Views of veterinary faculty students on the concept of Artificial Intelligence and its use in Veterinary Medicine practices: An example of Ankara University Faculty of Veterinary Medicine

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ABSTRACT

The study was carried out to determine the knowledge levels of the students of Ankara University Faculty of Veterinary Medicine, on the concept of artificial intelligence and its use in veterinary practices. For this purpose, an online questionnaire was applied to a total of 529 students in the study, covering all grades of the faculty. The questionnaire consists of two parts. In the first part, there are 10 questions including demographics, knowledge about the concept of artificial intelligence, etc. The second part consists of 26 5-point Likert-type questions to determine students' thoughts on artificial intelligence applications. Data were analyzed using statistical tests. Consequently, the students participating in the study are partially knowledgeable about artificial intelligence (52.9%). They know the importance of following the developments in artificial intelligence for the profession (45.2%). They think that artificial intelligence applications will improve their professional skills (53.5%). They have the opinion that a robot cannot replace a veterinary surgeon (36.7%) and artificial intelligence cannot cause unemployment in veterinary medicine in the future (35.3%). In addition, they believe that artificial intelligence can cause ethical problems (39.3%) and that applications made with this technology should be developed in an ethical sense (42.4%). As a result, while the students think that artificial intelligence will have positive effects in the field of veterinary medicine, they also think that artificial intelligence can bring negative ethical implications. It can be concluded that including elective courses on artificial intelligence applications in veterinary faculties and conducting further research on the subject would be beneficial.

Introduction

As a branch of computer science, artificial intelligence (AI) is an emerging science and technology used to mimic and expand human behavior and thinking (5). AI is a general term that means creating a model of intelligent behavior using computers with minimal human intervention (21). AI, which has become very popular today, especially with the increase in processor powers, is applied in many different areas such as the public and private sectors and academy (2). It is generally accepted that AI started with the invention of robots (21). The term AI was first mentioned by John McCarthy at Dartmouth College in a scientific meeting held in 1956, and it was defined as *"the science and engineering of making intelligent machines, especially intelligent computer programs"* (11, 16, 24). AI, which basically targets human intelligence, is a field of study that can imitate human intelligence through computers and aims to place products in different areas of life (13) It is an artificial operating system that is expected to exhibit high cognitive features such as recognizing, perceiving, analyzing, grouping, choosing, responding, learning, imitating, speaking, chatting, educating, connecting plural concepts, thinking, problem-solving, and communicating (5). Human

intelligence can forget the events and subjects that it has learned or experienced over time. Apart from some limitations, AI provides advantages in terms of using what it has learned very quickly and is permanent in the information it has learned (1, 13, 16, 28). Systems using AI have the potential to provide unprecedented benefits to humanity (32). Many researchers have started to work intensively on the topic since the introduction and use of AI in the literature. It is suggested that the technology of AI, which attracts the attention of almost everyone from all professions at any age, can especially be useful in health-related topics such as early diagnosis, accurate diagnosis, and clinical decision support to protect and maintain health (30, 39). AI is expected to significantly impact various fields of medicine in the future and, if designed and used appropriately, has the potential to strengthen many of the weaknesses encountered in current healthcare practices (29).

Becoming a very popular and developed subject in the field of veterinary medicine, AI is used in many areas such as animal health, welfare, production, public health, and herd health management (19). It is used as an important tool, especially in veterinary clinics, for performance management of dairy cows, and body condition score applications (37). In addition, it is known that AI will provide benefits such as prevention of zoonotic diseases, improvement of diagnosis, treatment, pharmacovigilance reporting, determination of new preventive medicine strategies, and reduction of unnecessary drug (antibiotic) use through diagnosis and treatment protocols (18). It is foreseen that the use of AI, 3D software, and gene technology will become prevalent in veterinary practices in the near future. Predictions have become widespread that the concept of AI for the medical field, which is a fairly new concept, will be on the agenda of the health sector in the future (2). Studies on integrating AI technologies into the education systems have started in many countries (27). Although AI applications are quite common globally, they have only just begun to be put into practice in Türkiye. Various AI projects are prepared in organizations providing services in education including the Ministry of National Education, the Council of Higher Education, and universities, and studies are carried out for the realization of these projects. These projects cover areas such as digital classrooms, lifelong learning approach, talent hunting for qualified human resources, and new education models (36).

Although there is no training within the scope of AI in the curricula of veterinary faculties, pioneering steps are coming from Türkiye's well-established faculties as the subject is on the rise in the world. Within the framework of the "Artificial Intelligence and Digitalization Training Program in Veterinary Medicine" organized at Ankara University Faculty of Veterinary Medicine (AUFVM) in 2021, experts invited from Türkiye and abroad provided information to veterinarians and students about AI (4). With this training program, which was organized for the first time in Türkiye and set an example for other veterinary faculties, raising awareness about AI applications is aimed.

AI has an increasing interest day by day and attracts the attention of various professional groups and many studies address the views of university youth on the concept of AI (13, 14, 17, 35, 39). However, no study has been found in Türkiye that deals with the knowledge level and opinions of students on AI in the field of veterinary medicine. This study was conducted to determine the knowledge level of AUFVM students on AI and their views on its use in veterinary medicine.

Materials and Methods

The data were collected with the "AI Knowledge Level Questionnaire" prepared by the researchers. In order to prepare the questions that serve the purpose, literature research was conducted, previous research on university students was examined, and a pilot study was conducted with 25 veterinary students. After the pilot study, the students' feedback was received and the questions were finalized. In the first part of the questionnaire, there are 10 questions including demographics, level of computer use, knowledge about the concept of AI, etc. The second part consists of 26 5-point Likert-type questions to determine students' thoughts on AI applications [Strongly Disagree (1), Disagree (2), Undecided (3), Agree (4), Strongly Agree (5)]. The study was carried out with 529 students studying in 1^{st}, 2^{nd}, 3^{rd}, 4^{th} and 5^{th} grades enrolled in XUFVM 2021-2022 Spring Semester Turkish Program. Informed consent and survey forms have been made online using Google Forms through the existing Google account of the researchers. The created link was delivered to the students via each grade's own WhatsApp group. The participants were provided with the questionnaire form after reading the consent form and giving their informed consent. Those who did not consent to the study were prevented from accessing the data collection tool. The answers were recorded in Excel via Google Forms Online and the analyzes were carried out. Descriptive statistics on the data to be obtained are determined as mean and standard deviation for quantitative data, frequency, and percentage for qualitative data. In addition, whether there is a relationship between the rate of answers given to the questions and demographic characteristics was examined by Chi-Square analysis. Pearson Chi-Square or Fisher's Exact Test was used according to the distribution of the observed values and expected values to the cells in the cross table. All statistical analyzes were conducted with SPSS 14.01 package program. The statistical significance limit was accepted as $P<0.05$.

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Results

It was determined that the majority of participants are women (54.6%) and the highest participation is between the ages of 18-22 (65.6%). Among the participants, 27.2% (n=144) are fourth grade, 20.8% (n=110) are third grade, 18.3% (n=97) are fifth grade, 18.3% (n=97) are first grade and 15.3% (n=81) are second grade students. The average level of computer use is average at a 46.7% rate (n=247). Considering the time spent on the internet daily, the average is 4.88±2.42 hours and 3.5-6 hours is the most preferred range by 54.6% (n=288) (Table 1).

Among the students, 93% (n=492) of them stated that they heard about the concept of AI before and 52.9% (n=279) stated that they have partial knowledge. 45.9% (n=242) said that they do not have knowledge about the use of AI in veterinary medicine. 87.3% (n=460) first heard about the concept of AI from social media and the internet and 61.4% (n=325) used an application using AI (Table 2).

Table 1. Distribution of demographics of students.

Variables	**Number (n)**	**Percentage (%)**
Gender		
Female	289	54.6
Male	240	45.4
Total	529	100
Age (mean±std.dev)	**22.10±3.07**	
	Number (n)	**Percentage (%)**
18-22 (1)	347	65.6
23-27 (2)	163	30.8
28-32 (3)	12	2.3
33 or older (4)	7	1.3
Total	529	100
Grade	**Number (n)**	**Percentage (%)**
1	97	18.3
2	81	15.3
3	110	20.8
4	144	27.2
5	97	18.3
Total	529	100
Level of computer use?	**Number (n)**	**Percentage (%)**
Bad	22	4.2
Average	247	46.6
Good	197	37.2
Very good	63	11.9
Total	529	100
Average time spent online per day?	**Number (n)**	**Percentage (%)**
0-3 hours	141	26.6
3,5-6 hours	288	54.4
6,5-9 hours	62	11.7
9,5- 12 hours	35	6.6
12,5 and above hours	3	0.6
Total	529	100

Table 2. Descriptive information on the concept of artificial intelligence.

Variables	**Number (n)**	**Percentage (%)**
Have you heard the concept of AI before?		
Yes	492	93.4
Partially	33	6.3
No	2	0.4
Total	527	100
Do you have information on the concept of AI?	**Number (n)**	**Percentage (%)**
Yes	208	39.5
Partially	279	52.9
No	40	7.6
Total	527	100
Do you have information on the use of AI in veterinary medicine?	**Number (n)**	**Percentage (%)**
Yes	84	15.9
Partially	201	38.1
No	242	45.9
Total	527	100
Have you ever used an application (simple or advanced) that uses AI?	**Number (n)**	**Percentage (%)**
Yes	325	61.4
No	204	38.6
Where did you first hear about the concept of AI?	**Number (n)**	**Percentage (%)**
Social media, internet	460	87.3
University environment	25	4.7
Circle of family, friends	27	5.1
Other	15	2.8
Total	527	100

As seen in Table 3, "AI should be used in the field of veterinary medicine." (4.28±0.780) got the highest score and this is followed by "It is important for me to follow the developments in AI for my profession." (4.26±0.876), "AI applications need to be improved from an ethical point of view." (4.21±0.799) and "The use of AI in veterinary medicine would contribute to the early diagnosis, treatment, and prevention of animal diseases." (4.17±0.642). The answers "AI would leave veterinarians unemployed in the future." (2.51±1.123) and "A robot can replace a veterinary surgeon with AI technology." (2.52±1.153) received the lowest scores.

***Chi-Square Analyzes*:** A significant relationship was found between male and female students for the *"Have you heard the concept of AI before?"* question (P=0.044). A significant relationship was found between male and female students for the *"Do you have information on the concept of AI?"* question (P<0.001). A significant relationship was found between male and female students for the *"Do you have information on the use of AI in veterinary medicine?"* question (P=0.008). No significant relationship was found between male and female students for the *"Where did you first hear about the concept of AI?"* question (P=0.488). A significant relationship was found between male and female students for the *"Have you ever used an application (simple or advanced) that uses AI?"* question (P=0.005).

Table 3. Distribution of 5-point likert-type questions related to measuring thoughts on the concept of AI.

	1 Strongly disagree	**2 Disagree**	**3 Undecided**	**4 Agree**	**5 Strongly agree**	**mean ± std. deviation**
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	
It is important for me to follow the developments in AI for my profession.	15 (2.8)	7 (1.3)	40 (7.6)	228 (43.1)	239 (45.2)	4.26 ± 0.876
AI should be used in the field of veterinary medicine.	4 (0.8)	8 (1.5)	59 (11.2)	221 (41.8)	237 (44.8)	4.28 ± 0.780
AI applications need to be improved from an ethical point of view.	4 (0.8)	8 (1.5)	76 (14.4)	223 (42.4)	215 (40.9)	4.21 ± 0.799
AI is the science and engineering of making intelligent computer programs.	4 (0.8)	43 (8.1)	152 (28.7)	254 (48)	76 (14.4)	3.67 ± 0.847
The developments for the use of AI in veterinary medicine excite me.	3 (0.6)	18 (3.4)	91 (17.3)	263 (49.9)	152 (28.8)	4.03 ± 0.806
The term AI reminds me of robotic systems.	9 (1.7)	66 (12.5)	78 (14.8)	296 (56.1)	79 (15)	3.70 ± 0.929
The decision support feature of AI can help veterinarians.	5 (0.9)	24 (4.5)	72 (13.6)	297 (56.1)	131 (24.8)	3.99 ± 0.807
AI applications reduce the risk of making medical errors.	3 (0.3)	36 (6.8)	128 (24.2)	263 (49.7)	99 (18.7)	3.79 ± 0.843
I can provide better healthcare to patients and patient owners by using AI.	1 (0.2)	10 (1.9)	67 (12.7)	322 (60.9)	129 (24.4)	4.07 ± 0.677
I am excited to chat about AI applications for my profession.	5 (0.9)	42 (7.9)	117 (22.2)	249 (47.2)	115 (21.8)	3.81 ± 0.899

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AI applications enrich my professional skills.	6 (1.1)	22 (4.2)	85 (16.1)	283 (53.5)	133 (25.1)	3.97 ± 0.825
As AI becomes more widespread, the need for healthcare workers would gradually decrease.	36 (6.8)	137 (25.9)	133 (25.1)	163 (30.8)	60 (11.3	3.14 ± 1.130
Developments in AI applications scare me.	57 (10.8)	191 (36)	171 (32.5)	79 (15)	28 (5.3)	2.68 ± 1.028
A robot can replace a veterinary surgeon with AI technology.	105 (19.8)	194 (36.7)	108 (20.4)	93 (17.5)	29 (5.5)	2.52 ± 1.153
Training on AI should be provided in the curricula of veterinary medicine education.	7 (1.3)	30 (5.7)	91 (17.2)	279 (52.7)	122 (23.1)	3.91 ± 0.861
AI applications should be placed in veterinary faculties.	5 (0.9)	13 (2.5)	74 (14)	295 (55.9)	141 (26.7)	4.05 ± 0.768
The use of AI can replace practical training in veterinary medicine in cases where practical training is insufficient.	9 (1.7)	28 (5.3)	110 (20.8)	276 (52.3)	105 (19.9)	3.83 ± 0.864
The use of AI in veterinary medicine would be useful in preventing zoonotic diseases transmitted from animals to humans.	4 (0.8)	21 (4)	117 (22.1)	270 (51)	117 (22.1)	3.90 ± 0.812
The use of AI in veterinary medicine would contribute to the early diagnosis, treatment, and prevention of animal diseases.	2 (0.4)	6 (1.1)	41 (7.8)	330 (62.6)	148 (28.1)	4.17 ± 0.641
Herd health management would be improved with the use of AI in veterinary medicine.	3 (0.6)	6 (1.1)	69 (13)	300 (56.6)	151 (28.5)	4.12 ± 0.707
AI technologies would prevent the unnecessary use of antibiotics and drugs in animals.	6 (1.1)	34 (6.5)	154 (29.3)	231 (44)	100 (19)	3.73 ± 0.881
Artificial intelligence technologies would benefit the profitability and sustainability of livestock enterprises.	4 (0.88)	6 (1.1)	66 (12.5)	312 (59)	141 (26.7)	4.10 ± 0.705
AI also causes ethical problems.	15 (2.8)	57 (10.8)	174 (32.9)	208 (39.3)	75 (14.2)	3.51 ± 0.960
AI is useful as long as it does not harm humanity.	14 (2.7)	27 (5.1)	84 (15.8)	265 (50.3)	137 (26)	3.92 ± 0.926
AI would leave veterinarians unemployed in the future.	102 (19.4)	186 (35.3)	135 (25.6)	74 (14)	30 (5.7)	2.51 ± 1.123

Table 4. Effects of gender on AI knowledge levels (n = 529).

Have you heard the concept of AI before?					P
		Female	**Male**	**Total**	
Yes	N	264	228	492	
	%	53.70%	46.30%	100.00%	
Partially	N	23	10	33	
	%	69.70%	30.30%	100.00%	0.044*
No	N	0	2	2	
	%	0.00%	100.00%	100.00%	
Total	N	287	240	527	
	%	54.50%	45.50%	100.00%	

*P<0.05.

Do you have information on the concept of AI?					P
		Female	**Male**	**Total**	
Yes	N	87	121	208	
	%	41.80%	58.20%	100.00%	
Partially	N	175	104	279	
	%	62.70%	37.30%	100.00%	<0.001*
No	N	25	15	40	
	%	62.50%	37.50%	100.00%	
Total	N	287	240	527	
	%	54.50%	45.50%	100.00%	

*P<0.05.

Do you have information on the use of AI in veterinary medicine?					P
		Female	**Male**	**Total**	
Yes	N	40	44	84	
	%	47.60%	52.40%	100.00%	
Partially	N	127	74	201	
	%	63.20%	36.80%	100.00%	0.008*
No	N	121	121	242	
	%	50.00%	50.00%	100.00%	
Total	N	288	239	527	
	%	54.60%	45.40%	100.00%	

Where did you first hear about the concept of AI?					P
		Female	**Male**	**Total**	0.488
Social media, internet	N	253	207	460	
	%	55.00%	45.00%	100.00%	
Circle of family, friends	N	15	10	25	
	%	60.00%	40.00%	100.00%	
University environment	N	11	16	27	
	%	40.70%	59.30%	100.00%	
Other	N	9	7	16	
	%	56.30%	43.80%	100.00%	
	N	288	240	528	
	%	54.50%	45.50%	100.00%	

Have you ever used an application (simple or advanced) that uses AI?					P
		Female	**Male**	**Total**	
Yes	N	162	163	325	
	%	49.80%	50.20%	100.00%	
No	N	127	77	204	0.005*
	%	62.30%	37.70%	100.00%	
	N	289	240	529	
	%	54.60%	45.40%	100.00%	

Discussion and Conclusion

With the developments in technology, the internet stands out as a tool that provides easier access to information in today's information societies (12). As like in the study of Akyüz et al. (2), the students participating in this study stated that they heard the concept of AI for the first time over the internet and social media (87.3%, n=460). It is seen that most of the students can use computers at average level (46.6%, n=247) and spend an average of 3.5-6 hours a day on the internet (54.4%, n=288). In terms of knowledge levels, it was determined that 93.4% (n=492) heard the concept of AI before and have partial knowledge about it (52.9%, n= 279). AI reminds robotic systems to students (56.1%, n=296) and is known as the science and engineering of making intelligent computer programs (48%, n=254). In addition, 61.4% (n=325) of the students reported that they used an AI application, simple or advanced. From these statements, it can be said that the students have more or less general knowledge about AI. When AI in veterinary medicine was examined, it was seen that 45.9% of the students (n=242) answered *"no"* to the *"Do you have information on the use of AI in veterinary medicine?"* question. As it is known, the usage areas of AI in the field of veterinary medicine are expanding globally. Kour et al. (23) in their article on AI in veterinary medicine report the areas where AI can be used as detection of left atrial enlargement on canine thoracic radiology, predicting survivability and need for surgery in horses with colic, detection of subclinical mastitis in cows with the help of machine learning, discriminating between meningiomas and gliomas in canines MRI's and using a xenograft platform and machine learning in development of exosomal gene to detect residual disease in dogs with osteosarcoma. Data sets from patient images and test results are being used to train AI software to detect complex diseases with growing accuracy. Some practices use AI to evaluate test results and suggest alternative diagnostics and further steps. There are even AI-built-in stethoscopes available that can detect arrhythmias and other conditions relating to the heart. These are only a few of the many applications of AI in veterinary care (3). Despite these developments in the world, the fact that veterinarian candidates in Türkiye do not have sufficient knowledge about the use of AI may be due to the new recognition of technology, and the fact that it has not yet been included in the veterinary medicine education system. Even if the students do not have enough knowledge about the use of AI in veterinary medicine, it is seen that they understand the importance of this technology. As a matter of fact, when the knowledge levels about the use of AI in veterinary medicine were examined, answers like *"It is important for me to follow the developments in AI for my profession."* (45.2%, n=239), *"AI should be used in the field of veterinary medicine."* (44.8%, n=237), *"AI applications enrich my professional skills."* (53.5%, n=283), *"The developments for the use of AI in veterinary medicine excite me."* (49.9%, n=263), *"The use of AI in veterinary medicine would contribute to the early diagnosis, treatment, and prevention of animal diseases."* (62.6%, n=330) indicate that they are aware of the importance of this technology and the benefits it will bring.

One of the areas where AI is being developed is the field of zoonotic diseases, which has an important place in public health. Students think that the use of AI would be beneficial in preventing zoonotic diseases transmitted from animals to humans (22.1%, n=117). Relatedly, researchers such as Deng (15) and Silva Motta et al. (34) mention positive scientific outcomes of the use of AI zoonotic diseases.

Park et al. (29) reported that the most important criterion for the adoption of the use of AI technology in medical applications is that it allows a better healthcare service for patients. Choudhury and Asan (10) noted that the results of AI studies are mostly positive for patient safety, and that AI improves or outperforms traditional methods, and AI-enabled decision support systems, when implemented correctly, can aid in enhancing patient safety by improving error detection, patient stratification, and drug management. The students stated that by using AI, they could provide better health care to patients and the owners (60.9%, n=322), that AI systems would reduce the risk of making medical mistakes (49.7%, n=263), and that AI would help veterinarians with its decision support feature (56.1%, n=297). These statements show that they have accurate predictions on the subject.

Students agreeing (59%, n=312) with the statements *"Herd health management would be improved with the use of AI in veterinary medicine."* (56.6%, n=300) and *"AI technologies would benefit the profitability and sustainability of livestock enterprises."* (59%, n=312) demonstrates their knowledge of the subject. In fact, Gökçen and Gökçen (20), while explaining the place and importance of AI technologies in animal husbandry, stated that to make predictions in extensive livestock management, a large number of different datasets such as weather, air quality, sound signals, and visual animal behaviors should be collected throughout the year. However, it is not possible to store and process large volumes of data with an ordinary system, and it is necessary to have a larger computing and storage power. At this stage, AI technologies such as sensors, big data, cloud computing, machine learning, etc. get involved, and that way, protection of animal health, productivity, profitability, and sustainability could be guaranteed.

On the matter, The European Coordination Committee on Veterinary Training (ECCVT), by considering the outcomes of a 2018 workshop on digital

technologies in veterinary medicine, has decided to establish a joint group of experts on assessing opportunities, risks, and impacts related to the use of digital technologies and AI applications in veterinary medicine (19).

ECCVT (19) emphasized that relevant authorities urgently need to develop policies and regulations and be incorporated into education systems to ensure the efficient, safe, ethical, and legal use of AI in veterinary medicine. According to this study, the students think that *"Training on AI should be provided in the curricula of veterinary medicine education."* (52.7%, n=279), *"AI applications should be placed in veterinary faculties."* (55.9%, n=295) and *"The use of AI can replace practical training in veterinary medicine in cases where practical training is insufficient."* (52.3%, n=276). These statements help to think that veterinarian candidates know that AI technologies can be used in the fields of health and education and that these technologies are needed to increase the quality of education. Wartman and Combs (38) report that teaching medical students to practice successfully in a healthcare environment transformed by AI applications should become the main focus of curriculum reform today. Moreover, Chen et al (8) emphasize that AI has a great impact on education, especially on the management, teaching, and learning areas of the education sector or in the context of individual learning institutions. It is thought that in veterinary medicine, which is a part of the health field, the subjects related to AI applications should be included in the curricula and the importance of this subject will increase day by day.

What AI can do, whether it can outperform human intelligence, and the effects this technology may create in the future are still being investigated (33). Although there are different opinions about the effects of AI, the main concern is the contribution of AI to the unemployment level (26). Chiacchio et al. (9) and Bardot (6) state that as a result of increasing efficiency in AI, robots may replace humans in the future and cause unemployment. Rigby (31), on the other hand, predicts that no matter how much patient care is improved with AI, patients will still be treated by doctors and that the practice of medicine will always have a human element. The students participating in the study stated that with the spread of AI, the need for healthcare professionals will gradually decrease (30.8%, n=163), but that AI will not cause unemployment in the future (35.3%, n=186), a robot cannot replace a veterinary surgeon with this technology (36.7%, n=194) and that they are not afraid of developments in the field of AI (36%, n=191). It can be said that a longer period is needed to observe the effects of this technology on unemployment in veterinary medicine in the future.

In various studies (7, 22, 25) that deal with the issue of AI in an ethical sense, it is generally stated that technology may create ethical problems in the future and that AI designs should be compatible with the ethical principles and moral values of human beings. Students in this study think that AI applications should be developed in an ethical sense (42.4%, n=223), that AI can cause ethical problems (39.3%, n=208) and that AI is beneficial as long as it does not harm humanity (50.3%, n=265). The findings from the study can be evaluated as that the students are aware of the ethical problems that may arise related to the designs of AI technologies, and if considered carefully in that sense, AI can be positively perceived by the students.

As a result, in this study, which deals with the opinions of veterinary faculty students on AI for the first time in Türkiye, it can be said that the students have partial knowledge about the subject and its use in veterinary medicine. Considering the benefits of AI to humanity, it can be argued that inclusion of this subject in the undergraduate and graduate curricula of veterinary faculties would be beneficial in terms of following the developments in the world. Large-scale studies detailing the subject are needed for the recognition and development of AI applications.

Ethical Statement

This study received ethical approval at the Ankara University Ethics Committee meeting dated 13.04.2022 with the decision number 07/70. In addition, additional permissions were obtained from the Dean's Office of the AUFVM for the application of the study to the students.

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Conflict of Interest

The authors declared that there is no conflict of interest.

Author Contributions

NY conceived and planned the study. NY and ÖK conducted literature review and writing the manuscript. All authors provided critical feedback and helped shape the research, analysis and manuscript.

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