Turkish Language Prospective Teachers' Perceptions of Metaphors Regarding Artificial Intelligence

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OPEN ACCESS

Volume: 12

Special Issue: 1

Month: June

Year: 2024

E-ISSN: 2582-1334

Received: 12.12.2023

Accepted: 25.02.2024

Published: 29.06.2024

Citation:
Savaşkan, V. (2024). Turkish Language Prospective Teachers' Perceptions of Metaphors Regarding Artificial Intelligence. *Shanlax International Journal of Education, 12*(S1), 180–89.

DOI:
https://doi.org/10.34293/education.v12iS1-June.7761

Abstract
The concept of Artificial Intelligence (AI) initially emerged as a term in the field of computer science. In the subsequent years, this concept transcended its origins and became relevant across various domains of human life. Nowadays, it's possible to encounter AI in nearly every aspect of human life. In this context, it's considered noteworthy to examine individuals' metaphorical perceptions of AI. Accordingly, the purpose of the research is determined as the investigation of Turkish prospective teachers' metaphorical perceptions of AI. Phenomenology, a qualitative research method, is employed in the study. The study group consists of 115 voluntary Turkish prospective teachers, 94 of whom are female and 21 are male, studying at the Faculty of Education at Artvin Çoruh University. Among the prospective teachers, 36 are first-year students, 37 are second-year students, 26 are third-year students, and 16 are fourth-year students. Data for the research are collected through semi-structured interview forms prepared by the researchers. Content analysis method is used for data analysis, and the data are presented by tabulating them along with frequency values. The analysis reveals that 115 Turkish language prospective teachers produced a total of 110 metaphors. Among these metaphors, 21 belong to male prospective teachers, while 89 belong to female prospective teachers. Metaphors such as human (f19), robot (f10), future (f4), ocean (f3), storm (f2), spring (f2), assistant (f4) are found to be generated by both female and male prospective teachers. In addition to positive metaphors, Turkish language prospective teachers also generated negative metaphors like threat (f2), massacre (f1), monster (f1), etc., concerning AI. Consequently, although Turkish language prospective teachers developed some negative metaphors, it's observed that their perceptions of AI are predominantly positive.
Keywords: Artificial Intelligence, AI, Metaphor, Turkish Language Prospective Teachers

Introduction

The concept of intelligence is defined as the entirety of mental activities such as thinking, reasoning, and inference. AI on the other hand, is the general term for technology created with artificial means, inspired by the human brain, and capable of exhibiting human-like behaviors through coding, without the need for a living organism. The idea of AI can be traced back to the ancient Greek period. The direct endeavor related to this topic was the mechanical calculating machine invented by Blaise Pascal in the 17th century. This endeavor led to the proposition by Alan Turing, through a thought experiment called the imitation game, questioning whether machines can think like humans. As a result of this proposition, it is argued that digital computers were developed with the purpose of performing any task that a human could do (Turing, 1950).

Following the invention of digital computers, efforts were made to find a name for this evolving technology, and the term 'artificial intelligence', proposed by John McCarty, Marvin Minsky, Allen Newell, and Herbert Simon, who attended the conference held at Dartmouth College in 1956, gained acceptance. Thus, these individuals came to be known as the fathers of AI. Since its inception, there has been rapid progress in the field of AI, and it was officially recognized as a scientific discipline in the 1980s. Consequently, human-like activities have gained momentum in various fields.

The advancement of AI has led to the emergence of different approaches in AI research. From the outset, there have been two rival approaches in AI studies. One is a logic-based approach, which does not have a biological basis and relies on the manipulation of symbols and the use of rules. The other approach is inspired by the biological neuron system, and it is the artificial neural networks approach, which mimics the working system of the brain. The development of AI is primarily associated with the 'neural networks approach'. Additionally, big data and deep learning techniques have played significant roles in the advancement of AI. Deep learning can be defined as 'the computer's ability to use previously stored or used information in new experiences' (Arslan, 2020).

AI has rapidly emerged as a significant technological transformation in recent years (Erdoğan & Bozkurt, 2023), arousing considerable interest, particularly in the education sector. After the introduction of AI into the education sector, some countries aimed to educate their students about AI by adding AI-related courses to their education programs from primary to higher education levels. When examining the efforts made by countries, it is observed that countries such as the United States, the United Kingdom, and China have started AI education initiatives. In Turkey, symposiums and workshops on AI are being held in the education field. In the latest workshop report, the concept of the 'Smart Classroom Behavior Method' was introduced. It was stated that through cameras placed in the classroom capable of capturing images at 30-second intervals, the facial expressions and emotional states of students during lessons could be detected. It was emphasized that by analyzing these emotional states of students, feedback could be provided to the teacher (İşler & Kılıç, 2021). In Turkey, efforts have been initiated not only to integrate AI into education but also to incorporate AI-related courses into the curriculum. It has been announced that new education programs will include AI-related courses, and AI courses will be included in higher education institutions.

The concept of 'educational technology' was introduced to address problems arising from traditional educational approaches, such as overcrowded classroom environments, teaching difficulties arising from students' individual differences, the inability to ensure equal opportunities, and the lack of support for out-of-school learning. 'Educational technology' is a system composed of personnel, design, tools, processes, and methods aimed at transforming educational theories into the most effective and positive practices (Demir, 2004). By integrating AI technology into education, efforts are being made to eliminate problems stemming from traditional education through modern and technological education.

The integration of AI into education has facilitated the concretization of lessons through activities such as designed simulations, exercises, applications, and educational games. By providing students with a rich living environment, learning speeds have been increased. Thus, quality in education has been enhanced while also achieving cost-effectiveness. The teaching model introduced by AI is the 'Programmed Instruction' model. With this model, the topics in which students are deficient are identified by AI, and the teaching of the subject is completed with activities suitable for the students' deficiencies. Thus, students' higher-order cognitive skills and independent learning skills are enhanced, leading to increased success. The absence of limitations in terms of place, time, and space in AI facilitates the provision of equal opportunities in education.

The effective and efficient integration of AI into education will be ensured through teachers' knowledge, usage, and transmission of AI-related information. 'Teachers should be the determinants of when and how AI tools should be used. Additionally, AI tools and the results obtained from these tools will assist teachers in deciding how various resources can be best utilized' (İşler & Kılıç, 2021). It is understood that there will be changes in teachers' duties with the widespread use of AI and technology. Although accessing data is facilitated with the proliferation of AI and technology, teachers must be able to analyze and differentiate this data correctly and teach it to their students. Additionally, they should be able to keep up with developments in AI and adapt to these developments. In order for teachers to acquire all these skills, they must first understand the concept of AI and what it entails. In this context, it is important

to investigate teachers' perceptions of AI in pre-service training and to arouse their curiosity about AI.

AI is a system designed to perform tasks assigned to it through codes by emulating the human brain. Today, AI is utilized in various fields through applications or devices. Despite its limited presence, the education system has been included in this concept through applications. 'When the education system is generally considered, it is built on four basic components: student, teacher, a curriculum, and an educational space' (İşler & Kılıç, 2021). The most influential factor among these components is the teacher. The applications developed through AI will be used by teachers and transferred to students. Teachers should be introduced to AI in their pre-service education, and necessary training should be provided during this period. In this context, the aim of this research is to investigate prospective teachers' metaphorical perceptions of AI. In line with this objective, the research problems are determined as follows:

1. What are the metaphorical perceptions of Turkish language prospective teachers regarding the concept of AI?
2. What are the common aspects of the metaphors made by Turkish prospective teachers, and how can they be categorized?

Method

This section of the research provides information about the research design, the study sample, data collection, and analysis process.

The Research Design

This study is a qualitative research conducted in a phenomenological design, examining the perceptions of Turkish language prospective teachers regarding the concept of AI through metaphors. Phenomenological design is utilized in qualitative research to illuminate phenomena that are perceived but require deeper understanding and exploration of their underlying reasons. It also aims to understand individuals' inner worlds and subconscious structures (Creswell, 2014; Yildirim & Simsek, 2013).

The Study Sample

The study group of this research consists of volunteer Turkish language prospective teachers who are enrolled in different class levels of the Turkish Teaching program at Artvin Çoruh University. Below are the demographic characteristics of the Turkish language prospective teachers who participated in the research.

Table 1 Participant Demographics (Gender)

Gender	f	%
Female	94	82
Male	21	18
Total	115	100

As seen in Table 1, out of the 115 teacher candidates who participated in the study, 94 are female and 21 are male.

Table 2 Participant Demographics (Age)

Age	f	%
18-25	111	96
26-30	2	2
31-35	2	2
Total	115	100

When examining Table 2, it is observed that out of the Turkish prospective teachers, 111 are between the ages of 18-25, 2 are between 26-30, and 2 are between 31-35 years old.

Table 3 Participant Demographics (Grade)

Grade	f	%
1st grade	36	31
2nd grade	37	32
3rd grade	26	23
4th grade	16	14
Total	115	100

When examining Table 3, it is observed that out of the Turkish language prospective teachers who participated in the research, 36 are in the 1st grade, 37 are in the 2nd grade, 26 are in the 3rd grade, and 16 are in the 4th grade.

Data Collection

The data for the research was collected through a form developed by the researchers. This form is tailored for Turkish language prospective teachers

and consists of three questions. The form inquires whether the Turkish language prospective teachers have heard of the concept of AI, and if so, where they heard about it. Additionally, the teacher candidates were asked to complete the sentence '*Artificial intelligence is like ... Because ...*' in order to identify their metaphors for the concept of AI. Here, what AI is likened to is revealed by the word 'like', while the meanings attributed to the metaphor are determined by the word 'because'. The reason for requesting an explanation is to accurately categorize the metaphors according to the teacher candidates' thought processes.

Data Analysis

In this study, content analysis, one of the data evaluation methods used in social research, was employed. Content analysis is a scientific approach that allows for the objective and systematic examination of verbal, written, and other materials, organizing them into specific categories (Tavşancıl & Aslan, 2001). In the research, the metaphors provided by the teacher candidates were evaluated and classified through content analysis. Common themes were considered during the classification process, and the findings were presented in tables along with frequency values for interpretation. To facilitate the interpretation of research data, participants were coded by the researchers. When presenting excerpts from the interview form, these codes indicating the participants' number and gender, as determined by the researchers (for example, 1FTLPT: 1st female Turkish language prospective teachers), were included.

To ensure the scope validity of the interview form, the form was initially presented to three experts in the fields of measurement and evaluation, as well as Turkish language. Based on the feedback from the measurement and evaluation expert and the Turkish language expert, the final version of the interview form was determined.

In order to establish reliability during the interpretation of the research data, the data were independently evaluated by the researchers and a subject matter expert. Subsequently, the evaluations were compared, and the reliability study was completed. The reliability level of the research was calculated as 93%. In calculating the reliability level, Miles & Huberman's (1994) formula 'Reliability = agreement / agreement + disagreement' was used.

Findings

In this section of the research, the findings obtained throughout the research process have been examined and interpreted. The opinions of Turkish language prospective teachers were considered in forming the findings, which were presented using tables. As part of the research, the first question posed was whether Turkish language prospective teachers had received coding training related to AI. The responses to this question are presented in Table 4.

Table 4 Turkish Prospective Teachers' Status Regarding Coding Training

Opinions	f	%
Yes	6	5
No	96	83
No comment	13	12
Total	115	100

When examining Table 4, it is observed that 6 Turkish language prospective teachers have received coding training, while 96 have not. Additionally, 13 participants did not express any opinion.

As part of the research context, the question '*Have you heard of the concept of AI before?*' was posed to determine whether Turkish language prospective teachers had previously heard of the concept of AI. The responses of the teacher candidates to this question are presented in Table 5.

Table 5 Opinions of Turkish Language Prospective Teachers Regarding the Question 'Have you Heard of AI Before?'

Opinions	f	%
Yes	113	98
No	2	2
Total	115	100

As seen in Table 5, 113 of the teacher candidates have previously heard of the concept of AI, while 2 have not. This indicates that 98% of the teacher candidates have encountered the concept of AI, which is widely used in various technologies today. The fact that almost all teachers have been introduced to AI further proves its prevalence.

To determine where and how teacher candidates heard about the concept of AI, the question 'If you have heard of the concept of AI, where did you hear about it?' was asked. The responses to this question were examined based on the interview form and presented in Table 6.

Table 6 Opinions of Turkish Language Prospective Teachers Regarding the Question 'Where did you Hear About the Concept of AI?'

Opinions	f	%
School	41	36
Social media	39	34
Internet	23	19
Television	10	9
No comment	2	2
Total	115	100

Upon examining Table 6, it is observed that teacher candidates have heard about the concept of AI in various ways. Specifically, it is understood that 41 participants heard about it from school; 39 from social media; 23 from the internet (news, websites, etc.); and 10 from television. Additionally, 2 participants did not express any opinion. As part of the research, teacher candidates were asked to fill in the blanks in the sentence '*Artificial intelligence is like ... Because ...*' to learn about their metaphorical perceptions of AI. The metaphors produced by the participants are presented in Table 7.

Table 7 Metaphors Produced by Turkish Language Prospective Teachers for AI

Metaphor	f	Metaphor	f
Heart	1	Dream	3
Storm	2	Infinity	1
Chip	1	Fox	1
Technology	4	Imitation	2
Human	19	Duty	1
Einstein	1	Posthuman being	1
Elon Musk	1	Google	1
Miracle	2	Robot	9
Virtual worker	1	Massacre	1
Love	1	Threat	2
Water	2	Light	1
Mind	1	Computer	2
Machine	2	Wind	1
Brain	6	Pool	1
Future	6	Space	2
Scale	1	World	1
Ladder	1	Trainer	1
Paper	1	Power	2
Ocean	3	Grandfather	1
Assistant	4	Puzzle	1
Spring	2	Information box	1
Guide	2	Monster	1
Book	1	Atomic bomb	1
Friend	1	Practicality	1
Internet	2	Speed	1
Teleport	1	PI number	1
Best friend	1	Age	1
Innovation	1	No comment	5
		Total	115

When Table 7 is examined, it is seen that Turkish language prospective teachers produced 115 metaphors related to AI. Most of these metaphors were generated by several teacher candidates. From the produced metaphors, it is understood that 2 are storm; 3 are dream; 4 are technology; 19 are human; 2 are water; 6 are brain; 6 are future; 3 are ocean; 4 are assistant; 2 are spring; 9 are robot; 2 are threat; 2 are computer; 2 are space; 2 are guide; 2 are machine; 2 are imitation; 2 are miracle; 2 are power; 2 are internet. It is indicated that heart, chip, fox, virtual worker, love, mind, speed, scale, ladder, paper, duty, massacre, light, wind, pool, world, trainer, grandfather, teleportation, Elon Musk, Einstein, puzzle, book, practicality, atomic bomb, friend, infinity, pi number, monster, innovation, age metaphors were mentioned once by different teacher candidates. 5 teacher candidates did not express any opinion. The distribution of metaphors specified by Turkish language prospective teachers for AI according to gender is shown in Table 8.

Table 8 Distribution of Metaphors Related to AI by Gender

Female				Male	
Metaphor	f	Metaphor	f	Metaphor	f
Human	13	Einstein	1	Storm	1
Brain	5	Innovation	1	Spring	1
Chip	1	Age	1	Granfather	1

Heart	1	Information box	1	Human	6
Best friend	1	Paper	1	Robot	1
Love	1	Trainer	1	World	1
Virtual worker	1	Ladder	1	Space	1
Technology	4	Scale	1	Future	1
Miracle	2	Pool	1	Teleport	1
Ocean	2	Wind	1	Practicality	1
Spring	1	Threat	2	Friend	1
Puzzle	1	Computer	1	Atomic bomb	1
Robot	9	Light	1	Assistant	1
Assistant	3	Massacre	1	Ocean	1
Power	2	Duty	1	Posthuman being	1
Water	2	Imitation	2		
PI number	1	Storm	1		
Dream	3	Internet	1		
Future	3	Book	1		
Fox	1	Monster	1		
Information	1	Guide	2		
Elon Musk	1	Space	1		
Machine	2	No comment	2		
Mind	1				
Speed	1				
Google	1				
Total			90	Total	20

As seen in Table 8, a total of 110 metaphors were produced by female (90), and male (20) teacher candidates. Among these metaphors, it is observed that 7 (human (f19), future (f4), ocean (f3), storm (f2), spring (f2), robot (f9), assistant (f4)) were produced by both female and male teacher candidates. The most frequently produced metaphor by teacher candidates is "human" (f19). When asked why they associate AI with the metaphor "human", the responses given by teacher candidates were as follows:

AI is like a human because it can do everything we do. (110FTLPT)

AI is like a human because it can do everything a human does and can think like a human. (45MTPT)

AI is like a human because it thinks like a human. (94FTLPT)

When looking at Table 8, it is understood that female and male teacher candidates generally produce metaphors that develop a positive attitude towards AI. However, there are also teacher candidates who develop metaphors in a negative direction (atomic bomb, monster, massacre, threat, storm). The opinions of teacher candidates who produce negative metaphors are as follows:

AI is like a threat because it brings situations that are beyond human comprehension face to face with humans. This could pose a threat to humanity in the future. (66FTLPT)

AI is a massacre because it is gradually putting the world in a worse situation. People are becoming lazy and their intelligence levels are declining. (56FTLPT)

AI is like a storm because it is developing very fast and like a storm, it will quickly advance, multiply as it develops, and destroy everything in its path. (40FTLPT)

AI is like an atomic bomb because if not used properly, it can cause a major disaster. (10MTLPT)

AI is like a monster because it poses a danger to humanity. It will be misused in the future. (13FTLPT)

The frequency distribution of metaphors developed by Turkish language prospective teachers according to the class level is presented in Table 9.

Table 9 Distribution of AI-Related Metaphors According to Grade Level

N	Metaphors Produced by 1st Grade Teacher Candidates	Metaphors Produced by 2nd Grade Teacher Candidates	Metaphors Produced by 3rd Grade Teacher Candidates	Metaphors Produced by 4th Grade Teacher Candidates
1	Brain	Human	Technology	Technology
2	Human	Technology	Speed	Miracle
3	Pool	Chip	Google	Spring
4	Wind	Heart	Internet	Puzzle
5	Threat	Love	Robot	Human

6	Computer	Virtual worker	Book	Robot
7	Light	Ocean	Power	Assistant
8	Water	Power	Miracle	Storm
9	Robot	Water	Imitation	Ocean
10	Massacre	Robot	Monster	
11	Future	PI number	Guide	
12	Duty	Dream	Atomic bomb	
13	Imitation	Brain	Assistant	
14	Technology	Future	Space	
15	Storm	Einstein	Human	
16	Fox	Innovation	Teleport	
17	Information	Information box	Practicality	
18	Elon Musk	Paper	Friend	
19	Dream	Trainer	Assistant	
20	Machine	Ladder	Ocean	
21	Mind	Scale	Posthuman being	
22	World	Grandfather		
23	Space	Machine		

When Table 9 is examined, it is seen that 23 metaphors were produced by Turkish language prospective teachers at the 1st grade level; 23 at the 2nd grade level; 21 at the 3rd grade level; and 9 at the 4th grade level. Accordingly, the metaphors brain, human, pool, wind, threat, computer, light, water, robot, massacre, future, duty, imitation, technology, storm, fox, knowledge, dream, machine, mind, world, space, and Elon Musk were developed by 1st graders; human, technology, chip, heart, love, virtual worker, ocean, power, water, robot, pi number, dream, brain, future, innovation one, knowledge box, paper, trainer, ladder, scale, grandfather, machine metaphors were developed by 2nd graders; technology, speed, internet, robot, book, power, imitation of a miraculous rose, monster, guide, atomic bomb, assistant, space, human, teleportation, practicality, friend, assistant, ocean, superhuman entity metaphors were developed by 3rd graders; and technology, miracle, spring, puzzle, human, robot, assistant, storm, ocean metaphors were developed by 4th graders. It is observed that some metaphors (technology, spring, ocean, human, water, robot) were commonly produced at different grade levels. Some metaphors, however, only mentioned once.

Within the scope of the research, the metaphors produced by Turkish language prospective teachers were classified under 5 different headings. These headings are as follows: (1) AI as a Natural Event, (2) AI as a Reflective of Emotions, (3) AI as a Reflective of Concrete Concepts, (4) AI as a Reflective of Abstract Concepts and (5) AI as an Instructor/Guide/Activity. The classification of categories is presented in detail in the following tables:

Table 10 AI as a Natural Phenomenon

Metaphor	f
Wind	1
Storm	2
Total	3

When Table 10 is examined, Turkish language prospective teachers describe the concept of AI as a natural event with 2 metaphors. These metaphors are as follows: wind (f1) and storm (f2). The opinions regarding the metaphors developed in this category are expressed as follows:

AI is like the wind because it can produce both good and bad results. (67FTLPT)

AI is like a storm because its rapid progress can lead to harmful outcomes. (63MTLPT)

Table 11 AI as a Reflector of Emotions

Metaphor	f
Love	1
Heart	1
Best Friend	1
Total	3

When examining Table 11, it is observed that teacher candidates describe AI reflecting emotions with 3 metaphors. These metaphors are love (f1), heart (f1), and friend (f1). The opinions regarding the metaphors developed in this category are expressed as follows:

AI is like love because even though it can make you happy, sometimes it can lead you astray. (105FTLPT)

AI is like a heart because the heart knows and feels everything. (107FTLPT)

AI is like a friend because it makes you feel good in bad times and makes your life easier. (106FTLPT)

Table 12 AI as a Reflector of Concrete Concepts

Metaphor	f	Metaphor	f	Metaphor	f
Ocean	3	Water	2	Space	2
Machine	2	Einstein	1	Friend	1
Human	19	Storm	2	Atomic bomb	1
Granfather	1	Brain	4	Wind	1
Scale	1	Ladder	1		
Spring	2	Paper	1		
Robot	10	Pool	1		
Puzzle	1	Light	1		
Virtual worker	1	Computer	1		
Chip	1	Fox	1		
PI number	1	Elon Musk	1		
World	1	Book	1		
				Total	65

When examining Table 12, it is observed that Turkish language prospective teachers produced a total of 65 metaphors in the category of AI as a reflector of concrete concepts. Among these metaphors, human (f19), robot (f10), and brain (f4) are the most commonly used metaphors. The opinions of teacher candidates regarding the metaphors developed in this category are as follows:

AI is like a robot because when AI is mentioned, I think of humanoid robots. (89FTLPT)

AI is like a brain because it mimics human intelligence. (42FTLPT)

AI is like a human because it possesses human characteristics. (26FTLPT)

AI is like a grandfather because when we don't know what to do in a situation, we ask our grandfather and he guides us. (54MTLPT)

AI is like a puzzle because it is a strange collection of pieces. (98FTLPT)

AI is like an ocean because a new aspect is discovered every day. (92FTLPT)

AI is like paper because it shapes itself according to what you add, whether the result is good or bad. (79FTLPT)

Table 13 AI as a Reflector of Abstract Concepts

Metaphor	f	Metaphor	f
Miracle	2	Speed	1
Dream	4	Internet	2
Future	4	Teleport	1
Power	2	Practicality	1
Age	1	Monster	1
Innovation	1	PI number	1
Massacre	1	Imitation	2
Threat	2	Technology	4
Information	1	Information box	1
Mind	1	Posthuman being	1
		Total	34

When examining Table 13, it is observed that Turkish language prospective teachers produced a total of 34 metaphors in the category of AI as a reflector of abstract concepts. Among these metaphors, dream (f4), future (f4), and technology (f4) are the most commonly used metaphors. The opinions of teacher candidates regarding the metaphors developed in this category are as follows:

AI is like a miracle because it makes our lives easier. (16FTLPT)

AI is practicality because it instantly presents the answer to the desired problem without researching. (25MTLPT)

AI is a superhuman entity because humans forget, neglect, but AI neither forgets nor neglects. (4MTLPT)

AI is like a dream because it makes everything in our dreams come true. (33FTLPT)

AI is like the future because although sometimes what will come out is pre-programmed, surprises can be encountered from time to time. (55FTLPT)

Table 14 AI as a Tutorial/Guide/Engagement

Metaphor	f
Assistant	4
Trainer	1
Duty	1
Guide	2
Total	**8**

When examining Table 14, it is observed that Turkish language prospective teachers developed a total of 8 metaphors in the category of AI as an instructor/guide/activity. Among these metaphors, assistant (f4) and guide (f2) are the most commonly developed metaphors. The opinions of teacher candidates regarding the metaphors developed in this category are as follows:

AI is helpful because everyone turns to AI immediately when they're in trouble. For example, they do their homework there, or if they want to learn something they don't know, they turn to AI. (7FTLPT)

AI is like a duty because it fulfills the given tasks. (50FTLPT)

AI is like a trainer because it provides information. (76FTLPT)

AI is like a guide because it guides us in many tasks we do. (11FTLPT)

Conclusion, Discussion and Recommendations

While the term AI emerged as a term in the field of computing since the 1950s, today, it is encountered in many fields, and AI technology is used to solve many problems encountered in life. The ubiquity of AI in every aspect of life necessitates determining individuals' thoughts and perceptions regarding AI. In this context, the results of this research aimed at identifying the metaphors developed by Turkish teacher candidates for the concept of AI are as follows:

A total of 115 Turkish prospective teachers participated in the research, and 110 metaphors were produced. It was determined that first-grade teacher candidates developed 23 metaphors, second-grade teacher candidates developed 23 metaphors, third-grade teacher candidates developed 21 metaphors, and fourth-grade teacher candidates developed 9 metaphors. The produced metaphors were categorized into five categories: AI as natural phenomena, AI as an emotional reflector, AI as a reflector of concrete concepts, AI as a reflector of abstract concepts, and AI as educational/guiding/pursuing. When the frequency values of the metaphors were examined, it was observed that 'human' (f19), 'robot' (f9), 'brain' (f6), 'future' (f6), 'assistant' (f4), 'ocean' (f3), and 'dream' (f3) were the most produced metaphors.

Another result obtained in the research is that when the metaphors produced by Turkish prospective teachers were examined, it was found that the majority of the metaphors carried positive meanings. In this context, metaphors such as 'love' (f1), 'friend' (f1), 'assistant' (f4), and 'power' (f2) are positive metaphors. Although they are few in number, negative metaphors such as 'monster' (f1), 'massacre' (f1), and 'threat' (f2) were also produced by Turkish prospective teachers.

According to the research results, it is observed that Turkish prospective teachers' awareness of AI is largely provided in school and social media. This finding is consistent with the conclusion drawn by Çam et al. (2021), which suggests that teacher candidates primarily hear about the concept of AI from social media. This result is similar to the outcome of this research.

There have been many studies on the application of AI to education in the relevant literature. Alkan (2024) reached the conclusion that e-learning platforms and AI increase students' education levels and efficiency. In this research, it was concluded that the concept of AI is most heard in the school environment. In both studies, it was concluded that the use of AI in education increases both awareness and knowledge levels. In the context of metaphorical perception of AI, the study conducted by Demir and Güraksın (2022) is noteworthy. Demir and Güraksın (2022) identified metaphors such as brain, computer, and robot regarding AI in their study with middle school students. This result is similar to the metaphors identified in this research. In the study conducted by Tartuk (2023) to determine middle school students' metaphorical perceptions of AI, metaphors such as brain, machine, technology, and human were reached. The metaphors identified in this study also show similarity with this study. The findings obtained by Saçan et al. (2022) to investigate children's perceptions of AI include metaphors such as miracle, human, and robot. The findings are also parallel to this research.

The results of the research are quite interesting and valuable. First and foremost, it is important to note that Turkish prospective teachers' awareness of AI is largely achieved through school and social media. This finding emphasizes the role of educational institutions and social media platforms in raising awareness of AI among teacher candidates. Particularly, research and educational materials related to the increasing use of AI in education can contribute to raising this awareness.

Additionally, examining the positive and negative metaphors revealed in the research demonstrates the diversity and depth of perceptions towards AI. Understanding the general perception of society regarding AI is crucial for directing efforts in education and awareness-raising in this field. Based on the research results, the following recommendations can be made:

Organizing AI-focused lessons and seminars at different educational levels could be highly beneficial in increasing awareness of AI. Furthermore, exploring the role of AI in education and sharing more information on this topic can enhance awareness of AI among Turkish prospective teachers and the general public.

Further research into the interaction between AI and education, along with increasing knowledge sharing in this area, can contribute to raising awareness of AI among both teacher candidates and the general public. This could ultimately facilitate more effective and ethical use of AI technology in the future. Increasing emphasis should be placed on AI studies at different educational levels to enhance individuals' awareness of the concept of AI.

The impact of AI in education has been proven through research. Therefore, there should be a focus on the interaction between AI and education.

References

Alkan, A. (2024). Artificial intelligence: Its role and potential in education. *Journal of the Human and Social Sciences Researches*, *13*, 483-497.

Arslan, K. (2020). Artificial intelligence and applications in education. *Western Anatolia Journal of Educational Sciences*, *11*, 71-80.

Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Sage Publications.

Çam, M. B., Çelik, N., Turan Güntepe, E., & Durukan, Ü. G. (2021). Determining teacher candidates' awareness of artificial intelligence technologies. *Mustafa Kemal University Journal of Social Sciences Institute*, *18*(48).

Demir, M. D. (2004). *Developing an Artificial Intelligence based Instructional Software*. Çukurova University.

Demir, K., & Güraksın, G. E. (2022). Determining middle school students' perceptions of the concept of artificial intelligence: A metaphor analysis. *Participatory Educational Research*, *9*(2), 297-312.

Erdoğan, Ş., & Bozkurt, E. (2023). Examining the perceptions of prospective physics teachers on the concept of 'Artificial Intelligence': A metaphor study. *Journal of Civilization and Society*, *7*(2), 152-163.

İşler, B., & Kılıç, M. Y. (2021). The use and development of artificial intelligence in education. *e-Journal of New Media*, *5*(1).

Miles, M. B., & Huberman, A. M. (1994). *Qualitative Data Analysis*. Sage Publications.

Saçan, S., Tozduman Yaralı, K., & Kavruk, S. Z. (2022). Investigation of metaphorical perceptions of children on the concept of Artificial Intelligence. *Mehmet Akif Ersoy University Journal of Faculty of Education*, (64), 274-296.

Tartuk, M. (2023). Metaphorical perceptions of middle school students regarding the concept ofartificial intelligence. *International Journal of Education & Literacy Studies*, *11*, 108-116.

Tavşancıl, E., & Aslan, A. E. (2001). *Content Analysis and Application Examples / for Verbal, Written, and Other Materials*. Epsilon Publishing.

Turing, A. (1950). Computing machinery and intelligence. *Mind*, *49*, 433-460.

Vasif, N., & Erümit, A. K. (2021). *Artificial Intelligence in Education: From Theory to Practice*. Pegem Academy Publishing.

Yildirim, A., & Simsek, H. (2013). *Qualitative Research Methods in Social Sciences*. Seckin.

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