Karya J Health Sci. 2021; 2(1): 5-11

ARAŞTIRMA MAKALESİ/RESEARCH ARTICLE e-ISSN:2717-9540

KARYA JOURNAL OF HEALTH SCIENCE

journal homepage: www.dergipark.org.tr/kjhs

THE APPROACHES AND EXPECTATIONS OF THE HEALTH SCIENCES STUDENTS TOWARDS ARTIFICIAL INTELLIGENCE

SAĞLIK BİLİMLERİ ÖĞRENCİLERİNİN YAPAY ZEKAYA KARŞI BEKLENTİ VE YAKLAŞIMLARI

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ABSTRACT

Objective: People also think that artificial intelligence can have negative impacts as well as it has positive contributions to life. In this study, it has been aimed to determine the expectations, concerns and thoughts of university students studying in health sciences departments about artificial intelligence.

Materials and Methods: The study is planned as a cross-sectional research. In the study, a questionnaire consisting of 55 questions on the future technological, sociological and professional effects of artificial intelligence has been applied to the students. A total of 550 students have been included in the study. In the study, knowledge about the use of artificial intelligence technologies has been also analyzed in addition to the students' thoughts about artificial intelligence.

Results: Most of the students can use artificial intelligence technologies according to the findings of the study. Students mostly think that artificial intelligence will have negative sociological effects in the future. Students assume that artificial intelligence will bring positive contributions to the field of health and medicine. Students think that artificial intelligence will increase the success rate in treatment. Students also think that artificial intelligence will cause unemployment in the future ($p<0.05$).

Conclusion: Whereas students think that artificial intelligence will have positive effects on technology and health, they assume that it will have negative effects on the subjects of sociology and unemployment. It is supported that medical students ought to get an education on artificial intelligence. Research should be done to increase the positive effects of artificial intelligence on life in the future and to reduce its negative effects.

Key Words: Artificial intelligence, Future, University students, Health sciences

ÖZ

Amaç: İnsanlar yapay zekanın yaşama olumlu katkı sağlayacağının yanısıra olumsuz etkilerinin de olabileceği endişesini taşımaktadır. Bu çalışmada sağlık bilimleri bölümlerinde öğrenim gören üniversite öğrencilerinin, yapay zeka konusundaki beklentileri, endişeleri ve düşüncelerinin belirlenmesi amaçlanmıştır.

Gereç ve Yöntem: Çalışma kesitsel olarak planlanmıştır. Çalışmada Kahramanmaraş Sütçü İmam Üniversitesinde öğrenim gören Diş Hekimliği, Tıp, Hemşirelik, Sağlık Yönetimi ve Ebelik öğrencilerine yapay zekanın gelecekteki teknolojik, sosyolojik ve mesleki etkilerine ilişkin 55 soruluk bir anket uygulanmıştır. Araştırmaya toplam 550 öğrenci dahil edilmiştir. Araştırmada öğrencilerin yapay zeka hakkındaki düşüncelerinin yanısıra yapay zeka teknolojilerinin kullanım sıklıkları da araştırılmıştır.

Bulgular: Çalışma bulgularına göre öğrenciler, yapay zeka teknolojilerini çoğunlukla kullanmaktadırlar. Öğrenciler çoğunlukla, yapay zekanın gelecekte sosyolojik açıdan olumsuz etkileri olacağını düşünmektedirler. Öğrenciler yapay zekanın, sağlık ve tıp alanında olumlu katkılar sağlayacağını düşünmektedir. Öğrenciler yapay zekanın tedavideki başarı oranını artıracağını düşünmektedir. Öğrenciler yapay zekanın gelecekte işsizliğe neden olacağını düşünmektedirler ($p<0.05$).

Sonuç: Öğrenciler yapay zekanın teknoloji ve sağlık alanında olumlu etkileri olacağını düşünmekte iken, sosyolojik açıdan ve işsizlik konusunda olumsuz etkileri olacağını düşünmektedirler. Üniversite öğrencilerine yapay zeka konusunda eğitim verilmelidir. Yapay zekanın gelecekte yaşama olumlu etkilerinin artırılması ve olumsuz etkilerinin azaltılması için araştırmalar yapılmalıdır.

Anahtar Kelimeler: Yapay zeka, Gelecek, Üniversite öğrencileri, Sağlık bilimleri

INTRODUCTION

The lifestyle of people is in a constant change with the rapid development of internet and computer technologies. Information technologies have started to take place more in human life since the end of the century. Developments in information technologies have gained speed since the 20th. Computer technologies have moved to very advanced points in recent years. Smartphones, autonomous systems, automation, unmanned devices are some of the products of the latest developments in information technologies. One of the most vital factors in the development of these technologies is artificial intelligence. Artificial intelligence is expressed as programs that enable machines to obtain information by imitating the physiological characteristics and learning style of the human brain. Artificial intelligence, which emerged in researches on cognitive ability designs, can imitate human abilities such as perception and learning [1-2]. The production of machines with these features in a short time has caused different concerns in people. Although artificial intelligence brings many innovations that make people's lives easier, they have worries about the rapid development of artificial intelligence. It is worried that artificial

Makale Bilgisi/Article Info

Yükleme tarihi/Submitted: 09.03.2021, **Revizyon isteği/Revision requested:** 22.03.2021, **Son düzenleme tarihi/Last revision received:** 30.03.2021, **Kabul/Accepted:** 31.03.2021, **Çevrimiçi yayım tarihi/Published online:** 30.04.2021.

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intelligence can bring disadvantages besides its advantages in people's life. Artificial intelligence is applied in health, economy, communication, security, food, education, technology, automation, industry and many sectors. Artificial intelligence applications are used in the processes of diagnosis and treatment of patients [3]. Artificial intelligence methods are used in the development of economic and financial data and prediction models [4]. Artificial intelligence applications are used in many communication tools, smartphone applications, computers, navigation and GPS systems. Artificial intelligence applications can be used frequently in the defence industry. Artificial intelligence applications are used to increase efficiency in agriculture and food production [5]. Many automotive and mechanical goods-producing companies can perform unmanned production on automatic production bands with artificial intelligence [6]. Artificial intelligence is widely used in smartphone applications, computers, and security systems.

Young, middle-aged and elderly individuals have different opinions about the advantages and disadvantages of artificial intelligence in general. Many predictions have been made about how artificial intelligence will affect the world. Many elderly individuals assume that artificial intelligence will have negative effects on life and may harm natural life. There are concerns that artificial intelligence will passivize people, cause unemployment, and keep people away from being a social entity. Middle-aged individuals have similar concerns in this regard. Middle-aged individuals think that artificial intelligence will cause more unemployment but will make life easier.

It is guessed that university students will play an active role in the use and application of artificial intelligence and in shaping the future with artificial intelligence. One of the fields, where artificial intelligence develops fastest is health sciences. Artificial intelligence applications are developed in many areas such as diagnosis, treatment, early diagnosis, drug development, patient care, hospital services, medical imaging, and patient monitoring. The thoughts of health education students about the future of artificial intelligence are very important for the future of artificial intelligence in the field of health. There are few studies that present the thoughts of university students of health education on artificial intelligence. In the study of Santos et al. it has been shown that medical students are aware of the developments in artificial intelligence. Medical students do not think that artificial intelligence will cause unemployment. It is supported that medical students ought to get an education on artificial intelligence [7]. Medical students are aware of the importance of artificial intelligence. Sit et al. have evaluated the attitudes of students studying at 19 medical schools in England towards artificial intelligence. Medical students believe that artificial intelligence will be widely used in health care services. The students have stated that artificial intelligence education would provide advantages in their careers [8]. Yuzbasioglu stated in his study that dentistry students want to learn artificial intelligence. Dentistry students believe that there will be positive developments in their profession with artificial intelligence. Some students have stated that there would be no need for dentists due to artificial intelligence [9]. Cho et al. have conducted research to determine the perceptions and attitudes of medical students regarding the application of artificial intelligence in dermatology. Students think that there will be positive developments in dermatology with artificial intelligence [10]. Yun et al. have conducted research to improve knowledge and skills for medical artificial intelligence. Participants have stated that learning artificial intelligence is very important for their career [11]. Sur et al. have evaluated the attitudes of dentists towards the use of artificial intelligence in oral radiology. Dentists have stated that they believed that artificial intelligence can provide successful results in radiological diagnosis [12]. Few studies have been conducted to evaluate societies' views on artificial intelligence. Schepman and Rodway have conducted a study evaluating the positive and negative aspects of artificial intelligence [13].

Although there are studies evaluating the attitudes of medical and dental students towards artificial intelligence, there are not many studies evaluating the attitudes of nursing, midwifery or health management students towards artificial intelligence. Many studies have analyzed how artificial intelligence will affect people's professions. There has not been much research on the use of artificial intelligence, technological expectations from artificial intelligence, and the sociological effects of artificial intelligence.

In this study, research has been conducted to determine the views, expectations and concerns of undergraduate students in the field of health (medicine, nursing, dentistry, midwifery, health management) about artificial intelligence. In the study, detailed research has been carried out in order to determine the students' knowledge about the use of artificial intelligence applications, their thoughts about the technological future of artificial intelligence, the sociological future of artificial intelligence and the advantages and disadvantages of artificial intelligence.

MATERIALS AND METHODS

The study is designed as a cross-sectional study. The population of the study consists of students studying at the undergraduate departments of health sciences at Kahramanmaraş Sütçü Imam University. Students of Faculty of Medicine, Faculty of Dentistry, Department of Nursing, Department of Midwifery and Department of Health Management have been included in the study. Power analysis has been used to determine the sample size of the study. N: 1800 population size, α: 0.05 type I error rate, β: 0.20- type II error rate, 0.80 test power, p = 0.50 value and sample size which have to be included in the study for 0.05 sampling error have been calculated as n: 548. Nunnally suggested using the sample size as 10 times the number of questions in studies with Likert-type questions [14]. There are 55 questions in the questionnaire of this study. The number of samples in the study has been determined as n: 550 by taking both methods into consideration. Systematic sampling method has been used to determine the sample. Weighting has been made by considering the number of students in the departments. In the study, a questionnaire about artificial intelligence has been applied to a total of 550 students, including 70 dentistry students, 114 nursing students, 123 health management students, 182 medical faculty students and 61 midwifery students. The questionnaire was applied to the students between 20 November 2019 and 20 December 2019 by face to face method. The students have answered the questionnaires for about 20 minutes. Approval has been obtained from the Kahramanmaraş Sütçü Imam University Clinical Research Ethics Committee for the implementation of the study. (Ethics Committee Approval No: 2019/21 Decision No: 14). 55 questions have been asked about artificial intelligence in the study as well as sociodemographic characteristics. The survey includes 20 questions about the use of artificial intelligence applications by students, 20 questions about the sociological effects of artificial intelligence on society, and 15 questions about the effects of artificial intelligence in the future. Cronbach alpha coefficient was used to evaluate the consistency and reliability of the questions. Cronbach alpha coefficient of Likert type questions were 0.795 and 0.866 respectively. Students have been asked to select one of the "Using" or "Not Using" options for the questions about the use of artificial intelligence. For the other questions, the students have been asked to select one of the options "Strongly disagree", "disagree", "neutral", "agree", and "Strongly agree".

Statistical Analysis

Chi-square test and Fisher exact test were used for statistical analysis of qualitative variables. Statistical parameters are expressed as n (number) and % (ratio). The statistical significance level has been accepted as $p<0.05$. IBM SPSS Statistics for Windows version 22 (IBM SPSS for Windows version 22, IBM Corporation, Armonk, New York, United States) and R 3.3.2 statistical software have been used to analyse the data.

RESULTS

In this research, the number of participants who received undergraduate education in health sciences is 550. The proportion of women in the study is 66.2% (n:365). The proportion of participants aged 19-20 is 51.5% (n:284). The participants of the study consist of 33.1% medicine, 22.4% health management, 20.7% nursing, 12.7% dentistry and 11.1% midwifery students.

Findings regarding the use of artificial intelligence technologies by students according to their gender are given in table 1. Male students use face recognition systems more than female students (p=0.001). Male students use voice command features in social media applications more than female students (p=0.035). Female students use health/diet applications on smartphones more than male students (p <0.001). Male students play artificial intelligence-based games more than female students (p=0.034). Similarly, male students use artificial intelligence-based multimedia systems in automobiles more than female students (p=0.001). There has been no difference between male and female students in terms of fingerprint reading, artificial intelligence-based assistants, artificial intelligence-based translation, photo editing applications, and usage of artificial intelligence-based banking systems.

Table 1. Use of artificial intelligence technologies

Variables		Male (n:185)	Female (n:365)	p
Artificial intelligence-based fingerprint reading system	Not Using	52(28,11)	95(26,03)	0.602
	Using	133(71,89)	270(73,97)	
Artificial intelligence-based face recognition system.	Not Using	144(77,84)	328(89,86)	0.001*
	Using	41(22,16)	37(10,14)	
Artificial intelligence-based assistant applications	Not Using	59(31,89)	120(32,88)	0.816
	Using	126(68,11)	245(67,12)	
Artificial intelligence-based voice command system	Not Using	91(49,19)	214(58,63)	0.035*
	Using	94(50,81)	151(41,37)	
Artificial intelligence-based voice message conversion application	Not Using	75(40,54)	156(42,98)	0.585
	Using	110(59,46)	207(57,02)	
Artificial intelligence-based health/diet/body analysis applications	Not Using	75(40,54)	89(24,59)	p<0.001*
	Using	110(59,46)	273(75,41)	
Artificial intelligence-based photo editing applications	Not Using	17(9,19)	24(6,58)	0.270
	Using	168(90,81)	341(93,42)	
Artificial intelligence-based games	Not Using	55(29,73)	142(38,90)	0.034*
	Using	130(70,27)	223(61,10)	
Artificial intelligence-based multimedia system	Not Using	123(66,49)	297(81,37)	0.001*
	Using	62(33,51)	68(18,63)	
Artificial intelligence-based call services/banking applications	Not Using	91(49,19)	209(57,26)	0.072
	Using	94(50,81)	156(42,74)	

*Chi-Square test; Exact test; α:0.05; *Statistical significance*

University students, who study in health sciences undergraduate departments, have different views on the effects of artificial intelligence on health and medical science. Dentistry students support the view that artificial intelligence can replace real organs more than other students (p <0.001). Midwifery students support the view more than other students that robots, which can imitate humans with artificial intelligence, will be developed (p<0.001). Nursing students support the view that unmanned autonomous surgical operations can be performed with artificial intelligence more than other students (p <0.001). Dentistry students support the view more than other students that the success rates in treatment with artificial intelligence will increase (p<0.001). Midwifery students support the view that artificial intelligence will cause the emergence of different diseases, more than other students (p<0.001). The distribution of students' views is given in Table 2.

Table 2. Effects of artificial intelligence for health and medicine field in future

Variables		Dentistry (n:70)	Nursing (n:114)	Health Man. (n:123)	Medicine (n:182)	Midwifery (n:61)	p
Artificial organs will be able to replace real organs in medicine with artificial intelligence	Strongly Disagree	0(0,0)	10(8,8)	20(16,3)	4(2,2)	3(4,9)	p<0.001*
	Disagree	14(20,0)	9(7,9)	11(8,9)	13(7,1)	2(3,3)	
	Neutral	5(7,1)	24(21,1)	33(26,8)	31(17,0)	21(34,4)	
	Agree	32(45,7)	48(42,1)	29(23,6)	95(52,2)	20(32,8)	
	Strongly Agree	19(27,1)	23(20,2)	30(24,4)	39(21,4)	15(24,6)	

Robots that can completely imitate humans with artificial intelligence will be developed.	Strongly Disagree	4(5,7)	2(1,8)	10(8,1)	9(4,9)	2(3,3)	p<0.001*
	Disagree	4(5,7)	6(5,3)	15(12,2)	24(13,2)	4(6,6)	
	Neutral	22(31,4)	23(20,2)	21(17,1)	45(24,7)	14(23,0)	
	Agree	24(34,3)	51(44,7)	40(32,5)	76(41,8)	19(31,1)	
	Strongly Agree	16(22,9)	32(28,1)	37(30,1)	28(15,4)	22(36,1)	
Unmanned autonomous surgical operations can be performed in medicine with artificial intelligence	Strongly Disagree	3(4,3)	1(0,9)	16(13,0)	5(2,7)	7(11,5)	p<0.001*
	Disagree	2(2,9)	13(11,4)	11(8,9)	25(13,7)	6(9,8)	
	Neutral	14(20,0)	29(25,4)	47(38,2)	26(14,3)	18(29,5)	
	Agree	33(47,1)	44(38,6)	28(22,8)	89(48,9)	20(32,8)	
	Strongly Agree	18(25,7)	27(23,7)	21(17,1)	37(20,3)	10(16,4)	
Success rates in treatment will increase thanks to the use of artificial intelligence in medicine.	Strongly Disagree	0(0,0)	2(1,8)	9(7,3)	4(2,2)	3(5,1)	p<0.001*
	Disagree	2(2,9)	12(10,5)	7(5,7)	10(5,5)	6(10,2)	
	Neutral	7(10,0)	23(20,2)	17(13,8)	32(17,6)	22(37,3)	
	Agree	34(48,6)	49(43,0)	48(39,0)	81(44,5)	15(25,4)	
	Strongly Agree	27(38,6)	28(24,6)	42(34,1)	55(30,2)	13(22,0)	
The use of artificial intelligence will lead to the emergence of different diseases.	Strongly Disagree	0(0,0)	4(3,5)	18(14,6)	9(4,9)	2(3,3)	p<0.001*
	Disagree	10(14,3)	19(16,7)	20(16,3)	27(14,8)	5(8,2)	
	Neutral	13(18,6)	31(27,2)	27(22,0)	41(22,5)	15(24,6)	
	Agree	27(38,6)	44(38,6)	43(35,0)	86(47,3)	13(21,3)	
	Strongly Agree	20(28,6)	16(14,0)	15(12,2)	19(10,4)	26(42,6)	

*Chi-Square test; Exact test; α:0.05; *Statistical significance*

University students, who study in health sciences undergraduate departments, have stated their expectations about the sociological effects of artificial intelligence. Midwifery students are more opposed to the view that artificial intelligence will increase communication between older and younger generations than other students (p<0.001). Health management students are more opposed to the view that artificial intelligence will increase communication within the family than other students (p=0.001). Midwifery students oppose the view that artificial intelligence will increase human relations and socialization more than other students (p=0.012). Dentistry students support the view that artificial intelligence will increase social problems more than other students (p<0.001). Midwifery students oppose the view that artificial intelligence will spread traditional cultures more than other students (p<0.001). The distribution of students' views is given in Table 3.

Table 3. Sociological effects of artificial intelligence in future

Variables		**Dentistry (n:70)**	**Nursing (n:114)**	**Health Man. (n:123)**	**Medicine (n:182)**	**Midwifery (n:61)**	**p**
The use of artificial intelligence will increase communication between the old and young generation.	Strongly Disagree	10(14,3)	6(5,3)	15(12,2)	39(21,4)	14(23,0)	p<0.001*
	Disagree	24(34,3)	22(19,3)	20(16,3)	51(28,0)	13(21,3)	
	Neutral	12(17,1)	39(34,2)	22(17,9)	40(22,0)	11(18,0)	
	Agree	12(17,1)	27(23,7)	49(39,8)	33(18,1)	14(23,0)	
	Strongly Agree	12(17,1)	20(17,5)	17(13,8)	19(10,4)	9(14,8)	
The use of artificial intelligence will increase communication within the family.	Strongly Disagree	21(30,0)	35(30,7)	51(41,5)	71(39,0)	23(37,7)	0.001*
	Disagree	23(32,9)	35(30,7)	25(20,3)	73(40,1)	19(31,1)	
	Neutral	12(17,1)	26(22,8)	22(17,9)	31(17,0)	10(16,4)	
	Agree	9(12,9)	12(10,5)	19(15,4)	4(2,2)	3(4,9)	
	Strongly Agree	5(7,1)	6(5,3)	6(4,9)	3(1,6)	6(9,8)	
Human relations and socialization will increase with the use of artificial intelligence.	Strongly Disagree	20(28,6)	27(23,7)	47(38,2)	50(27,5)	27(45,0)	0.012*
	Disagree	19(27,1)	27(23,7)	24(19,5)	63(34,6)	13(21,7)	
	Neutral	11(15,7)	33(28,9)	30(24,4)	46(25,3)	11(18,3)	
	Agree	12(17,1)	17(14,9)	12(9,8)	16(8,8)	4(6,7)	
	Strongly Agree	8(11,4)	10(8,8)	10(8,1)	7(3,8)	5(8,3)	

The use of artificial intelligence will cause an increase in social problems.	Strongly Disagree	0(0,0)	10(8,8)	14(11,4)	7(3,8)	4(6,6)	
	Disagree	5(7,1)	10(8,8)	23(18,7)	18(9,9)	10(16,4)	
	Neutral	21(30,0)	39(34,2)	32(26,0)	36(19,8)	21(34,4)	p<0.001*
	Agree	25(35,7)	40(35,1)	28(22,8)	77(42,3)	10(16,4)	
	Strongly Agree	19(27,1)	15(13,2)	26(21,1)	44(24,2)	16(26,2)	
Traditional cultures will become widespread with the use of artificial intelligence.	Strongly Disagree	24(34,3)	42(36,8)	45(36,6)	75(41,2)	28(45,9)	
	Disagree	19(27,1)	25(21,9)	43(35,0)	75(41,2)	14(23,0)	
	Neutral	16(22,9)	35(30,7)	15(12,2)	27(14,8)	12(19,7)	p<0.001*
	Agree	7(10,0)	5(4,4)	13(10,6)	4(2,2)	1(1,6)	
	Strongly Agree	4(5,7)	7(6,1)	7(5,7)	1(0,5)	6(9,8)	

*Chi-Square test; Exact test; α:0.05; *Statistical significance*

Students have different concerns about their job and professional careers with the widespread use of artificial intelligence technologies. Midwifery students assume that the use of artificial intelligence will not reduce the stress of people. Dentistry students, on the other hand, support the view that artificial intelligence will reduce stress, unlike other students (p=0.003). Midwifery students support the view that artificial intelligence will eliminate some job and profession definitions as compared to other students (p<0.001). Medical students are more opposed to the view that artificial intelligence will reduce unemployment than other students (p=0.007). Medical students think that artificial intelligence will increase unemployment. The majority of students predict that artificial intelligence will increase unemployment. Dentistry students support the view that robots working with artificial intelligence will replace humans in the manufacturing sector more than other students (p<0.001). Dentistry students support the view that artificial intelligence will increase success in the education sector more than other students (p<0.001). The distribution of students' views is given in Table 4.

Table 4. The effects of artificial intelligence on business life in the future

Variables		**Dentistry (n:70)**	**Nursing (n:114)**	**Health Man. (n:123)**	**Medicine (n:182)**	**Midwifery (n:61)**	**p**
The use of artificial intelligence will reduce stress	Strongly Disagree	11(15,7)	17(14,9)	20(16,3)	43(23,6)	21(34,4)	
	Disagree	14(20,0)	29(25,4)	28(22,8)	46(25,3)	8(13,1)	
	Neutral	15(21,4)	45(39,5)	30(24,4)	44(24,2)	13(21,3)	0.003*
	Agree	16(22,9)	18(15,8)	28(22,8)	32(17,6)	12(19,7)	
	Strongly Agree	14(20,0)	5(4,4)	17(13,8)	17(9,3)	7(11,5)	
The use of artificial intelligence will eliminate different job definitions.	Strongly Disagree	7(10,0)	2(1,8)	13(10,6)	4(2,2)	2(3,3)	
	Disagree	7(10,0)	10(8,8)	9(7,3)	18(9,9)	6(9,8)	
	Neutral	8(11,4)	43(37,7)	47(38,2)	30(16,5)	16(26,2)	p<0.001*
	Agree	33(47,1)	45(39,5)	35(28,5)	81(44,5)	18(29,5)	
	Strongly Agree	15(21,4)	14(12,3)	19(15,4)	49(26,9)	19(31,1)	
Unemployment will decrease and business environments will increase with the use of artificial intelligence.	Strongly Disagree	26(37,1)	29(25,4)	32(26,0)	70(38,5)	20(32,8)	
	Disagree	19(27,1)	26(22,8)	22(17,9)	50(27,5)	15(24,6)	
	Neutral	10(14,3)	36(31,6)	44(35,8)	37(20,3)	16(26,2)	0.007*
	Agree	9(12,9)	16(14,0)	11(8,9)	19(10,4)	3(4,9)	
	Strongly Agree	6(8,6)	7(6,1)	14(11,4)	6(3,3)	7(11,5)	
Robots that work with artificial intelligence will replace people in the manufacturing sector.	Strongly Disagree	0(0,0)	4(3,5)	10(8,1)	2(1,1)	2(3,3)	
	Disagree	14(20,0)	2(1,8)	6(4,9)	11(6,0)	6(9,8)	
	Neutral	7(10,0)	23(20,2)	22(17,9)	20(11,0)	9(14,8)	p<0.001*
	Agree	24(34,3)	62(54,4)	48(39,0)	88(48,4)	25(41,0)	
	Strongly Agree	25(35,7)	23(20,2)	37(30,1)	61(33,5)	19(31,1)	
Success in education will increase with the use of artificial intelligence.	Strongly Disagree	4(5,7)	2(1,8)	12(9,8)	21(11,5)	6(9,8)	
	Disagree	0(0,0)	10(8,8)	11(8,9)	35(19,2)	10(16,4)	
	Neutral	22(31,4)	47(41,2)	34(27,6)	40(22,0)	19(31,1)	p<0.001*
	Agree	24(34,3)	36(31,6)	44(35,8)	59(32,4)	15(24,6)	
	Strongly Agree	20(28,6)	19(16,7)	22(17,9)	27(14,8)	11(18,0)	

*Chi-Square test; Exact test; α:0.05; *Statistical significance*

DISCUSSION

Artificial intelligence has developed rapidly in recent years. Artificial intelligence technologies have been included in many mobile applications and devices in a short time. Artificial intelligence has reached widespread use in business life and service industry [15]. Different expectations and concerns have appeared in societies with the introduction of artificial intelligence technologies in our lives. There are many opinions that artificial intelligence will make life easier and provide advantages in terms of access to health services [16,17]. On the other hand, many researchers are concerned about the negative effects of artificial intelligence on humanity [18,19]. Older and younger individuals often have different views on the future effects of artificial intelligence.

Views of young people on artificial intelligence technologies will contribute to determining the future position of artificial intelligence. Artificial intelligence technologies are firstly accepted by young individuals. Attitudes of young people towards the use of artificial intelligence technology play a key role in shaping technology. Young people are generally familiar with artificial intelligence in applications on smartphones. One of the artificial intelligence technologies mostly used by young people on smartphones is health applications [20]. Health applications on smartphones are widely used among university students. The score for using health applications on smartphones among young people was 3.77±0.67 [21]. Similar findings were obtained in our study. 69.6% of university students use health applications on their smartphones. Many young individuals take advantage of the application containing artificial intelligence technology [22]. The findings in our study have shown that students in health sciences departments (undergraduate programs of dentistry, nursing, health management, medicine and midwifery) mostly use artificial intelligence technologies. Students mostly use artificial intelligence-based photo editing applications on smartphones. Artificial intelligence-based assistant applications, fingerprint recognition systems, health/diet applications and artificial intelligence-based mobile games are other applications that are frequently used by students.

One of the sectors, where artificial intelligence technologies are widely used, is the health sector. Significant developments have been made about artificial intelligence in the health sector. Artificial intelligence has gained significance in the field of medicine. Artificial intelligence is used for the diagnosis and treatment of diseases [23]. Artificial intelligence can be used in many application areas such as diagnosis, treatment protocol, estimating risks, classifying diseases and preventing possible errors [24]. One of the branches, where artificial intelligence applications are most successful in the field of health, is medical imaging methods. These methods are improving rapidly day by day [25]. In this study, the opinions of university students on the future developments of artificial intelligence in the field of health have been analyzed. Students mostly think that artificial organs can be used in future surgeries with artificial intelligence. Students support the view that artificial intelligence will produce robots that can completely imitate humans in the future. Students think that unmanned autonomous surgical operations can be performed with artificial intelligence in surgical operations in the field of medicine. Students assume that the success rate of the treatment of patients will increase with the development of artificial intelligence technologies in the field of health. Students think that the development of artificial intelligence technologies will cause the emergence of different diseases in societies.

There are changes in people's social life along with the developments in the field of technology. Communication and social life among people have been reshaped with the development of computers and smartphones. Smartphones have turned into an addiction mostly among young people. Young individuals spend time with their smartphones rather than spending time with their families and social circles. 67.3% of young people use smart phones to connect to social media [26]. Smartphones have negative impacts, especially on young people. Smartphones can cause problems such as anxiety, stress and inability to focus of young people [27]. One of the reasons why young people become addicted to smartphones is the artificial intelligence applications on phones. Artificial intelligence applications are included in many online games, virtual reality applications and video applications. Online game applications attract more attention of young people. Many games involving online games and virtual reality can cause differentiation in young people's behaviour [28]. There are biased approaches to social communication in terms of artificial intelligence because of many applications on smartphones. In this study, the opinions of university students about the future sociological effects of artificial intelligence have been determined. Students think that artificial intelligence will not increase communication between young and old individuals. Students think that the use of artificial intelligence will not increase communication within the family. Similarly, students think that artificial intelligence will not increase communication between people in the future. Most of the students assume that artificial intelligence will cause social problems in the future. Students think that artificial intelligence will have negative impacts on spreading traditional cultures.

One of the sectors, where the greatest effects of artificial intelligence will be seen, is professional and working life. One of the biggest concerns of people is that people will lose their jobs because of robots with the development of artificial intelligence. There are predictions that unemployment will increase with the introduction of robots in business life [29], automation in the production sector can do the work more practically than humans. This may cause the unemployment problem [30]. It is predicted that artificial intelligence will reduce many problems (work accidents, stress, etc.) that occur in business life. It is stated that it will provide positive contributions in terms of a safe environment in business life and minimizing the loss of workforce [31]. In our study, the opinions of young people about the effects of artificial intelligence on business life have been analyzed. Students think that stress in business life will decrease with artificial intelligence. However, most of the students anticipate that artificial intelligence will not reduce unemployment in the future, on the contrary, it will cause unemployment. Students think that artificial intelligence will eliminate many job definitions in the future. Students have many concerns about robots. Students think that robots will replace humans in the manufacturing industry. Students predict that using artificial intelligence in the education sector will increase educational success.

It is observed that students have many positive and negative opinions about the future effects of artificial intelligence. There are different opinions among the students, who are studying in different branches of health sciences. Medical students have different expectations and concerns about artificial intelligence. The rate of medical students who think that artificial intelligence will replace physicians is 6.5%. The rate of medical students who are concerned about developments in the field of artificial intelligence is 37.7% [32]. According to the findings of our study, 69.2% of medical students think that artificial intelligence and robots will perform surgery without a physician. 66% of medical students think that artificial intelligence will cause unemployment. 85.7% of dentistry students think that artificial intelligence will provide a great improvement in terms of dentistry. 28.7% of dentistry students think that artificial intelligence will leave dentists unemployed [9]. In our study, 64.2% of dentistry students think that artificial intelligence will cause unemployment. 87.2% of dentistry students think that artificial intelligence will increase the success rates of treatment. It has been observed that dentistry students have the opinion that artificial intelligence will generally have positive contributions. Dentistry students have positive expectations about artificial intelligence. On the other hand, the students of midwifery think that artificial intelligence will have negative effects on both social and business life, unlike dentists. It is observed that the health science students, who are most concerned about the negative effects of artificial intelligence, are midwifery students. The most concerned ones about unemployment are medical students. Medical students think that artificial intelligence will

cause unemployment in the future. In general, healthcare management students worry that artificial intelligence will have negative effects on family communication. On the other hand, nursing students think that artificial intelligence will make positive contributions in terms of technology in the field of health sciences. In general, students use artificial intelligence technologies widely. While female students generally use health/diet applications on smartphones, male students play artificial intelligence-based games.

There are some limitations of this study. The study has been carried out on health sciences undergraduate students studying at one university. The study has been done in undergraduate health sciences departments within the university. Associate and postgraduate students are excluded from the study. Including different universities, different health sciences departments, and associate and postgraduate students in the later stages of the study may contribute to the further generalizability of the results.

CONCLUSION

Artificial intelligence has entered human life very quickly. Artificial intelligence is constantly developing and providing technological transformation in many areas. People have different views on the advantages and disadvantages of artificial intelligence in the future. Although young people adapt to artificial intelligence faster, they have different concerns. University students in the fields of health sciences are concerned that artificial intelligence may have negative effects as well as positive contributions in the future. In general, students are able to use artificial intelligence technologies. They especially benefit from artificial intelligence technologies that provide benefits for them. Students think that artificial intelligence will damage relationships between people and negatively affect communication among family members. Students assume that artificial intelligence will bring great success in the field of medicine and health in the future and will increase the success rate in treatment. The students worry that artificial intelligence will cause unemployment in the future. Although artificial intelligence offers a technologically safe life, it may cause some negative effects in sociological terms according to the students. Informing the society about artificial intelligence can contribute to the elimination of some negative biases. Giving education to university students on artificial intelligence can provide practicality in the professional use of artificial intelligence technologies. Studies should be conducted to increase the positive effects of artificial intelligence on life in the future and to reduce its negative effects. Getting young people's opinions and predictions about artificial intelligence can contribute to these studies.

Ethical Approval: *2019/14, Kahramanmaraş Sütçü Imam University Clinical Research Ethics Committee.*

Acknowledgements: *None.*

Conflict of Interest: *The author has declared no conflict of interest for this article.*

Funding: *None.*

Author Contribution: *Concept: AD; Desing AD; Data collecting: AD; Statistical analysis: AD; Literature review: AD; Writing: AD; Critical review: AD.*

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