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Investigation of the relationship between medical students' digital competency levels and their attitudes towards e-learning

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Abstract

As a requirement of our era, digital competence and e-learning have become basic competencies. The importance of these concepts has become clearer in medical education, especially with the Covid-19 pandemic. This period also triggered the transformation in education with technology. This study aimed to examine the relationship between medical students' digital competence levels and their attitudes toward e-learning. Data were collected from 922 medical students who voluntarily participated in the study, using the Students' Basic Digital Competences Scale and the E-Learning Attitude Scale. It was determined that medical students had high levels of digital competence, and their e-learning levels were moderate. The digital content development, information and data literacy, communication, the university's virtual tools and social communication, and the problem-solving sub-dimensions of digital competence are significantly, positively, and moderately related to e-learning. Students' digital competency levels did not differ significantly according to sex and studied term. Men's e-learning attitudes are significantly higher than that of women. The e-learning attitudes of term 1 students are higher than term 4 and 5 students. Medical education is a process open to continuous improvement. This research will contribute to the explanations regarding the transformation after the pandemic concerning the aims of medical education.

Keywords: Digital Competence, E-Learning, Attitude, Medical Student

1. Introduction

In the digital age, the Internet and information and communication technologies (ICT) are used more widely, and a lifelong transformation takes place depending on this process (Reddy, Sharma, & Chaudhary, 2020). As a requirement of the digital age we live in, what is expected from today's people is to adapt quickly to innovations, to be aware of

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all developments, and to follow what is happening in the world (Şimşek İşenler, 2020). Digital competence is defined as the effective and efficient use of ICT by individuals and is considered necessary to take a role in the socioeconomic life of today's world (Kuzminska, Mazorchuk, Morze, Pavlenko, & Prokhorov, 2019). Therefore, digital competence has been identified as one of the core competencies in the era of the fourth industrial revolution (Choi, 2018).

Various concepts are used to determine which tools and how students use ICT in education and what they learn. For example, ICT skills, digital competence, or digital literacy are used for this purpose (Eger, Klement, Pisoňová, & Petrová, 2018). Digital competency was found appropriate to understand and analyze what students can do with technology (Hatlewik, Gudmundsdóttir, & Loi, 2015). In addition, the European Parliament and the Council of Europe emphasized the importance of digital competence, which has been defined as one of the eight key competencies for lifelong learning (European Commission, 2018).

The close relationship between science and technology is vital in producing, protecting, and sharing information in this information age. The world is globalizing, and the processes of change and transformation are accelerating in every field. Education and training activities have also developed with this transformation and moved to the electronic environment over time. The widespread use of the Internet and the accessibility of technological devices for information have allowed education to be carried out independently of time and place. Especially with the Covid-19 pandemic, the transition to distance education in Turkey and the world accelerated, and the online content produced was presented to students. This period also triggered the transformation experienced in the traditional education process with technology. Distance education concept has begun to change, and e-learning has started being used as a synonym (Korkmaz, Çakır, & Tan, 2015). In addition, it is seen that concepts such as distance learning (Al-Arimi, 2014), online learning (Zhang & Worthington, 2016), and web-based learning (Khan, 2001) are being used as substitutes. In summary, the distance education activities carried out using the Internet, and technological devices have been called e-learning, a more specific concept (Aoki, 2010; Haznedar & Baran, 2012).

Şentürk (2016) defines e-learning as an interactive learning-teaching process that can be carried out synchronously (simultaneously) or asynchronously (separately) via technology unconstrained to time and place. And also states that e-learning makes interaction, communication, and repetition between individuals possible at any time, provides individual learning pace progress, incorporates different teaching methods, reduces education costs, and provides opportunity equality. E-learning can be carried out simultaneously, separately (Zhang & Nunamaker, 2003), or with a mixture of both (Selim, 2007). In the synchronous model, the teacher and the learner are in different

places, but the activity is carried out at the same time (Çakır & Yükseltürk, 2010). In the asynchronous model, the teacher and the learner perform the activity independently of time and place (Henderson, 2003). The synchronous e-learning model allows individuals to feel like a member of the learning society since the interaction between students and teachers is done instantaneously. But in this model, the activity loses its flexibility in terms of time. For this reason, most e-learning systems are designed according to the asynchronous learning model, and technological studies are carried out in this direction. In addition, it is easier to develop and financially less expensive than the synchronous model (Zhang and Nunamaker, 2003). The content produced in this process continues to accumulate on the internet, and with the increasing habit of searching the internet for educational materials, asynchronous learning has gained continuity.

Today, rapid knowledge and technological developments in medical science also trigger changes in medical education and student profiles, and expectations bring up the necessity to include innovative educational approaches.

The main purpose of medical education is to equip students with professional competence and prepare them for lifelong learning. The European Parliament and the Council of Europe define digital competence as one of the eight key competencies for lifelong learning (European Commission, 2018). Furthermore, using digital tools in digital literacy and communication, keeping ourselves up to date, coping with information pollution, and using mobile health devices and applications have become essential skills (Lam et al., 2013). Therefore, the necessity of including digital literacy in the curriculum remains one of the current issues in medical education (Wells, 2011).

Medical educators' awareness of the importance of acquiring skills related to digital technologies has been increasing since the first year of medical school (Kind et al. 2010). Although there are attempts to use social media platforms in education, examples are rare, and it is stated that an expanded curriculum is needed (Cheston et al., 2013; Green et al., 2014; Jalali and Wood, 2014). In an online study with physicians (n=5000), 80% of Hungarian doctors stated that they used the internet to search the relevant literature or drug database daily, while 50% thought that digital literacy should be included in the medical education curriculum (Győrffy & Girasek, 2015).

Although elective courses are starting to be offered in some faculties to include the teaching of digital literacy skills in the medical curriculum, more work is needed to develop the digital skills of medical students. It is crucial to evaluate the effects of technology dominance in line with the aims of medical education, to determine the digital competencies of medical students and their attitudes towards e-learning, the transformation in medical education after the pandemic, and to determine future goals.

This research examines the relationship between medical students' digital competence levels and their attitudes toward e-learning. For this purpose, answers to the following research questions were sought:

1. What is the digital competence level of medical students?

2. What is the level of e-learning attitudes of medical students?

3. Is there a significant relationship between the digital competence level of medical students and their e-learning attitudes?

4. Is there a significant difference between the digital competence levels of medical students of different sexes studying at different terms?

5. Is there a significant difference between the medical students' e-learning attitudes regarding different sexes and study terms?

2. Method

2.1 Participants

The research consisted of students studying at Çanakkale Onsekiz Mart University Faculty of Medicine in the 2022-2023 academic year. A representative sample was calculated using the GPower sampling and power calculation program, taking the target population as 1060 students. Taking a medium effect size for analysis of variance (ANOVA) ($\eta 2 = 0.5$) alpha error as 5%, power as 90%, and the number of groups to be compared in ANOVA as 6, the minimum sample required was calculated as 289 people with a degree of freedom of 5. A total of 922 students from all terms (term 1 to term 6) participated in the study (Table 1). Participation in the research was voluntary, and students who participated by giving their consent in line with the purposeful sampling were included.

Table 1. Distribution of medical students participating in the study by study year and sex

Variable	Category	n (%)
Sex	Female	479 (52)
	Male	443 (48)
Term	Term 1	168 (18.2)
	Term 2	160 (17.4)
	Term 3	188 (20.4)
	Term 4	162 (17.6)
	Term 5	135 (14.6)
	Term 6	109 (11.8)

Total	922 (100)

2.2. Data Collection Tools

In this study, data were obtained with two different data collection tools:

2.3. E-Learning Attitude Scale (ELAS)

ELAS was developed by Yarayan, Fakazlı, and İlhan (2022). The aim of the scale is to determine university students' attitudes toward e-learning. ELAS consists of 14 items in Likert type with 5 graded response sets. As a result of the factor analysis, 14 items constituted a single factor. The scale was tested with confirmatory factor analysis. The fit indices were determined as x2/sd=3.49, RMSEA=0.072, SRMR=0.046, CFI=0.94, and GFI=0.92. The Cronbach Alpha value of the scale was 0.92.

2.4. Students' Basic Digital Competences Scale (DCS)

DCS was developed by López-Meneses et al. (2013) and adapted into Turkish by Afacan Adanır and Gülbahar (2022). The scale aims to determine the digital competencies of university students. The scale consists of 29 items and 5 sub-factors. These are: "Digital Content Development" (9 items), "Information and Data Literacy" (10 items), "Communication" (3 items), "University's Virtual Tools and Social Communication" (4 items), and "Problem Solving" (3 items). Scale items are Likert type with 4 graded response sets. Confirmatory factor analysis was applied, and the obtained structure was confirmed. The fit indices obtained were x2/sd=3.19, RMSEA=0.071, SRMR=0.074, CFI=0.84 GFI=0.83, AGFI=0.80, TLI=0.83, and IFI=0.84. The Cronbach Alpha value of the scale was 0.91.

2.5. Data Analysis

The data obtained in the research were transferred to the JAMOVI statistical software. Students' digital competence and e-learning attitudes are summarized with descriptive statistics such as arithmetic mean, standard deviation, median, and minimum and maximum values. Parametric analysis techniques were used in relational analysis and comparative analysis. A p-value of <0.05 was accepted as significant.

2.6. Ethical Approval

This research was carried out with the approval of Çanakkale Onsekiz Mart University Scientific Research Ethics Committee dated 28.07.2022 and numbered 14/50.

3. Results

3.1. Medical students' Digital Competency Levels

The digital competency level of 922 medical students was examined with descriptive statistics such as arithmetic mean, standard deviation, median, and minimum and maximum values. The results are shown in Table 2.

Table 2. Medical students' digital competency levels

Items	Mean (S. Deviation)	Median (Min.-Max.)
I can work with image files using tools and/or social software applications (Gloster, PicMonkey, Canva, Animoto...).	2.53(0.8)	3(1-4)
I feel competent in working with social software tools that help me analyze and/or navigate content found on blogs (Tagul, Tagxedo...).	2.51(0.8)	3(1-4)
I can organize, analyze, and synthesize information with concept maps using social software tools (cmaptool, mindomo, text2mindmap...).	2.50(0.8)	3(1-4)
I can use programs to publish interactive presentations on the Internet (Issuu, Prezi, SlideShare, Scribd, etc.).	2.58(0.7)	3(1-4)
I consider myself competent in designing, creating, or modifying a wiki (Wikispaces, nirewiki, PbWorks ..., etc.).	2.51(0.8)	3(1-4)
I can design, create and modify blogs (e.g., Blogger, WordPress, etc.).	2.55(0.8)	3(1-4)
I show progress in professional networks (Linkedin, Xing, etc.).	2.54(0.7)	3(1-4)
I can join forums properly.	2.64(0.8)	3(1-4)
I know how to use social bookmarking and tagging (del.icio.us, symbaloo, blinklist, ...).	2.56(0.8)	3(1-4)
I can browse the Internet with different browsers (Mozilla, Chrome, Opera, Explorer, etc.).	2.78(0.8)	3(1-4)
I can use different search engines (Google, ixquick, mashpedia, etc.).	2.76(0.8)	3(1-4)
I feel qualified to work with a digital cartography program (Google maps, google earth, vpike, tagzania, etc.) to search for places.	2.74(0.8)	3(1-4)
I can work with documents online (Google Drive, Dropbox, Zoho, OneDrive...).	2.77(0.8)	3(1-4)
I know how to use programs to schedule my work time (Google calendar etc.).	2.74(0.8)	3(1-4)
I can communicate with other people via e-mail.	2.81(0.8)	3(1-4)

Items	Mean (S. Deviation)	Median (Min.-Max.)
I know how to use wikis (Wikipedia, aulawiki21, etc.).	2.72(0.8)	3(1-4)
I can use audio recordings and video streams (YouTube, Vimeo, etc.).	2.80(0.8)	3(1-4)
I can use educational platforms (Moodle, WebCt, Campus Online, Intranet, Dokeos, etc.).	2.61(0.8)	3(1-4)
I use QR codes for information sharing.	2.66(0.8)	3(1-4)
I use chat to interact with other people.	2.77(0.8)	3(1-4)
I use instant messaging as a means of communication with other people.	2.78(0.8)	3(1-4)
I can communicate with other people participating in social networks (Facebook, Twitter, Instagram, etc.).	2.78(0.8)	3(1-4)
I read the university newspaper.	2.51(0.8)	3(1-4)
I follow the social networks of the university.	2.64(0.8)	3(1-4)
I am using university e-mail.	2.65(0.8)	3(1-4)
I use the university's virtual education platform.	2.64(0.8)	3(1-4)
I'm talking to a friend to see if we can solve problems about using an app together.	2.70(0.8)	3(1-4)
I'm looking for tutorials online and trying to figure issues out independently.	2.66(0.7)	3(1-4)
I consult the instructor through a network communication channel.	2.63(0.8)	3(1-4)

n=922

Medical students have high levels of digital competence. Items with relatively higher scores than others on the scale;

I can communicate with other people via e-mail.

I can use audio recordings and video streams (YouTube, Vimeo, etc.).

I can browse the internet with different browsers (Mozilla, Chrome, Opera, Explorer, etc.).

I can use different search engines (Google, ixquick, mashpedia, etc.).

I use instant messaging as a means of communication with other people.

I can communicate with other people participating in social networks (Facebook, Twitter, Instagram, etc.).

I can work with documents online (Google Drive, Dropbox, Zoho, ...).

The less agreed items are;

I can organize, analyze, and synthesize information with concept maps using social software tools (cmaptool, mindomo, text2mindmap, ...).

I feel competent in working with social software tools that help me analyze and/or navigate content found on blogs (Tagul, Tagxedo, ...).

I consider myself competent in designing, creating, or modifying a wiki (Wikispaces, nirewiki, PbWorks, ...).

3.2. E-Learning Attitudes of Medical students

The e-learning attitudes of 922 medical students were examined with descriptive statistics such as arithmetic mean, standard deviation, median, and minimum and maximum values. The results are shown in Table 3.

Table 3. E-learning attitudes of medical students

Items	**Mean (S. Deviation)**	**Median (Min.-Max.)**
I think e-learning is effective for theoretical courses.	2.99 (1.2)	3 (1-5)
I can get effective feedback on my performance in e-learning.	2.86 (1.1)	3 (1-5)
E-learning makes you feel more responsible for learning than face-to-face training.	2.76 (1.2)	3 (1-5)

In e-learning, I give importance to re-watching the course recordings when necessary.	3.20 (1.2)	3 (1-5)
E-learning is more comfortable in terms of space and time than face-to-face learning.	3.10 (1.2)	3 (1-5)
I think e-learning is effective for applied courses.	2.62 (1.2)	3 (1-5)
In e-learning, I do not lose concentration in the home environment.	2.82 (1.2)	3 (1-5)
In e-learning, I have no difficulty communicating with the instructor during extracurricular processes.	2.88 (1.2)	3 (1-5)
In e-learning, I repeat the subject after the lesson.	3.04 (1.2)	3 (1-5)
E-learning provides quality and permanent learning for students.	2.92 (1.2)	3 (1-5)
I do not experience a lack of lecture notes or materials in e-learning.	3.02 (1.2)	3 (1-5)
E-learning provides equal opportunity in education.	2.92 (1.2)	3 (1-5)
In e-learning, I prepare before the lesson.	2.87 (1.2)	3 (1-5)
E-learning has a positive effect on my individual performance compared to face-to-face learning.	2.89 (1.2)	3 (1-5)

n=922

The e-learning attitudes of medical students are moderate.

Items with relatively higher scores than other items on the scale;

In e-learning, I give importance to re-watching the course recordings when necessary.

E-learning is more comfortable in terms of space and time than face-to-face learning.

In e-learning, I repeat the subject after the lesson.

The less agreed items are;

I think e-learning is effective for applied courses.

E-learning makes me feel more responsible for learning than face-to-face training.

In e-learning, I do not lose concentration in the home environment.

3.3. The Relationship Between Digital Sufficiency Level and E-Learning Attitude

The research examined the relationship between the digital competence level of medical students and their e-learning attitudes. The results are shown in Table 4.

Table 4. The relationship between the digital competence levels of medical students and their e-learning attitudes

Relationships	n	r	p
Digital Content Development*E-Learning Attitude	922	0.475	<0.0001
Information and Data Literacy*E-Learning Attitude	922	0.483	<0.0001
Communication*E-Learning Attitude	922	0.445	<0.0001
University's Virtual Tools and Social Communication*E-Learning Attitude	922	0.454	<0.0001
Problem Solving*E-Learning Attitude	922	0.486	<0.0001

As a result of the correlations examined between the level of digital competence and e-learning attitudes, there were significant, positive, and moderate correlations between;

- the digital content development dimension, a digital competence subscale, and e-learning attitudes (p<.05, p: 0.0001). In this case, the e-learning attitude increases as digital content development competence increases.
- the information and data literacy dimension, the digital competence subscale, and e-learning attitudes (p<.05, p: 0.0001). In this case, the e-learning attitude increases as information and data literacy proficiency increases.
- the communication dimension, the digital competence subscale, and e-learning attitudes (p<.05, p: 0.0001). In this case, the e-learning attitude also increases as communication competence increases.
- the university's virtual tools and social communication dimension, the digital competence subscale, and e-learning attitudes (p<.05, p: 0.0001). In this case, the e-learning attitude increases as the university's virtual tools and social communication competence increase.
- the problem-solving dimension, a subscale of digital competence, and e-learning attitudes (p<.05, p: 0.0001). In this case, as problem-solving competence increases, the e-learning attitude also increases.

3.4. Comparison of Medical students' Different Sex Digital Sufficiency Levels and Education in Different Terms

The study compared the digital competence levels of medical students of different sexes and studying in different terms. This comparison was made with the two-factor ANOVA (factorial ANOVA) test. The results are shown in Table 5.

Table 5. Comparison of different sex medical students' digital proficiency level and studying in different terms

Source of Variance	F	p
Sex	0.023	0.880
Term	0.795	0.553
Sex * Term	0.279	0.925

F: ANOVA Test, p: Significance Value

Among the main effects, the sex of the students did not make a significant difference in the level of digital competence (p: 0.880, p>.05). In addition, the students' studied term did not make a significant difference in the level of digital competence (p: 0.553, p>.05). Finally, the interaction of students' sex and the term they studied did not make a significant difference in the level of digital competence (p: 0.925, p>.05).

3.5. Comparison of Medical Schools' E-Learning Attitudes with Different Sex and Different Terms

The study compared different sex medical students' e-learning attitudes and studying in different terms. This comparison was made with the two-factor ANOVA (factorial ANOVA) test. The results are shown in Table 6.

Table 6. Comparison of e-learning attitudes of medical students of different sexes and studying in different terms

Source of Variance	F	p	η^2
Sex	4.489	0.034	0.005
Term	3.132	0.008	0.017
Sex * Term	0.330	0.895	0.002

F: ANOVA Test, p: Significance Value, η^2: Effect Size

There was a significant difference in the e-learning attitudes of students' sex, which is one of the main effects (p:0.034, p<.5). This significant difference is a small effect size (η2=0.005) according to Cohen's (1988) classification. This significant difference is in favor of male students. The e-learning attitudes of female students (mean=39.91) are lower than male students (mean=41.97).

Among the main effects, there was a significant difference in the e-learning attitudes of students during their education period (p: 0.008, p<.5). This significant difference has a medium effect size (η2=0.017) according to Cohen's (1988) classification. According to the Bonferroni multiple comparison test results, the e-learning attitudes of term 1 students (mean=44.08) were higher than term 4 (mean=39.31) and 5 (mean=38.76) students. The

interaction between the sex of the students and the term they studied did not make a significant difference in the e-learning attitudes (p: 0.895, p>.5).

4. Discussion

Although various concepts are used to determine which tools and how students use information and communication technologies in the field of education and what they learn, the term digital competencies have been found appropriate to understand and analyze what students can do with technology (Hatlewik, Gudmundsdóttir, & Loi, 2015). In our digital age, distance education activities carried out using the Internet, and technological devices are called e-learning (Aoki, 2010; Haznedar & Baran, 2012). Although today's technological developments create significant changes in every sector, health services are one of the most significant technological developments. These technological developments and information technology applications, which are experienced in health services and contribute to maintaining health, also affect medical education. In a study conducted with medical students, it was stated that 69% of the students had medical applications installed on their smartphones and tablet devices, the applications were drug content applications (43%), and 59% of the students gained their current computer knowledge through self-learning. It has been revealed that 72% of non-academic search engines use Google, and more specialized academic search engines such as PubMed and Medscape are not used (Ferdoushe et al., 2021). Medical students thought that the basic ICT learning program should be in the first year of the medical curriculum (Gibson and Silverberg, 2000). Changes in student profiles and expectations have also brought up the necessity to include innovative educational approaches. This study examined the relationship between medical students' digital competence levels and their attitudes toward e-learning.

Medical educators' awareness of the importance of acquiring skills related to digital technologies has been increasing since the first year of medical school (Kind et al. 2010). In this study, it was determined that medical students had high levels of digital competence. A study evaluating the perspectives of medical faculty members and learners on e-learning stated that both students and educators evaluated e-learning as moderately effective (Padhi et al., 2021). Many studies show that students prefer the blended teaching method, which combines face-to-face teaching and e-learning. The most important limitations of e-learning are the technical problems experienced in online courses (Gupta et al., 2021, Shete et al., 2020, Olum et al., 2020, Radhi, 2021). The main reason for this situation is the sudden transition from traditional pedagogy to e-learning during the Covid-19 pandemic, and it can be associated with the negative experiences of students in faculties that do not have previous experience and preparation. This study

determined that the e-learning attitudes of medical students were at a moderate level and was parallel to the literature.

Studies suggest that medical informatics and information access, which have become an important part of medical education, should be added to the medical education curriculum (Clark and Li, 2010; Silverman et al., 2012, Mesko et al., 2015). Due to the Covid-19 pandemic, distance education and e-learning were used in medical education, as in other fields of education, and it can be predicted that its use will become more common in the future as a requirement of the technology age. When the relationship between medical students' digital competence levels and their e-learning attitudes was examined, e-learning attitudes increased as digital content development, information and data literacy, communication, university's virtual tools and social communication, and problem-solving competencies increased. To increase the e-learning attitudes of medical students in parallel with the requirements of the age and the change in medical education, it would be beneficial to include activities that increase their digital competence levels in the curriculum.

E-learning is expressed as providing interaction between individuals through various applications at any time and place through local and wide area networks such as information and communication technologies support and the execution of learning-teacher processes (Gülbahar, 2019). Therefore, items such as "I give importance to re-watch course records in e-learning when necessary," "E-learning is more comfortable in terms of space and time than face-to-face learning," and "I repeat the subject after the lesson in e-learning" being scored higher than other items by the students are compatible with the definition of e-learning.

In their study, Althubaiti et al. (2022) found that, sex, age, and internet use significantly impacted students' computer anxiety and digital readiness. They found that males' knowledge-sharing behaviors and skills performed better than females' and that students' computer anxiety decreased with age (Althubaiti et al., 2022). In studies investigating university students' information-sharing behaviors and social media usage, male students have higher rates of sharing learning resources (e.g., lecture notes) and use social media for educational purposes more often than females (Torun, 2020). Therefore, more digital technology sessions and resources should be provided to increase students' digital readiness, where more internet use among students is associated with better digital competence (Althubaiti et al., 2022). In this study, it was determined that the sex of the students, the term they studied, and the interaction between them did not significantly affect the level of digital competence. However, the sex of the students created a significant difference in their e-learning attitudes (p: 0.034, $p<0.5$). It was determined that female medical students' e-learning attitudes (mean=39.91) were lower than male medical students (mean=41.97).

When the items with lower scores than others in the digital competency level scale were examined, it was seen that the scale items expressing high-level cognitive skills, such as preparing concept maps with digital content, analyzing, and synthesizing had lower scores. Therefore, it would be more beneficial to add content that can improve these aspects while preparing the program to increase digital competence in the medical education curriculum. In this respect, it is essential to prepare high-level skills-enhancing content related to digital competence, as indicated in the findings of studies on the inclusion of digital literacy in the medical education curriculum (Győrffy & Girasek, 2015).

5. Conclusions

Today, many medical faculties train students with the classical education model, the roots of which date back to ancient Greece. It is an important research topic for medical education that the method used for students to learn the rapid knowledge and technological developments in traditional medical education curricula still continues without a major change. Today, the importance of scientific knowledge is increasing, and healthcare practices are changing rapidly. This rapid change continued even during periods of limitations, such as the pandemic process. Changes in student profiles and expectations have also brought up the necessity to include innovative educational approaches. As a result, it is recommended to design the curriculum to develop various skills so that medical students can use their digital competencies in their academic studies adequately and make necessary improvements to use e-learning more effectively. The medical students participating in the study scored lower on the scale items expressing high-level cognitive skills such as preparing concept maps with digital content, analyzing, and synthesizing. It would be more beneficial to add content that can improve these aspects while preparing the program content to increase digital competence in the medical education curriculum. In this respect, it is very important to prepare content that increases high-level skills related to digital competence in studies on the inclusion of digital literacy in the medical education curriculum.

Limitations

As in similar studies, some limitations in our study may affect the interpretation of our findings. Although 922 of 1060 students studying at the study's medical faculty participated in the research voluntarily, the sample may not be representative of all medical students because it was collected from only one university. In addition, our study examines the relationship between medical students' digital competencies and e-learning attitudes. Although it contributes to the transformation in medical education and determines future goals, the research findings highlight the need for future studies.

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