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Araştırma Makalesi/ Research Article

Attitudes of the Students of Health Sciences towards Mobile Learning

Sağlık Bilimlerinde Öğrenim Gören Öğrencilerin Mobil Öğrenmeye Yönelik Tutumları

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ABSTRACT
Objective: This study aimed to examine the attitudes of health sciences students towards mobile learning.
Methods: This descriptive and cross-sectional study was carried out in the departments of Nursing, Physical Therapy and Rehabilitation, Pharmacy, and Medicine in the Faculty of Health Sciences of a university located in the western Black Sea region of Turkey between December 2020 and May 2021. The study data were collected with the "Student Information Form" consisting of 10 questions and the "Mobile Learning Attitude Scale." The online survey method was used to manage the research data, and the answering time of the survey was 7-8 minutes on average.
Results: The study determined that the students had a moderate average score for their attitudes towards mobile learning. The highest average (3.11±0.45) score in its sub-dimensions was in usability in mobile learning.
Conclusion: It has been determined that the health science students' attitudes towards mobile learning are moderate. It was observed that the m-learning attitudes of the students who found the effectiveness of online education at a "low" level in theoretical and clinical/practical courses were also at a "low" level.
Keywords: Mobile learning, distance education, health sciences, students, mobile applications

ÖZ
Amaç: Bu çalışmada, sağlık bilimleri öğrencilerinin mobil öğrenmeye yönelik tutumlarının incelenmesi amaçlanmıştır.
Yöntem: Tanımlayıcı ve kesitsel tipte olan bu araştırma, Türkiye'nin Batı Karadeniz bölgesinde yer alan bir üniversitenin Sağlık Bilimleri Fakültesi'nin Hemşirelik, Fizik Tedavi ve Rehabilitasyon bölümleri, Eczacılık ve Tıp fakültelerinde 01 Aralık 2020 – 01 Mayıs 2021 tarihleri arasında gerçekleştirilmiştir. Çalışma verileri 10 sorudan oluşan "Öğrenci Bilgi Formu" ve "Mobil Öğrenme Tutum Ölçeği" ile toplanmıştır. Araştırma verilerinin toplanmasında google formlar aracılığıyla online anket yöntemi kullanılmış olup, anketin cevaplanma süresi ortalama 7-8 dakikadır.
Bulgular: Çalışmada, öğrencilerin mobil öğrenmeye yönelik tutumları için orta düzeyde (3.11±0.45) puan ortalamasına sahip olduğu saptandı. Alt boyutlarında en yüksek ortalama puan, mobil öğrenmede kullanılabilirlik alanındaydı.
Sonuç: Sağlık bilimleri öğrencilerinin mobil öğrenmeye yönelik tutumları orta düzeyde olduğu saptanmıştır. Teorik ve klinik/pratik derslerde çevrimiçi eğitimin etkinliğini "düşük" düzeyde bulan öğrencilerin m-öğrenme tutumlarının da "düşük" düzeyde olduğu görülmüştür.
Anahtar Kelimeler: Mobil öğrenme, uzaktan eğitim, sağlık bilimleri, öğrenciler, mobil uygulamalar

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Introduction

Today, all countries struggle with a new type of coronavirus (COVID-19) disease, which turned into a global epidemic. This epidemic has highly affected education and health systems all over the world. Educational processes have been continued through several platforms, which are advanced technological products, with the COVID-19 pandemic (Karadağ et al., 2021; Telli and Altun, 2021). Digital education technologies have begun to be used effectively and functionally with the differentiation in learning requirements. During the COVID-19 pandemic in higher education institutions, technology has grown to encompass the creation of new learning and teaching methods (Alismaiell, 2021). In the study by Alturki and Aldraiweesh(2022), have shown that students and instructors benefit from enhanced M-learning face-to-face and distance student participation. M-learning, a specialized and free application of e-learning, frees the learning environment (Çiftçi, 2021). When studies in the literature regarding m-learning in education were examined, many relevant studies were found in recent years. There are studies investigating the effects of m-learning on variables such as success, motivation, and attitude. In addition, there are also studies examining the obstacles met in m-learning (Alsancak and Seferoğlu, 2018; Al-Emran, 2020; Golenhofen et al., 2020; Gür and Özek, 2021). In a systematic review, including the studies carried out between 2010-2020 in Turkey, it was concluded that m-learning was an advantage for adolescents who commonly used mobile technologies and the internet (Alsancak and Seferoğlu, 2018). In a systematic review evaluating the benefits and challenges of mobile learning during the COVID-19 pandemic, it was stated that M-learning has excellent potential to be an effective platform for education (Saikat et al., 2021). In the study conducted to examine students' perceptions of their actual use of mobile learning, it was found that M-learning had a good and constructive effect on their actual usage (Alturki and Aldraiweesh, 2022). The efficiency of mobile knowledge in health sciences has also been investigated as in educational sciences (Çakır and Djibril, 2021; Ibili, 2020). However, the compulsory use of M-learning technologies in health sciences has increased the necessity of studies in this field. Therefore evaluating students' attitudes towards M-learning in this period is essential, especially since the pandemic process is a period in which theoretical and practical courses are carried out with distance education.This study also aimed to examine the attitudes of health sciences students towards m-learning. Therefore, answers to the following questions were sought during the study:

1. What are the attitudes of the students studying health sciences towards m-learning?
2. Do the attitudes of the students studying in health sciences towards m-learning vary based on their departments?
3. Do the attitudes of the students studying in health sciences towards m-learning vary depending on their preference of technological device and their states of using m-learning before/during the pandemic?

Material and Method

Design

This descriptive and cross-sectional study was carried out in the departments of Nursing, Physical Therapy and Rehabilitation, Pharmacy, and Medicine in the Faculty of Health Sciences of a university located in the western Black Sea region of Turkey between December 01, 2020, and May 01, 2021.

Participants

The research population consists of 1200 students studying from the first to the last year of the Faculty of Health Sciences, Nursing and Physical Therapy Departments, Faculty of Pharmacy, and Faculty of Medicine in the 2020-2021 academic year. The sample of the research was 95% confidence interval, with ±5% sampling error, statistical estimations could be made (Coşkun et al., 2019), and the minimum sample size to be included in the research was calculated as 291. The easy sampling method was used as the sampling technique in the study, it was aimed to reach the whole universe, and the study was completed with 771 students who agreed to participate. Therefore, 64.25% of the universe has been reached.

Data collection

Student Information Form and M-Learning Attitude Scale were used to collect data in the study. The questionnaire was uploaded to Google Forms, and the link address was delivered to the students. The informed consent page was presented to the students on the entry page of the forms; students who agreed to participate in the study could continue with the survey after ticking the checkbox. Adhering to the principle of confidentiality of data, information such as identity number, name, and surname of the students were not included in the questionnaire, and they were not asked to fill in.

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Filling out the forms prepared using the online questionnaire took 15-20 minutes.

Student information form

This form was prepared by the researchers based on the literature (Abachi, Muhammed, 2014; Yeap, Ramayah, Soto-Acosta, 2016). The form consisted of 10 questions including demographic characteristics of the students, their preference of technological device and their opinions regarding m-learning before and after the pandemic.

M-Learning Attitude Scale (MLAS)

In this study, "M-Learning Attitude Scale" which was developed Çelik (2013) was used to examine the attitudes of the students studying in health sciences towards mobile learning. The scale consists of a total of 21 items and 4 subscales. The subscales are the advantages of M-learning (7 items), limitations in M-learning (5 items), usability in M-learning (5 items) and freedom in M-learning (4 items). The minimum score of the scale is 21 and the maximum is 105. High scores indicate a high positive attitude towards m-learning. Internal consistency coefficient (Cronbach alpha) of the scale is 0.881. At the end of factor analysis performed for construct validity, it was determined that scale items explained 51.11% of the total variance. The items in the scale is scored as five-point likert type such as "totally disagree, disagree, neither agree nor disagree, agree, totally agree" (Celik, 2013). The data were interpreted as "very low level" between 1.00-1.79, "low level" between 1.80-2.59, "moderate level" between 2.60-3.39, "high level" between 3.40-4.19 and "very high level" between 4.20-5.00 (Elçiçek and Bahçeci, 2015). The internal consistency coefficient of the scale was found as 0.752 in our study.

Data analysis

Normality assumption of the variables in the study was made by Shapiro-Wilk test, and Levene test was used for assuming homogeneity of variance. Independent samples t-test was used to compare two independent groups for the measurement values conforming to normal distribution. Anova test was used to compare three or more independent groups and Tukey test was used for multiple comparison of three or more groups for the values conforming to normal distribution and variance homogeneity assumptions. In case that normal distribution assumption was ensured but homogenity assumption was not, Welch test was used to compare three or more independent groups and Tamhane test was used for multiple comparison test of three or more groups. When normality assumption was not provided, Kruskal-Wallis H test was used for comparing three or more independent groups; and Dunn test with Bonferroni correction was used for multiple comparison test of three or more groups. In hypothesis tests, descriptive statistics such as arithmetic mean ($\bar{X}$), standard deviation (SD), median (Med), minimum (Min) and maximum (Max) were also included. Confidence interval was taken as 95% in the study and analyses were carried out by using SPSS package program.

Results

Sociodemographic Features of Students for M-Learning

As shown in Table 1, 771 students were included in the study. Most of the students (54.6%) were studying in nursing. When technological device use of the students was examined, it was seen that they mostly preferred smart phones (80.5%). Majority of the students (62.0%) stated that they did not use m-learning before the pandemic. 42.9% of the students evaluated the efficiency of online education, which was started during the pandemic, on the theoretical courses as "moderate". Also, 35.3% of them assessed the efficiency of online education on clinical/practical courses as "bad" (Table 1).

Students' Perceptions of Attitude of M-Learning

When mean scores of the students from M-Learning Attitude Scale and its subscales were examined, mean total scale score was found as 3.11±0.45. The highest mean score (3.29±0.74) was in the usability in M-learning (Table 2).

Table 2. Mean scores of the m-learning attitude scale and its subscales

Subscale	$\bar{X}$	SD	Min.	Max.
Advantages of M-learning	2.86	0.73	1.00	5.00
Limitations in M-learning	3.19	0.79	1.00	5.00
Usability in M-learning	3.29	0.74	1.00	5.00
Freedom in M-learning	3.21	0.84	1.00	5.00
Total scale	3.11	0.45	1.00	4.90

$\bar{X}$: Mean, SD: Standard deviation, Min: Minimum, Max: Maximum

Table 3 shows the results of the comparison of the mobile learning attitude scale and sub-dimensions measurement scores of the students participating in the research according to some demographic data related to the students.

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Table 1. Personal characteristics of the students and their state of using m-learning

Variable	n	%
Sex		
Female	605	78.5
Male	166	21.5
Age		
17-20 years old	429	55.6
21-24 years old	325	42.2
25 years and older	17	2.2
Faculty of study		
Faculty of Health Sciences/Nursing	421	54.6
Faculty of Health Sciences/Physical Therapy and Rehabilitation	131	17.0
Faculty of Medicine	48	6.2
Faculty of Pharmacy	171	22.2
Academic year		
1st year	199	25.8
2nd year	175	22.7
3rd year	235	30.4
4th year	130	16.9
5th year	30	3.9
6th year	2	0.3
Technological device use		
Smart phone	621	80.5
Laptop	130	16.8
Notebook	16	2.1
Tablet	5	0.6
Status of using m-learning before the pandemic		
Yes	275	35.7
No	496	64.3
The aim of using m-learning before the pandemic		
Information for medications	47	6.1
Information for disease	101	13.0
Practical skills	77	9.9
Communication (patient/healthcare professional)	42	5.4
Laboratory information	24	3.1
Assessment of the efficiency of online education started during the pandemic on theoretical courses		
Very good	39	5.1
Good	166	21.5
Moderate	331	42.9
Bad	163	21.1
Very bad	72	9.3
Assessment of the efficiency of online education started during the pandemic on clinical/practical courses		
Very good	12	1.6
Good	45	5.8
Moderate	188	24.4
Bad	272	35.3
Very bad	254	32.9

Total scale scores did not show significant differences based on the Faculty of Health Sciences, in Nursing department, device used and status of using m-learning before the pandemic. Total scale scores of the students, who assessed the efficiency of online education on theoretical courses as bad (21.1%) were found to be significantly lower than the students who assessed as very good (5.1%) and good (21.5%). Moreover, total scale scores of the students, who assessed the efficiency of online education on clinical/practical courses as bad (35.3%) were significantly lower than the ones who assessed it as very good (1.6%), good (5.8%) and moderate (24.4%) (Table 3).

Discussion

The widespread use of mobile devices and the development in technology have affected education system today. Many studies have been performed on m-learning which started to be involved in education system. In a research study examining the studies which were carried out between 2010 and 2017 in Turkey, it was seen that assessments were often made on mobile learning and study samples were mostly composed of undergraduate students studying in the faculty of education (Korucu and Biçer, 2019). In another review including m-learning-associated studies between 2007 and 2017, it was reported that 65.8% of learning area was dependent on m-learning. In the same study, the relationship between m-learning and academic success, student opinions, permanence, motivation and attitude was frequently emphasized (Zengin et al., 2018). Conduction of m-learning studies in various scientific fields with the changing education system during the pandemic will be an opportunity to reflect the beneficial outcomes to the practice. In this study with this purpose, the attitudes of the students studying in the faculties of health sciences regarding m-learning were examined.

In our study, the attitudes of the students were found at a moderate level. In the relevant literature including the students studying at various scientific fields, it was found that attitudes of mechanical engineering and social and technical sciences students towards m-learning were at a moderate level (Kahraman et al., 2017; Karakuyu and Uyar, 2019). Also in a study evaluating the attitudes of nursing students towards m-learning, their overall attitude was found to be moderate (Günay İsmailoğlu et al., 2021).

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Table 3. The comparison of m-learning attitude scale and subscale scores based on the variables

Variable		Advantages of M-learning	Limitations in M-learning	Usability in M-learning	Freedom in M-learning	Total
		$\bar{X}$±*SD*	$\bar{X}$±*SD*	$\bar{X}$±*SD*	$\bar{X}$±*SD*	$\bar{X}$±*SD*
Faculty of study						
Nursing (a)		2.83±0.72	3.30±0.76	3.26±0.72	3.15±0.82	3.11±0.45
Physical Therapy and Rehabilitation (b)		2.86±0.73	3.11±0.81	3.29±0.83	3.09±0.89	3.07±0.48
Medicine (c)		3.15±0.64	2.69±0.71	3.51±0.65	3.62±0.66	3.22±0.38
Pharmacy (d)		2.85±0.76	3.10±0.81	3.31±0.73	3.32±0.85	3.11±0.45
	F	2.83	10.51	1.65	6.55	1.29
	p	**.038**^{AV}	**.001**^{AV}	.177^{AV}	**.001**^{AV}	.278^{AV}
Significant difference		a-c	a-c, a-d, b-c, c-d		a-c, b-c	
Status of using m-learning before the pandemic						
Yes		2.91±0.74	3.16±0.85	3.39±0.69	3.26±0.88	3.15±0.45
No		2.83±0.72	3.20±0.76	3.25±0.76	3.18±0.82	3.09±0.45
	t	1.36	-0.72	2.52	1.28	1.87
	p	.175^{T}	.471^{T}	**.012**^{T}	.202^{T}	.061^{T}
Assessment of the efficiency of online education on theoretical courses						
Very good (a)		3.64±0.80	2.15±0.72	4.02±0.87	3.79±1.09	3.40±0.54
Good (b)		3.24±0.58	2.83±0.71	3.63±0.57	3.65±0.61	3.32±0.36
Moderate (c)		2.88±0.59	3.21±0.66	3.29±0.61	3.23±0.68	3.12±0.36
Bad (d)		2.62±0.66	3.45±0.70	3.10±0.73	2.95±0.82	2.99±0.48
Very bad (e)		2.09±0.66	3.90±0.78	2.59±0.84	2.38±1.01	2.67±0.44
	F	61.72	57.62	35.82	38.29	35.37
	p	**.001**^{W}	**.001**^{AV}	**.001**^{W}	**.001**^{W}	**.001**^{W}
Significant difference		c- a, b, d, e e- a, b, d d- a, b	c- a, b, d, e e- a, b, d d- a, b a-b	c- a, b, e e- a, b, d d- a, b	c- a, b, d, e e- a, b, d d- a, b	c- a, b, d, e e- a, b, d d- a, b

In another study examining the attitudes of vocational school students studying at different departments, m-learning attitudes were found at a high level. At the same time, differences were detected in their attitudes based on the department of study (Elçiçek and Bahçeci, 2015). In a study investigating the perception of medical faculty students for e-learning during COVID-19 pandemic, it was concluded that most of the students had a positive perception towards e-learning (Gismalla et al., 2021). In addition, the study comparing many variables with the efficiency of e-learning underlined that education faculty students showed the highest online activity and probability of becoming e-learning users was highly low among the students who were not graduates of information technologies (Thomas, 2020). Students of information technologies might have greater interest in m-learning due to the fact that they had technology education. In another study, it was indicated that graduate students reported positive opinions about the use of mobile technologies in education (Korucu and Biçer, 2018). Also, in our study, differences were detected in the level of attitudes in the subscales based on the department. In our study, there were differences in attitude levels in subscales according to the department they studied. Accordingly, the advantage measurement scores of the students studying in the nursing department of the faculty of health sciences are lower than those in the faculty of medicine.

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Table 3. (continuation) The comparison of m-learning attitude scale and subscale scores based on the variables

Variable	Advantages of M-learning			Limitations in M-learning			Usability in M-learning			Freedom in M-learning			Total		
Assessment of the efficiency of online education in clinical/practical courses	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**
Very good (a)	3.86	2.43	5.00	2.20	1.00	4.00	4.00	2.00	5.00	4.00	2.25	5.00	3.55	2.24	4.05
Good (b)	3.57	1.85	5.00	2.60	1.00	4.00	3.80	2.00	5.00	4.00	2.00	5.00	3.42	1.95	4.04
Moderate (c)	3.07	1.28	5.00	3.00	1.60	5.00	3.60	1.00	5.00	3.50	1.00	5.00	3.21	1.71	4.47
Bad (d)	2.85	1.00	4.71	3.20	1.00	4.80	3.40	1.00	5.00	3.25	1.00	5.00	3.09	1.00	4.23
Very bad (e)	2.57	1.00	4.71	3.60	1.00	5.00	3.20	1.00	5.00	3.00	1.00	5.00	3.02	1.76	4.90
Chi-Square	116.566			83.511			52.755			78.776			72.693		
p	**.001^{KW}**			**.001^{KW}**			**.001^{KW}**			**.001^{KW}**			**.001^{KW}**		
Significant difference	e- d, c, b, a d- c, b, a			e- d, c, b, a d- a, b c-b			e- c, b, a d- c, b			e- c, b, a d- c, b c- b			e- c, b, a d- c, b, a		

$\bar{X}$: Mean, SD: Standard deviation, Med: Median, Min: Minimum, Max: Maximum, KW: Kruskal-Wallis H, AV: Anova, W: Welch T: Independent samples t-test

Limitation measurement scores of the students studying at the faculty of medicine are lower than those at the faculty of pharmacy and faculty of health sciences, nursing, and physical therapy and rehabilitation. In addition, the students studying at the Faculty of Health Sciences nursing department have higher limitations measurement scores than the students studying at the Faculty of Pharmacy. It was determined that the freedom measurement scores of the students studying in the Faculty of Medicine were higher than the students studying in the Department of Nursing and Physical Therapy and Rehabilitation of the Faculty of Health Sciences. Students' views on m-learning generally have a very positive attitude. Our study differs from other studies in that it consists of students studying at the same university during the pandemic process and taking clinical practical/theoretical courses via distance education. Differences were observed between the departments in terms of the individual conditions of the students. Although it has been determined that the sub-dimensions of freedom and advantage for m-learning, especially for medical school students, are higher than other faculties, and the sub-dimension of limitation is lower, the university's online education has been determined to be lower in terms of delivering online education to students, offering the same opportunity to all departments, and using the same educational materials and evaluation techniques appears to be given an equal opportunity. Considering the positive and negative contributions of the pandemic process to our lives, the necessity of using mobile technologies has brought up the usability of m-learning methodologies in the field of health sciences. The development of positive attitudes towards m-learning, especially in the basic field of health sciences, where applied courses are intensively applied, also reveals the necessity of preparing infrastructure for future educational problems in this field and better attitudes of students towards the use of m-learning. In our study, it was seen that majority of the students of health sciences owned smartphones. In a study examining the attitudes of nursing students towards mobile learning, all students were found to use smartphones (Günay İsmailoğlu et al., 2021). Moreover, in the study investigating the attitudes and perceptions of the Medical Faculty students towards the efficiency of mobile learning, it was seen that almost all students preferred smartphones in learning and other activities (Zhang et al., 2021). The most preferred mobile device has been reported as smartphone in the literature. Our results showed that majority of the students (80.5%) were using smartphones; and this is consistent with the results of other studies. When the place of mobile devices in daily life is considered, the intense use of smartphones by students is not surprising.

In our study, it was found that the scores of the students from the total mobile learning attitude scale and the subscales of advantage, limitation, usability and freedom did not differ based on which device(s) they were using actively. The lack of difference in

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the scores obtained from the scale based on the preference of device may be derived from the fact that m-learning environment can also be accessed easily with the other devices. Moreover, smart phones are considered to be preferred more frequently since they are more portable than the other technological devices and used as a means of interpersonal communication.

Our findings showed that most of the students (64.3%) were not using m-learning and only 13% were using mobile learning for disease information before the pandemic. Usability in m-learning scores were found to be higher among the students who were using m-learning before the pandemic compared to the ones who started to use it after the pandemic. M-learning has become a preferred method of learning in many countries and distance education has started during the pandemic (Yakar and Yıldırım Yakar, 2021). Using m-learning as an innovative approach in education enabled a better use of time for the students and educators (Günay İsmailoğlu et al., 2021). Students, who had not studied in this system previously and who had not met with m-learning, needed an adaptation process. The students, who were using m-learning before the pandemic, found it more practical compared to the others, and this suggests that their adaptation to new process have become easier.

In a study where behavioral intentions of university students were examined with technology acceptance model in Korea, this model was determined to be used for explaining the acceptance of m-learning by the students. It was also emphasized that technology acceptance model was an important structure to explain system accessibility, subjective norm, perceived usability and ease of use, attitude and behavioral intention towards the use of m-learning (Park et al., 2012). In another study, students' actual use of mobile learning was examined, and it was found that M-learning had a good and constructive effect on their actual use (Alturki and Aldraiweesh, 2022). It is essential to minimize the negative impact of global changes in the education system and the world. To adapt to such processes, it is foreseen that the necessary infrastructure for m-learning will be provided in different departments and education levels in the future. This method, which is widely used worldwide with the pandemic, will be more acceptable in the following processes in terms of students' adaptive behavior.

Health sciences are among the scientific branches including both theoretical and practical courses. In our study, students of health sciences were asked to assess the efficiency of online education, which was started during the pandemic, on theoretical and clinical/practical courses subjectively. Total scale scores of the students, who assessed the efficiency of online education on theoretical courses as "bad" were found to be significantly lower than the students who assessed as "very good" and "good". Moreover, total scale scores of the students, who assessed the efficiency of online education on clinical/practical courses as "bad" were found to be significantly lower than the students who assessed as "very good", "good" and "moderate". In addition, the attitudes of the students who considered the efficiency of online education in theoretical and clinical/practical courses as "low" were observed to be at a "low" level. Our findings indicate a relationship between the expectations of the students from online education and their attitudes towards m-learning. In a study investigating the opinions of midwifery and nursing students about online anatomy courses, it was found that students needed practical courses and they requested the integration of visual and auditory sources into the courses more (Elvan et al., 2021). In another study, the efficiency of instruction method and m-learning method was investigated in cardiopulmonary resuscitation education given to the nursing students. In this study, both methods were found to be successful, and none of them was superior over the other (Erikli and Akyol, 2021). In a study evaluating the knowledge and skills of medical students in the field of cardiopulmonary resuscitation and the effectiveness of mobile learning and workshop training, it was stated that mobile learning was better in increasing students' knowledge about cardiopulmonary resuscitation. Still, workshop training was more effective in developing practical skills in cardiopulmonary resuscitation (Abdollahi et al., 2022). In our study, although there was no significant difference between the attitudes of the departments, it was noted that while the attitude scores of the Nursing, Physiotherapy and Rehabilitation, and Pharmacy faculty students were close to each other, the medical faculty students' attitude scores were lower (Table 3). This situation is recommended to create a learning environment where they can develop their more practical and technical skills by creating virtual workshops to improve the learning environment and ensure the effectiveness of clinical practice for disciplines with applied courses such as health sciences. It is important. Considering that

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global problems that may bring about changes in the field of education may come to the fore in the future, it is necessary to develop applications that will support m-learning and theoretical/clinical practice for the primary field of health sciences.

Conclusion and Recommendations

The results of this study reveal the attitudes of students studying in four different departments of health sciences towards m-learning. The attitudes of the students were found positive at a moderate level. Attitude levels of the students showed differences based on the department of study. M-learning attitudes of the students did not show a significant difference based on the technological device which was actively used. The ones, who were using m-learning before COVID-19 pandemic, had higher scores from usability in m-learning subscale compared to the ones who were not using. Also, the attitudes of the students, who considered the efficiency of online education in theoretical and clinical/practical courses at a "low" level, were found to be "low" towards m-learning.

It can be predicted that the attitudes towards m-learning among health science students are at a moderate level, and especially with the development of the infrastructure of m-learning technology for applied courses, students' positive attitudes towards M-learning will increase. Especially in the processes caused by global changes, it may bring different problems in terms of education in the future as it is today. For students studying in health sciences, readiness is very important in improving their attitudes towards m-learning.

Future research can contribute to the literature with studies that compare the educational problems that global problems will bring to the schedule, especially studies that will support m-learning for the primary field of health sciences and theoretical/clinical practice and reveal their effectiveness.

Limitations

This study has some limitations. Since it is limited to a specific sociocultural region and the students studying in a public university located in the western Black Sea region, the results may not represent the attitudes of all students of health sciences towards m-learning. Study results makes generalization difficult due to single-centered sample size. Another limitation of this study is the presence of students who were not willing to participate in the study. However, ethical concerns required voluntariness for participation. These situations might have affected the power of the study and the generalization ability of the outcomes in a negative way.

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What did the study add to the literature?

- It was concluded that the scale scores of the population, which stated that the effectiveness of clinical/practical courses in online education was 'poor,' were also low.
- The widespread use of mobile devices worldwide has revealed the usability of mobile learning. As a result, the usability of mobile learning is essential for the continuation of education in extraordinary situations affecting humanity.
- In developing students' attitudes toward mobile learning, it is necessary to carry out studies on mobile learning techniques, especially in clinical/application departments such as medicine, nursing, physiotherapy, and rehabilitation. In addition to the transfer of theoretical knowledge, the development of technical infrastructure for practical courses will increase the effectiveness of mobile learning.
- Using online teaching methods with advanced infrastructure in continuing education when unexpected events remain uncertain is essential to benefit students studying health and show a positive approach to online teaching.

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