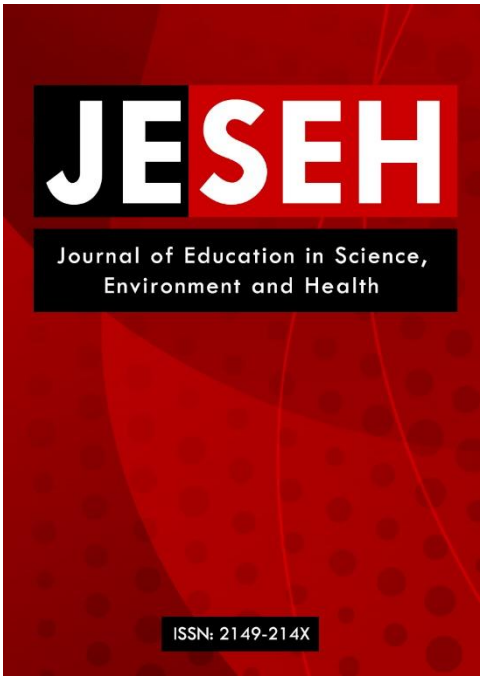

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Gifted Students' Perceptions of Artificial Intelligence through Drawings: A Perspective from Science and Art Centers

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Abstract

Artificial Intelligence (AI) emerges as the development of computer systems and software that imitate human abilities and perform human-like tasks. Understanding what gifted students think about this system that includes deep cognitive abilities is considered important. Based on this premise, this study examines the perceptions of gifted students towards the concept of AI. The research was conducted using phenomenological design, a qualitative research method. The data of the research were collected from 50 gifted students enrolled at a Science and Art Center and selected through a convenience sampling method. The "Draw-Write" form was used as the data collection tool. The data obtained were analyzed using content analysis, consistent with the nature of qualitative research methods. The study shows that participants may have three types of positive, neutral and negative roles related to AI. The research findings suggest that gifted students perceive AI as both a supportive tool and a potential competitor to human capabilities. The research showed the need for ethical considerations and awareness of the societal impacts of AI. Their futuristic vision shows that they are ready to explore the potential applications of AI in various fields. By recognising and addressing these perspectives, educators and policy makers can foster an environment that balances innovation with ethical responsibility and enables AI to serve as a tool for collective progress.

Introduction

Artificial Intelligence (AI) has emerged as one of the most significant technologies of the future, creating a profound impact in the scientific and technological domains in recent years. AI is defined as a set of algorithms and systems developed to enable machines to perform human-like tasks and includes processes that simulate human intelligence (Russell & Norvig, 2016; Isler & Kılınc, 2021). This technology not only performs complex processes such as data analysis, learning, problem-solving, and decision-making but also adapts to dynamic conditions by learning and improving from the data it receives.

Today, AI is revolutionizing sectors such as healthcare, education, finance, and manufacturing, profoundly transforming the operations within these fields (Kaplan & Haenlein, 2019). From diagnosis and treatment processes in healthcare to risk management and data analysis in finance, from personalized learning environments in education to automation in manufacturing, AI offers transformative innovations across a wide range of applications. The potential of AI in the field of education is equally expansive. This technology has the potential to reshape educational environments with adaptable learning systems in line with educational management, student success tracking, and individual learning needs (Holmes et al., 2019; Arslan, 2020). With the power of big data analytics, it is now possible to create personalized educational experiences that adapt to each student's unique learning pace and style. These AI-supported learning systems offer a powerful tool to better understand students' needs and shape educational processes accordingly (Arslan, 2020; Kocyiit & Darı, 2023; Tekin, 2023).

However, the incorporation of AI into education also necessitates an evaluation of societal and individual perceptions and attitudes towards this new technology. Examining how students perceive AI is crucial for understanding the societal integration and acceptance of this technology (West & Allen, 2020). Learning about the social acceptance of artificial intelligence and its potential future areas of use is possible by understanding individuals' perceptions of this technology (Pirim, 2006). In this context, the variability in perspectives towards AI based on age and cognitive abilities necessitates the analysis of different demographic groups' viewpoints. Particularly, individuals with advanced creative and critical thinking skills, such as gifted students, hold significant importance in this regard. Gifted individuals, known for their abstract and analytical thinking skills, tend to be more sensitive to technological advancements and are inclined to critically analyze these developments (Renzulli, 2012). Often, their unique perspectives on innovations and complex issues enhance their potential to

comprehend societal advancements. Therefore, examining gifted students' perceptions of AI can provide valuable insights into how they might interact with this technology in the future. The critical perspective of gifted students can be decisive both in the evaluations of the social effects of AI and in the acceptance of this technology in society.

The way this group of students perceives AI can be analyzed across a broad spectrum. The concept of AI can be interpreted by students from utilitarian, critical, or futuristic standpoints. Some perceive AI as a tool that supports humans and enhances quality of life, while others view it as a competitive force or a technology capable of disrupting societal order (Bostrom, 2016). As highlighted in the literature, while some individuals see AI as a beneficial support for humanity, others consider it a potential threat. Among gifted students, there is often an awareness of the potential dangers of AI, coupled with both positive and negative perspectives towards this technology. In education, AI's potential role can be perceived as a factor encouraging students to seek more interactive and suitable solutions for learning processes (Brynjolfsson & McAfee, 2014).

The perceptions of gifted students regarding AI serve as significant indicators of how societal acceptance of this technology might evolve. Their perspectives not only shed light on the impacts of AI in education or the workplace but also offer insights into how AI will be accepted by society in the future (Siau & Wang, 2020; Keskin & Ozkan, 2022). The purpose of this study is to gain an in-depth understanding of the perceptions of gifted students towards AI and to evaluate the potential implications of these perceptions for the societal integration of AI technology. Understanding how young individuals evaluate AI from different perspectives can contribute to the more conscious and beneficial application of AI in education and other sectors.

Purpose of the Study

The primary purpose of this study is to explore the perceptions of gifted students towards the concept of artificial intelligence (AI). Investigating these perceptions not only helps to understand their thoughts on this technology but also provides significant insights into the societal acceptance and impact of future technological advancements. In this context, the study seeks to answer the research question: *"What are the perceptions of gifted students towards the concept of artificial intelligence?"*

Method

Research Design

The study was conducted using phenomenological design, a qualitative research method. This approach aims to analyze in detail how individuals experience and interpret a phenomenon. Phenomenological research focuses on the shared meaning of lived experiences related to a phenomenon or concept (Creswell, 2013). In this study, the phenomenon of interest is the concept of artificial intelligence. Thus, the primary focus of this research is to investigate how gifted students understand, interpret, and conceptualize AI.

Participants

The data for the study were collected during the fall semester of the 2024-2025 academic year from 50 gifted students enrolled at the Science and Art Center (SAC), selected through convenience sampling. The demographic characteristics of the participants are presented in Table 1.

Table 1. Demographic characteristics of the participants

Groups	**Number of Students**	**Female**	**Male**
Support	27	13	14
ITR	14	8	6
STD	7	4	3
Project	2	1	1
Total	**50**	**26**	**24**

When the demographic characteristics of the 50 students in the study group are examined, it is seen that 26 are girls and 24 are boys. These students are divided into four groups based on their individual needs and talents: “Support”, “Individual Talent Recognition” (ITR), “Special Talent Development” (STD), and “Project” groups. Students continue their education at SAC in different groups according to their individual needs and talents. The Support group comprises students aged 7-12 who require guidance in developing basic skills in specific areas. The ITR group focuses on helping students aged 9-14 discover their potential and build self-confidence by recognizing their strengths.

The STD group supports students aged 10-16 with specific talents to advance their abilities to a higher level. Finally, the Project group involves students aged 12-18 conducting research on a specific subject and produce concrete outputs in order to foster problem-solving, collaboration and creativity skills. Among the groups, the Support group includes 27 students (13 female, 14 male); the ITR group consists of 14 students (8 female, 6 male); the STD group includes 7 students (4 female, 3 male); and the Project group comprises 2 students (1 female, 1 male).

Data Collection Tool

The "Draw-Write" form, developed by the researchers, was used as the data collection tool. The Draw-Write Form is a creative data collection tool used in the study and aims to deeply examine individuals' perceptions of the concept of artificial intelligence. This form allows participants to express their thoughts both visually and in writing. In alignment with the phenomenological design of qualitative research, this form allows participants to visualize their ideas about AI through drawings and provide written explanations. Having students concretize their thoughts about artificial intelligence with a picture over a certain period of time is a valuable method in terms of revealing their mental images and emotional reactions to this concept. The written explanations provided after the drawings allow participants to express their perceptions in more depth, while also revealing their relationship with this concept and their experiences more clearly. This dual-phase process facilitates a multidimensional evaluation of gifted students' perceptions of AI, contributing to the overall aim of the study. Thus, it became possible to obtain important findings on how students interpret the concept of artificial intelligence and the social acceptance of this technology. Participants were given 30 minutes to complete their drawings and provide written descriptions without any restrictions.

Data Analysis

The drawings and written explanations provided by the participants were analyzed using the content analysis method, consistent with the nature of qualitative research. Content analysis systematically identifies themes and codes to understand participants’ perceptions, emotional responses, and experiences with the concept of AI. During the analysis process, the themes and codes evident in the drawings were first identified based on the visual elements and content of the written descriptions. To ensure coding reliability, the analysis involved two independent researchers and a coding list. The reliability of the coding process was enhanced using the Miles and Huberman (1994) reliability formula, which calculated an agreement rate of 95% between the codes. This high consistency among researchers strengthened the quality and reliability of the analyses performed.

Findings

This study delves into the perceptions of gifted students regarding the concept of artificial intelligence (AI). The findings reflect participants' interactions with AI, their interpretation of this technology, and their perspectives on its role in education. Below, the main themes identified in the study and the corresponding participant insights are presented.

Human-Machine Interaction

It was determined that some students depicted the concept of human-machine interaction in their drawings. Selected drawings under this theme are presented in Figure 1.

Figure 1. Drawings by participants S12, S23, and S21.

Below are sample participant statements within this theme:

S14: "*The robot chip is the brain of the robot. This robot has a triangular head with a hole. It is a smart robot."*
S21: "*Artificial intelligence, although a machine, can think like a human brain or give the impression that it can think. AI prevents the loss of time related to a task and provides rapid answers to scientific questions."*
S27: *"AI makes human work easier. We interact with AI so much that it feels like it has become our world. We spend 24 hours with it. It has many benefits, but it could endanger our health, especially our eyesight. Thousands of disadvantages might emerge in the future."*

Students' drawings and explanations show that they associate AI with human-like thinking abilities, perceiving it as an intelligent entity. Based on the drawings and explanations of the students, it has been suggested that they define artificial intelligence as both functional and a structure close to humans.

Artificial Intelligence in Education

It was determined that some of the students created drawings emphasizing the increasing importance of the role of artificial intelligence technology in the education-teaching process. Some participant drawings within this theme are given in Figure 2.

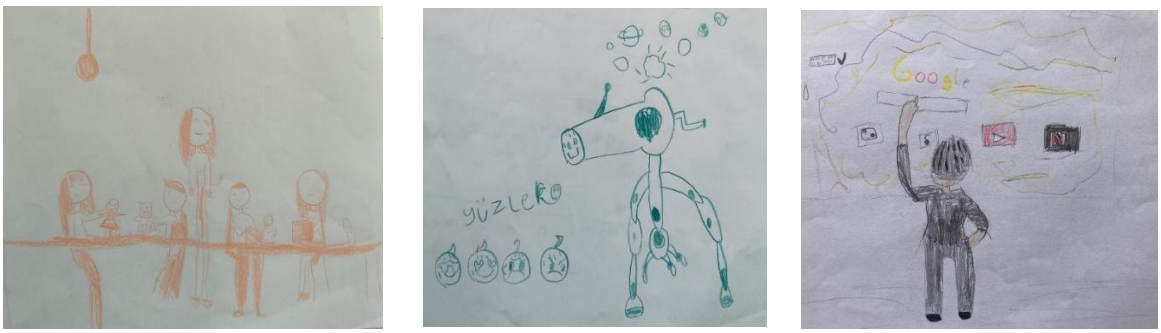

Figure 2. Drawings by participants S6, S47, S48,

Below are sample participant insights for this theme:

S6: *"Teachers often use smartboards in lessons. Smartboards are made with AI, similar to smartphones. They are touch-sensitive."*
S47: *"I find AI fascinating. This AI tool studies planets. You can select the planet you want to see, and it shows it to you."*
S48: *"In class, children build robots. They design different robots, and some upload the data into computers."*

Participants emphasized how AI has transformed educational environments by stating that teachers frequently use smart boards in classes and that these boards are equipped with artificial intelligence. Other students, on the other hand, emphasized the wide range of uses of AI in education and emphasized the impact of this technology on

teaching processes with the statement, “We use AI a lot in education.” In addition, students drew attention to the interactive and entertaining aspects of AI; for example, one student (S47) stated that AI-supported vehicles have the ability to examine planets and that they were interested in these vehicles. This situation reveals the potential of AI to enrich the learning experience. In addition, students’ designing robots in classes provides a concrete example of the integration of AI into education. These findings reveal students' perceptions of AI as a cornerstone of innovative educational practices and its potential to enrich learning experiences.

Artificial Intelligence and Digital Integration

The theme of "AI and Digital Integration" reflects students' perceptions of AI’s interaction with technological devices. Selected drawings are shown in Figure 3.

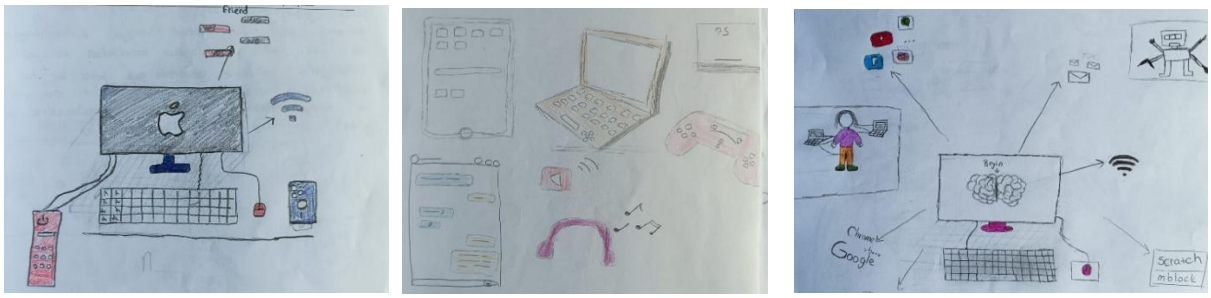

Figure 3. Drawings by participants S2, S31, S34, S31

Below are some participant statements related to this theme:

S2: *“In my opinion, Artificial Intelligence is electronic devices that are useful to humans. Also, robots are artificial intelligence tools: such as computers, robots and smartphones”*
S28: *“Almost every household has at least one technological device. Who makes these devices, and what are they for? Technological devices are created by AI, including phones, tablets, computers, and TVs.”*
S31*: “When I think of AI, technological devices such as programs (WhatsApp, YouTube, Instagram) and music come to mind.”*
S34: *“In this picture, the major role of the internet and technological devices in AI is depicted. Words such as phone, tablet, computer, internet, etc. remind me of artificial intelligence.”*

Some of the students defined artificial intelligence as an underlying concept of technological devices such as computers, smartphones, robots, and tablets. For instance, while one student (S2) stated that artificial intelligence is "electronic devices that are useful to people," another (S28) elaborated on the functionalities and conveniences offered by these devices. It was also emphasized that artificial intelligence provides information flow through media tools such as television. In their drawings and explanations, students provide examples of how artificial intelligence shapes their daily lives and draw attention to the role of this technology in the advancement of science and innovation. Students' thoughts on digital integration with artificial intelligence reveal the importance and impact of integrating this technology into individuals' lives.

Futuristic and Fantastic Visions

Figure 4. Drawings by participants S8, S46 and S25, respectively.

Some gifted students reflected their imagination by exploring AI's potential future applications, resulting in the theme "Futuristic and Fantastic Visions." Selected drawings under this theme are presented in Figure 4. Below are sample insights from participants:

S8: *"If a robot chef is invented, it will tell us what goes best with the food we eat. We don't always know what goes best with which food. Also, this artificial intelligence robot will tell us which drink goes best with the food."*
S18: *"Soon, we will live in space bases thanks to technology. I think it will be like living in the real world."*
S36: *"The cooking robot YEMİ. YEMİ helps elderly people. It buys their household needs from the market. After bringing it home, it asks the elderly what they want to eat and prepares it in an hour. In addition, the robot can connect to the technology and appliances in the house and control them. It can clean and wipe the house."*
S46: *"This thing I drew is a movie technology. What I drew has been in many Godzilla movies. This thing is a robot version of Godzilla and humans have cretaed it. This thing does not exist in reality. Its name is Mechgodzilla."*

Some of the participants stated that artificial intelligence can not only make daily life easier but also offer innovative solutions that can transform human life. For instance, a chef robot designed by a student (S8) will be able to optimize decision-making processes in the kitchen by determining which drink would be more suitable with meals. In addition, another student (S18) imagines the evolution of technology by suggesting the idea of living in space bases. In the students' explanations, it is noteworthy that with the integration of robots into human life, they imagine artificial intelligence-supported systems that help the elderly, take on housework and provide health services. Some students emphasize the elements of science fiction, bridging the gap between the real world and fantasy through the influence of futuristic robots and technological devices in popular culture and their place in the imagination. These futuristic and imaginative perspectives highlight students' capacity to view AI not just as a current technology but as a domain full of potential for reshaping human life in the future.

Fear, Power, Threat and Control Dynamics

The theme of "Fear, Power, Threat, and Control Dynamics" highlights the focus of gifted students on the potential dangers and power dynamics associated with artificial intelligence. Some student drawings reflecting this theme are presented in Figure 5.

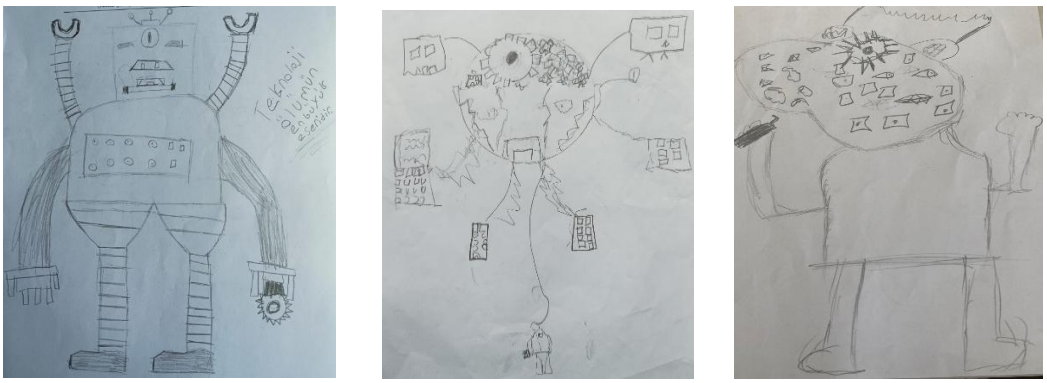

Figure 5. Drawings by participants S3, S13, and S5

The following are selected student statements related to this theme:

S2: *"I think it's good to have artificial intelligence, but if there are robots with their own will, they might harm us."*
S3: *"Artificial intelligence technology is the greatest work of death."*
S5*: "This is Woden. He is an artificial intelligence robot. He competes with the smartest people. People underestimate him at first, but when he defeats them, they give up. When someone powerful comes, he makes him passive. "*
S13*: "This robot produced by artificial intelligence has become very powerful. This tablet, computer, TikTok has taken control of us all."*
S26: *"Robots replacing humans and acting as they wished, and as a result, humans will disappear."*
S34: *"If artificial intelligence is being misused by humans even now, artificial intelligence could become very bad in the future."*

In their drawings and explanations, some students express concerns that artificial intelligence could pose a threat to humanity and emphasize fears such as loss of control in this context. For example, while some students fear that people will lose their jobs as a result of the misuse of artificial intelligence, others think that the rapid development of technology could jeopardize control over human life. Students have embodied their thoughts that artificial intelligence could change the balance of power and gain superiority over humanity in their drawings and explanations. Feelings of fear and threat arise strongly in response to the uncertainties and possible negative outcomes associated with AI. At the same time, the students' willingness to question and discuss the relationship between artificial intelligence and humans plays an important role in shaping social perception on this issue in the future.

Artificial Intelligence and Robotic Systems

The theme of "Artificial Intelligence and Robotic Systems" reflects gifted students' perceptions and expectations regarding the relationship between AI and robotics. In this context, some of their drawings are presented in Figure 6.

Figure 6. Drawings by participants S1, S15 and S19

The following are selected student statements related to this theme:

S1: *"Artificial intelligence makes me operate these devices. I think there is a connection between them. That's why I drew something like this. Robots are becoming indispensable in our lives."*
S15: *"A faucet that works with solar energy. It transmits the "operate" command from the energy cables to the cables and operates the faucets."*
S20: *Home lighting system: They allow us to do many things from a single place, such as the temperature of the house, the lights and many other things. For example, if you tell this device to turn on the room light from where we are sitting, it turns on the room light. The negative aspect is that you will not be able to even stand up anymore, so you will not be able to do sports and as a result, we may encounter many diseases."*
S32: *"When I say artificial intelligence, I immediately think of very smart robots."*
S50: *"My robots do everything. They make pizza, do homework, and a head robot watches them. It manages them and its name is Pokemonrobo."*

Some participants emphasized the influence of AI on robotic systems, showcasing how these systems provide convenience and functionality in daily life. For instance, students highlighted the ability of robots to perform various tasks efficiently, emphasizing the speed and productivity AI enables. Additionally, as S50 describes, students' imaginative robots are envisioned to handle complex tasks alongside routine ones. In this context, these depictions and explanations reveal a comprehensive consideration of AI and robotic systems' societal impact, highlighting their potential benefits as well as their associated risks.

Artificial Intelligence and Games

The theme of "Artificial Intelligence and Games" shows that students reflect different perceptions and experiences of the role of artificial intelligence in the game world. Drawings created by some students within this theme are given in Figure 7. The following are selected student statements related to this theme:

S11: *"Someone named Herobrine has superior characteristics. While making fun of the baby zombie, the baby zombie created a golden armor and they both respect each other. Thus, they become friends forever."*
S17: *"This child named Zeynep is wearing virtual reality glasses and playing a game. At that moment, it starts to rain. Zeynep is standing under a tree. Her friends are calling her but Zeynep doesn't even hear."*

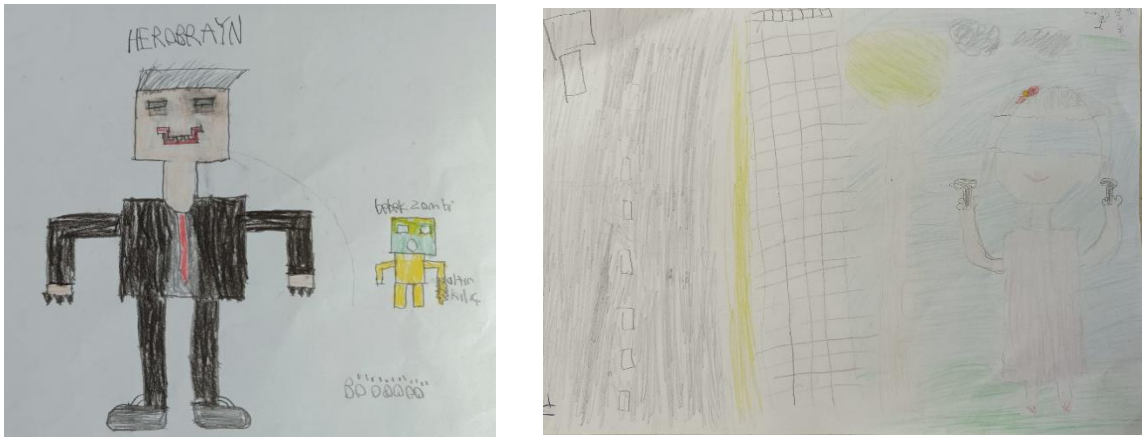

Figure 7. Drawings by participants S11 and S17.

The students' explanations within the scope of the theme "Artificial Intelligence and Games" reveal the impact of this technology on gaming experiences and the interaction between the virtual world and reality. For instance, S11's description demonstrates how AI enhances character interactions within games and the bonds players form with these characters. On the other hand, S17 illustrates the potential consequences of immersive virtual reality technology, such as social disconnection and the neglect of real-world interactions. These insights underscore concerns about how virtual games might weaken social bonds among players

Artificial Intelligence and the Development of Humanity

The students' opinions on the theme "Artificial Intelligence and the Development of Humanity" emphasize the broad impacts of artificial intelligence on society and the individual. Selected drawings are presented in Figure 8.

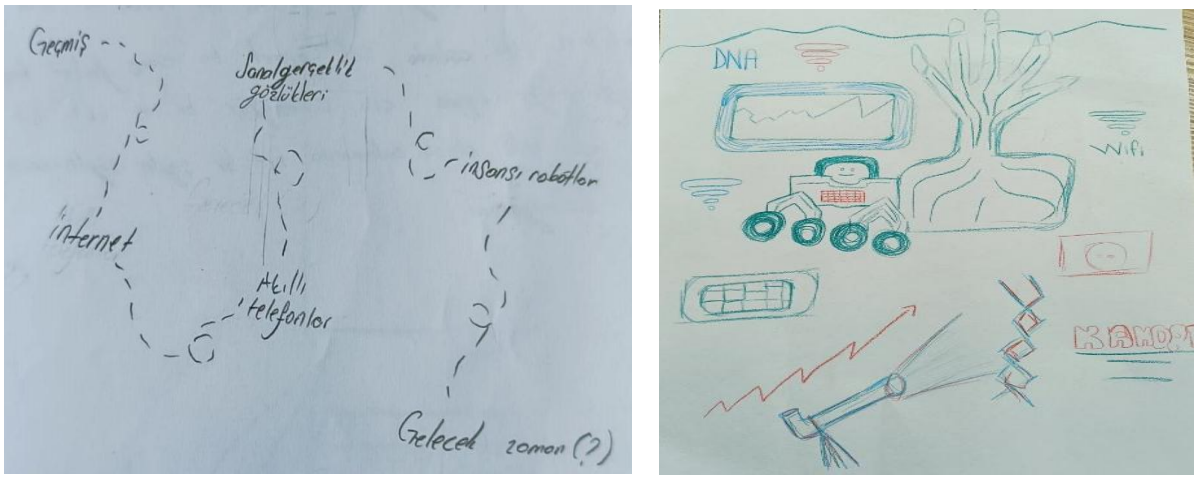

Figure 8. Drawings by S37 and S49

The following are selected student statements related to this theme:

S37: *"I liken artificial intelligence to a journey without boundaries, because no matter how hard you try, it takes everyone on different journeys depending on what you develop or what you want to do. Everyone sheds new light for the future by picking up something on the way with a different route for whatever they want to do with artificial intelligence…"*
S49: *"Artificial intelligence has developed thanks to technology and has also been effective in human life and made life easier. It has been effective in the fields of medicine, education, physics and chemistry, and has shown humanity the light. Many new discoveries and inventions have been introduced thanks to artificial intelligence. New generation robots and new projects have been developed and it has become easier for us to have more information about space and the universe."*

Striking results have emerged within the scope of this theme. For example, S37 likens artificial intelligence to a "journey without boundaries" and draws attention to the role that technology plays in personal and social

development. On the other hand, S49 states that artificial intelligence has made great contributions to humanity, especially in fields such as science, education and medicine. According to this student, thanks to artificial intelligence, space exploration, medical innovations and technological projects have accelerated, and humanity has moved towards a brighter future with new discoveries and inventions. These reflections show how students recognize the critical role AI plays in both individual and collective development.

Negative/Positive Aspects of Artificial Intelligence

As a result of examining the students' views, codes were created regarding the positive, neutral and negative aspects of artificial intelligence, and the created codes were brought together under the themes of "Negative/Positive Aspects of Artificial Intelligence". Table 2 provides the themes and codes regarding the positive and negative aspects of artificial intelligence:

Table 2. Participants' Views on the Positive, Neutral, and Negative Aspects of AI

Theme	Category	Sub-Category	Examples from Data	*f*
Positive Perspective	Technological Innovations	New applications	"Cooking robots can help the elderly." (S36)	7
	AI in Daily Life	Integration into daily tasks	"Phones, computers, smart boards make our work easier." (S16)	10
Neutral Perspective	Dual Nature of AI	Advantages and disadvantages	"The good aspect of AI is gaining knowledge; the bad aspect is addiction." (S7)	8
Negative Perspective	Future Risks of AI	Misuse and harm	"If AI falls into the wrong hands, it could mean the end of the world." (S1)	5
	Ethical Concerns	Misuse and bias	"AI could create fake images if misused." (S24)	6
	Human-AI Interaction	Dependency and autonomy	"Independent robots could destroy humanity." (S26)	4

According to the participants' views, three main themes were reached: positive perspective, natural (neutral) perspective and negative perspective. The positive perspective focuses on the aspects of artificial intelligence that make human life easier and provide practical solutions. Participants stated that technological innovations, especially cooking robots, can provide support to elderly individuals and make daily life easier. In addition, it was stated that artificial intelligence-supported tools such as phones, computers and smart boards make significant contributions to many areas of life by speeding up work. This theme expresses that artificial intelligence can be a positive force for society. The natural (neutral) perspective reveals the dual structure of artificial intelligence, which includes both advantages and disadvantages. Participants exhibited a balanced approach, appreciating the benefits of artificial intelligence, such as acquiring knowledge, and acknowledging that this technology can be addictive and that uncontrolled use can have negative consequences. This theme shows how AI is perceived in different contexts and is met with both hope and reservations. Lastly, the negative perspective focuses on potential risks and threats associated with AI. Concerns include its misuse, ethical dilemmas such as fake content creation, and the possibility of autonomous robots posing a danger to humanity. This perspective underscores the consequences of unregulated and unethical AI use.

Discussion

The study revealed that gifted students perceive artificial intelligence (AI) as a human-like entity and evaluate it based on human-machine interactions. The students' descriptions of AI as a robotic brain, a tool that facilitates human tasks, or an entity capable of human-like thinking suggest that they perceive both its cognitive and social capacities. This aligns with the observations of Erten and Goktepeliler (2022), who stated that AI redefines the human-machine relationship, evolving into a system increasingly perceived as human-like. Such perceptions also correspond to the view suggesting that AI is not merely a technical tool but an interactive entity offering functional benefits (Kaplan & Haenlein, 2019). Furthermore, the students' emphasis on AI's potential health risks brings attention to discussions surrounding the physical and mental health implications of technology (Siau & Wang, 2020; Demirkaya & Sarpel, 2018). These findings indicate that students tend to adopt a critical perspective, assessing both the benefits and risks of technology.

The students' positive assessment of AI integration into educational processes and the use of AI-powered tools in classrooms highlights the transformative potential of technology in education. AI offers broad applications in education, particularly in personalizing and enhancing interactivity in learning processes (Holmes et al., 2019; Incemen & Ozturk, 2024). Their emphasis on the role of AI in education is further supported by examples such as teachers using smartboards in classrooms or students engaging in robot design. Graesser et al. (2001) noted that AI strengthens student-teacher relationships and makes education more inclusive. Students' perception of AI as a tool facilitating the comprehension of scientific concepts demonstrates the effectiveness of AI-supported educational tools in boosting learning motivation (Carbonell, 1970). Hence, the aspects of AI that enrich learning experiences may underpin students' positive attitudes toward this technology.

Students associating AI with digital tools reflect its integration into commonly encountered technological devices. By linking AI to computers, smartphones, and televisions, they demonstrate an awareness of the widespread digital integration of technology, particularly among gifted students who are more engaged with and accustomed to digitalization (Kaplan & Haenlein, 2019; Kırık & Ozkocak, 2023). This situation is due to their greater interaction with technology and their familiarity with digitalization. The fact that students see AI as a basic component of social media applications, music platforms and the internet also shows how the effects of this technology on social life are perceived (West & Allen, 2020). In this context, students' awareness of the integration of AI into daily life shows that they have the capacity to evaluate the social effects of technology.

Gifted students' exploration of potential future uses of AI using their imaginations reflects the breadth of their visions regarding technology. Students' development of futuristic and fantastic themes such as robot chefs, systems that assist the elderly, or living in space in relation to AI provides a strong insight into how AI can transform human life in the future. Developing future-oriented and imaginative themes regarding AI provides an important perspective on how AI can shape human life in the future (Bostrom, 2016; Toprak, 2020; Benli & Fırat, 2024). Futuristic perspectives can be considered as an indicator of the desire to explore the evolutionary potential of technology (Aktas, 2024). As emphasized by Siau and Wang (2020), futuristic thoughts regarding the future role of technology support young individuals' critical thinking and creative problem-solving skills. These forward-looking perspectives suggest that AI could shape societal structures and lifestyles in profound ways.

The findings of the study show that students may perceive AI as a threat. Students' fears that AI may get out of control or replace human jobs reflect concerns about the unknown aspects of technology. Russell and Norvig (2016) stated that the rapid development of AI generates anxiety about control and power dynamics over people. Gifted students' apprehensions about AI's ethical and social implications underscore the importance of addressing these aspects in discussions about technology (Toksoy- Cagal & Keskin, 2023; Abanoz & Acar, 2023). The intense interest of male students in the power and control features of AI shows that gender roles in society are reflected in their perceptions of technology (Akyıldız & Akyıldız, 2020). These findings create concerns about the power of AI over people and emphasize the importance of questioning the ethical boundaries of this technology (Kaplan & Haenlein, 2019).

Students emphasizing the relationship between AI and robotics point to its functionality and the conveniences it offers in daily life. Their recognition of robots performing various tasks and the speed AI provides indicates their appreciation for its practical dimensions. Brynjolfsson and McAfee (2014) highlighted how robotic technologies enhance individual efficiency in daily life. The students' anticipation of robots' growing capabilities demonstrates their belief in the increasing integration of AI and robotics into human life, hinting at broader roles these technologies could play in the future.

Gifted students also recognized AI's impact on the gaming industry, highlighting its power in the entertainment sector. Their emotional attachment to game characters and focus on immersive technologies like virtual reality reflect their understanding of the interaction between virtual and real worlds (Russell & Norvig, 2016; Alanoglu & Karabatak, 2020). It is stated that the realistic experiences created by AI in virtual worlds shape how young individuals perceive this technology (Sarıca, 2019; Copgeven et al., 2023). In addition, the fact that students are disconnected from the real-world during games by using virtual reality glasses supports concerns that virtual games carry the risk of weakening social ties. In this context, the effects of AI on social interaction and individual experience in the gaming sector provide insight into the potential consequences of this technology on social structure.

The findings of the study suggest that gifted students evaluate AI as a power that contributes to the development of humanity. The fact that students perceive AI as a technology that sheds light on humanity in fields such as science, education and medicine points to the transformative power of this technology on society. Kaplan and Haenlein (2019) stated that AI plays a key role in accelerating developments in science and technology. The

students' view of AI as a boundless field of development reflects their innovative perspective (Öztemel, 2020). Their belief in AI's potential to facilitate new discoveries for humanity emphasizes its role as an indispensable part of the future.

Students' evaluation of both positive and negative aspects of AI reveals their awareness of the dual nature of technology. While students drew attention to its positive aspects such as obtaining information, analyzing accidents, and communication, they also emphasized its negative aspects such as addiction, damaging eye health, and deepfakes. Yılmaz et al. (2021) noted that while AI makes significant contributions to society, it also poses ethical and health-related risks. These findings show that students consider the potential negative aspects of artificial intelligence as much as they appreciate its benefits. Students' sensitivity to the correct use of technology and questioning ethical boundaries provide an important perspective for the responsible development and application of AI. (Dasdemir, et al., 2021; Alanoglu & Karabatak, 2020; Cam, et al., 2021)

Conclusion

This study explored gifted students' perceptions of artificial intelligence (AI) and revealed a variety of perspectives on the societal, educational, and technological roles of AI. The findings suggest that students perceive AI as both a collaborative and competitive entity, with human-machine relationships central to their conceptualizations. This dual perspective highlights the functional benefits of AI, such as problem solving and automation, as well as concerns about ethical implications and risks.

Gifted students emphasized the transformative potential of AI in education, particularly in advancing personalized and interactive learning. They associated AI with tools such as smart boards and robotics, emphasizing its integral role in modern educational practices. However, their critical views on over-reliance on technology, health risks, and ethical dilemmas suggest a nuanced understanding of the impact of AI. The futuristic visions presented by the students exhibited creative and forward-thinking attitudes that envisioned AI's capabilities in innovative areas such as healthcare support, space exploration, and advanced robotics.

This creative approach reflects their capacity to think beyond current technological boundaries and to foresee future societal changes brought about by AI.Students have positive, negative, and naturalistic views of AI. Concerns about AI as a potential threat, including fears of displacement and loss of control, are consistent with broader societal concerns. These perspectives underline the importance of addressing ethical issues in the development of AI and ensuring its responsible integration into human life.

In conclusion, the study suggests a balanced view of the thoughts of gifted individuals, appreciating the promises of AI while critically assessing its risks. These views may inform the development of AI education programs that foster ethical awareness and innovative thinking, preparing students to participate constructively in the evolving presence of AI in society.

Key Implications

Gifted students perceive AI as both a supportive tool and a potential competitor to human capabilities.

The research showed the need for ethical considerations and awareness of the societal impacts of AI.

Their futuristic visions suggest that they are ready to explore the potential applications of AI in a variety of areas.

The study shows that participants may have three types of positive, neutral and negative roles related to AI.

By recognizing and addressing these perspectives, educators and policymakers can foster an environment that balances innovation with ethical responsibility and ensures that AI serves as a tool for collective progress.

Suggestions

Students' association of AI with educational tools indicates that it would be beneficial to implement this technology more broadly in education. In this regard, the integration of AI-supported learning tools, smart boards and interactive robot designs into educational environments should be encouraged.

Considering that gifted students have developed awareness of the possible ethical risks of AI technology, courses addressing the ethical dimensions of AI should be added to educational programs. In these courses, students' awareness of the responsible and ethical use of AI should be fostered and their critical thinking skills should be developed about the potential negative effects of technology.

Considering that students see AI as a futuristic and fantastic technology, competitions and project activities should be organized to support them in researching and developing this potential. Such activities can enable students to develop their creativity and innovative thinking skills.

In line with students' emphasizing the negative effects of digital integration and the risks of AI on health, awareness programs should be organized regarding the health risks associated with long-term use of technology. These programs should be implemented to increase students' digital health awareness and encourage them to use digital tools responsibly.

Educational modules should be developed to provide knowledge and skills in the field of artificial intelligence and robotics at an early age. Workshops and events can be organized to enable gifted students to learn the working principles of robotic systems and AI so that they can interact with these technologies profoundly.

Considering the differences in AI perception observed between male and female students, social and cognitive studies should be conducted to examine the effects of gender on technology perceptions. These studies can be conducted to better understand the effects of gender on technological concepts and to contribute to students developing more balanced perspectives on technology.

Scientific Ethics Declaration

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

* The report on the ethical suitability of this research was obtained with the ethics report of Muş Alparslan University dated 03.06.2024 and numbered 8/72.

Conflict Interest Statement

The authors declare that they have no conflict of interest.

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Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Compliance of Ethical Standard Statement

Participants attended research processes, with clear instructions and details about the study and data usage provided upfront. Confidentiality of participants' personal information was ensured.

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