Exploring Middle School Students' Perceptions, Attitudes, and Opinions Toward Artificial Intelligence

Özgür Kürşad Derer, [1] [*], Nuriye Batmaz Derer [2]

[1] Ministry of National Education, Türkiye, 0000-0002-2383-5540
[2] Ministry of National Education, Türkiye, 0000-0003-4279-9159
[*] Corresponding author: Özgür Kürşad Derer (ok.derer@outlook.com.tr)

Article Info

Abstract

The main aim of this study is to examine the perceptions, attitudes, and opinions of seventh and eighth grade middle school students toward artificial intelligence (AI). A mixed-methods approach, combining both quantitative and qualitative data, was employed in the research. The study group consists of a total of 168 students enrolled in the seventh and eighth grades at a middle school located in the Bozüyük district of Bilecik province during the 2024–2025 academic year. Quantitative data were collected using Artificial Intelligence Perception and Attitude Scale. For the qualitative dimension, a semi-structured interview form was used to gain deeper insights into students' views. The analysis of the scale data revealed that students' perceptions and attitudes toward AI were at a moderate level, while their negative perceptions were found to be low. No statistically significant difference was observed based on gender; however, a significant difference favoring seventh-grade students was found when compared to eighth graders. Qualitative findings indicated that students generally held highly positive views toward artificial intelligence. Students emphasized that AI facilitates access to information, improves efficiency, saves time, and contributes to individuals' design and creativity skills. It was also found that students used AI tools in educational contexts for purposes such as completing homework, conducting research, summarizing data, reviewing subjects, and solving problems. On the other hand, some concerns regarding artificial intelligence were also identified. These included the potential disappearance of certain professions, a decline in creativity, threats to data privacy, dependency on AI tools, and reduced opportunities for socialization.

Introduction

Artificial Intelligence (AI) has emerged as a transformative force in education, offering innovative solutions to enhance both teaching and learning processes. AI technologies in education are not limited to administrative functions; they are actively reshaping classroom experiences through intelligent tutoring systems, adaptive learning platforms, automated assessment tools, and natural language processing-based writing assistants (Luckin et al., 2016). These tools enable more efficient classroom management while also providing individualized support to students.

One of the most prominent benefits of AI in education is its potential to support personalized learning. AI-powered platforms can analyse vast amounts of student data to identify individual learning patterns, strengths, and weaknesses. Based on this analysis, systems can dynamically adjust content, difficulty levels, and instructional approaches to meet students' specific needs, thereby promoting deeper engagement and higher academic performance (Holmes et al., 2019). This form of learning personalization fosters inclusivity and ensures that no student is left behind due to rigid instructional pacing or standardization. Moreover, AI has begun to reshape the role of teachers. Rather than replacing educators, AI augments their capabilities by handling routine tasks such as grading, progress tracking, and even behavior monitoring (Zawacki-Richter et al., 2019). This shift allows teachers to allocate more time to high-impact pedagogical activities, such as mentoring, critical thinking instruction, and emotional support. However, this transformation also demands new competencies from teachers, including digital literacy, data interpretation skills, and ethical awareness related to AI use in schools.

AI tools have also shown a measurable impact on student performance. Studies suggest that students who engage with AI-supported learning environments tend to perform better in both formative and summative assessments due to increased feedback loops and immediate scaffolding (Chassignol et al., 2018). Nevertheless, while the potential is vast, ethical concerns such as data privacy, algorithmic bias, and equity in access remain critical challenges that must be addressed in parallel with technological advancement.

In recent years, there has been increasing interest in understanding how students perceive and respond to technological innovations, particularly artificial intelligence (AI), within educational settings. The integration of artificial intelligence-based tools into educational environments directly impacts the nature of students' relationship with technology. Particularly at the middle school level, students' perceptions and attitudes become decisive in determining the contribution of technological innovations to learning processes. Chen et al. (2020) highlight the importance of considering students' perceptions and attitudes when integrating new technologies such as artificial intelligence into learning processes. Students' perceptions and attitudes toward AI are critical indicators of how effectively these technologies can be integrated into teaching and learning environments. Research has demonstrated that students who hold positive attitudes toward technology tend to exhibit higher motivation, engagement, and willingness to use AI-powered tools in their learning processes (Teo, 2011; Venkatesh et al., 2003). At the middle school level, where cognitive development and digital exposure intersect, perceptions of AI are often shaped by personal experience, media exposure, and socio-cultural factors. Suh and Ahn (2022) found that K-12 students generally hold positive attitudes toward AI applications, especially when

they are aware of its educational benefits. Similar findings were reported by Elçiçek (2024), who conducted a study in Turkey showing that students recognize AI as helpful in solving problems and completing assignments, although their AI literacy levels remain low overall.

Demographic variables such as gender, age, and grade level have also been shown to influence attitudes. Chen et al. (2020) reported in their review that male students tend to show slightly more favourable attitudes toward AI than female students, though the gap is narrowing. Moreover, Elçiçek (2024) reported that AI literacy levels vary significantly by gender, with male students showing higher scores in the technical understanding sub-dimension. These findings align with Teo's (2011) work, which emphasized that students' readiness for technology-integrated learning environments is strongly influenced by prior experience with technology. Additionally, ethical concerns begin to surface as students grow older and gain more awareness. Akgun and Greenhow (2022) found that K-12 students are more likely to express critical views about privacy, surveillance, and algorithmic bias associated with AI. Similarly, Suh and Ahn (2022) reported that students raised concerns about AI-related ethical dilemmas, particularly regarding autonomy and data use, suggesting the need for integrated AI ethics education from early school years. Taken together, these findings emphasize the importance of age-appropriate, inclusive AI education that considers both cognitive development and socio-demographic diversity. Understanding how various groups of students perceive and interact with AI is crucial for creating equitable and effective educational strategies.

Understanding how students interact with artificial intelligence (AI) in educational settings requires a strong grasp of the psychological and pedagogical constructs that shape their responses—namely, perception, attitude, and opinion. These constructs not only influence individual behaviour but also mediate how students accept and integrate technology into their learning processes (Schunk, 2020; Venkatesh et al., 2003). Perception refers to the process by which individuals interpret sensory input and assign meaning based on their prior experiences, beliefs, and expectations (Schunk, 2020). In educational contexts, perception significantly influences how students make sense of instructional content and technological tools. A student who perceives AI as a helpful tool is more likely to use it effectively, while those who associate it with surveillance or loss of autonomy may resist its use. Attitude is typically defined as a learned predisposition to respond favourably or unfavourably toward a specific object, idea, or behaviour (Ajzen, 1991). In the domain of educational technology, attitude plays a central role in determining technology acceptance and user intention. According to the Technology Acceptance Model (TAM), perceived usefulness and perceived ease of use are key predictors of user attitude, which in turn influences the behavioural intention to adopt a technology (Venkatesh et al., 2003). Opinion, though closely related to attitude, is considered a consciously held belief or judgment that may not be based on direct experience but is shaped through interpretation and reflection. Students' opinions about AI often include broader concerns—such as ethical implications, societal impact, and future employment—that go beyond immediate classroom experiences. These opinions are particularly relevant when analysing qualitative data in mixed-methods studies.

Collectively, perception, attitude, and opinion form a triadic lens through which student engagement with AI can be understood. These constructs are deeply embedded in the learning process, affecting motivation, autonomy, and behavioural outcomes. Therefore, a clear conceptual understanding of these terms is essential for both interpreting data and designing pedagogical strategies that promote meaningful interaction with AI-based

technologies.

Several empirical studies have investigated how students perceive and engage with artificial intelligence (AI) in educational settings, confirming the critical role of psychological constructs such as perception, attitude, and opinion. For example, Suh and Ahn (2022) conducted a validation study with K-12 students in South Korea and found that students generally had positive attitudes toward AI, particularly appreciating its ability to support academic tasks like research and homework. However, the same study also revealed concerns about dependency and creativity loss, highlighting the dual nature of student opinions. In another study, Chen et al. (2020) performed a review across multiple contexts and reported significant gender differences in AI-related attitudes, with males demonstrating higher interest and confidence levels. This supports previous work by Teo (2011), which emphasized the importance of digital familiarity in shaping technology acceptance, especially among young learners. Additionally, Akgun and Greenhow (2022) explored students' understanding of AI in K-12 settings through a synthesis of existing literature. Their analysis suggested that although students were enthusiastic about using AI tools, many held misconceptions about how these systems actually function. The study called for curriculum interventions to increase AI literacy and clarify its ethical and operational boundaries. Further, Elçiçek (2024) examined AI literacy among students in Turkey and found that while students perceived AI as beneficial, they lacked critical awareness of issues such as data privacy and surveillance. These findings align with Akgun and Greenhow (2022), who reported that older students were more likely to express nuanced, ethically informed opinions about AI's broader societal implications. These studies collectively underscore the importance of addressing both the affective (attitudinal) and cognitive (perceptual) dimensions of student engagement with AI. They also highlight the value of mixed method approaches in capturing the complex interplay of factors that shape how students accept and interpret AI in their learning environments.

While previous research has provided valuable insights into students' general attitudes and perceptions toward artificial intelligence, several notable gaps remain—particularly in terms of context, educational level, and methodological design. Most studies have focused either on high school (Akgun & Greenhow, 2022) or university students (Chen et al., 2020), overlooking the middle school population, where students are in a formative stage of cognitive and social development. Furthermore, earlier research has often relied solely on quantitative instruments, such as surveys or standardized scales (Teo, 2011; Suh & Ahn, 2022), which may not fully capture the nuanced and evolving nature of students' thoughts, emotions, and concerns regarding AI.

What sets the present study apart is its specific focus on middle school students (grades 7 and 8) within the Turkish education system, a demographic that has been underrepresented in AI-related educational research (Elçiçek, 2024; Suh & Ahn, 2022). In addition, this study employs a mixed-methods approach, integrating both quantitative data through validated attitude scales and qualitative insights obtained via semi-structured interviews. This triangulated methodology offers a more comprehensive and context-sensitive understanding of how students perceive, engage with, and reflect upon artificial intelligence in real learning environments. Moreover, unlike prior studies that emphasize only the positive dimensions of AI integration, the current research also examines students' critical perspectives—including concerns about privacy, creativity loss, and AI dependency—thus presenting a more balanced and realistic portrayal of youth engagement with emerging technologies. By

addressing these methodological and contextual gaps, this study contributes to the global discourse on AI in education and offers practical implications for curriculum designers, educators, and policymakers aiming to implement AI tools in age-appropriate and ethically informed ways.

Aim of the Study

The primary aim of this study is to explore the perceptions, attitudes, and opinions of seventh and eighth-grade middle school students regarding artificial intelligence (AI). In line with this main objective, the study seeks to answer the following sub-questions:

1. To what extent are students' positive and negative perceptions and attitudes toward artificial intelligence statistically significant?
2. Do students' positive and negative attitudes toward artificial intelligence differ significantly according to gender and grade level variables?
3. What are students' general opinions about artificial intelligence, and what are their views concerning its advantages and disadvantages?
4. What are students' expectations regarding education and future prospects related to artificial intelligence?

Method

This section presents detailed information regarding the research design, study group, data collection instruments, data collection and analysis procedures, as well as the strategies employed to ensure the validity and reliability of the study. Furthermore, ethical considerations adhered to throughout the research process are also discussed. Each component is explained to ensure the transparency, rigor, and replicability of the study.

Research Design

This study adopted a mixed-methods research design, integrating both quantitative and qualitative data collection tools to achieve a comprehensive and in-depth understanding of middle school students' perceptions, attitudes, and opinions toward artificial intelligence. Mixed methods allow for the combination of the generalizability and statistical rigor of quantitative approaches with the contextual richness and interpretive depth of qualitative inquiry. This dual strength provides a more holistic perspective on complex educational phenomena (Creswell & Plano Clark, 2018; Karasar, 2005). According to Creswell and Plano Clark (2018), mixed-methods research is defined as a methodological approach that involves the collection, analysis, and integration of both quantitative and qualitative data to better understand a research problem from multiple dimensions. Karasar (2005) similarly describes mixed methods as a framework that allows for the simultaneous use of quantitative and qualitative techniques, enabling researchers to both generalize findings through statistical analysis and generate deeper meaning through contextual exploration. He further emphasizes that such an approach is particularly valuable in educational and social science research, where both breadth and depth of understanding are essential.

In mixed-methods research, the dominance and sequencing of qualitative and quantitative components may vary.

In some studies, the quantitative approach serves as the primary method, while the qualitative part plays a supplementary role; in others, the opposite may occur. There are also designs where both methods are given equal priority. In the current study, an embedded (nested) design—a specific subtype of mixed-methods approach—was employed, as outlined by Yıldırım and Şimşek (2021). This design involves embedding one type of data within another, wherein one method (either qualitative or quantitative) is subordinate but supportive of the dominant method.

In this research, the quantitative component played the dominant role, utilizing a validated Artificial Intelligence Attitude Scale as the primary data collection instrument. To enrich and contextualize the quantitative findings, semi-structured interviews were conducted with a subset of students, offering qualitative insights into students' deeper thoughts, experiences, and concerns regarding artificial intelligence in educational settings. This embedded design allowed for the triangulation of data, strengthening the validity and interpretive power of the study's conclusions.

Study Group / Participants

The participants of this study consisted of seventh and eighth-grade students enrolled at Meliha Ercan Middle School, located in the Bozüyük district of Bilecik province, Turkey, during the 2024–2025 academic year. The selection of the study group was carried out using a combination of purposeful sampling strategies, specifically convenience sampling and criterion sampling methods. The convenience sampling technique was employed primarily due to the fact that the researchers were already working within the same school environment. This method is often preferred in situations where access to participants is limited, and time or logistical constraints exist (Yıldırım & Şimşek, 2021). Convenience sampling provides practical advantages by allowing researchers to work with easily accessible and nearby participants, making data collection more feasible and efficient without compromising the study's integrity. In addition to convenience sampling, the study also utilized criterion sampling, another type of purposeful sampling strategy. Criterion sampling involves identifying participants based on predetermined characteristics or criteria that are central to the research objective (Merriam, 2015). In this study, the primary criteria for participant selection included:

- Being in the seventh or eighth grade,
- Having prior experience or basic familiarity with using artificial intelligence tools (e.g., virtual assistants, AI-supported applications),
- And being at a cognitive developmental stage where opinions and attitudes toward technological concepts are meaningfully formed and expressed.

These criteria were established to ensure that the participants were both developmentally appropriate and contextually relevant for investigating perceptions and attitudes toward AI in education. By selecting students who met these conditions, the study aimed to capture more accurate, reflective, and diverse insights into the ways adolescents understand and interact with artificial intelligence in their learning environments. The combination of convenience and criterion sampling thus enabled the researchers to conduct a study that was not only logistically practical but also methodologically rigorous, aligning with the principles of purposeful sampling in qualitative and mixed-methods research.

Data Collection Instruments

To investigate the perceptions, attitudes, and opinions of seventh and eighth-grade middle school students toward artificial intelligence, two primary data collection tools were employed in this study: the Artificial Intelligence Perception and Attitude Scale (YAZAT-24) and a semi-structured interview form.

Artificial Intelligence Perception and Attitude Scale (YAZAT-24)

The YAZAT-24 was developed by Dinler (2025) to measure students' positive and negative perceptions and attitudes toward artificial intelligence. The scale development process followed rigorous psychometric protocols to ensure validity and reliability. Initially, an extensive review of contemporary literature and existing scales focusing on AI-related attitudes and perceptions was conducted to generate a preliminary item pool. This item pool was refined through expert evaluations involving professionals in education, psychology, and educational technology, resulting in a 50-item draft version of the scale.

A pilot study was carried out with a large sample of 1,600 students. The data were analyzed in two stages using both Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) on a subset of 855 participants. EFA results revealed a Kaiser-Meyer-Olkin (KMO) value of .94 and a Bartlett's Test of Sphericity of 19028.027 ($p < .001$), indicating suitability for factor analysis. The EFA indicated a four-factor structure explaining a cumulative variance of 75.17% across sub-dimensions: Positive Perception (46.90%), Negative Perception (63%), Media Production Attitude (70.20%), and ChatGPT Usage Attitude.

The four-factor structure was further validated using first- and second-order CFA. The first-order CFA showed factor loadings ranging from .72 to .98, with acceptable model fit indices: $\chi^2/df = 9.59$, RMSEA = .10, CFI = .95, TLI = .94, and WRMR = 2.07. The second-order CFA also confirmed the structure with factor loadings between .72 and .99 and improved fit indices: $\chi^2/df = 5.32$, RMSEA = .07, CFI = .97, TLI = .97, and WRMR = 1.37. These results indicated a statistically acceptable model-data fit. The internal consistency of the scale was evaluated using Cronbach's Alpha, calculated via SPSS 23. The reliability coefficients for the subscales were $\alpha = .96$ for Positive Perception, $\alpha = .92$ for Negative Perception, $\alpha = .94$ for Media Production Attitude, and $\alpha = .90$ for ChatGPT Usage Attitude. The overall reliability of the scale was found to be $\alpha = .96$. According to Kayış (2014), a Cronbach's Alpha value of .80 or above is considered indicative of high internal consistency. Therefore, the scale demonstrates strong psychometric properties suitable for use in this study. In the current sample, the recalculated Cronbach's Alpha was found to be $\alpha = .67$, which, although lower, is still within acceptable range for social science research.

Semi-Structured Interview Form

To complement the quantitative findings, a semi-structured interview form was developed by the researchers to collect qualitative data. This method allows for both standardized responses and in-depth exploration of participants' thoughts and experiences (Büyüköztürk et al., 2016).

In preparation for the interviews, the researchers followed the steps recommended by Adıgüzel (2019) for designing semi-structured interviews. First, interview questions were developed in alignment with the theoretical framework of the study, focusing on students' general perspectives on AI, perceived advantages and disadvantages, and future expectations regarding AI in education. Next, the draft interview questions were subjected to expert review. A structured feedback form was created, including four evaluation categories: "Appropriate," "Not Appropriate," "Appropriate with Revisions," and an open field for comments. The form was shared with four experts holding doctoral degrees or advanced expertise in educational sciences. Based on their feedback, necessary revisions were made to ensure content validity and clarity of the interview items. The finalized interview form was used in the qualitative component of the research to gain deeper insight into students' reflections, language, and emotional responses related to AI.

Data Collection and Analysis

Following the receipt of necessary institutional and ethical permissions, data collection procedures were conducted in two stages: quantitative and qualitative. The Artificial Intelligence Perception and Attitude Scale (YAZAT-24) was administered to all participants in the study group to gather quantitative data. Before completing the scale, students were asked whether any items or questions were unclear, and researchers were available to clarify if needed. On average, students completed the instrument in approximately 20 to 25 minutes under the supervision of the researchers, ensuring consistency and data quality during administration. Qualitative data were collected through a semi-structured interview form, which was developed in alignment with the study's theoretical framework. Interviews were conducted with a purposefully selected subgroup of 17 students who had prior interest or experience related to artificial intelligence. This criterion ensured that participants could provide informed and reflective insights. Each interview lasted approximately 15 minutes, and responses were audio-recorded and later transcribed for analysis.

To analyse the quantitative data, the researchers utilized IBM SPSS Statistics 27. Independent samples t-tests were conducted to examine whether students' positive and negative attitudes toward artificial intelligence differed significantly based on gender and grade level, in line with the sub-questions of the study. The qualitative data were analysed using the content analysis technique, which is widely used to systematically categorize and interpret textual information in qualitative research (Yıldırım & Şimşek, 2021). This process involved four major stages:

1. Transcription and familiarization – All interview data were transcribed verbatim and reviewed line by line.
2. Initial coding – Researchers identified and labelled meaningful units of text.
3. Categorization – Codes were grouped into themes that broadly represented students' thoughts and experiences.
4. Interpretation – Themes were analysed and discussed in relation to the study's objectives.

To ensure trustworthiness and transparency, direct quotations from student responses were included in the findings section. These excerpts were selected to illustrate recurring themes, add depth to the analysis, and support the interpretations made by the researchers. In accordance with ethical research standards, participants' real names were not disclosed. Instead, pseudonyms were used in the form of coded identifiers such as S1-M, S2-M for male

students and S1-F, S2-F for female students. In this coding system, "S" stands for Student, while "M" and "F" indicate Male and Female, respectively. Alignment between the study variables, data collection instruments, and analysis techniques is presented clearly in Table 1 to provide a structured overview of the research design and methodology.

Table 1. Measurement Tools, Variables Measured, and Analysis Methods Used in the Study

Measurement Tool	Variable Measured	Analysis Method
Artificial Intelligence Perception and Attitude Scale (YAZAT-24)	Students' Perceptions and Attitudes Toward Artificial Intelligence	Independent Samples t-Test
Semi-Structured Interview Form	Student Opinions on Artificial Intelligence	Content Analysis

Validity, Reliability, and Trustworthiness of the Study

To ensure the credibility and trustworthiness of the study, various strategies were employed across both quantitative and qualitative phases. In line with internal validity standards, the research design incorporated methodological triangulation, including the use of both quantitative instruments and qualitative data collection tools. This integration of data sources enhanced the depth and breadth of the findings and contributed to the robustness of the interpretations. During the qualitative data collection process, member checking was actively implemented to ensure that participants' statements were accurately represented. After interviews were conducted, students were given the opportunity to confirm or clarify their responses, helping to prevent potential misinterpretation or bias in the analysis. This process strengthened the credibility of the findings by validating the authenticity of participants' voices (Lincoln & Guba, 1985).

In addition, expert validation was utilized during the development of the semi-structured interview form. Feedback was obtained from four experts with academic qualifications in educational sciences, who evaluated the interview items in terms of clarity, relevance, and content coverage. Their insights contributed to the content validity of the qualitative instrument by ensuring alignment with the study's research questions and theoretical framework. To address the criterion of transferability, thick descriptions were provided throughout the presentation of findings. Comprehensive information about the research design, participant characteristics, data collection tools, and procedures was offered in the methodology section.

Furthermore, data were visualized through tables and supported by direct quotations from students, offering readers rich contextual understanding that allows for potential application of results in similar educational settings. Finally, dependability and confirmability were addressed through clear documentation of coding procedures, systematic analysis strategies, and transparent decision-making during data interpretation. The coding and theme development process was grounded in the content analysis framework outlined by Yıldırım and Şimşek (2021), which includes multiple stages such as transcription, initial coding, theme generation, and interpretation. Collectively, these strategies demonstrate a rigorous approach to ensuring that the study's conclusions are both valid and reliable, and that they reflect the authentic perspectives of participants in a transparent and ethically sound manner.

Ethical Considerations

Throughout the research process, strict adherence to ethical principles was ensured, and the following measures were taken to protect the rights, safety, and dignity of all participants:

- Prior to the implementation of the data collection process, official permission was obtained from the Ministry of National Education of Turkey to conduct the research in the designated school. This approval was granted after finalizing the appropriate research design, developing the qualitative interview protocol, and selecting the measurement instruments to be used in the study.

- All student participants were informed about the purpose and scope of the study, and their voluntary participation was emphasized. Informed consent procedures were followed in accordance with ethical research standards, and parental consent forms were distributed and collected for all minors involved in the research. Additionally, permission to use the Artificial Intelligence Perception and Attitude Scale (YAZAT-24) was formally obtained from the developer of the instrument.

- To maintain participant confidentiality and protect personal identities, pseudonyms were used throughout the study. Students' real names were not recorded or reported at any stage. Instead, each participant was assigned a coded identifier (e.g., S1-M, S2-F), allowing the researchers to refer to individual contributions while safeguarding privacy. These identifiers also facilitated transparent reporting of qualitative findings without compromising anonymity.

All data were stored securely and used solely for research purposes. The ethical guidelines followed were in accordance with the standards set by international codes such as the American Psychological Association (APA) Ethical Guidelines and the Declaration of Helsinki, particularly regarding voluntary participation, informed consent, and confidentiality.

Findings

This section presents the findings of the study, which aimed to explore middle school students' perceptions, attitudes, and opinions toward artificial intelligence. The results are organized in accordance with the research sub-questions and include both the quantitative analysis of the data collected through the Artificial Intelligence Perception and Attitude Scale (YAZAT-24), and the qualitative findings obtained through content analysis of the student interviews. Both data sets are interpreted to provide a comprehensive understanding of how students perceive and evaluate AI in educational contexts.

Findings Related to Middle School Students' Perceptions and Attitudes Toward Artificial Intelligence

The quantitative findings regarding middle school students' perceptions and attitudes toward artificial intelligence are presented in Table 2. As shown in the table, middle school students demonstrated a moderate level of positive perception, ChatGPT usage attitude, and overall scores regarding artificial intelligence. However, their scores in the negative perception dimension were found to be low. The findings related to students' perceptions and attitudes toward artificial intelligence based on gender and grade level are presented in Table 3.

Table 2. Mean and Standard Deviation Scores for Middle School Students' Perceptions and Attitudes Toward
Artificial Intelligence

Dimension	N	X̄	Sd	Level
Positive perception	168	57.38	.85	Moderate
Negative perception	168	27.01	.97	Low
Attitude Toward Using Chat-GPT	168	18.35	.54	Moderate
Total	168	102.75	1.23	Moderate

Table 3. Findings Related to Middle School Students' Perceptions and Attitudes Toward Artificial Intelligence
According to Gender and Grade Level

Variable		N	X̄	Sd	p
Gender	Girl	93	102.4	17.8	.76
	Boy	75	103.1	13.5	
Grade	7th grades	72	109.66	15.87	.001*
	8th grades	96	97.56	14.15	

As shown in Table 3, when examining the total scores of students' perceptions and attitudes toward artificial intelligence, female students had a mean score of 102.4, while male students had a mean score of 103.1. The results indicated no statistically significant difference between the groups based on gender. However, when analysed by grade level, it was found that seventh-grade students had a higher mean score (M = 109.66) compared to eighth-grade students (M = 97.56). This difference was found to be statistically significant, suggesting that grade level plays an important role in shaping students' perceptions and attitudes toward artificial intelligence.

The students' responses to the question "What does artificial intelligence mean to you?", which was asked to explore their general opinions about AI, eleven students described artificial intelligence primarily as a tool for accessing and expressing information. These students emphasized that AI systems help them retrieve knowledge quickly and efficiently, particularly when conducting research or completing homework assignments. One student, for instance, remarked that they could "easily learn anything [they] want" using AI and even receive help with generating content, such as writing a paragraph on the benefits of oranges. Such reflections reveal that students perceive AI as a facilitator of autonomous learning and digital literacy. Seven participants associated artificial intelligence with convenience and efficiency, specifically highlighting its time-saving benefits. These students viewed AI as a support mechanism that assists them in managing their academic responsibilities more effectively. One female student explained that AI allows her to "easily access nearly everything" in both the digital and physical world, adding that it simplifies daily tasks and provides support in completing schoolwork.

In contrast, a smaller group offered more conceptual or futuristic interpretations. Two students saw artificial intelligence as a symbol of the future, referring to it as a powerful innovation that will influence "every area of life." Meanwhile, one student associated AI with superior intelligence, noting its capacity for analytical thinking and problem-solving, and another highlighted its creative potential, especially in design and production tasks. Overall, these findings indicate that most students regard artificial intelligence not only as a practical tool in

educational contexts but also as a transformative technology with far-reaching implications for the future.

An integrated analysis of both the quantitative and qualitative findings reveals a coherent and mutually reinforcing outcome. The data suggest that middle school students generally maintain a moderately positive perception and attitude toward artificial intelligence. Quantitative results demonstrated moderate levels of positive perception and ChatGPT usage, while negative perceptions were found to be low. These numerical patterns are mirrored in the qualitative responses, where students frequently expressed that artificial intelligence helps them access information more easily, complete assignments faster, and manage learning tasks more efficiently. Interviewed students often described AI as a supportive presence in their academic lives, citing examples such as writing assistance, summarizing content, or retrieving facts instantly. This practical and efficiency-focused appreciation reflects the attitudes captured through the scale. Furthermore, the lack of statistically significant differences between genders, alongside the observed grade-level differences, is supported by qualitative evidence in which younger students tended to view AI more enthusiastically than their older peers. Taken together, the data indicate that students do not perceive AI as a source of anxiety or resistance. Instead, they regard it as a useful, manageable, and supportive tool that enhances their learning experiences and helps them feel more competent and autonomous in educational contexts.

As part of the exploration of students' general opinions about artificial intelligence, their responses to the question regarding the use of AI in daily life are presented in Figure 1.
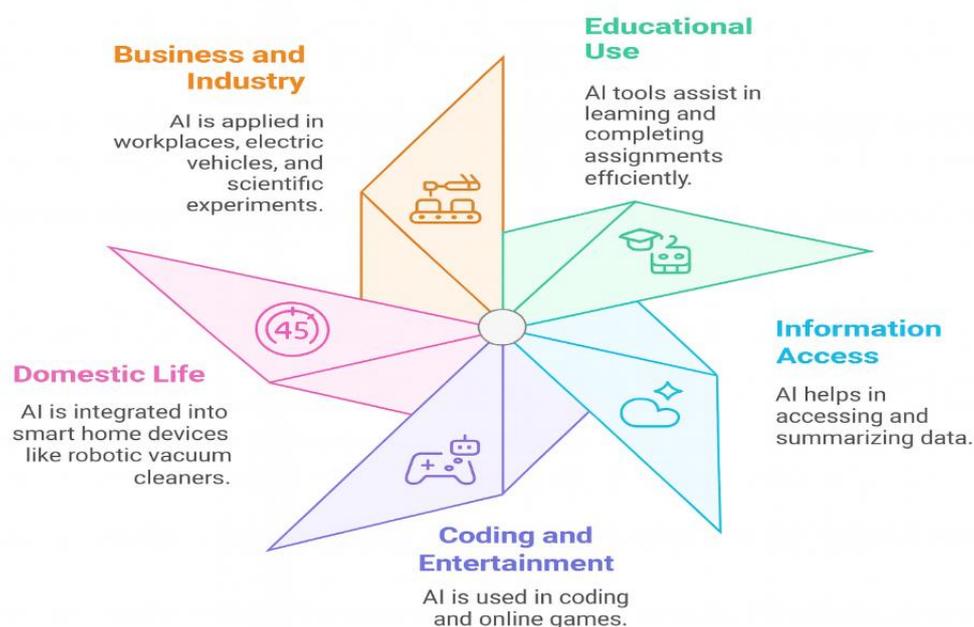

Figure 1. Students' Responses to the Question on the Use of Artificial Intelligence in Daily Life

As illustrated in Figure 1, fourteen students reported that artificial intelligence is particularly useful in learning and educational processes, especially in conducting research for assignments. They emphasized that AI tools help them complete homework more efficiently and serve as reliable academic assistants. In addition to educational use, five students mentioned that AI is beneficial in accessing information and summarizing data in everyday

contexts. Other responses reflected more diverse applications. One student referred to the use of AI in coding and digital entertainment, especially through online games. Another mentioned smart home devices, such as robotic vacuum cleaners, as examples of AI integration in domestic life. Additional comments included references to business and industrial applications, such as calculations in workplaces and the use of AI in electric vehicles, robotics, and scientific experimentation. For instance, S1-F noted that AI is helpful for entertainment (like computer games), makes housework easier with devices like robotic cleaners, and supports studying and homework tasks. She also added that it assists with workplace calculations and much more. Similarly, S5-F highlighted that electric vehicles, such as Tesla, use AI for sensory functions, and that AI can facilitate dangerous or complex scientific experiments through intelligent robotics. Another participant, S7-M, pointed out that AI allows users to easily access information they don't know, especially when trying to understand topics they are curious or confused about. These responses indicate that students recognize the multi-functional role of AI, not only in academic settings but also in daily practical contexts, ranging from education to entertainment, technology, and domestic life.

As part of students' general opinions on artificial intelligence, their responses to the question regarding which AI tools they use, the majority of interviewed students (fourteen out of seventeen) reported using ChatGPT primarily for research purposes and completing assignments. This suggests that ChatGPT is widely perceived as a practical educational tool among middle school students. Additionally, three students mentioned using Copilot as a conversational AI tool, mainly for informal dialogue and entertainment. A smaller group of students, specifically two participants, indicated that they used AI tools such as Picsart AI and Ideogram for generating images and visual content. Only one student stated that they do not use any artificial intelligence tools at all. Several student statements further illustrate these patterns. For instance, S4-M explained that he uses ChatGPT for academic tasks such as homework, Copilot for casual conversations, and Picsart AI for creating images and visuals. Similarly, S8-M shared that he relies on ChatGPT not only for completing school assignments but also for satisfying everyday curiosities. He also noted using Picsart AI to create visuals and edit photographs.

These findings suggest that middle school students are not only familiar with multiple AI tools but are also able to differentiate their functional roles—from academic productivity to creative expression and personal assistance. This versatility in usage underscores the growing integration of artificial intelligence into students' daily academic and technological routines. As part of students' general opinions regarding artificial intelligence, their responses to the question about the use of AI tools in educational processes, fourteen out of seventeen students stated that artificial intelligence tools contribute positively to teaching and learning processes, primarily because of their ability to provide easy and fast access to information. Students reported using AI to support various academic tasks, such as completing homework, reviewing lessons, and solving practice questions. These applications were seen as enhancing their efficiency and understanding in subjects like mathematics and language.

For instance, S2-F mentioned that AI has a positive impact on her academic performance and that she already uses it regularly in daily life. She explained that she turns to AI when she cannot solve a math problem or when she encounters a difficult language question, although she only asks for help with the parts she finds truly challenging. Similarly, S6-M highlighted that AI significantly contributes to his learning, especially in

mathematics. He shared that he often asks AI about problems he does not understand or uses it to clarify points during study sessions. However, two students reported that they do not find AI effective in educational settings. They explained that assignments completed with the help of AI are often easily distinguishable from those done independently, raising concerns about authenticity and academic integrity. For example, S4-F noted that although AI can answer almost any question due to its large knowledge base, it may sometimes provide incorrect information. She also emphasized that when AI is used for assignments, teachers can easily detect the difference between AI-generated content and student-created work. Only one student, S1-M, stated that he does not use AI tools in his educational activities at all. He believed that relying on artificial intelligence in schoolwork could hinder his personal development by reducing opportunities for independent thinking and learning. These findings reflect a general consensus that AI tools can be beneficial in supporting students' academic efforts. However, they also highlight a minority of students who express critical concerns related to overreliance, reduced originality, and the potential negative impact on learning autonomy.

The students' responses to the question regarding their concerns about artificial intelligence and its potential harm are presented in Figure 2.
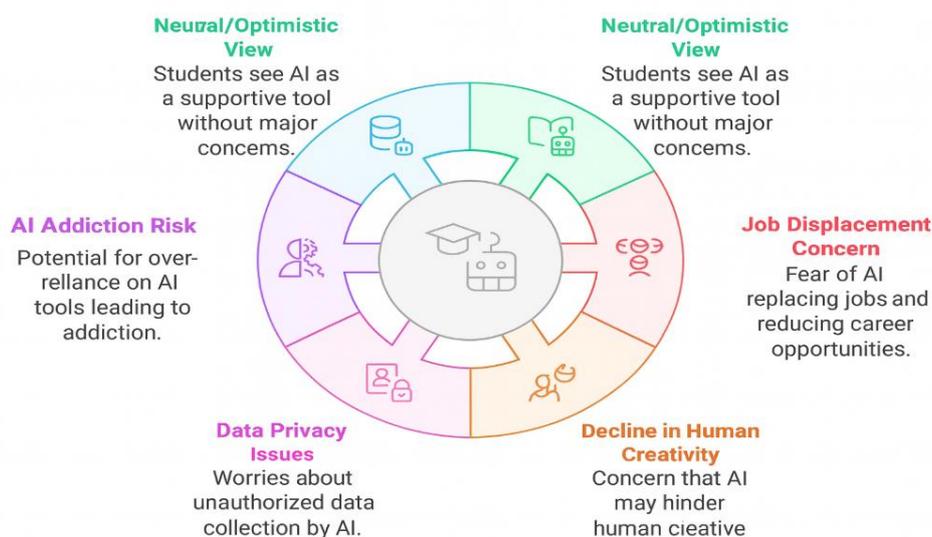

Figure 2. Students' Responses to the Question About Concerns and Perceived Harms of Artificial Intelligence

As seen in Figure 2, more than half of the students (ten out of seventeen) reported no significant concerns about artificial intelligence and stated that they do not consider it a threat to humanity. These students emphasized that the outcomes of using AI depend largely on how responsibly individuals choose to use it. For example, S1-M explained that he is not worried about AI because "how good or bad it becomes depends on how we use it," adding that if used efficiently, AI can offer many benefits. Similarly, S2-F expressed confidence in AI, saying that it makes life easier and helps people access information quickly and effectively. Nevertheless, several students voiced critical concerns about the possible negative consequences of AI in the long term. A number of participants highlighted the risk of job displacement, arguing that as AI becomes more advanced, the need for human labor in certain professions may diminish. Others were worried about a decline in human creativity, as AI tools become capable of generating ideas and solutions with minimal human input. S5-F pointed out that "AI could be harmful

in some cases," particularly in terms of fostering dependency. She added that such risks can be mitigated by setting clear boundaries and limits on AI use. Likewise, S7-M noted that overreliance on AI might "cause people to lose touch with real-life social interactions" and reduce human-to-human communication over time. Concerns about data privacy were also mentioned, with a few students expressing unease about the possibility of AI tools collecting personal or sensitive information without consent. S4-F remarked that while she values the convenience of AI, she is cautious about sharing too much information through digital platforms, as it could be misused or exploited. In summary, while the majority of students held optimistic and pragmatic perspectives on AI, a smaller group demonstrated critical awareness of its potential social, emotional, and ethical drawbacks. These nuanced responses reflect a growing consciousness among young learners about both the opportunities and challenges posed by artificial intelligence in everyday life.

Several students indicated that they had encountered artificial intelligence tools during Information and Communication Technology (ICT) classes, though often only in a limited or introductory capacity. Most participants emphasized the need for more in-depth coverage of AI concepts within the formal curriculum. For example, S8-M shared that AI tools were mentioned briefly in fifth and sixth grade but that the lessons did not provide enough depth. He explained, "We only talked about AI a little bit in ICT class, but I think it wasn't enough. We need more time for AI, because it's the technology of the future, and we should be learning to use it." Similarly, S1-F added, "In class, we mostly learn about basic computer skills, but we barely touch on AI. I think we should learn more, especially how to use tools like ChatGPT or image generators."

Several students also referenced the use of AI tools in project-based extracurricular settings, particularly within eTwinning and TÜBİTAK initiatives. These projects provided more practical engagement with artificial intelligence in a creative and collaborative context. S6-F recalled her experience with an eTwinning project: "We created visual content and videos using AI tools. It was really fun and made our project more interesting." Similarly, S7-M described how his group used AI to develop a product prototype in a TÜBİTAK science fair project, adding, "AI helped us generate ideas and improve our designs." S9-F emphasized the motivational effect of using AI in school projects: "When we use AI in group activities, it feels like we're working with real-world tools. It makes the project more exciting and realistic."

These insights suggest that while classroom integration of AI remains minimal, students are increasingly exposed to AI applications through project-based, interdisciplinary learning, which they find both engaging and meaningful. Students shared diverse views when asked whether they would consider a career involving artificial intelligence. A majority of those who expressed interest envisioned themselves in technology-related fields, especially in coding, software development, and computer engineering. S3-M expressed a clear goal, saying, "I want to become a computer engineer and work with AI. I've always liked technology and robots, and I want to build smart systems." S4-F echoed this ambition: "I want to be a software engineer. Since I was young, I've been interested in AI and how it thinks like a human. I want to create programs that can do that." S10-M added, "I like programming, and I want to make games and AI systems that can play with humans. That would be amazing."
Some students linked their future career aspirations to STEM fields that intersect with AI, such as architecture, engineering, space exploration, and design.

S5-M explained, "I want to be a space engineer, and AI will help with building intelligent systems for rockets or satellites." S9-F mentioned an interest in architecture: "I think AI can help us design smarter cities and buildings. I'd like to study that." In contrast, a few students shared that they did not plan to pursue AI-related careers, either due to lack of interest or different personal goals. S2-F stated, "I'm not into technology that much. I'd rather be a doctor and help people directly." S11-M added, "AI is cool, but I don't want to work with computers. I want to do something outdoors like be an environmental scientist." Overall, the findings show that AI inspires many students to dream of future careers in cutting-edge technology fields yet also reveals that some maintain a preference for human-centred or nature-focused professions. The responses reflect a broad spectrum of aspirations, with AI serving as both a motivator and a boundary, depending on students' interests and perceived identities.

Discussion, Conclusion, and Recommendations

The findings of this study revealed that middle school students demonstrated moderate levels of positive perception and attitudes toward artificial intelligence (AI), especially in dimensions related to ChatGPT usage, while their negative perception levels remained low. This suggests that efforts to increase students' awareness of AI's core principles, applications, and ethical dimensions generally yield positive outcomes. Moreover, exposure to emerging tools such as ChatGPT appears to shape students' views of AI as a useful and assistive educational tool. Supporting this, Oruç, Korkmaz, and Kurt (2024) argued that AI applications in education enhance academic achievement and provide instructional opportunities tailored to individual needs. This claim aligns with students' positive views on the role of AI in supporting access to information, time efficiency, and productivity. However, the same study also emphasized certain risks such as security and privacy concerns, which were echoed in the current research by a subset of students.

The study also found no significant differences based on gender in students' perceptions of AI, though grade level did play a significant role, with seventh-grade students showing more favourable attitudes than eighth-grade students. These results suggest that while gender may not influence students' views on AI, developmental and educational stages might. This is consistent with Eker and Halıcı Gürbuz (2024), who found that gender and demographic variables had limited influence on perceptions of AI, whereas Akbay and Yıldırır (2024) reported that middle school students tend to view AI more optimistically compared to high school students, whose perspectives are shaped by more human-cantered metaphors. In alignment with this, younger students tend to be more open and enthusiastic toward new technologies like AI due to their association with innovation and playfulness, whereas older students adopt a more critical and analytical stance. Aksakal, Emre, and Özbek (2024), in contrast, identified gender as a significant factor in shaping AI attitudes among primary teachers, showing that contextual variables can yield different outcomes.

The current study also showed that students viewed AI tools as beneficial in tasks such as homework completion, research, summarization, review activities, and problem-solving. These views resonate with findings from Zawacki-Richter et al. (2019), who reported that AI in higher education enabled faster access to learning resources and personalized feedback, improving productivity and engagement. Holmes, Bialik, and Fadel (2019) similarly

emphasized the value of AI in developing creativity and design-oriented thinking, especially in problem-solving exercises. Nevertheless, some scholars have taken a more cautious stance. Selwyn (2019) emphasized that the increasing use of AI in education may threaten the human dimension of learning by reducing opportunities for critical thinking and social interaction. Williamson (2017) also warned that the use of AI might push education toward a metric-based, algorithmically governed model, where students' autonomy could be undermined. Students in this study also reported frequent use of AI technologies not only in academic settings but also in their daily lives, such as coding, online games, smart appliances, and commercial tools. This is consistent with Dwivedi et al. (2021), who noted that smart devices and AI-based recommendation systems are rapidly shaping consumer behaviour and daily decision-making.

While many students expressed strongly positive views about AI—largely due to its ability to support learning, simplify daily tasks, and offer meaningful solutions—some also voiced concerns. These included the elimination of certain professions, the diminishing of creativity, invasion of privacy, dependency, and reduced social interaction. literature concerns were raised by a minority of students; they reflect broader themes found in the literature. Frey and Osborne (2017), for instance, highlighted the risk of job displacement due to automation, confirming students' anxieties about the future workforce. Therefore, despite students' generally optimistic outlook on AI, this research demonstrates that they also maintain a critical awareness of its potential risks. To ensure that the opportunities provided by AI in both educational and personal contexts are ethically and productively leveraged, it is crucial to foster ethical awareness, digital literacy, and human-guided implementation strategies. Educational environments must balance technological advancement with reflective and ethically grounded practices, preventing overdependence and promoting responsible AI use. Luckin et al. (2016) emphasize that educators should guide students through AI experiences in ways that preserve critical thinking and human creativity.

In conclusion, while artificial intelligence offers promising benefits for personalized learning, creative support, and task efficiency, it is imperative that these technologies are positioned within ethical, pedagogical, and developmentally supportive frameworks, ensuring that AI remains a tool that enhances rather than replaces the human dimension of education. In light of the study's findings, several important recommendations can be proposed for the effective and ethical integration of artificial intelligence in middle school education. First and foremost, artificial intelligence should be more comprehensively embedded into the school curriculum, particularly within Information and Communication Technology (ICT) courses. This integration should move beyond surface-level discussions and offer hands-on opportunities for students to interact with AI tools in meaningful ways. In addition, given that some students expressed concerns related to data privacy, algorithmic bias, and overdependence, it is recommended that digital citizenship and AI ethics be included in educational content to develop students' critical digital literacy. Teacher training is another essential area, as educators must be equipped not only with technical knowledge but also with pedagogical skills to use AI effectively while maintaining ethical sensitivity. Schools should also support project-based learning initiatives, such as eTwinning and TÜBİTAK programs, which provide interdisciplinary and practical applications of AI.

Furthermore, career guidance and awareness campaigns are necessary to help students explore how AI relates not

only to technology professions but also to areas such as healthcare, architecture, environmental science, and art. To promote healthy learning habits, it is important to guide students toward a balanced use of AI tools, ensuring that these technologies enhance, rather than hinder, original thinking and independent problem-solving. Finally, educational policymakers should establish clear frameworks and regulatory guidelines to safeguard student data, ensure responsible AI use, and foster equitable access to AI-enhanced learning environments. These combined efforts will help maximize the benefits of AI in education while minimizing its potential risks.

Statements and Declarations

References

Adıgüzel, O. C. (2019). *Eğitim programlarının geliştirilmesinde ihtiyaç analizi el kitabı* (2. baskı). Anı Yayıncılık.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Akbay, B., & Yıldırır, H. E. (2024). Ortaokul ve lise öğrencilerinin yapay zekâya yönelik metaforlarının karşılaştırmalı olarak incelenmesi. *International Journal of Computers in Education*, *7*(2), 118–132.

Akgun, S., & Greenhow, C. (2022). Artificial intelligence in education: Addressing ethical challenges in K-12 settings. *AI and Ethics*, *2*(3), 431–440. https://doi.org/10.1007/s43681-021-00096-7

Aksakal, Ş., Emre, İ., & Özbek, M. (2024). Sınıf Öğretmenlerinin Yapay Zekaya İlişkin Tutumlarının Belirlenmesi. *Eğitimde Yeni Yaklaşımlar Dergisi, 7*(1), 1-13. https://izlik.org/JA37YU94PN

Büyüköztürk, Ş., Kılıç Çakmak, E., Akgün, Ö. E., Karadeniz, Ş., & Demirel, F. (2016). *Bilimsel araştırma yöntemleri* (22. baskı). Pegem Akademi.

Chassignol, M., Khoroshavin, A., Klimova, A., & Bilyatdinova, A. (2018). Artificial intelligence trends in education: A narrative overview. *Procedia Computer Science*, *136*, 16–24. https://doi.org/10.1016/j.procs.2018.08.233

Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. *IEEE Access*, *8*, 75264–75278. https://doi.org/10.1109/ACCESS.2020.2988510

Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). Sage

Publications.

Dinler, H. (2025). Development of the artificial intelligence perception and attitude scale (AIPAS): Validity and reliability study. *Bartın University Journal of Faculty of Education, 14*(4), 1283-1304. https://doi.org/10.14686/buefad.1602673

Dwivedi, Y. K., Hughes, L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., … Williams, M. D. (2021). Artificial intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management, 57*, 101994. https://doi.org/10.1016/j.ijinfomgt.2019.08.002

Eker, C., & Halıcı Gürbüz, S. (2024). Matematik öğretmenlerinin matematik dersinde yapay zekâ kullanımına yönelik yeterlilik algıları. *Sosyal, Beşeri ve İdari Bilimler Dergisi, 7*(7), 513–528.

Elçiçek, M. (2024). Öğrencilerin yapay zeka okuryazarlığı üzerine bir inceleme [A study on students' artificial intelligence literacy]. *Bilgi ve İletişim Teknolojileri Dergisi, 6*(1), 24–35. https://doi.org/10.53694/bited.1460106

Frey, C. B., & Osborne, M. A. (2017). The future of employment: How susceptible are jobs to computerisation? *Technological Forecasting and Social Change, 114*, 254–280. https://doi.org/10.1016/j.techfore.2016.08.019

Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial intelligence in education: Promises and implications for teaching and learning*. Center for Curriculum Redesign.

Karasar, N. (2005). *Bilimsel araştırma yöntemi* (15. baskı). Nobel Yayın Dağıtım.

Kayış, A. (2014). Güvenirlik katsayısı olarak Cronbach alfa. İçinde Ş. Kalaycı (Ed.), *SPSS uygulamalı çok değişkenli istatistik teknikleri*. Asil Yayın Dağıtım.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Sage Publications.

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence unleashed: An argument for AI in education*. Pearson Education.

Merriam, S. B. (2015). *Nitel araştırma: Desen ve uygulama için bir rehber* (S. Turan, Çev. Ed.). Nobel Yayıncılık. (Özgün eser 2009'da yayımlanmıştır)

Oruç, T., Korkmaz, O., & Kurt, M. (2024). Primary school students' views on artificial intelligence. *International Journal of Technology in Education and Science (IJTES), 8*(4), 583–601. https://doi.org/10.46328/ijtes.577

Schunk, D. H. (2020). *Learning theories: An educational perspective* (8th ed.). Pearson.

Selwyn, N. (2019). Should robots replace teachers? AI and the future of education. *Learning, Media and Technology, 44*(2), 109–123. https://doi.org/10.1080/17439884.2019.1666281

Suh, W., & Ahn, S. (2022). Development and validation of a scale measuring student attitudes toward artificial intelligence. *SAGE Open, 12*(2), 1–12. https://doi.org/10.1177/21582440221100463

Teo, T. (2011). Technology acceptance research in education. In T. Teo (Ed.), *Technology acceptance in education* (pp. 1–16). SensePublishers. https://doi.org/10.1007/978-94-6091-487-4_1

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly, 27*(3), 425–478. https://doi.org/10.2307/30036540

Williamson, B. (2017). *Big data in education: The digital future of learning, policy and practice*. SAGE Publications.

Yıldırım, A., & Şimşek, H. (2021). *Sosyal bilimlerde nitel araştırma yöntemleri* (12. baskı). Seçkin Yayıncılık.

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education—where are the educators? *International Journal of Educational Technology in Higher Education*, *16*, Article 39. https://doi.org/10.1186/s41239-019-0171-0