critical thinking disposition and positive attitudes toward artificial intelligence ($r=0.374$, $p<0.01$). This finding suggests that as students' critical thinking dispositions increase, their positive attitudes toward artificial intelligence tend to increase. Similarly, the sub-dimensions of engagement ($r=0.350$, $p<0.01$), maturity ($r=0.350$, $p<0.01$), and innovativeness ($r=0.334$, $p<0.01$) were all positively correlated with positive attitudes. In contrast, no significant correlations were found between critical thinking dispositions (total or sub-dimensions) and negative attitudes towards artificial intelligence ($p>0.05$). These findings suggest that critical thinking disposition did not significantly influence students' negative attitudes towards artificial intelligence. Positive and negative attitudes were also unrelated ($r=0.029$, $p>0.05$), suggesting that these perspectives develop independently.

Table 5. The relationship between the CTDI and GAAIS subdimensions.

Variables	1	2	3	4	5	6
Total Critical Thinking Disposition	—					
Engagement	0.950**	—				
Maturity	0.890**	0.764**	—			
Innovativeness	0.906**	0.779**	0.750**	—		
Positive Attitude	0.374**	0.350**	0.350**	0.334**	—	
Negative Attitude	-0.104	-0.049	-0.095	-0.070	0.029	—

$p < .05^*$, $p < .01^{**}$.

Discussion

This study examined the relationship between nursing students' critical thinking dispositions and their attitudes towards artificial intelligence. The findings indicate that students demonstrated relatively high levels of critical thinking dispositions, with engagement emerging as the strongest sub-dimension. This finding is consistent with evidence that specific teaching strategies, such as multidimensional teaching approaches, effectively develop critical thinking dispositions among nursing students [18]. They also reported more positive than negative attitudes toward artificial intelligence. Similarly, Salameh et al. (2025) found that nursing students exhibited significantly positive attitudes toward the integration and benefits of artificial intelligence in nursing practice [19]. Notably, a positive and moderately significant association was observed between critical thinking dispositions and positive attitudes toward artificial intelligence, whereas no such association was observed for negative attitudes toward artificial intelligence. These results provide important insights into the readiness of future nurses to engage with rapidly evolving artificial intelligence technologies [10] and underscore the pivotal role of critical thinking in fostering adaptive, evidence-informed, and constructive perspectives on technological innovations in healthcare [9]. It could be suggested that students with a high critical thinking disposition tend to evaluate artificial intelligence technologies with a more conscientious, questioning, and positive perspective.

In terms of sociodemographic variables, female students had higher scores on the maturity dimension of critical thinking disposition, which is consistent with previous research highlighting gender-related differences in reflective thinking [12]. Moreover, students with higher income levels demonstrated stronger critical thinking dispositions and more positive attitudes towards artificial intelligence. This result suggests that socioeconomic factors may foster favorable attitudes toward technology, potentially due to greater access to digital devices, educational resources, and opportunities to technology use

[20,21]. Daily internet usage was also identified as a significant factor, with students who reported longer online engagement exhibiting more positive attitudes toward artificial intelligence. This finding aligns with evidence that frequent digital interaction enhances familiarity, trust, and openness to innovation [2,22]. At the same time, students who reported knowledge about artificial intelligence also demonstrated slightly higher negative attitude scores. This finding may reflect a more balanced perspective, suggesting that greater familiarity with artificial intelligence may increase awareness of both its potential benefits and limitations. These findings emphasize the importance of integrating sociodemographic considerations into nursing curricula. Designing artificial intelligence-related educational interventions that address disparities in access, digital literacy, and socioeconomic context may contribute to more equitable readiness for the adoption of emerging technologies in nursing [2].

Correlation analysis in this study revealed a moderately positive association between critical thinking dispositions and positive attitudes towards artificial intelligence, whereas no significant link was observed with negative attitudes. These findings align with previous research in the literature [23–25]. El-Ashry et al. (2025) demonstrated that nursing students' acceptance and perceived usability of artificial intelligence tools are positively associated with critical thinking motivation [23]. Similarly, Sumengen et al. (2025) found that increased artificial intelligence literacy was associated with more positive attitudes toward artificial intelligence among nursing students [24]. Furthermore, a study by Al Omari et al. (2024) revealed a significant positive relationship between knowledge, attitudes, perceptions, and intent to use artificial intelligence in nursing education [25]. These results imply that students with stronger analytical, innovative, and reflective thinking skills are more inclined to embrace the opportunities presented by artificial intelligence. Conversely, the absence of a relationship with negative attitudes suggests that skepticism toward artificial intelligence may be rooted in broader ethical, cultural, or societal concerns that critical thinking alone cannot address. Therefore, nursing curricula should not only foster critical thinking but also integrate structured content that addresses the ethical, legal, and psychosocial dimensions of the use of artificial intelligence use in healthcare practice [2].

Limitations of the study

This study has some limitations. First, the study was conducted only with students from the Kırşehir Ahi Evran University, Faculty of Health Sciences, Department of Nursing, and the results may not be generalizable to nursing students at different universities. Second, no sampling method was used in the study, and participation was voluntary, which may have led to selection bias. Third, data were collected based on students' self-reports; therefore, responses may have been influenced by social desirability. Furthermore, excluding students who were on sick leave or leave on the day of data collection may have limited the representativeness of some groups.

Conclusion

This study examined the relationship between nursing students' critical thinking dispositions and their attitudes towards artificial intelligence. The results showed that students had relatively high levels of critical thinking dispositions, particularly in the "engagement" sub-dimension. They demonstrated more positive than negative attitudes toward artificial intelligence, and a significant relationship was found between critical thinking dispositions and these attitudes. Sociodemographic factors such as gender, income level, internet use, and knowledge of artificial intelligence also emerged as influential variables shaping students' perspectives.

These findings highlight the importance of strengthening critical thinking skills in nursing education to support students' ability to evaluate and effectively use emerging technologies, such as artificial intelligence, in clinical practice. Integrating artificial intelligence related competencies into nursing curricula may help prepare future nurses for technology-supported healthcare environments.



Additionally, educational strategies that improve digital literacy and promote responsible use of artificial intelligence may enhance students' readiness to engage with these technologies. Future studies should explore these relationships using multicenter designs and longitudinal or interventional approaches to better understand how artificial intelligence education and the development of critical thinking influence nursing students' readiness for the digital transformation of healthcare.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

Data availability statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request. The data are not publicly available due to privacy and ethical restrictions.

References

1. Kırkar D, Buzlukçu C. Determining the general attitudes of undergraduate students studying tourism towards artificial intelligence [in Turkish]. *J Turk Tour Res.* 2024;8(3):205-216. doi: 10.26677/TR1010.2024.1442.
2. Labrague LJ, Aguilar-Rosales R, Yboa BC, Sabio JB. Factors influencing student nurses' readiness to adopt artificial intelligence (AI) in their studies and their perceived barriers to accessing AI technology: A cross-sectional study. *Nurse Educ Today.* 2023;130:105945. doi: 10.1016/j.nedt.2023.105945.
3. O'Connor S, Yan Y, Thilo FJ, Felzmann H, Dowding D, Lee JJ. Artificial intelligence in nursing and midwifery: A systematic review. *J Clin Nurs.* 2023;32(13-14):2951-2968. doi: 10.1111/jocn.16478.
4. Kılıç Akça N, Taşçı S. Nursing education and critical thinking [in Turkish]. *Mersin Univ J Fac Educ.* 2009;5(2):187-196. doi: 10.17860/efd.02659.
5. Kashaninia Z, Yusliani F, Hosseini MA, Reza Soltani P. The effect of teaching critical thinking skills on the decision making style of nursing managers. *J Client-Cent Nurs Care.* 2015;1(4):197-204. doi: 10.15412/J.JCCNC.04010405.
6. Tayaz E, Koç A. Retrospective analysis of postgraduate theses on critical thinking in nursing in the last twenty years [in Turkish]. *Kırşehir Ahi Evran Univ J Health Sci.* 2022;6(1):1-13.
7. Kum Ö. The attitudes of graphic design students towards artificial intelligence (The sample of Tokat province) [in Turkish]. *EKEV Akad J.* 2023;(96):172-181. doi: 10.17753/sosekev.1381995.
8. Kandemir F, Azizoğlu F. Examining nurses' general attitudes towards artificial intelligence [in Turkish]. *J Intensive Care Nurs.* 2024;28(2):113-125. doi: 10.62111/ybhd.1502758.
9. Park CSY, Kim H, Lee S. Do less teaching, do more coaching: toward critical thinking for ethical applications of artificial intelligence. *J Learn Teach Digit Age.* 2021;6(2):97-100.
10. Akgerman A, Özdemir Yavuz ED, Kavaslar İ, Güngör S. Artificial intelligence and nursing [in Turkish]. *J Artif Intell Health Sci.* 2022;2(1):21-27. doi: 10.52309/jaihs.v2i1.36.
11. Salem GMM, El-Gazar HE, Mahdy AY, Alharbi TAF, Zoromba MA. Nursing students' personality traits and their attitude toward artificial intelligence: A multicenter cross-sectional study. *J Nurs Manag.* 2024;2024(1):6992824. doi: 10.1155/2024/6992824.



12. Çelik S, Yılmaz F, Karataş F, Al B, Karakaş NS. Critical thinking dispositions of nursing students and influencing factors [in Turkish]. *Arch Health Sci Res.* 2015;2(1):74-85.
13. Yılmaz Y, Uzelli Yılmaz D, Yıldırım D, Akın E, Özer Kaya D. Artificial intelligence and the use of artificial intelligence in health: Opinions of health sciences students [in Turkish]. *Süleyman Demirel Univ J Health Sci.* 2021;12(3):297-308. doi: 10.22312/sdusbed.950372.
14. Irani T, Rudd R, Gallo M, Ricketts J, Friedel C, Rhoades E. *Critical thinking instrumentation manual.* 2007. Available from: http://step.ufl.edu/resources/critical_thinking/ctmanual.pdf. (Accessed on Oct 22, 2025).
15. Kılıç HE, Şen A. Turkish adaptation study of the UF/EMI critical thinking disposition instrument [in Turkish]. *Educ Sci.* 2014;39(176):1-12. doi: 10.15390/EB.2014.3632.
16. Schepman A, Rodway P. Initial validation of the general attitudes towards artificial intelligence scale. *Comput Hum Behav Rep.* 2020;1:100014. doi: 10.1016/j.chbr.2020.100014.
17. Kaya F, Aydin F, Schepman A, Rodway P, Yetişensoy O, Demir Kaya M. The roles of personality traits, AI anxiety, and demographic factors in attitudes toward artificial intelligence. *Int J Hum Comput Interact.* 2024;40(2):497-514. doi: 10.1080/10447318.2022.2151730.
18. Tseng TJ, Guo SE, Hsieh HW, Lo KW. The effect of a multidimensional teaching strategy on the self-efficacy and critical thinking dispositions of nursing students: A quasi-experimental study. *Nurse Educ Today.* 2022;119:105531. doi: 10.1016/j.nedt.2022.105531.
19. Salameh B, Qaddumi J, Hammad B, Eqtit F, Ibraheem Ayed AJ, Fashafsheh I, et al. Nursing students' attitudes toward artificial intelligence: Palestinian perspectives. *SAGE Open Nurs.* 2025;11:23779608251343297. doi: 10.1177/23779608251343297.
20. Mubarak F, Suomi R, Kantola SP. Confirming the links between socio-economic variables and digitalization worldwide: The unsettled debate on digital divide. *J Inf Commun Ethics Soc.* 2020;18(3):415-430. doi: 10.1108/JICES-02-2019-0021.
21. Ojong AS. Bridging the digital divide: Unmasking socioeconomic barriers to equitable access to digital tools in education. *Int J Sci Res Arch.* 2025;15(1):1285-1300. doi: 10.30574/ijrsra.2025.15.1.1143.
22. Choung H, David P, Ross A. Trust in AI and its role in the acceptance of AI technologies. *Int J Hum Comput Interact.* 2023;39(9):1727-1739. doi: 10.1080/10447318.2022.2050543.
23. El-Ashry AM, Al Saleh NS, AlOtaibi NG, Almutairi TZ, Sallam LA, Alnassar MM, et al. The impact of artificial intelligence attitudes and acceptance on critical thinking motivation among nursing students in Saudi Arabia. *SAGE Open Nurs.* 2025;11:23779608251369564. doi: 10.1177/23779608251369564.
24. Sumengen AA, Subasi DO, Cakir GN. Nursing students' attitudes and literacy toward artificial intelligence: A cross-sectional study. *Teach Learn Nurs.* 2025;20(1):e250-e257. doi: 10.1016/j.teln.2024.10.022.
25. Al Omari O, Alshammari M, Al Jabri W, Al Yahyaei A, Aljohani KA, Sanad HM, et al. Demographic factors, knowledge, attitude and perception and their association with nursing students' intention to use artificial intelligence (AI): A multicentre survey across 10 Arab countries. *BMC Med Educ.* 2024;24(1):1456. doi: 10.1186/s12909-024-06452-5.