

University Students' Perceptions About Artificial Intelligence

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Abstract

The aim of this study was to determine the perceptions of university students about the concept of artificial intelligence. The sample of the research carried out with the screening method consists of 130 fourth grade students studying in the Faculty of Education, Faculty of Arts and Sciences and Faculty of Economics and Administrative Sciences of a university in Eastern Anatolia region in 2018-2019 academic year. 42 students from Faculty of Education, 47 from Faculty of Arts and Sciences and 41 from Faculty of Economics and Administrative Sciences participated in the study. The sample of the study was determined by snowball sampling method. Independent Word Association Test was used as data collection tool. Content analysis was used for data analysis. As a result of the study, it was determined that artificial intelligence perceptions of the students of the Faculty of Education were richer than the students of the Faculty of Economics and Administrative Sciences and the Faculty of Arts and Sciences. Another important result determined in the study is that the negative perceptions of all sample groups about artificial intelligence concept are more significant than positive perceptions. Giving lectures to university students about current artificial intelligence applications and usage in their fields are among the suggestions of the study.

Key Words: Artificial intelligence concept, University students, Perception of artificial intelligence concept

Introduction

Artificial intelligence is one of the topics that have been frequently emphasized in recent times when technological advances are advancing rapidly. Especially, in recent years, the results obtained from the studies on artificial intelligence in many different areas have a very positive effect on our lives day by day (Adalı, 2017). The fact that artificial intelligence has many different application areas makes it difficult to make a common definition about the concept (Birdman, 2015). According to the most common definition in the related literature, artificial intelligence; the ability of a computer or a computer-controlled machine to perform tasks related to higher mental processes, such as reasoning, inference, generalization, and learning from past experiences, which are generally assumed to be human-specific qualities Nab (Nabiyev, 2005).

On the other hand when updated curricula by the Ministry of the Republic of Turkey National Education in 2018 is examined, in the curriculum of all courses, it is seen that students are aimed to be educated as individuals who produce knowledge, use it functionally in life, solve problems, think critically, enterprising, determined, have communication skills, empathize, contribute to society and culture (MoNE, 2018a, 2018b, 2018c).

In order to realize this aim, it is seen that the science curriculum is prepared in the context of Science-Engineering-Technology-Society-Environment (SETSE) in which Knowledge, Skills and Affective dimensions are related (MoNE, 2018a). It is clear that artificial intelligence applications, which we frequently hear about in many different fields, are related to the ‘Life Skills’ and ‘SETSE’ dimensions of the curriculum. These points make all teachers’ perceptions about the concept, especially science teachers and prospective teachers, important to think about the concept. Because it is known that the high level of knowledge and awareness of the teachers about the subject will make it easier for students to understand the subject correctly (Demir et al., 2007; Öcal, 2012).

On the other hand, it is known that parents are as effective as teachers in the success of students (Çanakçı and Özdemir 2015) In studies, it is stated that as the science literacy levels of the parents increase, the success of science lesson and high school entrance exam increases (Sahin, et al., 2010; Ozer and Anil, 2011). Indeed, PISA 2015 and TIMSS 2015 reports on Turkey also lends support to these results (Polat and Madra, 2018). Therefore, it is clear that the correct guidance and interaction of parents who are familiar with current concepts and have scientific thinking capacity to their children inevitably increases student achievement. This situation makes the opinions of university students, who will be the parents and teachers of tomorrow, about current issues important. There are many studies in the literature about artificial intelligence and its use in different fields. The most notable of these is the 75th issue of Journal of ITU Foundation, which devotes its issue to artificial intelligence. In this issue published under the name of ‘Humanized machines and artificial intelligence’, many questions have been tried to be searched for, as well as the latest usage areas of this technology today. Adalı (2017) focuses on the positive aspects of artificial intelligence and natural intelligence and their differences from each other and the future of artificial intelligence, while İnce (2017) in his study, he tried to find an answer to the question ‘what happens if the intelligence of machines catches ours?’. Uyar (2017), on the other hand, focuses on the sociological dimension of

the use of artificial intelligence and questions how artificial intelligence will take into account ethical issues in making critical decisions. A study about the concept of artificial intelligence reflecting what teacher candidates or other undergraduate students think or perceived the concept has not been found in the literature. Based on these points, the aim of this study was to determine the perceptions of university students about the concept of artificial intelligence.

Method

In this research, survey method was used. Surveying studies, which are widely used in the literature and allow the study of large groups, are those in which the researcher has no intervention on the independent variable and these studies are aimed at describing a situation that existed in the past or present. (Karasar, 2012; Buyukozturk, 2012).

Sample

The sample of this study consists of 130 fourth grade students from the Faculty of Education, Faculty of Science and Letters, Faculty of Economics and Administrative Sciences of a university in the Eastern Anatolia region. 47 students from Education Faculty, 42 students from Faculty of Arts and Sciences, 41 students from Faculty of Economics and Administrative Sciences participated in the study. While 22 of the students from the Faculty of Education were studying in science, 20 of them were studying in the classroom teaching department, 18 of the students from the Faculty of Science and Literature were studying in Biology, 18 in Turkish Language and Literature and 11 in History. Of the 41 students from the Faculty of Economics and Administrative Sciences, 20 were in business and administration department and 21 were in economics department. All of the prospective teachers who participated in the research were 4th grade students. Snowball sampling method was used to determine the sample of the study. In the study, based on the questions ‘Who knows more about this?, Who should I interview?’ of Patton (1987), the study group was formed by directing the researcher to each other. This approach is effective in identifying individuals or situations that may be a rich source of information about the researcher’s problem (Yıldırım & Şimşek, 2011).

Data Collection Tool

In this research, Word Association Test (WAT) was used. It is seen that this technique is used in the literature to collect data in many studies (Timur and Taşar, 2011; Yener, et al., 2017; Keskin, and Örgün 2015). This technique is based on the assumption of answering related to the stimulating word, regardless of limiting ideas coming into the mind. (Spring, Johnstone and Sutcliffe, 1999 cited in Kurt, & Ekici, 2013). The word association test is frequently used to analyze the cognitive structure of individuals and the relationships between concepts in this structure and to determine whether the relationships between the concepts in their long-term memory are sufficient (Atasoy, 2004; Kurt & Ekici, 2013). In this study, the second stage of the word association test, a sentence writing section about the given concept, was not used. In the literature, this use of word association test is frequently encountered (Bahar and Özatlı, 2003; Polat, 2013; Önel and Yüce, 2016).

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In the research, the word association test was conducted under the control of 3 researchers in two different stages as given above. In the first part of the test, students were asked to write the first eight words that came to their minds about the key concept. In the related literature, it is seen that the duration given varies according to the repetition of the key concept (Özatlı; 2006; Yalvaç; 2008; Kurt and Ekici 2013). Since the key concept is repeated eight times in the related studies, this time is determined as 30-40 seconds, so students were given 40 seconds (Keskin & Örgün, 2015).

Data Analysis

Content analysis was used in the analysis of the data obtained from the study. The main purpose of content analysis is to reach the concepts and relationships that can explain the data. In this

context, similar data are brought together within the framework of certain concepts and categories and interpreted in a way that the reader can understand (Bilgin, 2006; Lichtman, 2010). In this study, the data obtained from the word association test were analyzed using the number of words, the number of answers and the semantic relationship of the words in accordance with the content analysis. (Atasoy, 2004). It is reported that the analysis of word association tests with semantic correlation technique is reliable (Kostova and Radoynovska, 2008; Kurt and Ekici, 2013). The words analyzed using semantic relationships were categorized and their frequencies were calculated. In the study, many words that are not understood and have no relation with other words were not evaluated. (Kostova and Radoynovska, 2008). In analyzing the data obtained from the study, the conceptual categories and the words forming the categories were determined separately by coding by a field expert and a researcher. The cases in which the researchers made the same coding in the coding of the data were considered as consensus and the cases in which the different coding was made as the disagreement. In cases where one of the researchers was in conflict, coding was made by taking the opinion of the other researcher. The reliability of the data analysis performed within the scope of the study was calculated using the formula $Reliability = \frac{Consensus}{(Consensus + Disagreement)}$ (Miles and Huberman, 1994). The mean reliability among the coders for this research was found to be 90% for the findings obtained from the Faculty of Education, 87% for the findings from the Faculty of Arts and Sciences, and 85% for the findings from the Faculty of Economics and Administrative Sciences. If the reliability calculations are more than 70%, the research is considered to be reliable (Miles and Huberman, 1994).

Findings

In this section, the results obtained from the analysis of the answers given by the university students to the word association test related to the concept of artificial intelligence are given. Below are the frequency distributions of the categories created by the students of the Faculty of Arts and Sciences.

Table 1 Categories and Frequencies of Art and Science Faculty Students

N=47 Categories	Concepts in the category		Frekans of the category
Areas where artificial intelligence is used	Teknology	26	102
	Machine	10	
	Science	11	
	Robot	40	
	Chemistry	2	
	Software	3	
	Internet	3	
	Program	3	
	Operation system	3	
	Mathematik cs	1	
Ttechnological devices using artificial intelligence	Computer	22	81
	Refrigerator	5	
	Navigation	3	
	Tablet	5	
	Computer game	7	
	Television	5	
	Telephone	22	
	Food processor	2	
	Dishwasher	1	
	Combi	2	
	radio	3	
	Satellite tools	1	
Memory	3		
Human characteristics of artificial intelligence	Mind	4	27
	Intelligence	4	
	Observation	1	
	Information	2	
	Mimic	1	
	Rigor	1	
	Skill	1	
	Thoughts and feelings	1	
	Human	11	
Logic execution	1		

Popular examples of artificial intelligence	Siri	9	21
	Sophie	12	
Negative aspects of artificial intelligence	War	5	18
	Laziness	2	
	Radiation	1	
	Non-wit	4	
	Destruction of humanity	2	
	Globalization	1	
	Danger	1	
	Managing people	2	
Positive aspects of artificial intelligence	Ease	5	12
	Benefit	2	
	Innovation	1	
	Endless knowledge	3	
	Acquired ability	1	
Total	Number of words	48	261

When Table 1 given above is examined, it is seen that the perceptions of the students of the Faculty of Arts and Sciences are composed of 48 words collected in 6 different categories. Among these, the frequency of the “Uses of Artificial Intelligence” has the highest frequency with 102 frequencies. The expressions of “Robot” in this category has 40 frequencies and “Technology” has 26 frequencies. In the second order, the category of “Technological devices using artificial intelligence” comes with 81 frequencies. The category with the lowest frequency is the frequency of ‘positive aspects of artificial intelligence’ with 12 frequencies.

Table 2 Categories and Frequencies of the Students of the Faculty of Economics and Administrative Sciences

N= 41 Categories	Concepts in the category		Frekans of the category
Use areas of artificial intelligence	Technology	6	72
	Machine	4	
	Science	5	
	Robot	34	
	Cloning	2	
	Software	7	
	Operarion System	2	
	Internet	2	
	Program	6	
	Automation	2	
	Mechanical	2	
Technological devices using artificial intelligence	Computer	20	68
	Photocell	8	
	Navigation	5	
	Tablet	8	
	Computer game	2	
	Television	12	
	Drone	5	
	Stopwatch	2	
	Camera	2	
	Calculator	2	
Step counter	2		
Popular examples of artificial intelligence	Siri	13	21
	Sophia	8	
Negative aspects of artificial intelligence	War	3	15
	Gun	4	
	To be a prisoner	2	
	Artificial dreams	1	
	Unemployment	4	
	To be checked	1	
Positive aspects of artificial intelligence	Ease	5	13
	Travel to space	2	
	Flawless	1	
	Dazzling	1	
	Good quality of life	1	
	Advanced	1	
	Developability	1	
	Helper	1	

Human characteristics of artificial intelligence	Intelligence	3	13
	Frenzy	2	
	Lateral thinking	1	
	Creativity	1	
	Visual memory	1	
	Human	3	
	Guess	2	
Total	Number of words	45	202

When the Table 2 given above is examined, it is seen that the perceptions of the students of the Faculty of Economics and Administrative Sciences consist of 45 words collected in six different categories. Among these, the frequency of “use areas of artificial intelligence” is the highest frequency with 72 frequencies. In this category, the expressions of ”Robot” has 34 frequencies and “software” has six frequencies. The category of ‘technological devices using artificial intelligence’ ranks second with 68 frequencies. The category with the lowest frequency is the ‘positive aspects of artificial intelligence’ category with 12 frequencies.

Table 3 Frequency Distribution of the Perceptions of the Students of the Faculty of Education about the Concept of Artificial Intelligence by category

N= 42 Categories	Concepts in the category		Frekans of the category
Use areas of artificial intelligence	Technology	24	142
	Machine	9	
	Science	16	
	Robot	38	
	Space Capsule	2	
	Software	11	
	Invention	9	
	Digital	1	
	Astronomy	2	
	Space technology	5	
	Program	5	
	Operation System	15	
Medicine	5		

Technological devices using artificial intelligence	Computer	17	45
	Microscope	1	
	Navigation	1	
	Tablet	4	
	Computer game	2	
	Television	1	
	Telephone	10	
	Smart House	2	
	Smart Cars	5	
	Airplane	1	
	Memory	1	
	Negative aspects of artificial intelligence	War	
Laziness		4	
mechanization		1	
Unemployment		4	
Destruction of humanity		4	
Doomsday		5	
Danger		2	
Cost		1	
Future Anxiety		3	
Deformability		1	
Slavery		5	
Human characteristics of artificial intelligence	First citizenship	1	16
	Memory	2	
	Design	2	
	Information	3	
	Ability	1	
	Scientist	4	
	Human	5	
	Check	1	
Popular examples of artificial intelligence	Siri	13	16
	Sophia	3	
Positive aspects of artificial intelligence	Ease	2	9
	Development	4	
	Innovation	1	
	Be usefull	1	
	Change	1	

People or brands related to artificial intelligence	Elon Musk	2	6
	Marc Zuckerberg	1	
	Tesla	1	
	Apple	2	
Toplam	Number of words	54	273

When the Table 3 given above is examined, it is seen that the perceptions of the students of the Faculty of Education are composed of 54 words collected in seven different categories. The category with the highest frequency among them is the frequency of “use areas of artificial intelligence” with 142 frequency. The expressions of “Robot” in this category has 38 frequencies and “Technology has 24 frequencies. In second place with 45 frequencies ‘technological devices that use artificial intelligence’ category comes. The category with the lowest frequency is the category of ‘human or brands related to artificial intelligence’ with six frequencies. It is seen from the Table 2 and 3 that the categories of ‘people or brands related to artificial intelligence’ are not found in the categories formed from the perceptions of the students of the Faculty of Economics and Administrative Sciences and the Faculty of Arts and Sciences about artificial intelligence.

Results and Discussion

This study was conducted to determine the perceptions of University students about the concept of artificial intelligence. When the findings obtained from the study were taken into consideration, it was seen that the perceptions of the 42 Education Faculty students who participated in the study are composed of 53 words in 7 categories. These categories were ‘areas of use of artificial intelligence’, ‘technological devices using artificial intelligence’, ‘positive aspects of artificial intelligence’, ‘negative aspects of artificial intelligence’, ‘human characteristics of artificial intelligence’, ‘examples of popular artificial intelligence’, ‘people or brands related to artificial intelligence’.

From the sample of the study, while the perceptions of the 41 students of the Faculty of Economics and Administrative Sciences were

collected in six categories with 45 words, it was seen that the perceptions of 47 students of Faculty of Arts and Sciences were classified in six categories with 48 words. From Table 2 and Table 3, it is seen that the category of 'human or brands related to artificial intelligence' was not found in this sample group. Another point that draws attention from the findings of the study was that although the number of students of the Faculty of Science and Literature participated in the study was more than the students who participated in the study from the Faculty of Education, the number of words produced by the students of the Faculty of Education was more than the number of words produced by the students of the Faculty of Arts and Sciences. Based on these findings, it can be said that artificial intelligence perceptions of the students of the Faculty of Education are richer than the students of the Faculty of Economics and Administrative Sciences and the Faculty of Arts and Sciences. these results will not be discussed as there was no similar studies in the literature on direction. However, it is reported in the literature that teacher candidates in different branches have high beliefs about the positive effect of technology in education and these belief levels cannot be differentiated according to departments (Yavuz and Coskun, 2008; Sekerci et al., 2008; Usta and Korkmaz 2010; Albayrak Sari, et al., 2016). When the findings obtained from the study were examined; It is seen that the categories with the highest frequency among the categories consisting of the perceptions of all sample groups participating in the research about the concept of artificial intelligence are the 'areas of use of artificial intelligence' and 'technological devices using artificial intelligence'. The frequencies of these two categories were performed as 102-81 for the students of the Faculty of Economics and Administrative Sciences, 72-68 for the students of the Faculty of Arts and Sciences, and 142-45 for the students of the Faculty of Education. These findings can be explained with the contribution of artificial intelligence applications to the social life of university students and familiarity with their daily lives. As a matter of fact, in the study conducted by Ekici, Gökmen and Kurt (2014), it is stated that the pre-service teachers focused on the contributions of artificial intelligence to their social lives in their

perceptions about the concept.

Another finding obtained from the study was that the negative perceptions of all sample groups participated in the study, about artificial intelligence concept were richer than their positive perceptions. From this point of view, it can be said that university students focus on negative aspects rather than positive aspects of artificial intelligence applications. In today's world where many new artificial intelligence applications that make life easier in different fields have entered our lives, negative thoughts about the future of this technology are also quite common. In his study Ince (2017) is seeking an answer to the question "If we encounter situations where these machines challenge human intelligence in the near future, and even confront the fact that they cross our intelligence (at speeds we cannot adapt), how will we react?". In the same study, it is reported that a Taiwanese electronics manufacturing giant, which has 40% of the turnover of consumer electronics worldwide, has added 30,000 robots to its production line every year since 2016, and so far a total of 60,000 workers have been unemployed. In his study titled 'Artificial Intelligence: Friend or Enemy?' Bakırcı (2017) focused on the thoughts of many scientists, especially the famous physicist Stephan Hawking, about the dangers posed by artificial intelligence, in the face of the rapid progress of artificial intelligence developments than anticipated and the possibility of the consequences threatening humanity. Therefore, the results obtained from this study show parallelism with the related literature. On the other hand, it is very obvious that the only negative perspective to be developed regarding the artificial intelligence applications that enter into our daily lives a little more every day will influence their attitudes and behaviors related to the topic, relevant developments and in this case Turkey would leave behind other developed and developing countries.

Suggestions

When the results obtained from this study were examined, it was determined that artificial intelligence perceptions of the students of the Faculty of Education were richer than the students of the Faculty of Economics and Administrative Sciences and the Faculty of Arts and Sciences. It is thought

that activities such as symposiums and conferences to be given at universities about this technology, which is increasing in use in different fields, may enrich the perceptions of university students. In addition, it was determined that the negative perceptions of all sample groups participating in the research about artificial intelligence concept were richer than positive perceptions. Giving students lessons related to current artificial intelligence applications and usage in related fields at the undergraduate level may enable them to re-question their negative perceptions about the subject as well as enable them to be aware of technological developments related to their professions.

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