Research article
Journal of Innovative Healthcare Practices (JOINIHP) 4(2), 103-117, 2023
Recieved: 15-Aug-2023 Accepted: 23-Aug-2023
https://doi.org/10.58770/joinihp.1343820

SAKARYA UNIVERSITY
OF APPLIED SCIENCES

E-Learning in Health: Investigation of Family Physicians' Acceptance and Use of Technology on Demographic Factors*

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ABSTRACT

E-learning is the changing and renewing face of education in health, as in many other fields. Advancements in information and communication technologies allow the development of health professionals in continuous education. Since e-learning provides asynchronous learning opportunities to health professionals working in different geographical regions, it provides various opportunities for the career development of health professionals. One of Turkey's most significant e-learning projects in the health field was carried out by the Family Medicine Distance Education Centre (AHUZEM). The e-learning project prepared for family physicians aimed to provide much more accessible, effective, and faster training for family physicians. This study aims to reveal family physicians' adoption of e-learning applications according to demographic factors. In the study, the Unified Technology Acceptance and Use Model (UTAUT) developed by Venkatesh et al. (2003) by examining many theories and models was used as a data collection tool. In addition, the author integrated the attitude towards technology use dimension consisting of 4 questions into the model by examining the relevant literature. In addition, the research was organized according to a 5-point Likert-type scale. The data was obtained from 429 family physicians who agreed to participate in the online survey shared on social networks nationwide by convenience sampling. Whether there is a difference according to the demographic characteristics of the family physicians participating in the study was evaluated using the t-test and ANOVA. According to the results of the analyses, a significant difference was found in the intention to use e-learning and UTAUT based on factors such as age, specialty, working time, and e-learning experience. Nevertheless, there was no statistically significant disparity observed based on gender.

Keywords: E-learning, Family physicians, Technology use

* This study is derived from the Ph.D. thesis of the first author under the supervision of the deceased second author. I want to thank my Ph.D. thesis advisor Professor Gültekin Yıldız, for his contributions to my study and wish him God's mercy.

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Sağlıkta E-Öğrenme: Aile Hekimlerinin Teknoloji Kabul ve Kullanımının Demografik Faktörlere Göre Analizi

ÖZ

E-öğrenme, diğer birçok alanda olduğu gibi sağlık eğitiminin de yeni ve değişen yüzüdür. Bilgi ve iletişim teknolojilerinin gelişimi, sürekli eğitimde sağlık profesyonellerinin gelişimine imkan tanımaktadır. E-öğrenme, farklı coğrafyalarda görev yapan sağlık profesyonellerinin gelişimi için asenkron eğitim imkanları sağladığı için çeşitli fırsatlar sunmaktadır. Sağlık sektöründe e-eğitim projesi olarak aile hekimlerimize yönelik Aile Hekimliği Uzaktan Eğitim Merkezi tarafından Türkiye'de gerçekleştirilen en büyük e-öğrenme projelerinden biridir. Bu çalışmanın amacı, aile hekimlerinin demografik faktörlere dayalı olarak e-öğrenme uygulamalarının benimseme düzeyini ortaya koymaktır. Çalışmada veri toplama aracı olarak Venkatesh ve ark. (2003) tarafından birçok teori incelenerek geliştirilen Birleşik Teknoloji Kabul ve Kullanım Modeli (BTKKM) kullanılmıştır. Ayrıca ilgili literatür taraması yapılarak 4 sorudan oluşan tutum boyutu yazarlar tarafından modele dahil edilmiştir. Araştırma 5'li Likert tipine göre düzenlenmiştir. Araştırmada veriler, kolayda örnekleme yöntemiyle sosyal ağlarda paylaşılan çevrimiçi ankete katılmayı kabul eden 429 aileden elde edilmiştir. Çalışmaya katılan aile hekimlerinin demografik özelliklere göre fark gösterip göstermediği ise t-testi ve ANOVA kullanarak değerlendirilmiştir. Analiz sonuçlarına göre; yaşa, uzmanlık alanına, çalışma süresine, e-öğrenme deneyimine göre kullanım niyetinde ve BTKKM'de anlamlı bir fark bulunmuş, ancak cinsiyete göre anlamlı bulunmamıştır.

Anahtar Kelimeler: E-öğrenme, Aile hekimleri, Teknoloji Kullanımı

1 Introduction

The development of medical education has undergone significant changes over the years. The focus on classical education in medical education in the 1910s evolved to Problem-Based Learning (PBL) in the 1970s [1]. However, the medical education process constantly evolves, and new challenges and demands emerge. There is also a growing recognition of the importance of lifelong learning and the need for continuous professional development throughout a physician's career, which continually triggers a change in medical education to address the changing healthcare environment, technological advances, and the evolving needs of patients and communities [2]. In the last ten years, e-learning application transformation and integration have been observed in medical education and many fields. E-learning is the use of Internet technologies to improve knowledge and performance. E-learning technologies allow users to personalize and adapt their learning experiences to meet their learning objectives. In the context of medical education, e-learning is almost as effective as traditional learning methods. It also has technical standards and peer review methods. Innovations in e-learning technologies enable personalizing learning, increasing users' interactions with each other, and transforming the role of the instructor. E-learning supports a move towards a direction in which educators are more involved as facilitators and learner assessors rather than as content distributors. This can trigger a transition that provides users with adaptive learning, encourages collaborative learning, and leads to the application of adult learning theory [3].

Today's medical educators may face different challenges than their predecessors when teaching tomorrow's physicians [2]. Traditional instructor-centered teaching is transforming into a learner-centered model that puts learners in control of their learning [3]. E-learning is becoming an increasingly important component of medical education. One particular area of e-learning in medical education that attracts attention is the use of virtual patients. Virtual patients are computer-based simulations that allow students to practice clinical reasoning skills. However, more research is needed to determine how to effectively use virtual patient etc., applications in medical education [4]. Overall, e-learning in medical

education is an exciting and dynamic field that requires creativity and adaptability [5]. Many studies have been conducted to determine the factors affecting users' adoption of e-learning systems in various sectors [6-9].

When the studies in the literature are examined, demographic factors are an essential subject of study in the field while examining technology acceptance and use in many fields. For example, in the study conducted by Chen et al., 2020, it was found that demographic characteristics such as gender, age, and level of education significantly affect the effects of the factors in the UTAUT model. The study drew attention to the importance of considering demographic factors when examining technology acceptance and use. It emphasized that demographic factors play a decisive role in shaping the results of studies conducted with the technology acceptance model [10]. However, there needs to be more studies to determine the technological acceptance of physicians in the health sector. For this reason, knowing the demographic variables according to which physicians differ in technology acceptance in the health sector will guide future projects and investments.

In line with this purpose, the following research question was asked in the study.

The answer to the question "Do the dimensions that make up the UTAUT model differ according to the socio-demographic characteristics of family physicians?" will be sought.

2 Methodology

The study aims to reveal the level of adoption of e-learning applications by family physicians according to demographic factors. For this purpose, the Unified Technology Acceptance and Use Model (UTAUT) developed by Venkatesh et al. [6], by examining many theories and models in the field [11-17], was used as a data collection tool the authors added the dimension of attitude towards technology use consisting of 4 questions to the model of 22 questions. A 5-point Likert-type scale was used in the study. It consists of 30 questions, including questions to measure the socio-demographic characteristics of the participants.

Family Medicine Distance Education Centre (AHUZEM) in Turkey was determined as the population of the study. AHUZEM is a center under the coordination of the Ministry of Health, Department of Public Health Education, where "Family Medicine Continuing Professional Development" training programs, including both in-service training and second-stage clinical training of transition to family medicine, are carried out for family physicians (22.000) [18]. In order to carry out the study properly, support was obtained from the Department of Family Medicine Education and Development and Family Medicine Associations. The study was conducted between 01/01/2013-28/02/2013, and 515 family physicians participated in the study, but 86 questionnaires were found to need to be filled in correctly, and 429 questionnaires were analyzed.

In order to determine the main factors determining the use of e-learning systems by family physicians, the Unified Technology Acceptance Model (UTAUT), one of the most comprehensive technology acceptance models in the relevant literature, was taken as a basis and adapted to Turkish conditions. Basically, four groups of variables can directly determine the acceptance of technology by users integrated from many theories in the related literature. These are; effort expectancy, performance expectancy, social impact, and facilitating conditions. The UTAUT is a comprehensive model that provides insight into the factors that influence the acceptance and use of technology. It has been widely applied in various contexts and has contributed to our understanding of user adoption behavior. However, due to the mandatory use of the e-learning system in healthcare by family physicians in

Turkey, the model needed to be adapted accordingly. As a requirement of this, the voluntariness moderator was excluded from the model. Considering that the use of e-learning systems in health is compulsory in our country, it would be essential to include the dimension of attitude toward using technology in the model to determine physicians' attitudes. These variables have started to be included in the studies in this field as new factors reflecting physicians' thoughts in the e-learning system. Hung, Chang, and Yu (2006) and Schaupp et al. (2010) also used their models of attitudes toward the use of technology to determine the effect of different factors on the use of e-learning systems [18,19].

3 Results

According to the results of the reliability analysis of the research in Table 1, Cronbach's Alpha (α) coefficient was determined as 0.96. Since this value is in the range of "0,80 ≤ α ≤ 1,00", it was determined that the dimensions forming the scale are suitable for validity [20].

In Table 1, it is determined that the findings related to the sub-dimensions of the scale have values above the minimum conditions required for reliability.

Table 1: *Reliability Analysis of the Scales Used in the Study*

Dimensions	Number of Questions	Mean	SD	α
Performance Expectation	7	3,49	0,945	0,934
Effort Expectation	4	3,69	0,858	0,843
Social Impact	4	3,23	0,884	0,801
Facilitating Conditions	4	3,64	0,792	0,786
Attitude Towards Using Technology	4	3,38	1,062	0,788
General	23	3,45	0,805	0,960

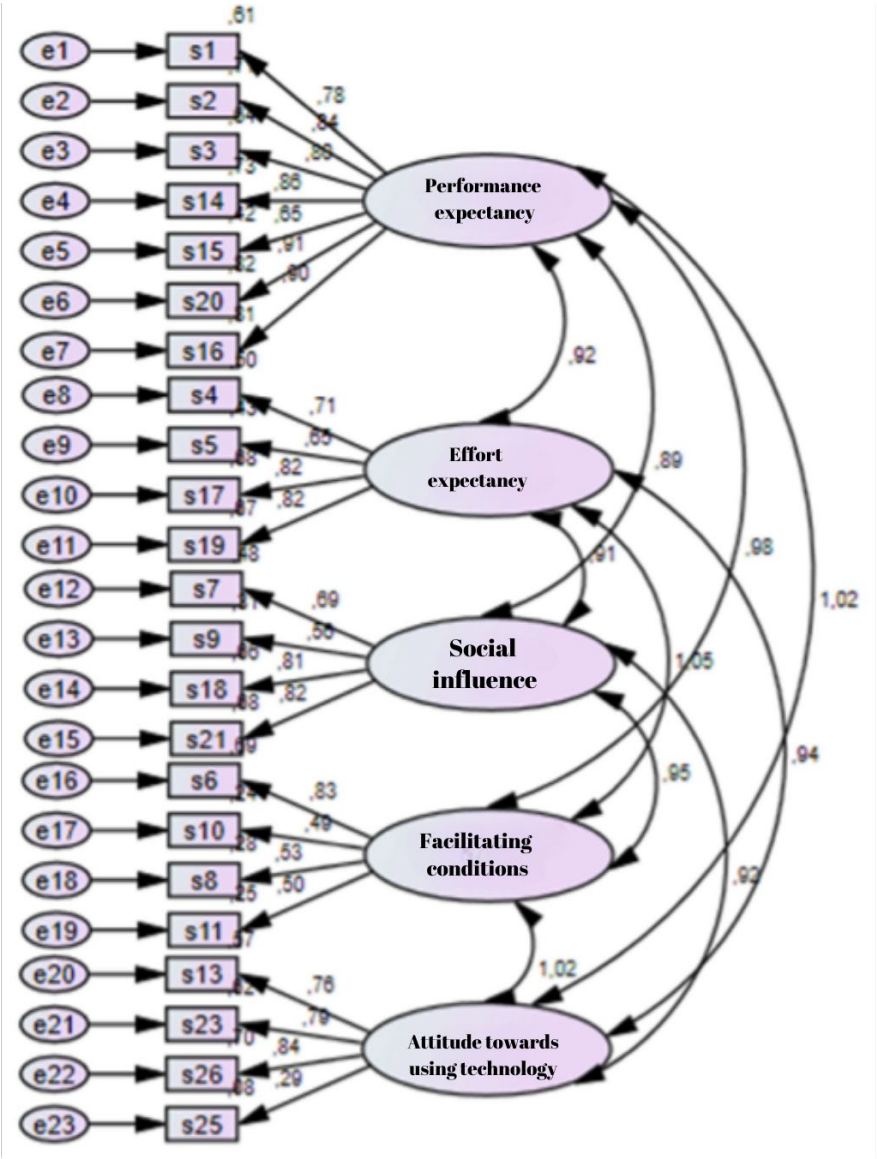

Figure 1: *Confirmatory Factor Analysis of the Model*

Generalized value ranges of the fit measures are given in Table 2 [21,22]. In addition, the fit indices obtained as a result of the CFA analysis of the study are given in Table 2. As can be seen, when Table 2 is analyzed, the fit indices obtained as a result of CFA analysis are Chi-Square/Df= 2,512, GFI= 0,904, AGFI=0,871, CFI=0,960, IFI=0,960, NFI=0,935, RMSEA=0,059, PGFI= 0,672 and AIC= 657,010. As can be seen when Figure 1 and Table 2 are analysed, the model generally provides a good fit according to the confirmatory factor analysis findings.

Table 2: *Acceptance Criterion Intervals for Goodness of Fit Indices and Confirmatory Factor Analysis Fit Indices of the Model Used in the Study*

Fit Indices	Good Fit	Acceptable Fit	Estimated Model
RMSEA	0<RMSEA<0,05	0,05≤RMSEA≤0,10	0,059
NFI	0,95≤NFI≤1	0,90≤NFI≤0,95	0,935
NNFI	0,97≤NNFI≤1	0,95≤NNFI≤0,97	0,950
CFI	0,97≤CFI≤1	0,95≤CFI≤0,97	0,960
GFI	0,95≤GFI≤1	0,90≤GFI≤0,95	0,904
AGFI	0,90≤AGFI≤1	0,85≤AGFI≤0,90	0,871

Whether there is a differentiation regarding the use of technology acceptance according to the socio-demographic characteristics of the participants was tested with Independent t-test and One Way Anova. In the process of analysing the hypotheses, the statistical significance value was accepted as $p<0.05$.

When Table 3 is examined; according to the gender variable, it is seen that among the physicians participating in the research, the rate of men (64.1%) is higher than women (35.9%) and the majority of them are general practitioners (91%) according to their speciality areas. According to the age variable, it is seen that physicians are mostly gathered in 31-45 age groups. According to the duration of service, the most predominant groups of the physicians participating in the study were found to have served between 16-20 years (21.2%) and 20 years (26.5%).

Table 3: *Demographic Data of Participants*

Demographic Characteristics		Number	%	Demographic Characteristics		Number	%
Gender	**Male**	275	**Specialisation status**	**Specialisation Status**	**General Practitioner**	390	91,0
	Woman	154	35,9		**Family Physician Specialist**	39	9,0
Term of Office	≤5	51	11,8	**Age**	≤30	36	8,3
	6-10	85	19,8		31-35	94	21,9
	11-15	88	20,5		36-40	98	22,8
	16-20	91	21,2		41-45	96	22,3
	≥20	114	26,5		≥46	105	24,6

3.1 Changes in the dimensions of the UTAUT model according to the gender of family physicians

In Table 4, according to the results of the t-test conducted on the variables related to the acceptance and use of e-learning by family physicians according to gender, it was determined that there was no statistically significant difference ($p>0,005$).

Table 4: *t Test Results of E-Learning Acceptance and Usage by Gender*

Dimensions	Gender	N	Mean	SD	t	p
Performance Expectation	Female	167	3,43	0,934	0,939	0,606
	Male	262	3,52	0,952		
Effort Expectation	Female	167	3,67	0,873	0,316	0,872
	Male	262	3,70	0,851		
Social Impact	Female	167	3,27	0,868	0,811	0,244
	Male	262	3,20	0,894		
Facilitating Conditions	Female	167	3,64	0,765	0,053	0,558
	Male	262	3,63	0,810		
Attitude towards Using Technology	Female	167	3,35	1,042	0,575	0,585
	Male	262	3,41	1,076		
E-learning Usage Intention	Female	167	3,69	0,878	0,901	0,227
	Male	262	3,78	0,957		

3.2 Changes in the dimensions of the UTAUT model according to the speciality of family physicians

In Table 5, according to the t-test result to determine whether there is a difference in e-learning usage and acceptance variables according to the specialty of family physicians, it was determined that there was no difference (p>0,05).

Table 5: *T-test Results of E-learning Acceptance and Use According to Specialty*

Dimensions	Specialty	N	Mean	SD	t	p
Performance Expectation	General Practitioner	386	3,52	0,940	1,422	0,867
	Family Physician Specialist	43	3,29	0,980		
Effort Expectation	General Practitioner	386	3,70	0,853	1,273	0,680
	Family Physician Specialist	43	3,53	0,902		
Social Impact	General Practitioner	386	3,24	0,888	1,315	0,287
	Family Physician Specialist	43	3,06	0,838		
Facilitating Conditions	General Practitioner	386	3,65	0,794	1,334	0,701
	Family Physician Specialist	43	3,48	0,763		
Attitude Towards Using Technology	General Practitioner	386	3,41	1,061	1,38	0,833
	Family Physician Specialist	43	3,17	1,063		
E-learning Usage Intention	General Practitioner	386	3,76	0,916	0,701	0,137
	Family Physician Specialist	43	3,65	1,023		

3.3 Variation of the Dimensions Composing the ICPC Model according to the Age of Family Physicians

As a result of the analysis detailed in Table 6, it was determined that there was a statistically significant difference in all dimensions affecting e-learning usage intentions of physicians according to their age groups (p<0,005). Tukey HSD test was performed to determine which age groups the difference was between.

According to the findings of the analysis, it was found that the difference in all dimensions was caused

by family physicians the age group of 46 and over and family physicians who were younger than 30 years old. Other differences are also shown in the table 6. In addition, it was determined that the social impact dimension of the family physicians participating in the study decreased with increasing age.

Table 6: *ANOVA Results of E-Learning Acceptance and Use According to Age*

Dimensions	Age	n	Mean	SD	F	p	Post. Hoc
Performance Expectation	<30	39	3,54	1,061	4,032	0,003	1-5 p=0,036 2-5 p=0,000 3-5 p=0,004 4-5 p=0,002
	31-35	93	3,65	0,798			
	36-40	99	3,55	0,914			
	41-45	96	3,58	0,962			
	>46	102	3,17	0,980			
	Total	429	3,49	0,945			
Effort Performance	<30	39	3,82	0,853	6,832	0,000	1-5 p=0,001 2-5 p=0,000 3-5 p=0,000 4-5 p=0,000
	31-35	93	3,86	0,730			
	36-40	99	3,77	0,797			
	41-45	96	3,78	0,810			
	>46	102	3,31	0,970			
	Total	429	3,69	0,858			
Social Impact	<30	39	3,24	0,845	7,066	0,000	1-5 p=0,023 2-5 p=0,000 3-5 p=0,000 4-5 p=0,000
	31-35	93	3,50	0,750			
	36-40	99	3,30	0,945			
	41-45	96	3,26	0,865			
	>46	102	2,87	0,867			
	Total	429	3,23	0,884			
Facilitator Conditions	<30	39	3,61	0,825	5,990	0,000	1-5 p=0,049 2-5 p=0,000 3-5 p=0,000 4-5 p=0,000
	31-35	93	3,81	0,697			
	36-40	99	3,71	0,811			
	41-45	96	3,73	0,712			
	>46	102	3,32	0,838			
	Total	429	3,64	0,792			
Attitude Towards Using Technology	<30	39	3,43	1,165	4,278	0,002	1-5 p=0,041 2-5 p=0,000 3-5 p=0,007 4-5p=0,001
	31-35	93	3,58	0,889			
	36-40	99	3,42	1,034			
	41-45	96	3,51	1,119			
	>46	102	3,02	1,072			
	Total	429	3,38	1,062			
Intention to Use e-learning	<30	39	3,82	1,037	4,649	0,001	1-5 p=0,019 2-5 p=0,002 3-5 p=0,003 4-5 p=0,000
	31-35	93	3,82	0,659			
	36-40	99	3,80	0,873			
	41-45	96	3,93	0,932			
	>46	102	3,42	1,064			
	Total	429	3,75	0,927			

3.4 The change in the dimensions of the UTAUT model according to the working period of family physicians

According to the results of the analyses based on the working time groups of family physicians in Table 7, it was found that there was a difference in all dimensions ($p<0.05$).

According to the findings obtained, it was determined that the difference in all dimensions was mostly caused by family physicians with 21 and more years of working time and family physicians with less than 5 years of working time.

Table 7: *ANOVA Results of E-Learning Acceptance and Use According to Working Period*

Dimensions	Working Period	n	Mean	SD	F	p.	Post Hoc
Performance Expectation	<5	60	3,54	1,007	4,392	0,002	1-5 p=0,018 2-5 p=0,000 3-5 p=0,007 4-5p=0,006
	6-10	88	3,71	0,740			
	11-15	97	3,53	0,982			
	16-20	77	3,56	0,963			
	>21	107	3,18	0,955			
	Total	429	3,49	0,945			
Effort Expectation	<5	60	3,82	0,830	6,084	0,000	1-5 p=0,001 2-5 p=0,000 3-5 p=0,001 4-5 p=0,001
	6-10	88	3,89	0,645			
	11-15	97	3,73	0,824			
	16-20	77	3,76	0,917			
	>21	107	3,35	0,933			
	Total	429	3,69	0,858			
Social Impact	<5	60	3,28	0,840	6,384	0,000	1-5 p=0,009 2-5 p=0,000 3-5 p=0,001 4-5 p=0,019 2-3 P=0,039 2-4 P=0,020
	6-10	88	3,53	0,724			
	11-15	97	3,27	0,964			
	16-20	77	3,22	0,926			
	>21	107	2,91	0,834			
	Total	429	3,23	0,884			
Facilitator Conditions	<5	60	3,66	0,802	4,917	0,001	1-5 p=0,022 2-5 p=0,000 3-5 p=0,005 4-5 p=0,005
	6-10	88	3,84	0,671			
	11-15	97	3,68	0,834			
	16-20	77	3,70	0,728			
	>21	107	3,37	0,825			
	Total	429	3,64	0,792			
Attitude Towards Using Technology	<5	60	3,46	1,125	4,143	0,003	1-5 p=0,019 2-5 p=0,000 3-5 p=0,030 4-5 p=0,007
	6-10	88	3,64	0,862			
	11-15	97	3,38	1,093			
	16-20	77	3,48	1,020			
	>21	107	3,06	1,114			
	Total	429	3,38	1,062			
E-learning Usage Intention	<5	60	3,82	0,936	4,703	0,001	1-5 p=0,013 2-5 p=0,000 3-5 p=0,000
	6-10	88	3,92	0,602			
	11-15	97	3,69	1,009			
	16-20	77	3,95	0,822			
	>21	107	3,45	1,063			
	Total	429	3,75	0,927			

3.5 The Change of the Dimensions Composing the UTAUT Model According to the E-Learning Experiences of Family Physicians.

When Table 8 is analyzed, it is found that there is a statistically significant difference only in terms of the intention to use e-learning according to the E-learning experiences of family physicians (t=2,030; p<0,01).

Table 8: *t Test Results of E-Learning Acceptance and Usage According to E-Learning Experience*

Dimensions	E-learning Experience	n	Mean	SD	t	p
Performance Expectation	**Yes**	173	3,59	0,965	1,818	0,763
	No	256	3,42	0,927		
Effort Expectation	**Yes**	173	3,81	0,871	2,467	0,677
	No	256	3,60	0,841		
Social Impact	**Yes**	173	3,37	0,887	2,736	0,844
	No	256	3,13	0,870		
Facilitating Conditions	**Yes**	173	3,84	0,744	4,394	0,275
	No	256	3,50	0,796		
Attitude Towards Using Technology	**Yes**	173	3,51	1,051	2,003	0,315
	No	256	3,30	1,063		
E-learning Using Intention	**Yes**	173	3,85	0,878	2,030	**0,010**
	No	256	3,67	0,953		

4 Discussion

According to the results of the analyses, a significant difference was found in the intention to use e-learning and UTAUT according to age, specialty, working time, and e-learning experience. However, no significant difference was found according to gender. The UTAUT model has been widely studied to understand the factors affecting the acceptance and use of technology. It is emphasized that gender affects technology acceptance and usage behavior. Venkatesh & Davis (2000) study showed that the extended model is strongly supported for all four systems regardless of gender [7].

However, another recent study by Afrizal & Wallang (2021) also investigated the effect of gender on the intention to use e-government using a modified version of the UTAUT. The study found that gender did not significantly affect the intention to use e-government [23]. Although these studies suggest that gender may not directly affect technology acceptance and use, it is essential to note that individual differences and cultural factors may still play a role. In conclusion, the research on the impact of gender on technology acceptance and use based on the UTAUT model suggests that gender may not directly impact technology acceptance and use behavior. However, it is essential to consider individual differences and cultural factors that may interact with gender to influence the acceptance and use of technology.

Venkatesh & Bala (2008) investigated e-banking adoption in developing countries from a UTAUT perspective. The study found that age significantly moderates the relationship between performance expectancy and behavioral intention to use e-banking. This suggests that the effect of performance expectancy on behavioral intention may vary depending on age [24]. Furthermore, another study examined the impact of social factors on the adoption of e-government services, with age as a moderating factor. The study found that age moderates the relationship between social influence and intention to use e-government services [25]. This suggests that the impact of social factors on technology acceptance may differ across age groups. Overall, the literature suggests that age may moderate the relationship between certain factors of the UTAUT model and technology acceptance and usage behavior. However, the specific nature of this effect may vary depending on the context and technology being examined. Further research is needed to investigate these age-related differences and understand their impact on technology adoption and use. The results are in line with the literature.

Subhani et al. (2023) investigated technology acceptance in public sector universities, looking specifically at the mediating role of behavioral intention and the moderating effect of experience. The study found that experience moderated the relationship between the UTAUT model and employee behavior, suggesting that the impact of the model may vary depending on individuals' experience level [26]. E-learning is becoming an increasingly important component of medical education. It can allow the user to control their learning experience by providing access to content, allowing them to learn at their own pace, and tailoring their experience to meet individual learning goals. Research has indicated that e-learning is at least as effective as traditional instructor-led methods, such as lectures in various medical education contexts. However, it is still helpful for medical education students to see e-learning not as a replacement for traditional methods but as a complement to them and part of a blended learning strategy [3]. Increasingly, many different e-learning formats are being developed in medical education. Virtual patients are computer-based simulations that allow the user to practice clinical reasoning skills. [4] Overall, e-learning in medical education is an exciting and dynamic field that requires creativity and the ability to adapt to the specific and changing contexts in which it is used [5].

Ahmedy et al. (2021) also stated in their study that designing e-learning in medical education requires planning at national and international levels. It was also emphasized that for the qualitative and quantitative improvement of e-learning, global progress, achievements, and standards should be continuously monitored, and strategic, tactical, and executive aspects should be meticulously addressed. They identified e-learning in medical education as an area requiring further research [27].

Shabila et al. (2021) conducted a study to explore medical students' perspectives on the implementation of e-learning in medical education during the Covid-19 pandemic. This study explores medical students' perspectives on e-learning in medical education and emphasizes the need for facilities and training to strengthen the role of e-learning [28].

Alsaywid et al. (2021), study discusses the strategies implemented during global infectious disease outbreaks in their research in Saudi Arabia and emphasizes the support given to medical education through e-learning [29].

In their study, Noerholk and Tolsgaard (2022) discuss the need to transition from individual approaches to collaborative learning strategies in medical education, emphasizing the potential of peer-assisted learning. The increasing use of e-learning in medical education provides insight into medical students' perspectives, the need for the necessary facilities and training, and the potential for collaborative learning strategies. It supports the claim that there is a growing interest in e-learning and its importance in medical education [30]. The results are generally in line with the literature.

In the future, in addition to theoretical applications, medical education programs including many basic professional skills, skills applications, virtual reality, augmented virtual reality, artificial intelligence applications, and online applications to improve clinical skills have also been developed in order to prevent physicians from being deprived of many skills that they cannot do in practice. Creating such experiences can be vital due to the low level of authentic experiences. Of course, research on each of these will be necessary, as in this study.

5 Conclusion

This study is one of the first empirical studies to reveal the level of adoption of e-learning applications by family physicians according to demographic factors (gender, working time, age, e-learning experience). According to these results, in addition to the technological infrastructure of e-learning platforms in the field of health, the quality of course content and learning platforms and whether the learning environments have new roles and competencies that they impose on physicians are thought to be important in terms of the quality of the learning experience. Undoubtedly, it should be considered that e-learning in health has difficulties and opportunities. Nevertheless, considering that technology and the internet occupy more and more space in our lives day by day, epidemics and disasters such as Covid-19 pandemic becoming more frequent, and there is a tendency towards a user-centered active education from an educator-centered education in education e-learning applications should be made widespread in our country, as in the world, by eliminating the deficiencies as an application that supports education in all branches in medical education, although not yet in all branches. In this sense, it is thought that in future studies, it will be helpful to research the students of the Faculty of Medicine who experienced the e-learning system in health during the Covid-19 pandemic process and will be active users in the future by including different dimensions with mixed methods. In conclusion, e-learning in medical education is an exciting and dynamic field. The pandemic has further emphasized the importance of e-learning and revealed the importance of distance education in medical education. E-learning has been an essential tool for students to continue their education, and it will continue to play an essential role in medical education with the further expansion and widespread use of technological opportunities. In the future, e-learning in health; With the increasing use of artificial intelligence and machine learning; It is predicted that it will spread to an even wider area with topics such as virtual patients and personalized learning experiences. Finally, to increase the rate of physicians' use of e-learning systems, it would be beneficial to evaluate the data obtained from such studies effectively and continue such studies in depth.

6 Declarations

6.1 Study Limitations

This study is limited to family physicians who received training from AHUZEM in Turkey and accepted to participate in the study by online survey method and cannot be generalized to all branch physicians.

6.2 Acknowledgements

I would like to thank the Ministry of Health, Public Health Institution, Department of Family Medicine Training and Development and the Family Medicine Associations for this research.

This study is derived from the Ph.D. thesis of the first author under the supervision of the deceased second author. I want to thank my Ph.D. thesis advisor Prof. Dr. Gültekin Yıldız, for his contributions to my study and wish him God's mercy.

6.3 Funding source

No financial support was received for this research.

6.4 Competing Interest

There is no conflict of interest in this study.

6.5 Authors' Contributions

Corresponding Author Tarık SEMİZ: Creation of research idea, research design, literature review, collection of research data, analysis and interpretation of data, article writing.

Gültekin YILDIZ: Research design, formulation of research questions. Analysis and interpretation of data.

7 Human and Animal Related Study

7.1 Ethical Approval

Republic of Turkey Ministry of Health, Public of the Health Institution Directorate of Family Medicine Training and Development Department 14.02.2013 Number: 67350377

7.2 Informed Consent

Informed consent form was obtained from all participants for the study that they agreed to participate in the study.

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