

The Analysis of Sports Science Students Metaphorical Perceptions of Artificial Intelligence

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Abstract

The purpose of this study is to reveal the perceptions of sports sciences students regarding artificial intelligence (AI) through metaphors and to conduct a categorical analysis of these metaphors in order to gain an in-depth understanding of how AI is perceived by the students. A qualitative research design, specifically the "Metaphor Analysis" method, was employed. Data were collected by asking sports sciences students to complete the sentence: "Artificial intelligence is like _____ to me because _____." A total of 222 students participated in the study. The findings were grouped under five themes: facilitator, source of information, threat and risk, human entity, and redundancy. As a result, the majority of sports sciences students perceive AI as a valuable assistant that facilitates their lives and as a resource that provides rapid access to information. However, there is also significant awareness regarding the risks associated with AI and its human-related dimensions. The broad spectrum of students' perceptions of AI offers important implications for the integration of technology into educational processes. It is anticipated that the study's findings will contribute to both academic and practical levels in the design of instructional activities and the pedagogical integration of AI-based tools.

Keywords: Artificial Intelligence Perception, Metaphor Analysis, Sports Sciences Education, Technology Integration, Student Attitudes

Introduction

Artificial Intelligence (AI) has emerged in recent years as a transformative force permeating nearly every sphere of life, exerting profound impacts across diverse disciplines ranging from education and healthcare to sports and security (Padmaja & Lakshminarayana, 2024; Popescu, Corboş & Bunea, 2024; Sharma, 2024). Within the educational domain, AI finds multifaceted applications including access to information, personalization of learning processes, assessment, and content generation (Mimoudi, 2024; Aggarwal, 2023; Gómez Cano & Colala Troya, 2023). Consequently, understanding students' perceptions of AI is of critical significance not only for enhancing the efficacy of pedagogical practices but also for elucidating the broader socio-cultural ramifications of this technology (Krouska et al., 2022; Roe, Furze & Perkins, 2024). Students' attitudes and perceptions towards AI technologies serve as pivotal indicators influencing the successful integration of these tools within educational processes.

Within qualitative research paradigms, metaphor analysis constitutes a robust methodological instrument for discerning how individuals cognitively and affectively apprehend abstract or complex phenomena (Lakoff & Johnson, 1980). Metaphors transcend mere linguistic expressions; they function as symbolic constructs reflecting cultural, social, and cognitive reference points through which individuals externalize their mental representations (Nass & Moon, 2000). Accordingly, metaphors are particularly conducive to uncovering the meanings consciously or unconsciously ascribed to technology by users (Gupta et al., 2024). In a similar vein, metaphor analysis has been effectively employed in sports sciences research, such as the study by (Arikan & Culha, 2021), which explored metaphorical perceptions related to swimming and demonstrated the method's utility in revealing athletes' conceptualizations of their sport. Similarly, (Hoşver & Sarıkol, 2022) investigated sports sciences students' metaphorical perceptions of "play" and "physical activity," providing valuable insight into how these foundational concepts are cognitively construed through symbolic representations. The potential of metaphor analysis to unveil how an abstract and intricate technological entity such as AI is construed by individuals is especially valuable in comprehending students' relationships with technology.

Extant literature examining perceptions of AI reveals a wide spectrum of affective, cognitive, and functional meanings attributed to this technology by students (Shin, 2020; Krouska et al., 2022; Katsantonis & Katsantonis, 2024; Yellapantula & Ayachit, 2019; Walan, 2024). For instance, while some students regard AI as a reliable source of information, others perceive it as a potential threat capable of engendering ethical dilemmas (Azeem & Abbas, 2025; Cheng et al., 2025). This heterogeneity underscores the necessity for a nuanced understanding of how technological tools are internalized by individuals. Particularly among university students, perceptions of such technologies may exert direct influences on their academic achievement as well as their long-term engagement with technology (Gupta et al., 2024; Brey, 2020).

Perceptions of AI encompass not only cognitive evaluations but also emotional responses, expectations, and apprehensions regarding technology. Roe, Furze, and Perkins (2024), through metaphorical analyses, identified characterizations of AI as a "shadow teacher," "all-knowing friend," and "personal assistant" — denoting predominantly positive orientations. Similarly, Krouska et al. (2022) reported that university students appraised AI as a facilitator accelerating learning processes and enhancing individual performance. Conversely, Azeem and Abbas (2025) found evidence suggesting that excessive dependence on AI tools may engender cognitive laziness and undermine critical thinking skills.

In the context of higher education institutions in Turkey, interest in the role of AI in education has been progressively increasing (Altınay et al., 2019; Ermağan & Ermağan, 2022; Haseski, 2019). Particularly following the acceleration of digitalization in the post-pandemic era, both faculty members and students have encountered augmented exposure to these technologies (Turhan & Tutar, 2023; Tutar & Turhan, 2023; Turhan, 2023a; Turhan, 2023b). Nevertheless, comprehensive and context-specific investigations into the perceptions of AI in education remain limited. Addressing this gap, the present study seeks to analyze the perceptions of AI among sports sciences students through metaphors. The discipline of sports sciences encompasses both theoretical and practical components and is directly influenced by technological advancements (Williams & Reilly, 2004). Usage of AI in domains such as data analytics, performance measurement, biomechanical analyses, and e-learning applications is increasing, thereby rendering an understanding of sports sciences students' perceptions towards AI particularly salient (Selwyn, 2019).

While extant metaphor-analytical studies predominantly focus on general perceptions of AI, they often overlook interdisciplinary variations. Different academic disciplines employ technology in distinct manners, leading to diversity in perceptions. Given that sports sciences is a field where technological developments have direct implications for field applications, understanding how students within this discipline perceive AI bears special importance. For example, performance analysis software, training optimization applications, and e-health tools contribute to earlier and more intensive exposure of sports sciences students to AI. Thus, this study represents one of the pioneering efforts aimed at elucidating students' technological awareness and attitudes toward AI within the sports sciences context.

Accordingly, the aim of the present research is to elucidate sports sciences students' perceptions of Artificial Intelligence (AI) through metaphorical expressions and to conduct a categorical analysis of these metaphors to gain an in-depth understanding of how AI is construed by the students.

Material and Method

Ethics committee permission: Ethics committee approval for the conduct of this study was obtained from Harran University (Date: 17.07.2025, Decision Number: E.462986)

In this study, students' perceptions of artificial intelligence were examined through metaphor analysis to achieve an in-depth understanding. A qualitative research design employing the "Metaphor Analysis" method was utilized. Metaphor analysis is an effective qualitative approach for revealing how individuals concretize and make sense of abstract concepts (Lakoff & Johnson, 1980). Additionally, a phenomenological design, one of the qualitative research paradigms, was employed. Data were collected by asking sports sciences students to complete the sentence: "Artificial intelligence is like _____ to me because _____." A total of 222 students participated in the study.

Participants

The participant group consisted of 222 students enrolled in the Faculty of Sports Sciences at a university in Turkey. Participants were selected through convenience sampling and included in the study on a voluntary basis. Data were collected online over a one-month period, and the participation process was conducted voluntarily.

Data Collection Instrument

Data were gathered using an open-ended metaphor completion form. In this form, participants were requested to complete the sentence: "Artificial intelligence is like _____ to me because _____"

_____.” This method allowed participants to express their perceptions of artificial intelligence through metaphors.

Data Collection Procedure

Data were collected online via a Google Form. The link to the form was shared with participants, who were given sufficient time to complete it. The data collection process spanned approximately one month. Prior to completing the form, participants were informed about the aim and scope of the study, and informed consent was obtained through an online consent form.

Data Analysis

Content analysis was employed to analyze the collected data. In the initial phase, the collected metaphors were coded and categorized, followed by grouping these categories under broader themes. The frequency of each theme was calculated to reveal the prevalence and diversity of students’ perceptions toward artificial intelligence. The coding and theme development processes were conducted through mutual consultation and consensus among the researchers, thereby enhancing the reliability and validity of the analysis. The stages of metaphor analysis delineated by Yıldırım and Şimşek (2021) were followed: coding the data, categorizing metaphors, generating themes, conducting validity and reliability checks. Metaphors generated by participants were classified into categories based on their shared characteristics.



Figure 1. Word Cloud for Metaphors

Reliability and Validity

The reliability and validity of the study were ensured through expert review and researcher triangulation. Themes emerging from the data analysis were independently examined, and coding consistency was maintained. Inter-coder reliability was calculated at 90%.

Ethical Considerations

Prior to the study, participants were informed about the purpose and methodology, and their voluntary consent was obtained. Participants’ identities were kept confidential, and ethical

principles were strictly adhered to throughout the research process. The study was approved by the Harran University Social and Human Sciences Ethics Committee under decision number 2025/258.

Findings

The metaphors generated by the students were grouped under five main themes. This section provides a general presentation and interpretation of the statements influencing participants' perceptions within these themes.

Theme	Frequency (n)	Percentage (%)
Artificial Intelligence as Facilitator and Assistant	102	45.9
Artificial Intelligence as a Source of Information	47	21.1
Artificial Intelligence as a Threat and Risk Element	20	9.0
Artificial Intelligence as an Entity with Human Characteristics	32	14.4
Negative Perceptions and Redundancy of Artificial Intelligence	21	9.5

Artificial Intelligence as Facilitator and Assistant (n=102, 45.9%)

This theme, most frequently expressed by students, reflects AI as a tool that facilitates tasks and enhances efficiency across various domains of life. Common metaphors within this category include assistant, convenience, supporter, right hand, practicality, aide, and tool. Students characterize the ease and rapid access to information provided by AI as a supportive mechanism offering practical solutions both in educational processes and daily life. Underlying these perceptions is a functional and efficiency-oriented perspective focused on improving academic performance and quality of daily living.

Artificial Intelligence as a Source of Information (n=47, 21.1%)

Students in this theme perceive AI as a valuable repository offering unlimited access to information. Metaphors such as "library," "encyclopedia," "source of knowledge," "homeland of information," and "search engine" are prominent. Emphasis is placed on AI's capacity to provide instant and comprehensive responses to various inquiries, facilitating academic work and personal information acquisition. In this context, AI is regarded as an effective and reliable reference resource in students' learning processes.

Artificial Intelligence as a Threat and Risk Element (n=20, 9.0%)

Metaphors associated with this theme include "dangerous," "weapon," "darkness," "trap," and "death." Students generally perceive AI as an uncontrollable entity that may lead to unpredictable outcomes, posing potential risks and constituting a threat to humanity. These metaphors highlight concerns regarding ethical issues, security risks, and negative impacts on human life that AI might engender.

Artificial Intelligence as an Entity with Human Characteristics (n=32, 14.4%)

Within this category, students attribute human traits to AI, perceiving it as a social being or an individual capable of forming emotional bonds. Metaphors such as "human," "brain," "child," "mother," "friend," "teacher," and "companion" reflect this perception, suggesting that AI can engage in social and emotional interactions similar to humans. This view transcends seeing AI

merely as a functional tool, defining it as an entity with which one can establish emotional connections, communicate, and seek advice on a personal level.

Negative Perceptions and Redundancy of Artificial Intelligence (n=21, 9.5%)

Students within this theme generally express negative attitudes toward AI, considering it unnecessary and meaningless to use. Prominent metaphors include “unnecessary,” “nothing,” “waste of time,” and “meaningless.” These students exhibit either indifference or an actively critical stance toward AI. Underlying this attitude are beliefs that AI does not contribute to individuals’ cognitive and social skills or may adversely affect personal development in the long term.

Discussion and Conclusion

The metaphors generated by the students indicate that artificial intelligence (AI) plays a significant role in their daily lives, while simultaneously revealing concerns about the threats and risks associated with the widespread adoption of this technology. The emergent themes clearly demonstrate the variability in attitudes toward AI usage. These findings provide important insights for educational policy-making and the integration of technology into educational processes.

Artificial Intelligence as Facilitator and Assistant

Among the most frequently employed metaphors by students were terms such as assistant, convenience, supporter, right hand, guide, and aide, reflecting the perception of AI as an element that facilitates daily life, learning, and decision-making processes. These results suggest that young users tend to view AI technologies as tools enhancing personal productivity. Similarly, Roe, Furze, and Perkins (2024) analyzed AI’s “facilitator” role through metaphors, reporting that students described AI as a “shadow teacher,” “personal assistant,” and “all-knowing friend.” This aligns closely with the “assistant” and “supportive” metaphors found in our data (Roe et al., 2024). Additionally, Krouska et al. (2022) reported that university students embraced AI as a tool that saves time, enables faster decision-making, and supports problem-solving skills during learning processes, directly corroborating the facilitator and efficient learning tool metaphors observed in our study (Krouska et al., 2022).

However, our findings reflect not only functional satisfaction but also emotional attachment. Students’ attribution of AI as “right hand” or “guide” suggests they perceive it not merely as an information provider but as a reliable support in decision-making processes. Thus, our results indicate that AI is ascribed cognitive as well as psychosocial support functions. Nonetheless, the facilitator metaphors observed here diverge from more cautious perspectives reported elsewhere. For example, Azeem and Abbas (2025) argue that although AI supports learning, it may increase dependency and reduce productivity. Such differences may be shaped by students’ level of interaction with AI, usage purposes, and individual learning strategies.

The majority of our sample positioned AI as an effective learning tool associated with a positive technological experience. This can be explained by the increasing prevalence of AI technologies at the higher education level in Turkey and the active use of tools like ChatGPT in classroom and assignment contexts. Furthermore, this student group, identified as digital natives, may have benefited from early and intensive exposure to the facilitative aspects of AI.

Artificial Intelligence as a Source of Information

Students' metaphors describing AI as a library, encyclopedia, source of knowledge, homeland of information, and search engine position AI as a functional repository of information, especially in cognitive and research activities. These metaphors indicate that students frequently rely on AI as a reference tool in academic work. Similarly, Tartuk (2023) found that middle school students commonly associated AI with concepts such as "computer," "information box," and "robot." Despite the age difference, AI's role as a facilitator of information access remains prominent. The more abstract and comprehensive metaphors produced by university students (e.g., "homeland of knowledge") may reflect their higher cognitive abstraction and academic experience. Krouska et al. (2022) observed university students defining AI as a "fast information access" and "study partner," consistent with the "search engine" and "source of information" metaphors in our data. Additionally, Gupta et al. (2024) report that AI is positioned as an "assistant providing access to infinite information," with text generation models like ChatGPT perceived as "personalized information systems."

Students' perception of AI as a reliable reference source also reflects epistemological trust in technological systems for knowledge production and organization. However, this entails certain risks. For instance, Azeem and Abbas (2025) note that students often insufficiently scrutinize the accuracy of AI-derived information, potentially weakening critical thinking skills over time. In this regard, the metaphor of AI as the "homeland of knowledge" may suggest a shift of epistemic authority from humans to technology. Conversely, viewing AI as a "search engine" may reflect a more functional and limited use pattern. These sub-metaphors indicate diversity in students' perceptions of AI's informational function, varying according to interaction type, purpose, and intensity.

Artificial Intelligence as a Threat and Risk Element

The characterization of AI with metaphors such as dangerous, weapon, darkness, trap, and death reveals a substantial level of anxiety, uncertainty, and perceived threat among students. These metaphors suggest that students view AI not merely as a technological tool but as an element capable of producing uncontrollable consequences and encompassing ethical and existential risks. Such findings align with empirical studies in the literature. Cheng et al. (2025), in a large-scale metaphor analysis, describe a transition of AI metaphors from "tool to thief," related to rising public distrust. They emphasize societal concerns over AI's unpredictability and autonomous decision-making capacity, which reinforce threat metaphors. Students' use of metaphors like weapon or trap suggests AI is perceived as not only instrumental but also vulnerable to strategic manipulation. This corresponds with Brey's (2020) concept of the "technological mediation of morality," wherein technological systems influence individuals' ethical decision-making and may supplant ethical norms with artificial coding. Thus, threat perceptions may also express moral apprehensions.

Additionally, metaphors related to AI's uncontrollability (e.g., darkness, death) allude to its opaque "black box" nature. Burrell (2016) highlights that machine learning decision processes are often incomprehensible even to developers, undermining trust. Our threat-themed metaphors indicate that this epistemic uncertainty is felt among students. However, in younger age groups, such threat perceptions appear more limited; Tartuk (2023) reports middle school students predominantly describe AI with positive metaphors such as helper or information provider. Differences may relate to age, cognitive maturity, technological literacy, and engagement intensity with advanced systems like ChatGPT.

Our findings also reveal high awareness of ethical concerns AI may generate in academic settings. Although metaphors directly referencing plagiarism, ghostwriting, or erosion of

critical thinking were not explicitly expressed, representations such as trap and darkness may embody these issues. Azeem and Abbas (2025) similarly highlight risks to academic integrity posed by generative AI tools, noting increased tendencies toward ready-made answers among students.

Artificial Intelligence as an Entity with Human Characteristics

Students' use of metaphors like human, brain, child, mother, friend, teacher, and companion reflects attribution of human qualities to AI, perceiving it not solely as a technological tool but also as a social and emotionally interactive entity. This aligns with anthropomorphic tendencies observed in human-technology relationships.

Literature examining emotional dimensions of human-machine interaction supports this trend. Gupta et al. (2024) found students metaphorically describing AI as "assistant," "parrot," or "colonizing speaker" emphasizing anthropomorphic and communicative features. Similarly, Nass and Moon (2000) propose that humans perceive computers as social actors and exhibit social norms in interactions. Our metaphors such as friend, mother, and companion similarly imply emotional and social meanings attributed to AI. The concentration of anthropomorphic perceptions among university students may be partly due to their direct interaction with natural language processing models like ChatGPT, fostering the perception of AI as a "speaking," "responding," and even "understanding" subject. Roe, Furze, and Perkins (2024) term this the "emotional echo effect," whereby human-like feedback from AI systems predisposes users to social attributions.

Metaphors such as child and mother also suggest developmental or protective roles assigned to AI, indicating meanings constructed not only cognitively but also through themes of attachment, trust, care, and guidance. Shin (2020) similarly notes young individuals' tendency to view social robots or intelligent systems as partners for social bonding rather than mere functional agents. However, this poses risks. Perceiving AI as a conscious or sentient subject may foster unrealistic expectations, leading to overlooking AI's limitations and excessive trust. Coeckelbergh (2022) argues such emotional loading may blur ethical boundaries and weaken critical judgment.

Younger age groups tend to express anthropomorphic metaphors more intensively. For example, Tartuk (2023) reports middle school students describing AI as "smart child," "helpful robot," or "loyal friend." Our study's metaphors, such as brain, teacher, and mother, indicate more advanced conceptual frameworks, potentially reflecting participants' cognitive development, technological awareness, and interaction depth.

Negative Perceptions and Redundancy of Artificial Intelligence

Some students in our study articulated negative perceptions of AI using metaphors such as unnecessary, nothing, waste of time, and meaningless. These metaphors indicate that a portion of students consider AI technologies as unworthy of time and mental effort, even viewing them as hindrances to personal development. This stance suggests a resistance or critical posture toward the affordances of AI, consistent with some critical perspectives in the literature. Azeem and Abbas (2025) argue that generative AI tools may foster "cognitive laziness" among students and weaken intrinsic motivation for learning over time. Excessive dependency on such tools can lead to neglecting higher-order cognitive skills such as reasoning, synthesis, and interpretation. Within this framework, metaphors like waste of time or meaningless reflect concerns about cognitive decline.

Similarly, Selwyn (2019) calls for a critical interrogation of “technological optimism” regarding AI in education, cautioning that assumptions of AI’s capacity to solve all educational problems often diverge from pedagogical realities. The “unnecessary” metaphor in our data may embody such personal-level critiques. The superficial content generation capacity of AI tools might lead some students to perceive them as not contributing to deep learning.

Negative perceptions in this theme may also relate to individual technology attitudes. Vekiri and Johnson (2020) report that students’ meaningful engagement with technology significantly affects their overall attitudes toward it. If students perceive AI tools as misaligned with their learning goals, they are likely to label them meaningless or unnecessary. We observed that students employing such metaphors often maintain a distant or even oppositional stance toward AI. Similar patterns appear in prior studies where some students associate AI tools with “time wasting,” “learning adversary,” or “unreal world” (Shin, 2021; García-Peñalvo et al., 2022). These attitudes are more common among individuals with low self-regulation skills or limited technological literacy. Thus, students perceiving AI as meaningless may have superficial or non-critical relationships with technology.

Nevertheless, the existence of these metaphors also indicates that perceptions of AI’s educational role are neither singular nor homogeneous. Negative attitudes may stem from underutilization of AI’s potential or inadequate pedagogical implementation. The criticisms expressed via negative metaphors reflect not only a stance toward technology but also a systemic questioning of how these technologies are positioned within educational environments.

As a conclusion, according to the findings, sports sciences students predominantly perceive AI as a facilitator that eases daily life, provides rapid access to information, and functions as an effective support tool in educational processes. Furthermore, a significant proportion of students attribute human characteristics to AI, viewing it as an entity open to emotional and social interaction. Simultaneously, some students highlight uncontrollable, dangerous, and risky aspects of AI, expressing ethical and security concerns. Lastly, a considerable number regard AI as unnecessary or ineffective, demonstrating a negative attitude. It is recommended that these diverse perceptions be taken into account in educational policies and processes regarding AI integration in education. Based on the study findings, the following recommendations are proposed:

- Develop content within educational curricula that supports positive attitudes toward AI use.
- Provide training to raise awareness about ethical use and risk management of AI technologies.
- Investigate the underlying causes of students’ negative perceptions toward AI more deeply and develop strategies to transform these perceptions positively.

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