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An Examination of Teachers' Perspectives and Metaphorical Perceptions Regarding AI

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Abstract: The purpose of this study is to examine awareness, usage experiences, concerns, future predictions, and metaphorical interpretations of AI among teachers working in different subject areas and educational levels. The study was designed within the framework of a qualitative research approach. A survey consisting of 10 open-ended questions, designed to develop a multidimensional perspective on AI, was used as the data collection tool. The study sample consists of 16 teachers working in different subjects and educational levels. Data were collected in written form and analyzed using content analysis. During the analysis process, the data were categorized and coded. The findings indicate that teachers are generally familiar with the concept of AI and are most aware of generative AI tools such as ChatGPT and Gemini. Teachers predominantly described AI as a technology that provides rapid access to information, supports learning, and reduces workload. However, some teachers expressed concerns about the potential negative impacts of AI on data security, the generation of misinformation, ethical use, and creativity. The study also included a metaphor analysis, which revealed that teachers described AI using metaphors such as machine, robot, guide, computer, and ocean. These metaphors indicate that AI is perceived both as a functional tool and as a complex and unpredictable entity. Consequently, while teachers view AI as a supportive tool in education, they believe it cannot replace the human teacher in terms of pedagogical and emotional dimensions. In this context, it is recommended that professional development programs aimed at enhancing teachers' AI literacy be expanded.

Keywords: AI, Teacher perspectives, Metaphor analysis, Content analysis, Educational technologies

Introduction

Problem Statement

Education systems have entered a profound transformation process alongside the accelerating pace of digitalization; at the center of this transformation, AI technologies have begun to take a prominent role. In particular, the widespread adoption of generative AI applications presents new opportunities in teaching and learning processes while simultaneously bringing various uncertainties and challenges. Tools such as ChatGPT and Gemini, used in educational settings, are transforming the ways teachers and students access information; this necessitates that teachers re-evaluate their pedagogical roles. However, despite this rapid transformation, it is evident that teachers' perceptions of AI, their level of knowledge, and their usage practices have not been sufficiently understood in depth.

It is noteworthy that studies in the literature on the use of AI in education have largely focused on technical applications and their effects on student outcomes, while research on how teachers experience and interpret this process remains limited (Holmes & Littlejohn, 2024; Zawacki-Richter et al., 2019). However, teachers occupy a critical position in the integration of educational technologies into classroom practices, and the effective use of

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these technologies is largely shaped by their knowledge, attitudes, and acceptance (Ertmer et al., 2014). In this context, how teachers perceive AI, the purposes for which they use it, and the types of concerns they hold regarding these technologies emerge as a significant research problem.

On the other hand, there are various risks related to the use of AI technologies in education in terms of ethics, security, and pedagogy. Data privacy, the generation of incorrect or misleading information, algorithmic biases, and potential impacts on students' critical thinking skills are causing teachers to approach these technologies with caution (Selwyn, 2019; Williamson & Eynon, 2020). However, how teachers assess these risks and how these assessments translate into classroom practices has not been sufficiently clarified. This situation poses a significant obstacle to the sustainable and effective integration of AI.

Furthermore, how teachers interpret AI not only at the cognitive level but also at the affective and symbolic levels emerges as a significant area of research gap. In this context, metaphors are considered an effective tool for revealing individuals' mental models of complex concepts (Lakoff & Johnson, 1980). However, upon reviewing existing studies, it is evident that research adopting a holistic approach to examine teachers' metaphorical perceptions of AI—along with their usage experiences and concerns—is quite limited. This gap hinders a deep and multidimensional understanding of teachers' perspectives on AI.

In this context, the central problem of this study is that teachers' awareness of AI, their usage experiences, concerns, and future projections—as well as how they metaphorically interpret this technology—have not been presented within a comprehensive framework. In light of this problem, examining teachers' views on AI and their metaphorical perceptions will both fill a significant gap in the literature and provide an evidence-based foundation for policies and practices aimed at enhancing teachers' AI literacy.

Research Objective and Significance

Rapid advancements in AI technologies in recent years are fundamentally transforming the structure of education systems and teaching processes. In particular, with the widespread adoption of generative AI applications, access to information, content creation, and learning processes are being reshaped; this necessitates a redefinition of teachers' roles and responsibilities. The use of AI in education offers significant opportunities such as creating personalized learning environments, analyzing student performance, and optimizing teaching processes (Holmes & Littlejohn, 2024; Zawacki-Richter et al., 2019). In this context, AI is viewed not merely as a technological tool but also as one of the key components of pedagogical transformation.

As one of the most critical stakeholders in the education system, teachers play a decisive role in the integration of AI technologies into classroom practices. Therefore, teachers' knowledge, attitudes, perceptions, and experiences regarding AI are of great importance for the effective and ethical use of these technologies in education. The literature highlights that while teachers' awareness of AI is increasing, this awareness often remains superficial and involves various uncertainties regarding pedagogical integration (Akgun & Greenhow, 2022; Choung et al., 2023). In particular, the rapid proliferation of generative AI tools such as ChatGPT and Gemini in educational settings has made teachers' perceptions of these technologies even more critical. However, there are also various ethical, pedagogical, and security-based debates regarding the use of AI technologies in education. Data privacy, algorithmic bias, the generation of misinformation, and potential impacts on students' cognitive development are among the primary factors leading teachers to approach these technologies with caution (Selwyn, 2019; Williamson & Eynon, 2020). Additionally, some studies indicate that while teachers view AI as a supportive tool, they believe that human interaction and emotional connection are indispensable in the educational process (Luckin & Holmes, 2016).

One of the key methods for deeply examining teachers' perceptions of AI is metaphor analysis. Metaphors are powerful cognitive tools that reveal how individuals make sense of complex and abstract concepts (Lakoff & Johnson, 1980). In educational research, metaphors are frequently used to analyze the mental models, beliefs, and emotional approaches of teachers and students toward specific concepts (Saban, 2006). In this context, the metaphors through which teachers define AI serve as an important data source for revealing the meanings and expectations they attribute to this technology.

A review of the literature reveals that while studies examining teachers' views on AI are increasing, there is a notable lack of research that comprehensively addresses these views alongside metaphorical perceptions. In particular, there is a need for more studies that examine how teachers in different subject areas and educational levels interpret AI in a multidimensional manner. Based on this, the present study aims to examine teachers'

awareness of AI, their usage experiences, concerns, and future projections in conjunction with their metaphorical perceptions. In this regard, the study aims to contribute to the theoretical literature and shed light on practices aimed at developing teachers' AI literacy.

Method

Research Model

Since this study aims to deeply examine teachers' views and metaphorical perceptions regarding AI, it was designed within the framework of a qualitative research approach. Qualitative research is defined as research designs that aim to reveal individuals' experiences, perceptions, and meaning-making processes within their natural context (Creswell, 2013). In this specific study, a phenomenological design was adopted to examine teachers' thoughts regarding AI in a multidimensional manner. Phenomenological studies aim to uncover individuals lived experiences of a specific phenomenon and the meanings they ascribe to these experiences (Moustakas, 1994).

Study Group

The study group consists of a total of 16 teachers working in different subject areas and educational levels. In determining the study group, the maximum diversity sampling method was preferred among purposeful sampling methods. This approach allows the research problem to be addressed from a more comprehensive and rich perspective by including participants with diverse characteristics (Akdemir & Kılıç, 2021). Accordingly, care was taken to ensure diversity among the teachers in terms of subject area, seniority, and the educational level at which they teach. Information regarding the demographic variables of the participants is presented in Table 1 below.

Table 1. Demographic characteristics of teachers in the study group

		f
Gender	Female	15
	Male	1
Subject	Religious Education Teacher	1
	Turkish Teacher	1
	Social Studies Teacher	3
	Science Teacher	4
	Math Teacher	3
	Music Teacher	1
	English Teacher	2
	Technology and Design Teacher	1
Years of Experience	1–5 years	9
	6–10 years	2
	11–15 years	3
	16+ years	3
Age	25–35	12
	36–45	3
	46+	1
Grade	Elementary School	1
	Middle School	15
Total		16

Upon examining Table 1, it is observed that out of the 16 teachers in the study group, 1 is male and 15 are female. In terms of subject areas, the study includes 1 religious culture teacher, 1 Turkish language teacher, 3 social studies teachers, 4 science teachers, 3 mathematics teachers, 1 music teacher, 2 English teachers, and 1 technology and design teacher. In terms of years of service, 9 teachers had 1–5 years of experience, 2 had 6–10 years, 3 had 11–15 years, and 3 had 16 or more years of experience. In terms of age, it was determined that the participants were generally between 25 and 35 years old. When the grade levels where the teachers worked were examined, it was observed that they generally worked at the middle school level.

Data Collection Tool

In the study, a survey form consisting of 10 open-ended questions was used as the data collection tool, aiming to reveal teachers' awareness of AI, their usage experiences, concerns, future projections, and metaphorical perceptions. Open-ended questions enable participants to express their thoughts in their own words without restriction, thereby facilitating the collection of in-depth data in qualitative research (Yıldırım & Simsek, 1999). During the development of the data collection instrument, the relevant literature was reviewed, a pool of questions was created in line with the research objective, and the opinions of field experts were sought to ensure content validity. Based on expert feedback, the clarity of the questions and their alignment with the research objective were reviewed, and necessary revisions were made. Accordingly, the open-ended questions included in the data collection tool were structured to elicit teachers' views on AI in a multidimensional and in-depth manner. The open-ended questions included in the data collection tool are presented below:

1. Have you heard of AI before? If your answer is yes, which AI applications are you familiar with?
2. If you were to describe AI in your own words, how would you describe it?
3. Are you familiar with AI applications used in education? If yes, which AI applications do you know?
4. Where did you obtain your information about AI?
5. Does the integration of AI into our lives concern you? Why?
6. In your work, in which processes do you use AI the most?
7. Would a human teacher or an AI teacher be better? Why?
8. In your opinion, what inventions using AI could be created in the future?
9. What is the most interesting AI you can imagine?
10. AI is like... Because...

Data Collection Process

Research data was collected in writing from participants. During the data collection process, teachers were informed about the purpose of the research, and participation was based on voluntary consent. Principles of anonymity and confidentiality were observed to ensure participants could express their views freely and comfortably.

Data Analysis

The data obtained within the scope of the research was analyzed using content analysis, a qualitative data analysis method. Content analysis is a process that involves systematically coding data, categorizing it, and organizing it into meaningful themes (Krippendorff, 2018). During the analysis process, the data was first carefully read, then meaningful statements were converted into codes, and similar codes were grouped together to form categories. Subsequently, these categories were grouped under overarching themes to interpret the findings. Additionally, a metaphor analysis was conducted in the study to more deeply explore teachers' perceptions of AI. In this context, the metaphors developed by the participants were identified, the common characteristics of the metaphors were examined, and similar metaphors were classified under specific conceptual categories (Saban, 2006).

Validity and Reliability

In qualitative research, the concepts of validity and reliability are approached differently from the traditional criteria used in quantitative research; in this context, the criteria of credibility, transferability, dependability, and confirmability—developed by Guba and Lincoln (1994)—serve as the foundation. Within the scope of this study, various strategies were implemented in accordance with these criteria to strengthen the scientific quality of the research. Credibility concerns the extent to which the research findings reflect reality (Guba & Lincoln, 1994).

In this study, to ensure credibility, data collection and analysis processes were conducted in detail; participants' views were supported by direct quotations. Additionally, the validity of the codes and themes obtained during the data analysis process was continuously reviewed, and the consistency of interpretations with the data was ensured. Care was taken to reflect participants' statements as authentically as possible, thereby strengthening the internal validity of the research. Generalizability refers to the extent to which research findings can be applied to

similar contexts (Guba & Lincoln, 1994). In this regard, the study group, data collection process, and analysis stages have been described in detail. Detailed explanations regarding the participants' characteristics (field, seniority, educational level, etc.) have been provided to enable readers to make comparisons with their own context. In this way, efforts were made to enhance the research's external validity. Consistency refers to the research process being traceable and repeatable (Guba & Lincoln, 1994).

In this study, the development of data collection tools, the data collection process, and the data analysis stages were conducted systematically and reported in detail. A specific systematic approach was followed during the coding process, ensuring that similar data were grouped under the same codes. Presenting the research process in an open and transparent manner strengthens the methodological consistency of the study. Verifiability refers to the extent to which research findings are independent of the researcher's subjectivity (Guba & Lincoln, 1994). In this context, the researcher sought to ensure objectivity in the data analysis process by directly linking interpretations to the data and striving to minimize the influence of personal biases. Additionally, the verifiability of the analysis process was supported by verifying the consistency of the findings with the raw data. Consequently, the measures taken in this study in accordance with the criteria proposed by Lincoln and Guba aim to enhance the scientific validity and reliability of the study; they contribute to the reliable, consistent, and meaningful interpretation of the findings.

Ethical Principles

Ethical principles were adhered to throughout the research process. Participants were informed about the purpose of the study, and participation was entirely voluntary. Participants' personal details were kept confidential, data were anonymized, and codes were used instead of real names during the reporting process. Research data were used solely for scientific purposes.

Findings

Teachers' Awareness of AI and Evaluation of Known Applications

In this section, teachers' levels of awareness regarding the concept of AI and the AI applications they are familiar with were examined. The data obtained were analyzed using inductive content analysis; application names and conceptual expressions in the teachers' responses were coded and grouped under categories.

Table 2. Frequency of AI applications mentioned by teachers

AI Tool	f
ChatGPT	13
Gemini	10
Grok	3
Google AI	1
DeepL	1
NotebookLM	1
Canva	1
Robotics Coding	1
X AI	1

According to the analysis results of the data in Table 2, it was determined that the vast majority of teachers are familiar with the concept of AI. Nearly all participants mentioned at least one AI application name; only one participant used a general statement of awareness without directly naming an application. This finding indicates that teachers have developed a basic level of awareness regarding AI. The literature also indicates that teachers' awareness of digital technologies has increased, though this awareness often centers around popular tools (Choung et al., 2023).

Upon examining the frequency analysis results, it is observed that the most well-known AI tools among teachers are ChatGPT (f=13) and Gemini (f=10). These tools are followed by applications such as Grok (f=3), DeepL (f=1), NotebookLM (f=1), and Canva (f=1) at lower frequencies. This finding indicates that teachers are particularly familiar with text-generation and question-answering-based generative AI tools. Indeed, this is clearly evident in the participants' statements: remarks such as "ChatGPT, Gemini—those are the ones I know" (T2) and "ChatGPT, Grok, Gemini" (T9) indicate that teachers have developed an awareness of the most

commonly used tools. However, it was found that some teachers approach AI technologies from a broader perspective and are familiar with tools across different categories. For example, the statement “ChatGPT, Gemini, X, DeepL, NotebookLM” (T12) indicates that AI is perceived not only as limited to content generation but as part of a broader digital ecosystem that also encompasses translation, data analysis, and platform-based applications. This finding reveals that the level of AI knowledge among teachers is not homogeneous and varies depending on individual experiences.

Another notable finding in the study is that some teachers describe AI not as a specific application but as a broader technological field. One participant’s response, “Yes, robotic coding” (T3), indicates that the concepts of AI, robotics, and coding are perceived as interconnected. This suggests that, in teachers’ mental models, AI is often situated within a broader technological framework. Similarly, the literature indicates that individuals tend to relate new technologies to their existing knowledge structures (Lakoff & Johnson, 1980).

Table 3. Categories identified

Code	Description	Category
<i>ChatGPT</i>	A generative AI system developed by OpenAI	Generative AI Tools
<i>Gemini</i>	An AI system developed by Google	Generative AI Tools
<i>Grok</i>	An AI system developed by the X platform	Generative AI Tools
<i>Google AI</i>	Google's AI technologies	AI Platforms
<i>X AI</i>	The X platform's AI system	AI Platforms
<i>DeepL</i>	AI-powered translation tool	Translation and Language Tools
<i>NotebookLM</i>	Google’s AI-powered note analysis system	Generative AI Tools
<i>Canva</i>	AI-powered design platform	Design Tools
<i>Robotics Coding</i>	A technology field associated with AI	Conceptual Perception of AI

In conclusion, these findings reveal that teachers possess a basic awareness of AI, but that this awareness is largely shaped around popular and widely used applications. Additionally, it is observed that some teachers are proficient in a wider range of tools and evaluate AI within a broader technological context. This situation indicates that teachers’ levels of AI literacy vary and highlights the need for systematic professional development initiatives in this field.

Evaluation of Teachers’ Definitions of AI

This section examines how middle school teachers define the concept of AI. The open-ended responses obtained from teachers were analyzed using inductive content analysis; descriptive statements were coded and grouped into categories based on similar semantic structures (Krippendorff, 2018).

Table 4. Categorized definitions of AI by teachers

Category	Description
Perception of Human-Like Intelligence	The perception that AI thinks or reasons like a human
Perception of AI as a Technological System/Tool	The perception of AI as technology, software, or a system
Perception of Functional Benefit	The aspect of AI that simplifies life or provides practicality
Perception of Negative Impact	The negative aspects of AI, such as fostering laziness or reducing creativity
Mixed Perception (Benefit + Risk)	The perception that AI is both beneficial and risky

The analysis results reveal that teachers’ definitions of AI exhibit a multidimensional structure. The findings indicate that teachers perceive AI primarily as a technology that provides the highest level of functional benefit ($f=7$). Teachers mostly defined AI as a tool that simplifies life, offers practicality, and provides quick solutions. Indeed, expressions such as “technology-compatible, up-to-date, and practical applications” (T7), “a quick and solution-oriented assistant” (T9), and “superintelligence that simplifies life” (T12) highlight the supportive role of AI in daily life. This finding reveals that teachers primarily evaluate technology in terms of ease of use and efficiency, aligning with the functional technology acceptance approaches in the literature (Venkatesh et al., 2003).

Table 5. Frequency distribution of categories for descriptive concepts and semantic units related to AI

Category	f
Perception of Functional Benefit	7
Perception of Technological Systems	3
Perception of Human-Like Intelligence	2
Perception of Negative Impact	3
Mixed Perception	1

However, upon examining Table 5, it is observed that some teachers approach AI from a more technical perspective, defining it as a technological system or tool ($f=3$). The statements in this category emphasize that AI is a system that operates through codes, data, and algorithms. For example, the statements “Robotic applications that perform thinking tasks using code” (T2) and “The harmony of unlimited internet data operating on command” (T10) indicate that a certain portion of the teachers have developed an awareness of the infrastructure of AI. This suggests that levels of technological literacy vary among teachers and that some participants possess a more analytical perspective.

Table 6. Coding table of descriptive concepts and units of meaning related to AI

Code	Description	Category
Thinking like a human	The likening of AI to human intelligence	Perception of Human-Like Intelligence
Robotic thinking	Robotic systems operated by code	Perception of Technological Systems
System / software	Perception of AI as a technical system	Perception of Technological Systems
Practicality	Speeding up and simplifying tasks	Perception of Functional Benefit
Quick solution	Helping to solve problems	Perceived Functional Benefit
Access to information	Quick access to information	Perceived Functional Benefit
Laziness	Encouraging people to think less	Perception of Negative Impact
Reducing creativity	Hindering independent thinking	Perception of Negative Impact
Risk / danger	Potential harms of technology	Mixed Perception

The study also found that some teachers defined AI as human-like intelligence ($f=2$). In this context, AI was described as a system that thinks, reasons, and generates knowledge like a human. Expressions such as “a machine that thinks like a human” (T1) and “a tool that knows everything very clearly and has an opinion on every subject” (T16) indicate that AI is perceived as a reflection of the human mind. Such definitions align with cognitive approaches that reveal individuals’ tendency to associate complex technological concepts with human characteristics when making sense of them (Lakoff & Johnson, 1980).

On the other hand, the findings also indicate that teachers have developed not only positive but also critical perspectives toward AI. In the category of perceived negative effects ($f=3$), views suggest that AI could make individuals lazy, reduce creativity, and limit independent thinking were prominent. Statements such as “It prevents children from using their own intelligence and skills” (T5) and “A technology that makes our lives easier while making us lazy” (T11) clearly highlight these concerns. This finding indicates that teachers have developed a critical awareness of AI and are considering the technology’s potential side effects (Selwyn, 2019). Additionally, it was observed that a teacher evaluates AI in terms of both its benefits and risks and has developed a mixed perception ($f=1$). The statement “It’s often useful but sometimes dangerous” (T13) points to the dual nature of AI. Such balanced approaches indicate the presence of a holistic perspective that evaluates both the opportunities and limitations of technology.

In conclusion, the findings reveal that teachers define AI along three main axes: (1) a tool that simplifies life and offers practical solutions, (2) an advanced technological system operating with codes and data, and (3) a structure exhibiting characteristics similar to human intelligence. However, it is also observed that some teachers highlight the potential risks of AI. This situation reveals that teachers’ perceptions of AI are not one-dimensional; rather, they exhibit a multi-layered structure that encompasses both functional benefits and critical evaluation.

Assessment of Teachers’ Knowledge Levels Regarding AI Applications in Education

In this section, middle school teachers’ knowledge levels regarding the use of AI in education and the applications they are familiar with were examined. Teachers’ responses to the open-ended question were analyzed using inductive content analysis; the knowledge levels and application names mentioned in the statements were coded and grouped under categories (Krippendorff, 2018).

Table 7. Teachers' levels of knowledge regarding AI applications used in education

Category	Description
Lack of knowledge about AI applications	Responses indicating a lack of knowledge regarding AI applications used in education
Awareness of AI tools for educational purposes	Responses indicating AI applications that can be used in education
Partial knowledge	Awareness of the existence of AI applications but inability to provide concrete examples or use general terms

The findings indicate that a significant proportion of teachers have limited knowledge regarding AI applications used in education. According to the frequency distribution, the majority of participants ($f=6$) stated that they had no knowledge in this area. Statements such as “No” (T1), “I am not familiar with the applications used in education” (T4), and “I have no knowledge” (T5) reveal that while teachers are generally familiar with the concept of AI, they lack sufficient understanding of the concrete applications of this technology in education. This finding aligns with studies in the literature indicating that teachers' awareness of new technologies often remains at a general level and that there are gaps in their practical knowledge (Holmes & Littlejohn, 2024).

Table 8. Teachers' statements regarding knowledge of AI tools used in education and application name categories

Code	Description	Category
No knowledge	Indicating that they are unaware of AI applications used in education	Lack of Knowledge
Canva	An AI-powered design and educational content creation tool	AI Tools for Educational Purposes
ChatGPT	An AI system that provides text generation and learning support	AI Tools for Educational Purposes
Gemini	An AI-powered content creation and image generation tool	AI Tools for Educational Purposes
DeepL	AI-powered translation app	AI Tools for Educational Purposes
Science360	Science-focused digital learning platform	AI Tools for Education
Language apps	AI-powered foreign language speaking apps	Partial Knowledge

However, it appears that some teachers possess a certain level of knowledge regarding AI tools used in education ($f=4$). In this context, teachers cited applications such as ChatGPT, Canva, Gemini, DeepL, and Science360 as examples. In particular, the statement “DeepL for translations, Gemini for creating visuals, and ChatGPT for setting up summary topics” (T8) demonstrates that some teachers can effectively integrate AI tools into pedagogical processes. This indicates that a portion of the teachers view AI as a tool that supports learning and teaching processes.

The study also identified that a limited number of teachers ($n=1$) demonstrated partial knowledge. Participants in this category, while possessing a general awareness of AI's use in education, could not provide concrete examples of its application. The statement “Partially, there are applications that speak foreign languages” (T9) clearly reflects this situation. This finding indicates that while teachers are aware of the presence of AI technologies in education, they lack in-depth knowledge regarding these technologies.

Table 9. Frequency distribution of categories for teachers' statements regarding AI tools used in education and the names of applications

Category	f
Lack of knowledge about AI applications	6
Awareness of AI tools for educational purposes	4
Partial knowledge	1

Overall, it is observed that while teachers' awareness of AI is higher at the conceptual level, their knowledge regarding specific applications used in education remains limited. This situation highlights the need for systematic and practice-based professional development programs aimed at enhancing teachers' AI literacy. Additionally, enhancing teachers' ability to recognize and effectively use AI tools in education is considered a critical requirement for the pedagogical integration of these technologies.

An Evaluation of Teachers' Sources of Information on AI

This section examines the sources from which middle school teachers acquire their knowledge regarding AI.

Table 10. Teachers' sources of information on AI

Category	Description
Digital media sources	Digital platforms such as the internet, social media, and search engines
Traditional media sources	Traditional media tools such as television
Social environment sources	Close social circles such as family, friends, and colleagues
Institutional / Educational sources	Educational platforms or academic institutions

The analysis results indicate that digital media sources play a prominent role in teachers' processes of acquiring knowledge about AI (n=11). The vast majority of participants stated that they utilized digital platforms such as the internet, social media, and search engines during the knowledge acquisition process. Expressions such as "social media" (T1), "from the internet" (T8), and "social media, Google" (T10) reveal that teachers have largely developed their awareness of AI through digital environments. This finding demonstrates that information access processes are increasingly becoming digital today and that teachers are an active part of this transformation. The literature also emphasizes that individuals primarily acquire information about new technologies from digital and online environments (Choung et al., 2023).

Table 11. Teachers' sources of information on AI and explanations

Code	Description	Category
Social media	Social media platforms	Digital Media
Internet	General internet usage	Digital Media
Google	Search engine usage	Digital Media
Television	TV programs	Traditional Media
Community / Immediate surroundings	Friends, family, acquaintances	Social Circle
Colleagues	Work environment	Social Circle
Academy	Education platform	Corporate / Education

However, it was determined that some teachers acquired their knowledge of AI through their social circles (f=6). In this context, participants stated that they obtained information from their colleagues, friends, and close circles. Statements such as "From the internet and my colleagues" (T3) and "Close circle and social media" (T7) indicate that the information-gathering process is not only individual but also based on social interaction. This highlights that information sharing and professional interaction play a significant role among teachers.

The study also revealed that some teachers use traditional media sources (f=2), particularly television, as a means of acquiring information. Statements such as "TV, Google" (T2) and "From television" (T6) indicate that traditional media remains effective to a certain extent. However, the low frequency of this category indicates that digital media tools hold a more dominant position in teachers' information-gathering processes compared to traditional media.

Table 12. Frequency of information sources related to AI among teachers

Category	f
Digital Media Sources	11
Social Environment Sources	6
Traditional Media Sources	2
Corporate / Educational Resources	1

(Some participants indicated more than one area of use.)

In addition, it was determined that teachers' level of acquiring information about AI from institutional or education-based sources is quite limited (f=1). The fact that only one participant mentioned "Internet, phone, academy" (T9) indicates that the use of such formal learning resources is quite low. This finding suggests that teachers' processes of acquiring knowledge about AI are largely shaped through informal learning environments.

Overall, it is observed that teachers' processes of acquiring knowledge about AI are predominantly based on digital media, while the social environment plays a supportive role in this process. Conversely, the limited use of traditional media and institutional educational resources indicates that AI literacy develops primarily through

individual and informal learning processes. This situation indicates that teachers' knowledge levels regarding AI need to be supported by systematic and structured educational programs.

Assessment of Teachers' Concerns Regarding AI and the Reasons Behind These Concerns

This section examines middle school teachers' levels of concern regarding the integration of AI into our lives and the underlying causes of these concerns.

Table 13. Frequency of teachers' concerns regarding AI

Concern Status	f
Yes (Concerned)	11
No (No concern)	3
Partially	2

The findings indicate that the vast majority of teachers harbor certain levels of concern regarding AI. While 11 participants expressed direct concern, 2 indicated partial concern, and 3 teachers stated they had no concerns. This result demonstrates that teachers evaluate AI not only in the context of opportunities but also within the framework of risks. The literature also emphasizes that perceptions of AI are largely shaped by a balance of benefits and risks (Selwyn, 2019).

Table 14. Frequency of teachers' concerns regarding AI

Reason for Concern	f
Privacy and data security	4
Social and human impacts	4
Misuse / Manipulation	3
Control and anxiety about the future	3
Positive approach	3

(Some participants indicated more than one area of application.)

When the causes of concern were examined, it was observed that teachers were most concerned about privacy and data security ($f=4$) and the impacts on social and human values ($f=4$). In the context of privacy, teachers expressed uncertainty regarding the protection of personal data and information security. Statements such as "I don't think it's reliable in terms of privacy" (T1) and "It worries me because I think my information might be leaked" (T4) highlight the prominence of this concern. This finding indicates that the lack of transparency in AI systems' data processing procedures affects user trust (Williamson & Eynon, 2020).

Table 15. Categories of teachers' concerns regarding AI

Code	Description	Category
Privacy risk	Data leakage, data security	Privacy Concern
Data control	Uncertainty regarding the use of personal data	Privacy Concerns
Manipulation	Production of false or speculative information	Misuse
Malicious use	Potential for harmful use	Misuse
Human relationships	Damage to social relationships	Social impact
Loss of creativity	Decrease in independent thinking	Social Impact
Dependency	People not making an effort	Social Influence
Loss of control	Inability to manage technology	Fear of losing control
Job loss	Disappearance of professions	Fear of losing control
Benefit / convenience	Time-saving or convenience	Positive Perception

However, a significant portion of teachers express concern about the effects of AI on social and human values. In this context, issues such as a decline in creativity, a weakening of independent thinking, and negative impacts on human relationships stand out. Statements such as "It hinders children's creativity" (T5) and "It gets people used to relying on ready-made solutions" (T14) reflect a critical perspective on the potential effects of AI on individual development. This indicates that teachers are conducting an evaluation that takes into account both pedagogical and emotional dimensions.

The study also identified that teachers expressed concerns regarding misuse and manipulation ($f=3$). Participants highlighted the possibility of AI generating misinformation or being used for malicious purposes. Statements such as "Speculative information can be presented as factual" (T9) and "I think malicious people will use it with

bad intentions” (T13) clearly highlight concerns regarding information reliability and ethical use. This finding demonstrates that the dimensions of accuracy and ethical use of AI systems constitute a significant area of discussion within an educational context.

Additionally, it was observed that some teachers harbor concerns regarding control and the future ($f=3$). Statements suggesting that AI could get out of control or lead to job loss reflect a perception of uncertainty regarding technology’s long-term effects. Statements such as “It could get out of control” (T10) and “I’m worried about becoming unemployed in the future” (T11) reveal teachers’ concerns regarding the social and professional consequences of AI.

On the other hand, it was observed that some teachers ($n=3$) adopted a positive attitude toward AI and expressed no concerns. Statements such as “It provides convenience when used appropriately” (T2) and “Easier access to information saves teachers time” (T3) reflect a perspective focused on the benefits provided by AI. This indicates that perceptions of AI among teachers are not homogeneous and vary depending on individual experiences.

In conclusion, the findings reveal that teachers’ concerns regarding AI exhibit a multidimensional structure. These concerns primarily center on data security, social impacts, misuse, and uncertainties about the future. However, it is also observed that some teachers evaluate AI from a benefit-oriented perspective. This indicates that teachers’ perceptions of AI are not solely risk-focused but possess a balanced structure that also encompasses opportunities.

Evaluation of Teachers’ Processes for Using AI in Their Work

This section examines the processes through which middle school teachers utilize AI in their professional work.

Table 16. Category codes for teachers’ processes of using AI in their work

Code	Description	Category
I do not use it	Indicates that AI is not used	No AI Used
Information research	Use for information gathering and research	Academic Use
Topic summary	Summarizing learning materials	Academic Use
Academic research	Scientific research processes	Academic Use
Material preparation	Production of worksheets, tests, and course materials	Educational Content
Presentation preparation	Creating course presentations	Educational Content
Visual production	Visual production for educational materials	Educational Content
Analysis	Data analysis and teacher evaluation	Analysis
Documentation	Document and file preparation	Administrative tasks
Teacher activities	Use in the teaching process	Teaching Process

The findings indicate that teachers use AI at different levels and for various purposes, but this usage is not widespread or uniform among all participants. According to the analysis results, some teachers ($n=4$) stated that they never use AI or consciously avoid using it. Statements such as “I don’t use it” (T1) and “I try not to use it too much” (T11) reveal that some teachers adopt a cautious or reserved approach toward AI. This situation can also be linked to the concerns and risk perceptions highlighted in previous findings.

Table 17. Frequency of categories in teachers’ AI usage processes

Category	f
Not Using AI	4
Information Research and Academic Use	4
Educational Content Creation	4
Analysis and Data Processing	2
Administrative and Document Management	1
Use in the Teaching Process	2

(Some participants indicated more than one area of use.)

When examining teachers who use AI, it is observed that one of the most common areas of use is information research and academic processes ($f=4$). Participants indicated that they actively use AI, particularly for summarizing topics, acquiring information, and in academic research processes. Statements such as “To summarize topics and to gather information on subjects I’m unfamiliar with” (T2) and “I frequently use it while

researching information” (T7) indicate that AI is positioned as a tool that facilitates rapid access to information. This finding reveals that teachers perceive AI as a cognitive support tool. However, it was determined that a significant portion of teachers use AI in educational content production processes ($f=4$). It is observed that AI is utilized in activities such as preparing lesson materials, creating tests, developing presentations, and producing visuals. The statements “preparing worksheets, creating and editing text, and creating visuals” (T12) and “when preparing tests appropriate for the teacher’s level” (T15) indicate that AI is being used as a functional tool in the development of instructional materials. This finding is significant as it indicates that teachers are beginning to integrate AI as a supportive technology in pedagogical processes.

Table 17. Descriptions of categories for teachers’ AI usage processes

Category	Description
Not Using AI	Statements indicating that AI is never used or that efforts are made not to use it
Information Search and Academic Use	Use in information acquisition, research, and academic processes
Educational Content Creation	Preparing lesson materials, tests, worksheets, or presentations
Analysis and Data Processing	Analysis, teacher evaluation, or data organization
Administrative and Paperwork	Document preparation, paperwork
Use in the Teaching Process	Use in activities with teachers or in educational processes

The study also reveals that some teachers use AI in analysis and data processing ($f=2$). Statements such as “Extracting Word and Excel files and teacher analysis” (T4) and “Analysis” (T10) demonstrate that AI can also be utilized in data organization and evaluation processes. This finding indicates that AI is viewed not only as a tool for content creation but also as a potential tool in decision-support processes. Additionally, it was determined that a limited number of teachers use AI for administrative and paperwork tasks ($f=1$) as well as in instructional activities ($f=2$). The statement “in my paperwork” (T13) points to AI’s potential to reduce teachers’ administrative workload. Furthermore, the mention of its use in the teaching process indicates that AI is beginning to be directly integrated into in-class applications.

Overall, it is evident that teachers use AI most frequently for information research, educational material production, and analysis processes. However, the fact that some teachers do not use AI at all or use it only to a limited extent suggests that this technology has not yet become fully widespread in educational settings. This situation highlights the need for practical support and professional development opportunities to help teachers integrate AI more effectively into pedagogical processes.

Teacher Preference: Human Teacher or AI Teacher?

This section examines the choices middle school teachers make between AI-based instruction and human teachers, as well as the reasons behind these choices.

Table 18. Frequency of teachers’ preferences for teacher selection

Preference	f
Human teacher	16
AI teacher	0

The analysis results clearly show that all participants ($n=16$) preferred the human teacher. The fact that no participant preferred the AI teacher indicates that the teaching profession is viewed as having not only cognitive but also emotional and social dimensions of critical importance. This finding aligns with studies highlighting the multidimensional nature of the educational process (Biesta, 2015).

Table 19. Frequencies of reasons for teachers’ preferences in teacher selection

Reason	f
Emotional connection and empathy	9
The humanistic aspect of education	6
Interactive learning process	4
The Limitations of AI	5
Digitalization and anxiety about the future	2

(Participants cited multiple reasons.)

Upon examining the participants' reasons for their preferences, the most dominant theme was emotional connection and empathy (f=9). Teachers emphasized that the learning process is not limited to the transfer of information but also requires emotional interaction and empathy. Statements such as "The learning process is also about emotions" (T2) and "We build an emotional bond with the children" (T11) demonstrate that the human aspect of teaching holds a central position for the participants. This highlights that the teacher-student relationship is a decisive factor in pedagogical processes.

Table 20. Categories and descriptions of teachers' preferences in teacher selection

Category	Description
Emotional Bond and Empathy	Emphasis on emotional connection and empathy in teacher-teacher relationships
The Humanistic Dimension of Education	Education is not merely the transmission of knowledge, but a process of value and character development
The Interactive Nature of the Teaching Process	The fact that learning requires mutual interaction and communication
Perceived Inadequacy of AI	The perception that AI is inadequate in terms of emotions, body language, or pedagogical competence
Digitalization and Concerns About the Future	Concerns that AI could diminish humanity's role

Another important reason is the human dimension of education (f=6). Participants stated that teaching is not merely about the transmission of academic knowledge; it also encompasses functions such as values education, character development, and preparing the individual for life. The statements "A teacher is a guide who prepares students for life" (T12) and "We share things about humanity with children" (T13) emphasize the holistic nature of education. This finding demonstrates that the normative and ethical dimensions of education cannot be fully replaced by technology.

Some participants, however, highlighted the interactive nature of the teaching process (f=4). It emphasized that learning is shaped by mutual communication, immediate feedback, and classroom dynamics. Statements such as "The learning process is a dynamic process" (T3) and "Those who teach by demonstrating and experiencing are always ahead" (T5) reveal that the teaching process is based on direct human interaction. In this context, it is believed that AI, in its current state, cannot fully replicate this interactive structure.

However, participants noted that AI falls short in certain areas (f=5). In particular, it was noted that elements such as emotional intelligence, body language, and pedagogical adaptability cannot be adequately addressed by AI. Statements such as "An AI teacher lacks emotional intelligence and body language" (T9) and "I don't think AI can adapt to the student's level" (T15) indicate that while teachers view AI as a supportive tool, they do not consider it a structure capable of replacing the teacher's role.

Finally, some participants made assessments within the framework of digitalization and future anxiety (f=2). Statements suggesting that AI could reduce the human role and transform social structures reflect a critical awareness of technology's long-term effects. The statements "Too much digital environment is turning people into robots" (T14) and "In the future, AI will manage everything" (T16) support this perspective.

Table 21. Teachers' teacher selection preferences: codes and categories

Code	Description	Category
Emotional bond	Establishment of an emotional relationship between teachers	Emotional Bond
Empathy	Understanding the Teacher	Emotional Bond
Value transmission	Preparing Teachers for Life	The Human Dimension of Education
Interaction	Learning Through Mutual Communication	Interactive Learning
Body language	Nonverbal communication in teaching	AI Deficiency
Pedagogical alignment	Teaching Appropriate for the Teacher's Level	AI Deficiencies
Humanity Concerns	AI reducing the human role	Anxiety About the Future

Overall, the fact that all teachers prefer human teachers indicates that education is perceived as a multi-layered process involving not only cognitive but also emotional, social, and ethical dimensions. While participants accept AI as a supportive tool in education, they do not view it as a structure capable of replacing the teacher.

This finding indicates that the integration of AI in education should be approached from a “complementary” rather than a “replacement” perspective.

An Evaluation of Teachers’ Predictions Regarding Future Inventions That Could Be Developed with AI

This section examines middle school teachers’ predictions regarding future innovations that could be developed using AI.

Table 21. Frequency of categories in teachers’ predictions regarding future inventions that could be developed using AI

Category	f
Unable to Express an Idea	5
Everyday Life Technologies	4
Robotic Systems	3
Manufacturing and Industrial Technologies	2
Agricultural and Livestock Technologies	1
Health Technologies	1
Digital Experience Technologies	1

The analysis findings indicate that teachers have developed various predictions regarding the future applications of AI, but these predictions remain limited for some participants. Indeed, a portion of the participants (n=5) did not offer any ideas regarding future innovations. Statements such as “I don’t know” (T1) and “I can’t offer an idea” (T13) reveal that a portion of the teachers struggled to develop a systematic prediction regarding the future potential of AI. This situation is noteworthy in that it suggests AI literacy may be limited to knowledge of current applications.

Table 22. Categories of teachers’ forecasts regarding inventions that could be developed with AI in the future

Category	Description
Inability to Express Ideas	Failure to present ideas about future inventions
AI in Daily Life	Technologies that simplify home life and daily routines
Manufacturing and Industrial Technologies	Technologies that can be used in factories and production processes
Agriculture and Livestock Technologies	Automation and analysis systems in the agriculture and livestock sector
Robotic Systems	Humanoid robots or automated machines
Health and Service Sectors	Technologies applicable to healthcare and care services
Digital and Virtual Experience Technologies	Technologies for virtual experiences or experiencing different environments

When examining teachers who develop foresight, it is observed that one of the most prominent categories is AI technologies in daily life (f=4). Participants particularly emphasized smart systems and automated devices that simplify home life. Statements such as “home robot” (T10) and “they can do all task people do at home” (T16) indicate that AI is perceived as a technology that enhances functionality in individual living spaces. This finding reveals that AI is positioned as a facilitator that transforms daily life. In addition, a significant portion of the teachers associate AI with robotic systems (f=3). Statements such as “robots” (T8) and “designing a human and transferring all my knowledge to it” (T4) indicate that AI is often conceptualized through human-like machines. This suggests that teachers perceive AI as an integrated structure with physical and autonomous systems.

The study also highlights predictions regarding the potential use of AI in manufacturing and industrial technologies (f=2). Participants specifically noted that factory automation and production processes could become more efficient with AI. Statements such as “in factories and production centers” (T6) and “a sewing machine that sews a garment model exactly” (T9) reflect the perception that AI could play a role in enhancing efficiency in industrial processes.

However, it was observed that a limited number of participants developed predictions regarding the potential use of AI in agriculture and livestock (f=1), healthcare (f=1), and digital/virtual experience technologies (f=1). The statement “Automated systems for crop cultivation and livestock farming based on soil analysis” (T3) indicates that AI could enhance efficiency in agricultural production, while the statement “Can be used effectively in the healthcare sector” (T14) highlights its potential in the healthcare sector. Additionally, the

statement “Inventions that can take us to places we haven’t been” (T7) indicates that AI could pave the way for innovative applications in the fields of virtual experiences and digital reality.

Table 23. Codes and categories of teachers’ predictions regarding inventions that could be developed with AI in the future

Code	Description	Category
No idea	Failure to express an idea regarding future inventions	Inability to express an idea
Home robot	Robots that do household chores	Daily Life
Smart home appliances	Home appliances with AI integration	Daily Life
Factory automation	Automation in production processes	Industry
Agricultural robots	Automation in Agricultural Production	Agriculture
Livestock automation	Systems for managing livestock operations	Agriculture
Robots	Humanoid machines	Robotics
Healthcare technologies	AI applications in healthcare	Health
Virtual experience technologies	Technologies for experiencing different environments	Digital Experience

Overall, it is observed that teachers’ future projections regarding AI are primarily shaped around themes of automation, simplification, and increased efficiency. However, the fact that some teachers have developed only limited projections in this regard indicates that advanced conceptual awareness of AI has not yet sufficiently developed. In this context, it can be argued that teachers need support not only in their ability to use current technologies but also in their capacity to develop future-oriented predictions.

An Assessment of Teachers’ Perceptions Regarding the AI Technologies They Envision

This section examines middle school teachers’ perceptions regarding the AI technologies they envision or find most interesting.

Table 24. Categories of teachers’ perceptions regarding the AI technologies they envision

Category	Description
AI That Simplifies Daily Life	Technologies that perform household chores or personal tasks
Human-Like AI	Systems that mimic human behavior or possess human-like characteristics
Information and Learning Technologies	AI that enhances access to information and learning processes
Health and Science	Technologies that contribute to disease treatment or scientific advancements
Transportation and Automation	AI for transportation or automated systems
Digital Experience and Communication Technologies	Virtual experiences or communication technologies
Failure to Present an Idea	The participant’s failure to present a specific idea

The analysis results indicate that teachers’ visions regarding AI are primarily shaped around themes such as simplifying daily life, developing human-like systems, and accelerating access to information. However, it is observed that some participants (n=2) struggled to develop a specific idea on this subject. These statements, categorized under “No idea,” reveal that teachers’ creative and advanced thinking processes regarding AI did not develop to the same extent for every participant.

Table 25. Categories and frequencies of teachers’ perceptions regarding the AI technologies they envision

Category	f
AI That Simplifies Daily Life	4
Human-Like AI	3
Information and Learning Technologies	3
Digital Experience and Communication Technologies	2
Health and Science	1
Transportation and Automation	1
Inability to Express Ideas	2

The category with the highest frequency is AI systems that simplify daily life ($f=4$). Participants particularly emphasized automated systems that handle household chores and personal tasks. Statements such as “A tool that does the work for me” (P3) and “A robot capable of handling all household chores” (P11) indicate that AI is positioned as a helper that simplifies individual life. This finding reveals that teachers evaluate AI from a perspective focused on practical benefits.

Another notable category is human-like AI systems ($f=3$). Participants expressed that they envisioned systems that mimic human behavior or possess human-like characteristics. Expressions such as “human clone” (T4) and “AI that mimics a human exactly” (T6) indicate that AI is often associated with anthropomorphic traits. This situation reveals that teachers conceptualize AI not merely as a tool but also as a human-like entity.

Some participants noted that AI could develop technologies that contribute to information and learning processes ($f=3$). Ideas such as rapid access to information and the direct transfer of knowledge stand out in particular. The phrases “AI that transfers knowledge to the mind” (T9) and “accessing information very quickly” (T16) indicate that AI is perceived as a technology that supports cognitive processes. This finding reflects an awareness of AI’s transformative potential in learning processes.

In addition, some teachers indicated that AI could offer innovative solutions in the field of digital experience and communication technologies ($f=2$). Statements such as “3D communication with loved ones at a distance” (T13) and “Being able to experience the outcomes of different choices” (T7) indicate that AI is considered in conjunction with virtual reality and interactive digital environments. This suggests that AI is addressed not only in terms of its functional aspects but also its experiential dimensions.

Although to a more limited extent, some participants expressed ideas regarding the potential use of AI in the fields of health and science ($f=1$) and in transportation and automation systems ($f=1$). The phrase “AI used in the treatment of diseases” (T1) points to the potential in the health sector, while the phrase “driverless bus” (T12) reflects a vision of autonomous transportation systems. These findings indicate that teachers are aware that AI can create transformative effects across various sectors.

Table 25. Perception codes and categories regarding teachers’ envisioned AI technologies

Code	Description	Category
Home robot	Robots that perform household chores	Daily Life
Cleaning robot	Robotic systems that clean	Daily Life
Decision-making AI	Systems Capable of Making Decisions in Place of Humans	Daily Life
Human replicas	Human-like robot	Human-like AI
Human imitation	System that mimics human behavior	Human-like AI
Knowledge transfer	Systems that directly transfer information to the mind	Information Technology
Fast information access	AI that provides information quickly	Information Technology
Disease treatment	AI used in healthcare	Health
Self-driving vehicles	Autonomous transportation systems	Transportation
Virtual communication	3D communication or virtual experience	Digital experience
No idea	Failure to specify an AI concept	Inability to specify ideas

Overall, it is observed that the AI technologies envisioned by teachers largely center on systems that simplify human life, possess human-like characteristics, and accelerate access to information. Furthermore, the presence of predictions regarding the fields of healthcare, transportation, and digital experience indicates that an awareness has emerged regarding the multifaceted development potential of AI. In this context, it can be said that teachers’ visions of AI offer a holistic perspective that encompasses both the functional and transformative impacts of technology.

An Evaluation of Teachers’ Metaphorical Perceptions of AI

In this section, the responses participants provided to the statement “AI is like... because...,” developed to elicit their perceptions of AI, were analyzed using content analysis. The findings reveal that participants conceptualize AI through various metaphors and that these metaphors cluster under specific thematic categories. The analysis of the metaphors reveals that participants’ mental models of AI exhibit a multidimensional structure.

Table 26. Frequency of categories in teachers' metaphorical perceptions of AI

Category	f
Vehicle and Technology Metaphors	5
Information and Guidance Metaphors	4
Negative Perception Metaphors	3
Metaphors of Uncertainty and Complexity	2
Two-Sided (Benefit–Risk) Metaphors	1
Creative Metaphors	1

As a result of the analysis, the metaphors were grouped into six categories: tools and technology, information and guidance, negative perception, uncertainty and complexity, two-way (benefit–risk), and creative metaphors. Upon examining the frequency distributions, it is observed that the highest number of metaphors is concentrated in the tools and technology category ($f=5$), followed by the information and guidance ($f=4$) and negative perception ($f=3$) categories. Metaphors in the uncertainty and complexity ($f=2$), dual-sided perception ($f=1$), and creative metaphors ($f=1$) categories appear at lower frequencies. This distribution reveals that participants primarily position AI as a technological structure, yet this perception is not one-dimensional.

Table 27. Categorization of teachers' metaphorical perceptions of AI

Metaphor	Description	Category
Machine	Command-driven system	Technology
Robot	Mechanical system that simplifies tasks	Technology
Computer	A ready source of information	Information
Guide	Navigation system	Information
Data analyst	Data processing system	Technology
Medicine	Tool that provides solutions to problems	Information
Ocean	Deep and unknown structure	Uncertainty
Gum	A structure that constantly generates new responses	Creative
Virtual / soulless	Fictional structure	Negative
A robot that encourages laziness	Technology that makes people passive	Negative
Humanity	The sum of human knowledge	Knowledge
Like reality	Ability to imitate	Technology
Variable	Technology with an uncertain future	Uncertainty

Within the framework of vehicle and technology metaphors, participants described AI using concepts such as “machine,” “robot,” and “data analyst.” For example, one participant described AI as “like a machine” (P1), defining it as a command-based system, while another participant emphasized its data processing capacity by stating, “It is like a data analyst” (P14). These findings indicate that participants perceive AI primarily as a functional and technical tool.

When examining metaphors related to information and guidance, it is evident that AI is viewed as a resource that facilitates access to information and provides direction. Participants described AI using metaphors such as “guide,” “computer,” and “medicine.” For example, statements such as “AI is like a guide” (P9) and “It’s like a computer containing ready-made information” (P5) reveal that AI is positioned as a support system that provides rapid access to information. This suggests that AI is perceived as a functional learning tool within an educational context.

In the category of negative perception metaphors, participants were observed to highlight the potential risks and negative effects of AI. Statements such as “a robot that encourages laziness” (T4) and “virtual and soulless” (T8) reflect a critical perspective suggesting that AI could render individuals passive and lacks human qualities. This finding indicates that participants have developed a cautious and questioning attitude toward AI.

Within the framework of metaphors of uncertainty and complexity, the unpredictability regarding the limits and future of AI has been emphasized. Statements such as “AI is variable” (T3) and “It is like an ocean” (T11) reveal that this technology is perceived as a deep, complex, and not fully comprehensible structure. This indicates that participants view AI as a dynamic and evolving system.

Statements in the dual-sided (benefit–risk) metaphor category, meanwhile, reflect a holistic perspective that addresses both the positive and negative aspects of AI. The statement “Both dazzling and unsettling” (T7) indicates an awareness of the risks that AI carries alongside the opportunities it offers. This approach reveals that participants evaluate technology within a critical balance.

Table 28. Categories and descriptions of teachers' metaphorical perceptions of AI

Category	Description
Tool and Technology Metaphors	Metaphors that define AI as a tool, machine, or technology
Information and Guidance Metaphors	Metaphors that view AI as a source of information or a guide
Two-Sided (Benefit–Risk) Metaphors	Metaphors that view AI as both beneficial and risky
Metaphors of Uncertainty and Complexity	Metaphors that view AI as an unknown or complex structure
Negative Perception Metaphors	Metaphors that emphasize the negative effects of AI
Creative and Figurative Metaphors	Metaphors containing various abstract or creative analogies

Overall, it can be said that participants' metaphorical perceptions of AI centered on three main axes: viewing AI as a technological tool and system, positioning it as a guide that facilitates access to information, and evaluating it as a structure involving risk and uncertainty. These findings indicate that participants approach AI from both a functional and a critical perspective and have developed a multidimensional perception (Miles et al., 2014; Saban, 2008).

Results and Discussion

The findings obtained in this study reveal that middle school teachers' perceptions of AI exhibit a multidimensional and heterogeneous structure. The participants' evaluation of AI as both a functional tool and a technology harboring potential risks aligns with the “dual-sided perception” framework frequently emphasized in the literature (OECD, 2021).

The study found that teachers largely define AI as a tool that simplifies life and offers practical solutions. This finding aligns with studies indicating that AI is positioned as a productivity-enhancing support tool in education (UNESCO, 2021). However, the fact that some teachers perceive AI as a human-like entity suggests that the conceptual framework regarding AI has not yet fully solidified and that cognitive representations are still in the process of development.

One of the study's notable findings is that a significant portion of teachers possess limited knowledge regarding AI tools used in education. This situation reveals that, despite teachers having a general level of technological awareness, there are shortcomings in the dimension of pedagogical integration. The literature also emphasizes that teachers' AI literacy is still an emerging field and that systematic training is needed in this area (Holmes et al., 2019).

Findings regarding sources of information indicate that teachers primarily acquire knowledge about AI through digital media and social networks. This suggests that AI knowledge is largely shaped by informal learning processes. However, the limited use of formal and institutional sources poses potential risks regarding the quality and accuracy of information (European Commission, 2022).

The research findings also indicate that a significant proportion of teachers have concerns regarding AI in the context of privacy, data security, misuse, and social impacts. This finding aligns with studies showing that ethical concerns regarding AI are becoming increasingly visible among education stakeholders (Floridi et al., 2018). In particular, concerns about data security and manipulation are considered a critical determinant of trust in AI systems.

Findings regarding the applications of AI indicate that teachers primarily use this technology in information research and content creation processes. This suggests that AI currently plays a largely supportive and instrumental role in education. However, the fact that some teachers do not use AI at all can be attributed to resistance to technology or a lack of proficiency.

Findings regarding teacher preference reveal that all participants prefer a human teacher. This preference indicates that the human dimensions of teaching—such as emotional connection, empathy, and interaction—take precedence. This aligns with approaches arguing that AI should be positioned as a tool to support human teachers rather than replace them (Cukurova & Luckin, 2018).

Findings regarding metaphors and future projections, however, indicate that teachers perceive AI as a technology that both simplifies daily life and involves uncertainty and risk. This reveals that perceptions of AI vary depending on individual experience, level of knowledge, and exposure to technology.

Conclusion

This study has revealed that middle school teachers' perceptions of AI, their knowledge levels, usage practices, and future predictions exhibit a multidimensional structure. Based on the findings, teachers: generally perceive AI as a functional and facilitative tool, however, their knowledge regarding specific AI tools used in education is limited; they acquire their knowledge about AI largely from digital and informal sources; they harbor various concerns regarding data security, ethical use, and social impacts; they use AI primarily as a supportive tool in educational processes; and due to the humanistic aspects of the teaching profession, they view the human teacher as indispensable. Overall, it can be said that teachers' perceptions of AI are shaped by a balance of benefits and risks, and that the role of this technology in education is still in a process of transformation.

Recommendations

Based on the research findings, the following recommendations have been developed:

- In-service training programs aimed at developing AI literacy among teachers should be systematically planned.
- Ethical, data security, and responsible use frameworks regarding the use of AI in education should be established.
- Practical training should be provided to help teachers integrate AI into pedagogical processes, rather than using it solely as a tool for information delivery.
- Guidance documents and platforms for reliable AI tools that can be used in education should be developed.
- Teachers' perceptions of AI across different subjects and educational levels can be examined comparatively.
- More in-depth analyses can be conducted using mixed-methods studies that combine quantitative and qualitative approaches.
- The relationship between teachers' AI literacy and their in-class applications can be investigated.
- AI should be positioned not as a structure that replaces the teacher, but as a tool that supports and enriches the teaching process; accordingly, a teacher-centered integration approach should be adopted.

Scientific Ethics Declaration

* The authors declare that the scientific ethical and legal responsibility of this article published in EPESJ journal belongs to the authors.

Conflict of Interest

* The authors declare that they have no conflicts of interest

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