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Systematic Review of the Ethical Use of Artificial Intelligence (AI) Tools in Education

Eğitimde Yapay Zekâ (YZ) Araçlarının Etik Kullanımının Sistematik İncelemesi

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ABSTRACT: AI technology, which is becoming more widespread day by day, also affects education and training processes. The use of AI tools in educational environments provides many benefits to teachers and students. However, the use of AI in education also raises some ethical concerns. The aim of this study was to reveal the ethical issues arising from the use of AI in educational environments. The words "education", "artificial intelligence (AI)" and "ethics" were searched for in Web of Science, Google Scholar, Eric, Taylor & Francis, Springer, PsycINFO, PubMed, Scopus, IEEE, intelligent learning systems (ILS), automatic feedback systems (AFS), automatic assessment systems (ASS), big data (BD), learning analytics (LA), and the "internet of things (IoT)". Further searches were made by adding the keywords "wearable technologies (WT)", "robot (R)", "deep learning (DL)" and "generative AI (GenAI)". Twenty of the 489 studies accessed during the research were included in the scope of the research. Studies that were conducted with an AI-supported system/tools or that examined the ethical dimension of a possible educational intervention from the perspective of any study group/sample were included. Ethical issues arising in the studies were examined in the context of the ethical framework determined by Ryan and Stahl (2021). The general characteristics of the studies included in the scope of the research, research designs, technologies used and ethical issues that arise are presented. In the study, it was determined that eight principles in the context of the ethical framework determined by Ryan and Stahl were of concern for teachers and students.

Keywords: Artificial intelligence tools, education, ethics, systematic review.

ÖZ: Günümüzde gittikçe yaygınlaşan yapay zekâ teknolojisi eğitim-öğretim süreçlerini de etkilemektedir. Eğitim ortamlarında yapay zekâ araçlarının kullanılması öğretmen ve öğrencilere pek çok faydalar sağlamaktadır. Ancak, eğitimde yapay zekânın kullanımı birtakım etik sorunlar da doğurmaktadır. Bu çalışmanın amacı eğitim ortamlarında yapay zekâ araçlarının kullanımından doğan etik sorunları ortaya çıkarmaktır. Araştırmada "eğitim", ''yapay zekâ'' ve ''etik'' kelimelerine akıllı öğrenme sistemleri (ILS), otomatik geri bildirim sistemleri (AFS), otomatik değerlendirme sistemleri (ASS), büyük veri (BD), öğrenme analitiği (LA), nesnelerin interneti (IoT), giyilebilir teknolojiler (wt), robot (r), derin öğrenme (dl) ve üretken yapay zekâ (GenAI) anahtar kelimeleri eklenerek Web Of Science, Google Scholar, Eric, Taylor & Francis, Springer, Psycinfo, Pubmed, Scopus, IEEE veri tabanlarında arama yapılmıştır. Araştırma sırasında erişilen 489 çalışmadan 20'si araştırma kapsamına dâhil edilmiştir. Çalışmaların yapay zekâ destekli bir sistem/araçla yürütülen, olası bir eğitim müdahalesinin etik boyutunu inceleyen ve çalışma grubu/örneklem içermesine dikkat edilmiştir. Çalışmalarda ortaya çıkan etik konular Ryan ve Stahl (2021) tarafından belirlenen etik çerçeve bağlamında incelenmiştir. Araştırma kapsamına alınan çalışmaların genel özellikleri, araştırma tasarımları, kullanılan teknolojiler ve ortaya çıkan etik konular sunulmuştur. Araştırmada, Ryan ve Stahl tarafından belirlenen etik çerçeve bağlamında sekiz ilkenin öğretmenler ve öğrenciler için endişe konusu olduğu belirlenmiştir.

Anahtar kelimeler: Yapay zekâ araçları, eğitim, etik, sistematik inceleme.

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It goes without saying that Artificial Intelligence (AI) has an important place among the technological developments in our age. The origins of AI studies date back to the 1950s, when the question “Can machines think?” was asked by computer scientist Alan Turing (1950, p. 433). Turing (1950) defined ‘‘the computer as a universal machine and argued that a properly programmed machine can behave like a human brain’’ (p. 433). The term "machine intelligence" that Turing coined was renamed "AI" in 1956 as a result of the work of Minsky, McCarthy, Newell and Simon (as cited in Zawacki-Richter et al., 2019).

AI has a number of different meanings, such as “the science of making humans and similar intelligent machines, especially intelligent computer programs.” (McCarthy, 2007, p. 2). Other definitions in the literature include “performance of human-specific behaviors by machines” (McCarthy et al., 2006, p. 1) or “a theory allowing for imitation of human intelligence” (Nilsson, 2011, p. 13). In general, AI can be defined as systems that have the ability to learn in their environment and that can make inferences and adapt based on what they have learned (Hinojo-Lucena et al., 2019). AI is currently being utilized in a wide range of fields from mobile devices to smart home appliances, from industry to energy and mining, from agriculture to health, and from communication to software development (Becker et al., 2018).

The widespread use of AI in recent years has also enabled it to be used in educational environments. Popenici and Kerr (2017) state that AI in educational environments includes information processing systems that learn, synthesize, adapt, self-organize and serve the processes carried out by humans by using data to solve complex problems. Baker et al. (2019) discuss AI tools in educational environments from three different perspectives: a) student-oriented, b) teacher-oriented, and c) system-oriented. Student-oriented AI tools are adaptive and personalized software that students use to learn a subject. Thanks to these systems, students can learn at their own level and learning speed, as well as having the opportunity to actively participate in the lesson by motivating themselves (Hwang, 2014; Popenici & Kerr, 2017). When evaluated from the perspective of the teacher, AI systems reduce the workload by automating tasks such as management, evaluation and feedback. The system-oriented dimension of AI is that it provides institutional level information to administrators in faculties or colleges (Baker et al., 2019). Personalized training programs with AI systems can increase the quality of education by tracking individual performance, preparing course content, and determining the teaching model (Meço & Coştu, 2022).

In addition to all these factors, the ethical dimension of AI is increasingly emphasized and it can be seen that it has become a global concern today (Berendt et al., 2020; Regan & Jesse, 2019). The use of artificial intelligence tools is becoming increasingly widespread, rapidly transforming academic, social and business life. This situation increases both individual and social anxiety, and the ethical issues that may arise in the future and the deep effects it will have on society need to be discussed more (Yeşilkaya, 2022). These problems have led to the idea that human rights and humanitarian values should be taken into account among AI users and developers (Fadhlurrahman et al., 2024). To address the ethical concerns surrounding AI today, government agencies and companies have focused attention on AI ethics. In fact, many expert committees have been established by the European Commission (2019) on AI. Although these institutions and organizations aim to reveal the ethical problems caused by the use of AI, it is clear that

these issues are becoming more relevant day by day and efforts to address them need to be intensified (Borenstein & Howard, 2021; Osasona et al., 2024).

Various principles for AI ethics have been put forward in the literature. These principles are discussed extensively by Ryan and Stahl (2021). Researchers have categorized the principles that should be taken into account when designing systems supported by AI technology as follows: transparency, justice and fairness, privacy, responsibility, non-maleficence, freedom and autonomy, trust, beneficence, sustainability, dignity, solidarity. In this context, transparency (explainability) in AI ethics refers to the transparency of an AI system itself and those who develop and use it. The performance of the system and the purposes for demonstrating this performance should be clearly explained. In other words, the reasoning of AI systems should be explained and the outputs should be interpreted by humans (European Parliament, 2022; Heilinger, 2022; Munn, 2022; Ryan & Stahl, 2021).

Justice and Fairness emphasizes that AI systems should be free from prejudice or labeling that would cause discrimination. AI systems must be accessible to everyone, and mechanisms must be developed by also taking into account any probable discriminatory consequences (European Parliament, 2022; Hagendorff, 2020; Jang et al., 2022; Ryan & Stahl, 2021). Privacy includes the use of both user-provided data and data generated about the user during interaction with the system. Because AI contains a large amount of data, AI developers and corporate users have to prioritize the privacy and personal data of the end user during the design process so that the privacy of individuals is not compromised (Akgün & Greenhow, 2021; European Parliament, 2022; Hagendorff, 2020; Holmes et al., 2021; IEEE, 2019; Jang et al., 2022; Ryan & Stahl, 2021). Responsibility refers to the person(s) responsible for the autonomy of the AI. The focus is on who will be held accountable for the processes of designing, developing and deploying AI (European Parliament, 2022; Hagendorff, 2020; Nguyen et al., 2022; Ryan & Stahl, 2021). In this regard, the main question is whether AI should be held accountable in a human-like way, or whether new models should be developed to assess responsibility (Jang et al., 2022; Ryan & Stahl, 2021).

Non-maleficence principle is about the development, deployment and use of AI in a way that prevents harm to humans. Since the emergence of AI tools, such technologies as killer robots, autonomous cars and unmanned aerial vehicles have become available. It has been the primary issue of AI ethics to make sure that such vehicles do not harm human beings (European Parliament, 2022; Heilinger, 2022; Ryan & Stahl, 2021). Freedom and autonomy relate to AI not harming or impeding the freedom and autonomy of individuals. AI developers must acknowledge and identify situations in which the tool may harm human freedoms during the use of AI and take the necessary measures to remedy this. Existing organizations must ensure that users are informed, are not deceived or manipulated by AI, and are allowed to exercise their autonomy (European Parliament, 2022; High-Level Expert Group on AI, 2019; Ryan & Stahl, 2021).

Trust is considered a fundamental requirement for the ethical deployment and use of AI. In this context, organizations developing AI must prove that the existing tool is reliable. To ensure that the system works as intended, users must be able to trust AI technologies. Users should be able to justly trust AI organisations to fulfil their promises and to ensure that their systems function as intended (European Parliament, 2022; Digital Decisions, 2019; Ryan & Stahl, 2021). Beneficence is related to the benefit that artificial

intelligence tools will provide. It should be made clear to whom and how AI technology will benefit. The benefits should outweigh the costs and apply to as many people as possible. AI tools should serve to improve individual welfare, enable people to benefit from the use of AI tools, and serve peace and social good (Ewijk et al., 2020; IEEE, 2019; Ryan & Stahl, 2021). Sustainability means that AI technology is environmentally sustainable and incorporates environmental outcomes into decision-making processes. Organizations should use AI developed in an environmentally responsible manner, while at the same time the use of AI respects energy efficiency, reduces greenhouse gas emissions, and protects biodiversity (Ryan & Stahl, 2021; Special Interest Group on Artificial Intelligence, 2018). Dignity is about AI tools respecting human dignity, inherent values, and rights. Humans have innate values, and AI developers must ensure that these are respected in the design and use of AI (Ministry of Internal Affairs and Communications, 2017; Ewijk et al., 2020; Ryan & Stahl, 2021; High-Level Expert Group on AI, 2019). AI tools should strengthen the social ties between people and those of different generations, avoid harming them, and increase solidarity among people (Floridi et al., 2018; University of Montreal, 2017; Ryan & Stahl, 2021).

AI tools enable educators to personalize instruction, provide timely feedback, and optimize learning paths for better outcomes. However, their integration in education raises ethical concerns, including transparency, accountability, and algorithmic biases. The opacity of AI systems sparks debates on fairness, impartiality, and potential risks (AlAli & Wardat, 2024). According to Boulay (2023) AI can behave unfairly in the classroom environment, causing learners to be divided into inappropriate groups and presenting a student with tasks that are not ideal or much more difficult than they can handle. There are similar concerns for teachers. According to Lu et al. (2021) AI tools can put the teacher into situations that create serious dilemmas or force them to make a choice. In addition, in research conducted with AI systems, participants are often concerned about issues such as who owns the data, who will access this data, and how long it will be kept (European Commission, 2021).

When the literature is examined, systematic review studies on the opportunities and challenges arising from artificial intelligence tools in educational environments are found. The opportunities offered by AI tools in education (Mouta et al., 2023), the opportunities offered in science education (Almasri, 2024), the impact of AI and computational sciences on student performance (García-Martínez et al., 2023), how it affects students' critical cognitive abilities such as decision making, critical thinking and analytical reasoning (Zhai et al., 2024), its impact on online assessment (Karadağ, 2023), potential implications, possibilities and concerns regarding the use of ChatGPT in education (İpek et al., 2023; Mohebi, 2024; Lo et al., 2024), challenges and opportunities in English language education (Crompton et al., 2024), challenges in higher education (Marengo et al, 2024), ethical issues and challenges faced by instructional designers (Malone, 2024), risks and opportunities of artificial intelligence tools based on publications in Web of Science, ScienceDirect and Scopus (Yusuf et al., 2024), opportunities and challenges of artificial intelligence in K-12 education (Azzam & Charles, 2024).

When the studies in the literature are examined in general, a compilation of the opportunities and challenges posed by artificial intelligence tools in different levels and courses of education is presented. This study aims to highlight the ethical issues arising from AI tools in educational settings based on experimental/sample studies. It is expected

that the study, which focuses on the ethical concerns expressed by the participants, will contribute to the relevant literature. When it comes to the use of AI in educational environments, it is crucial to be aware of the ethical problems that may arise for both learners and teachers. Bearing these in mind, the present study aimed to review studies dealing with the use of AI technology in educational settings in an ethical context. To this end, it sought answers to the following research questions:

1. What are the common characteristics of the studies reviewed?
2. What research methods and data collection tools were used in the studies?
3. What technologies were used in the studies?
4. What ethical issues were addressed in the studies?

Method

This study was conducted as a systematic review. The purpose of this method is to reveal studies to be included or excluded by addressing specific questions based on a clear, systematic and repeatable search strategy (Gough et al, 2017). The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) was followed to conduct this systematic review (Page et al., 2021). The studies were reviewed by two researchers.

Data Collection Process and Analysis

A literature review covering the period between 2016 and 2024 was conducted using Web of Science, Google Scholar, Eric, Taylor & Francis, Springer, PsycINFO, PubMed, Scopus, IEEE Xplore and Science Direct databases, which include current and comprehensive publications related to the research area. The studies to be included in the research were accessed using the keywords presented in Table 1.

Table 1

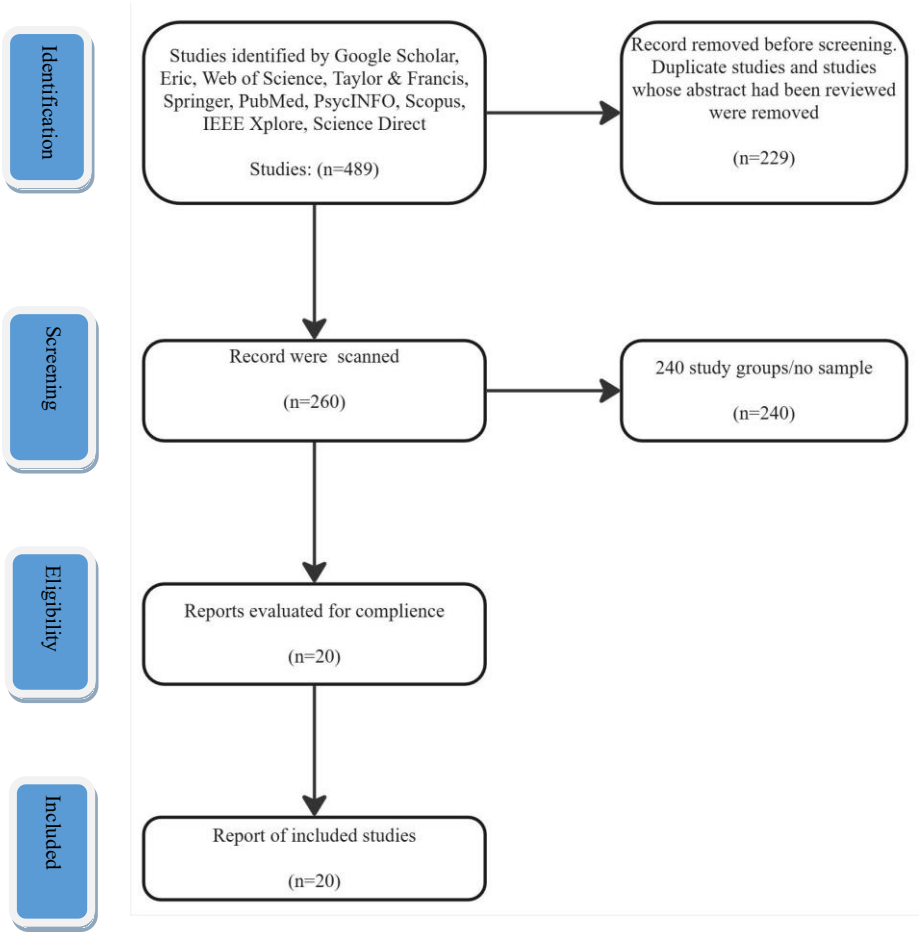
Keywords

Keywords	"education", "artificial intelligence" and "ethics" with the additional key words "adaptive systems", "intelligent learning systems (ILS)", "automatic feedback systems (AFS)", "automatic assessment systems (ASS)", "big data (BD)", "learning analytics (LA)", "internet of things (IoT)", "wearable technologies (WB)", "robot (R)", "deep learning (DL)" and "generative AI (GenAI)"

Studies that were conducted with an AI-supported system or that examined the ethical dimension of a possible educational intervention from the perspective of any study group/sample were included. The first round of elimination was made by examining the titles and abstracts of the 489 studies found. A total of 229 studies that were repeated and whose abstracts were reviewed were eliminated and the remaining 260 studies were screened again. By examining the full texts, 240 studies that did not contain a study group/sample were eliminated and a final total of 20 studies were included in the review. The process, which was carried out according to PRISMA, is presented in Figure 1.

Figure 1

Systematic Review Process Using Prısma



Two researchers analyzed the articles included. The analysis was conducted under the headings of the general characteristics of the research (year, author, publication name, sample and journal), research model, design and data collection tools, technologies used in the research, and ethical problems arising in the research. Content analysis technique was used to reveal the ethical issues raised in the studies. Content analysis is the process of gathering data around certain concepts and themes and organizing them in an understandable way (Şimşek et al., 2008). In order to ensure reliability, consensus among the researchers was ensured during the coding process. In the first stage, the researchers independently scanned the existing literature using the keywords determined within the scope of the research. After the scanning process, the publications reached were compared with each other and a common pool was created. The data analysis process was carried out separately by each researcher for each research question. A third researcher also participated in the process of checking the consistency of the analyses. For example, for the fourth research question, all three researchers examined the principles of Ryan and Stahl (2021) in detail. The two primary researchers analyzed the studies using these principles in the form of a list of themes and codes. Considering the ethical principles outlined by Ryan and Stahl (2021), the statements pointing to these principles in the existing studies were identified. The identified statements were compared with the themes and sub-themes in Ryan and Stahl's (2021) ethical table. In the meantime, the codes reached by all researchers were associated with the relevant themes and sub-themes. All three researchers then met again to compare consistency. At this stage, Miles and

Huberman's (1994) stages of organizing, displaying, describing and verifying the results were followed. For validity, the data inherent in qualitative research were presented in detail and how the researchers reached their findings was explained in detail (Yıldırım, 2010). The studies were coded "P1, P2, P3 etc."

Results

The findings were presented under the relevant headings within the framework of the research questions.

Characteristics of the Studies

Analysis was carried out on the 20 studies meeting the predetermined criteria. Detailed information about the studies is given under the headings of code name, year, author, title, sample, and journal. These findings are presented in Table 2. As can be seen from the table, 15 of the studies were papers published in a journal, while the remaining studies (P7, P8, P9, P10, P14) were conference proceedings given in full text. In terms of distribution by year, four studies were published in 2021 and 2024, three in 2017, two studies in each of the years 2018, 2019 and 2020, one study was published in 2016, 2022 and 2023.

Table 2

Information about the Studies Reviewed

Code	Year	Author(s)	Title of Paper	Participant(s)	Journal
P1	2016	Roberts et al.	Student Attitudes toward Learning Analytics in Higher Education: "The Fitbit Version of the Learning World"	Undergraduate students (35), Graduate students (3)	Frontiers in Psychology
P2	2017	Kerner & Goodyear	The Motivational Impact of Wearable Healthy Lifestyle Technologies: A Self Determination Perspective on Fitbits with Adolescents	Students aged 13-14 (84)	American Journal of Health Education
P3	2017	Remesal et al.	Online Questionnaire Use with Automatic Feedback for e-Innovation in University Students	Pre-school and primary-school students (687)	Media Education Research Journal
P4	2017	Serholt et al.	The Case of Classroom Robots: Teachers' Deliberations on the Ethical Tensions	Teachers doing master's degree (77)	AI & Society
P5	2018	Engen et al.	Wearable Technologies in the K-12 Classroom: Cross-disciplinary Possibilities and Privacy Pitfalls	14-year-old K-12 12 students	Journal of Interactive Learning Research
P6	2018	Ware	Wearable Technologies and Journalism Ethics: students' Perceptions of Google Glass	56 Journalism students	Teaching Journalism & Mass Communication

P7	2019	Nevaranta et al.	Insight on the Finnish Field of Learning Analytics: Applications and Ethics in Adaptive Education Models	Teachers (4) and undergraduate students (138)	Helda Helsingin Yliopisto Helsingfors Universitet, University of Helsinki
P8	2019	Sun et al.	It's My Data! Tensions Among Stakeholders of a Learning Analytics Dashboard	Academics (8) and undergraduate students (20)	In CHI Conference on Human Factors in Computing Systems Proceedings
P9	2020	Ewijk et al.	Teachers' Perspectives on Social Robots in Education: An Exploratory Case Study	Classroom teachers (18)	Proceedings of the Interaction Design and Children Conference
P10	2020	Nevaranta et al.	Students' Perceptions about Data Safety and Ethics in Learning Analytics	Undergraduate students (201)	Proceedings of the Conference on Technology Ethics
P11	2021	Chounta et al.	Exploring Teachers' Perceptions of Artificial Intelligence as a Tool to Support their Practice in Estonian K-12 education	K-12 teachers (140)	International Journal of Artificial Intelligence in Education
P12	2021	Nyland et al.	Piloting Learning Analytics in a Multidisciplinary Online Program	Undergraduate students (338)	Online Learning
P13	2021	Li et al.	Disparities in Students' Propensity to Consent to Learning Analytics	Undergraduate students (119)	International Journal of Artificial Intelligence in Education
P14	2021	Nevaranta et al.	Changes in Student Perceptions of Ethics of Learning Analytics due to the Pandemic	Undergraduate students (133)	Proceedings of the Conference on Technology Ethics 2021
P15	2022	Williams et al.	AI + Ethics Curricula for Middle School Youth: Lessons Learned from Three Project-Based Curricula	Middle-school students (78)	International Journal of Artificial Intelligence in Education
P16	2023	Yu & Yu	Qualitative and Quantitative Analyses of Artificial Intelligence Ethics in Education Using VOSviewer and CitNetExplorer	Graduate students (33, consisting of 31 master's and 2 doctoral students)	Frontiers in Psychology

P17	2024	Acosta-Enriquez et al.	Knowledge, attitudes, and perceived Ethics regarding the use of ChatGPT among generation Z university students	Undergraduate students (201)	International Journal of Educational Integrity
P18	2024	Veletsianos, Houlden & Johnson	Is Artificial Intelligence in Education an Object or a Subject? Evidence from a Story Completion Exercise on Learner-AI Interactions	College or university (48), bachelor's degree (31), high school diploma (8), master's degree (3), professional degree (1), had less than a high school (1) Total=92	TechTrends
P19	2024	Usher & Barak	Unpacking the role of AI ethics online education for science and engineering students	Graduate students specializing in diverse science and engineering (90)	International Journal of STEM Education
P20	2024	Khan et al.	Educating students about the ethical principles underlying the interpretation of infographics	Participants (364) (School of Mathematical and Physical Sciences), data science (School of Computing), and psychology (Department of Psychology)	Teaching Statistics

The studies appeared in the following databases: Web of Science (P1, P17, P18, P19, P20) Taylor & Francis (P2), Springer (P4, P11, P13, P15), ERIC (P3, P12,) and Google Scholar (P5, P6, P7, P8, P9, P10, P14, P16). As regards the participants, it was seen that they consisted of teachers and students from various educational levels. The total number of teachers participating in the studies reviewed was 687. In addition, 8 academics took part in one study as participants. The other group contained students at different stages of education, namely middle-school, high-school, undergraduate, master's and PhD students, with a total of 2694 participants in the studies examined.

Research Model, Pattern and Data Collection Tools

According to the analysis, there were seven qualitative studies (P1, P4, P5, P8, P9, P12, P18), seven quantitative studies (P3, P6, P7, P10, P11, P14, P17,) and six mixed-model studies (P2, P13, P15, P16, P19, P20). The distribution of the studies by research model, pattern and data collection tools is shown in Table 3.

Table 3

Research Model, Pattern and Data Collection Tools Used in the Studies Reviewed

Research Model	Research Pattern	Data Collection Tool(s)	Article	f
Qualitative	Phenomenological Research	Interview	P1, P9, P8	7
	Design-Based Research	Survey and Interview	P4, P12	
	Case Study	Observation	P5	
	Speculative Research	Questionnaire	P18	
Quantitative	Survey	Survey	P6, P10, P11	7
	Longitudinal Research		P14	
	Experimental Study		P7	
	A nonexperimental and Cross-sectional Desing		P17	
	Survey	Scale	P3	
Mixed	Quantitative + Qualitative	Survey	P13, P16	6
		Survey and Observation	P15	
		Survey and Interview	P2	
		Survey and Questionnaire	P19	
		Scale	P20	
Total				20

When the quantitative studies were examined in terms of research design, it was seen that surveys (P3, P6, P7, P10, P11, P14, P17) were the most frequent data collection instrument. In other studies, Longitudinal Research (P14), Experimental Study (P7) and A nonexperimental and cross-sectional designs (P17) were used as quantitative designs. The analysis of the qualitative studies in terms of research design found three phenomenological studies (P1, P8, P9), two design-based studies (P4, P12), one case study (P5) and one Speculative research (P18). In the case study (P5), observation was carried out. In two of the phenomenological studies (P1, P9), data were collected from the participants through focus-group interviews, while the participants were contacted through a semi-structured interview form in the other one studies (P8). In two of the design-based studies (P4, P12), focus group discussions and a questionnaire were used to collect data. In one study (P18) data was collected by online questionnaire. Survey (P6, P10, P11), Longitudinal Research (P14), Experimental Study (P7) and A nonexperimental and cross-

sectional design (P17) techniques were used in quantitative studies. Data were collected by questionnaire (P18) scale (P13) and survey (P6, P10, P11).

The analysis revealed that six mixed-method studies (P2, P13, P15, P16, P19, P20) were included in the review. In those studies, data were collected from participants using both qualitative and quantitative data collection techniques. In the study coded P2, a survey called the Behavioral Regulation in Exercise Questionnaire-2 was applied and focus-group discussions were held. In the study coded P13, researchers analyzed the data they obtained from a survey quantitatively and qualitatively. In the study coded P15, data obtained through survey and observation were evaluated. In P16, a survey called Questionnaire Star was presented to the participants. Bibliometric analysis was performed using VosViewer, and qualitative analysis was performed using CitNetExplorer. Qualitative data were also collected from the Questionnaire Star survey. In the study coded P19, it was collected through Questionnaire and Question Form. In the study coded P20, students were presented infographics and asked to analyze them. After the review process, they were asked to participate in an online survey. In the meantime, data were collected with a pre-test and post-test prepared according to a 5-point Likert scale.

Technologies Used in the Studies

According to Table 4, three studies using WT (P2, P5, P6) were identified. In P2, participants answered the questions "What ethical dilemmas may be encountered when using social media, applications and wearable devices?" and "What ethical procedures should be considered?" The participants used a FitBit device for eight weeks, and then their feedback was obtained. In P5, smart monitoring was used during physical education classes and the device collected data about the students' training, workout, heart rate and location, and this process was followed by interviews with the students. In the study coded P6, the opinions of students enrolled in a Department of Journalism about whether Google Glass could be useful for journalism were examined. A survey was applied to find out their attitudes about the newly available technology, its ease of use, the usefulness of the technology and its subjective measurements.

Table 4

Technologies Used in the Studies Reviewed

Technology	Sub-Technology	Code	f	Total
AI	AFS	P3	1	20
	WB	P2, P5, P6	3	
	R	P4, P9, P15	3	
	LA	P1, P7, P8, P10, P12, P13, P14	7	
	-	P11, P16, P18, P19, P20	5	
	GenAI	P17	1	

Three studies (P4, P9, P15) used R. The study coded P4 aimed to explore teachers' views on the ethical implications of using R in primary education. Within this framework, 77 teachers watched video clips about current developments in social R technology, and a

series of focus-group interviews were held with them. In P9, the researchers aimed to explore teachers' perceptions of concerns and opportunities regarding educational R. Presentations on social R and moral values were given to 18 teachers, and the teachers were introduced to the humanoid robot NAO R. Lastly, in P15 the participants used AI tools such as GAN, Sketch RNN and AI Duet. Throughout the workshops, key ethical issues related to generative AI art were discussed, allowing students to reflect on how machine-made art differs from man-made art. Next, the students were told to develop web-based tools that would allow them to add their own text and drawings in order to create new media.

LA was utilized in seven of the studies (P1, P7, P8, P10, P12, P13, P14). In the study coded P1, higher-education students were asked questions about LA and videos about LA systems were played for them. Following this, the participants were encouraged to discuss LA. In P7, several empirical experiments were conducted at the Finnish University of Applied Sciences to explore students' performance, motivation and perceptions through an LA project called APOA. In P8, interviews were conducted with academics and students at the University of Michigan to reveal their perceptions of e-learning tools. Opinions were received from the participants included in the study via e-mail regarding the design of the "Student Explorer" component of the system. In another study, P10, the students were given a course online (MOOC) and students at the Universities of Helsinki and Satakunta were compared regarding their use of LA and ethical perspectives. Another study, P12, reported on an LA in a fully online, multidisciplinary program employing a pilot planning group of stakeholders with various roles. A pilot application was carried out with the participants (from April to September 2017) before the implementation. Students were offered online classes in seven different courses through a system called Blackboard Analytics for Learn. In the study coded P13, answers were sought to the questions "What are the students' perspectives on the training data used by the LA systems in the form of predictive models?" and “What are the demographic features of students who stated that they would agree to participate and those who would prefer not to participate in this type of use?” in order to reveal the tendencies of university students to consent to LA. In P14, the aim was to explore students’ views, attitudes and expectations about LA and related ethics during the transition to distance education at the University of Applied Sciences in Finland. An online course was given to the participants and their views were then obtained.

In the studies coded P11, P16, P18, P19 and P20 no reference was made to any sub-technology of AI. P11 tried to reveal the perceptions and concerns of 140 K-12 teachers towards AI through a survey. P16 aimed to reveal the opinions of 33 participants (two PhD and 31 graduate students) regarding the use of AI in education. In the study coded P18, 92 participants from different levels, including master's, bachelor's, high school and below high school, were included in the study. The study focused on the question of whether there is a unidirectional relationship between artificial intelligence and learners. In this context, participants were invited to complete the story question. After they were given instructions, they were asked to answer the question ‘What will happen in the future’ and tell a story. Story completion was designed in accordance with a qualitative approach as a part of data generation. The study coded P19 aimed to investigate the role of an online, open and reflective learning module in developing ethical knowledge, awareness and problem solving skills of postgraduate students in science and engineering. A total of 90

participants, including postgraduate students specialized in various science and engineering fields, were included in the study. A module was developed for this purpose. The module is designed to equip students with the ethical knowledge and skills needed to competently handle the ethical intricacies of AI technologies. In this way, students are comprehensively prepared for the ethical challenges they may face in their future professional endeavours. In the study coded P20, it was aimed to raise ethical awareness among future infographic producers. The study included 364 participants from the Faculty of Mathematical and Physical Sciences, the Faculty of Computing and the Department of Psychology. In the study, the five ethical principles of non-maliciousness, usefulness, justice, autonomy, and explainability, which are commonly used in applied ethics were applied.

In one of the studies included in the research (P17) generative artificial intelligence (GenAI) was used. The aim of the study was to evaluate the knowledge, concerns, attitudes and ethical understanding of the use of ChatGPT among Generation Z university students studying in higher education institutions in Peru. In the study, 201 undergraduate students who marked yes to the Google Forms designed as a data collection tool were selected as participants.

Ethical Issues Addressed in the Studies

Themes and codes emerged within the framework of the eight principles of AI determined by Ryan and Stahl (2021). The ethical problems indicated by the participants in each study are summarized in Table 5.

Table 5

Ethical Issues Addressed in the Studies Reviewed

Themes	Reached Codes	Article Code -Technology	f	Unreachable Codes
Transparency	Transparency	P8, P13-LA, P16, P19-AI	4	Explicability
	Explainability	P20- AI	1	Understandability
	–	–	–	Interpretability
	–	–	–	Communication
	–	–	–	Disclosure
	–	–	–	Showing
Justice and Fairness	Non-bias	P1 – LA, P16 - AI	2	Equity
	Justice	P20-AI	1	Non-Discrimination
	Equality	P1- LA, P17-GenAI	2	Fairness
	Inclusion	P6 - WT	1	Consistency
	–	–	–	Diversity
	–	–	–	Plurality
	–	–	–	Accessibility
	–	–	–	Reversibility
	–	–	–	Remedy
	–	–	–	Redress

	–	–	–	Challenge
	–	–	–	Access and Distribution
Privacy	Privacy	P4, P9, P15 – R, P5, P6 -WT P7, P8, P10, P12, P14 - LA P18- AI	11	–
	Personal or private information	P10, P12, P13, P14 -LA	4	–
Responsibility	Accountability	P4, P9 - R	2	Responsibility
	–	–	–	Liability
	–	–	–	Acting with integrity
Non-maleficence	Harm	P4, P9 –R, P11, P16, P20-AI	5	Non-maleficence
	Security	P19-AI	1	Safety
	–	–	–	Protection
	–	–	–	Precaution
	–	–	–	Prevention
	–	–	–	Integrity
	–	–	–	Non-subversion
Freedom and Autonomy	Freedom	P2 – WT, P3 - AFS	2	Choice
	Autonomy	P1 – LA, P20-AI	2	Self-determination
	Consent	P18- AI	1	Liberty
	–	–	–	Empowerment
Trust	Trustworthiness	P10 - LA	1	–
Beneficence	Benefits	P20- AI	1	Beneficence
	–	–	–	Well-being
	–	–	–	Peace
	–	–	–	Social Good
	–	–	–	Common Good
Sustainability	–	–	–	Sustainability
	–	–	–	Environment (nature)
	–	–	–	Energy
	–	–	–	Resources (energy)
Dignity	–	–	–	Dignity
Solidarity	–	–	–	Solidarity
	–	–	–	Socialsecurity
	–	–	–	Cohesion
Total			41	

It was determined that four studies (P8, P13, P16, P19) emphasized the theme of transparency. This principle implies openness on the part of AI developers about its intended use, benefits, harms, and potential consequences. In this context, the participants' concerns about the transparency of the system were emphasized in P8. In P13, the researchers highlighted that 11% of respondents expressed concern about a lack of transparency. One participant's statement about how data is collected and used was: "I have concerns about who will have access to my data and the real purposes for which it is used (i.e. more than optimizing learning for the future)." Similarly, in P16, participants stated that “transparency cannot always be achieved in AI systems.” In the study coded P19, which was reached within the scope of transparency, it reached a high effect size among the questionnaires applied to the participants. A few of the participant students drew attention to transparency and pointed out that both the researcher and the research group should sign the informed consent document. One student stated: ‘‘Both parties should sign a document that provides full transparency about the way data is collected, how the data will be used now and, in the future, and whether there is an AI intervention’’. Another code found within the scope of transparency is explainability. In a study included in the research (P20), findings related to explainability were found. In the current study, the principle of explainability was identified as a major ethical principle among 92 comments. Students described the system presented to them as ‘incomplete information, unclear, inaccurate, incorrect, erroneous, undocumented and unexplained’’. One student evaluated the artificial intelligence tool as: ‘‘It does not clearly convey the work presented’’.

The theme of justice and fairness was discussed in six different studies. Four different codes were developed: non-bias (P1, P16), Justice (P20) equality (P1, P17) and inclusion (P6). According to this principle, unfair biases should be examined and eliminated at every stage of the AI development process. Biases derived from the data used and the results of algorithmic processes must be taken into account. The code of prejudice emerged from both P1 and P16. In P1, researchers noted that bias was the biggest concern expressed by students. Students expressed that LA would have a functional impact on their education and a negative impact on their ability to make personal decisions. Similarly, in the study coded P16, the researchers noted that the participants stated that transparency and privacy as well as justice cannot always be achieved in AI systems. Another code reached within the scope of justice and fairness is justice. In a study on justice (P20), the finding was reached. In the current study, the principle of justice was mentioned by 248 (82%) of 301 participants. In the survey results, the fairness of the artificial intelligence tool was defined as a major ethical principle in 112 comments. In this context, the AI tool was shown with themes such as stereotypical, not representative, no diversity, not inclusive and not fair. One participant said: ‘‘There are no women in the visual. It is not representative’’ and drew attention to the unfair behaviour of the artificial intelligence tool. The code of equality emerged from two study (P1, P17). In P1 which LA was used, the researchers stated that while the participating students revealed their knowledge, attitudes and concerns about LA, they also expressed concerns that their grades could be unfairly affected when extra guidance was provided to a group. In the study coded P17, in which ChatGPT was used, the results show that students' ethical perceptions were significantly affected. Students stated that the artificial intelligence tool leads to academic misconduct and concerns about equality. The last code reached in this context is inclusion. Inclusion was also emphasized in P6. In this study using WT, the researchers underlined that the

participating students were worried that they would look strange to people when they wore Google Glass. This situation was coded in the context of the theme of inclusion, taking into account the fact that AI should not become another tool for exclusion in society, as stated by Ryan and Stahl (2021).

In the context of the theme of privacy, the codes of privacy itself (P4, P5, P6, P7, P8, P9, P10, P12, P14, P15, P18) and of personal or private information (P10, P12, P13, P14) emerged. It was determined that three studies (P4, P9, P15) in which R was used highlighted issues of privacy. In the study coded P4, the researchers quoted a participant who said: "It is a huge problem that the data is based on all students. It includes facial recognition, emotions, everything." In the study coded P9, concerns about privacy were again expressed by a participating teacher, who said, "I think it would be beneficial for me, as a teacher, to see the data before it reaches the parents, in order to avoid problems" and "Imagine this, the robot is working with a small group of children, then you run into this problem: another child's privacy." Similarly, in the study coded P15, the researchers stated that the participating students might be able to deceive them and access their information as if they were an undercover police officer. Two studies (P5, P 6) using WT were found. In the study coded P5, where WT was used, the researchers stated that the participating students emphasized privacy. In the study coded P6, 30.3% of 52 undergraduate students expressed their concerns about privacy by agreeing with the following statement: "I am afraid that Glass will be a problem with personal privacy and will become more of a spying tool." In P18 privacy was identified as the ethical problem most frequently mentioned by the participants (n=14). One participant expressed concern about whether his/her data would 'leak to someone else's social media' as a result of his/her interaction with the artificial intelligence tool. Five studies (P7, P8, P10, P12, P14) in which LA was used were found. In the study coded P7, where LA was used, 85% of 398 undergraduate students, in the context of privacy concerns agreed with the statement "I need to know the data that others have about me", while 91% agreed that "My consent to the use of data largely depends on the application." In the study coded P8, where LA was used, "most of the advisors described SE as a useful tool that makes students' studies more effective and efficient, while a few of them stated that it could have a negative impact on students." Researchers noted that some students expressed a need for better protection of student privacy, that they were concerned that they would be misrepresented and that this caused them stress. In the study coded P10, where LA was used, most of the participants agreed with the statement "I find it risky for my data to be used by third parties." In the study coded P12, the participating students were concerned about how the data collected in the LA system would be used. In the study coded P14, where LA was used, some of the 133 undergraduate students were uncomfortable with their data being collected and monitored by others. Four studies (P10, P12, P13, P14) on personal or private information were found and LA was used in these studies. In the study coded P10, the participating students agreed that the data collected could be used as long as it was beneficial to them. In the study coded P12, the researchers expressed their concerns about the data use of the participating students in terms of the following issues: (i) students' access to the collected data; (ii) how the data is used; (iii) bias in interpreting and acting on data; (iv) the level of access to data by advisors and other students. In the study coded P13, 12.5% of the 119 undergraduate students who participated stated that they were concerned about their academic data being

used in a way that would negatively affect them. In the study coded P14, the researchers reported that students expressed concerns about the collection and use of data.

In the context of the theme of responsibility, the code of accountability emerged from two studies. According to Ryan and Sthal (2021), AI organizations should be aware of problems related to data use and should be held accountable if there are any harmful consequences. In this context, the code of accountability was found in two studies (P4, P9) in which R was used. In the study coded P4, the researchers expressed concerns that teachers might become passive by stating that R functions as a teaching assistant in the classroom environment. In the study coded P9, the researchers stated that teachers thought that the supplier or school should be responsible for issues such as the purchase, maintenance, software updates and security of R.

In the context of the theme of non-maleficence, the codes of harm (P4, P9, P11, P16, P20) and security (P19) emerged in six studies. Two studies (P4, P9) in which robots were used were reached. In the study coded P4, where R was used, the researchers stated that all of the teachers participating could become "emotional wrecks" and feel dehumanized as a result of students'' excessive interaction with R. In the study coded P9, the researchers stated that if the teachers participating constantly gave the same answer when things went wrong, the students would be affected by this negative situation. In this context, three studies (P11, P16, P20) was used. In the study coded P11, the researchers stated that the participants' concerns about the system suggested that time was a critical resource that affected teachers' practices and that AI often increased their workload and that they had difficulty managing their time. In the study coded P16, the participants stated that AI development should not harm people. In another study (P20), the harm principle was chosen by 119 (65%) of 184 participants. In the results obtained from the applied questionnaire, the harm principle of artificial intelligence emerged as non-maliciousness. Non-maleficence (minor) was identified in 7 comments showing themes such as misleading. For example: "If China and India only make up 43% of international students, then the claim that they are the largest source can come off as misleading." Another code reached within the scope of non-harm is security. In P19, the most prominent category that emerged in the pre-test and post-test results was 'data security'. Data security, which was mentioned by 25 students in the pre-test results, was almost doubled by 42 students in the post-test results. One participant expressed his concerns about data security as follows: ''There are several solutions to this, as there could be a significant breach of people's privacy...A password should be used that allows only the principal investigator to access the data.''

In the context of the theme of freedom and autonomy, the codes of freedom (P2, P3), autonomy (P1, P20) and consent (P18) came to the fore in five studies. In the study coded P2, where WT was used, the participants perceived FitBit as exerting a constant pressure about what to do and setting limits and that this limited their freedom. A similar situation arose in the study coded P3, where AFS was used. In the study, the researchers created an online platform using Moodle. The students participating stated that they should be free to choose the time and place of online access and perceived the 24-hour delay in being able to access the Moodle platform created by the researchers as a limitation on their freedom of movement. In the study coded P1, the students stated that excessive dependence on LA systems in the university environment would become a problem in places where similar systems do not exist. In the study coded P20, ethical principles related

to autonomy were selected by 119 (65%) of 184 participants. However, 133 (33%) of the participants paired the principles of autonomy and non-maleficence with prioritising an age group. One in five respondents thought this was linked to beneficence. This suggests that participants need more intervention to differentiate between non-maleficence and beneficence. Another code reached within the scope of freedom and autonomy is consent. In the study coded P18 was used, 6 participants expressed their concerns about consent. Regarding this issue, one participant said: ‘‘Before starting something, it is necessary to ask whether Olivia is uncomfortable’’.

In the context of the theme of trust, the code of trustworthiness emerged from one study, P10. As Ryan and Sthal (2021) note, trust is a fundamental requirement for the ethical deployment and use of AI, and organizations developing and using AI must prove that they and their technologies are trustworthy. In P10, the researchers found that the students participating were concerned about the security of their data. According to the researchers: "Although students generally seemed to find the possibilities offered by learning analytics quite positive, they were concerned about the security of their data and whether it was stored and used in an ethically sustainable way." Within the scope of the beneficence theme in the research, the code benefits was identified. One study (P20) reported a finding related to this theme. However, the specific sub-dimension of artificial intelligence utilized in the study was not explicitly stated. One of the participants expressed his concerns about the usefulness of the artificial intelligence tool:

> It is not clear whether these figures refer to the percentage of international students or the percentage of total students in Australia. It also doesn't specify primary, secondary, tertiary or vocational education, so they don't seem to be very useful as statistics. (Khan et al., 2024, p. 87)

Discussion and Conclusion

In this study, 20 studies addressing the ethical dimension of the use of AI in education in the context of the participants’ opinions were examined. In the studies included in the research in the context of the ethical framework determined by Ryan and Stahl (2021), findings on some ethical principles were found, while findings on some ethical principles were not obtained. While 7 studies with quantitative and qualitative designs were reached, 6 studies were found to have mixed designs. The samples consisted of both teachers and students. In the studies with students, the participants were selected from a wide range of educational levels, from middle-school to PhD level. In the present research, the largest number of studies were targeted at undergraduate students (P1, P6, P7, P8, P10, P12, P13, and P14). The others involved teachers from different areas, including preschool teachers, classroom teachers, K-12 teachers, postgraduate teachers doing masters, and academics. In this context, various ethical problems were identified by both the teachers and students. While the concerns of the teachers were generally centered on students’ interaction with AI tools and their social and emotional development, the students were mostly concerned about privacy and misuse of personal data.

The theme of privacy in the ethical framework of artificial intelligence identified by Ryan and Stahl (2021) stands out in this study with two codes: privacy and personal or private information. Other codes (explainability, understandability, interpretability, communication, disclosure, showing) could not be reached. In the studies included in the research, the ethical issue of privacy (11) in the context of the theme of privacy was most

prominent, and students stated that their privacy could be violated. Unlike the results of this study, Baysan and Çetin (2021) stated that privacy training was the least needed factor among the participants in their study. Başkaya and Karacan (2022), in their literature review, and Akgün and Greenhow (2022), in their study on the ethical challenges of using AI, stated that AI-based systems can have a significant impact on personal privacy. The code of personal and private information was another concern in this context. Students were worried that their personal information would be used in a way that would disturb them. In this context, AI tools should only be used in or as systems that respect personal data and the risks arising from their use in educational environments should be reduced (Başkaya & Karacan, 2022).

In the ethical framework determined by Ryan and Stahl (2021), the theme of justice and fairness is represented by the codes of equity, non-discrimination, fairness, consistency, diversity, plurality, accessibility, reversibility, remedy, redress, challenge, access and distribution, non-bias, justice, equality, inclusion. In this study, only findings related to non-bias, justice, equality, inclusion codes were obtained. The code of non-bias within the scope of fairness focused on the possibility that students may be prejudiced against the system, and the participants' concerns that AI could lead to ethical violations. Roberts et al. (2016) also stated in their study that prejudice is the most frequently expressed ethical concern by students. Another code reached in this context is equality. Findings on equality were found in two different studies. The code of equality highlighted students perceived giving extra guidance to specific groups during the application as leading to inequality. Roberts et al. (2016) and Acosta-Enriquez et al. (2024) stated in their studies that the most effective ethical issue raised by the participants as a result of their interactions with artificial intelligence was equality. The code of inclusion involved students' concerns that they would be perceived as "strange" if they were to wear Google Glass. This situation, as stated by Ryan and Stahl (2021), highlights that artificial intelligence tools should not lead to exclusion within society and should be inclusive. Another code that emerged in this context in the study is justice. Justice code was reached in one study. Participants defined the artificial intelligence tool with themes such as stereotypical, not representative, no diversity, not inclusive and not fair. In her study analyzing the ethical guidelines in literature about AI, Hagendorff (2020) stated that justice was mentioned as an important ethical issue in 80% of the existing literature. Leslie (2019) also stated that bias is one of the most important potential harms that AI tools can cause.

The theme of non-maleficence comes to the fore with the codes of non-maleficence, security, safety, harm, protection, precaution, prevention, integrity, non-subversion within the ethical framework of Ryan and Stahl (2021). In the studies included in the scope, findings were found only for harm and security codes. The theme of non-maleficence or "doing no harm" was represented by code of harm and ethical concerns about this issue were found in five studies. In studies where R was used, concerns come to the fore that children might be negatively affected by excessive interaction with R, and that if R constantly gives the same answer, then this will have a negative effect on students. Concerns were also expressed about increasing teachers' workloads and not harming people. In their study on children's abuse of R, Nomura et al. (2015) stated that R can lead to shyness, as well as hostile and aggressive behavior in children. In this context, as stated in the guideline prepared by IEEE (2019), organizations that prepare AI systems should design them in terms of they will benefit their human users. Adams et al. (2023)

emphasized that the important of ensuring that AI tools are compatible with children's rights and the pedagogical situation of children. Additionally, researchers have proposed teacher well-being as an ethical principle when it comes to the use of AI in K12-education. Another code within the scope of do no harm is security. In one study, findings on security were found and the researchers stated that the participants frequently expressed their concerns about data security as a result of their study. As Ryan and Stahl (2021) state, artificial intelligence tools should be robust, reliable and provide assurance to participants about data security.

In the study, while the findings regarding the codes of transparency and explainability in the ethical principles determined by Ryan and Stahl (2021) were found, the findings regarding the codes of explicability, understandability, interpretability, communication, disclosure and showing were not found. The theme of transparency was represented by the code of the same name. In four studies, students generally stated that the system was not transparent about the purposes for which the data collected would be used. Ryan and Stahl (2021) also stated, in their study examining the literature about AI ethics, that transparency was one of the most frequently discussed ethical issues. In this context, as stated by the European Parliament (2022), Heilinger (2022), Munn (2022), Ryan and Stahl (2021), the use and functioning of AI systems, the purposes they are used for, and the logic of the system should be clearly explained to the participants. Another code reached within the scope of transparency in the study is explainability. In a study, when participants interacted with an artificial intelligence tool, they mostly mentioned the principle of explainability. As Ganatra et al. (2024) state, AI developers should ensure that the tools make sure that the system works as planned. AI tools should create a set of machine learning techniques that enable human users to understand, appropriately trust and effectively manage the next generation of AI partners.

In the study, while the codes of choice, self-determination, liberty, empowerment among the ethical principles determined by Ryan and Stahl (2021) in the context of freedom and autonomy could not be reached, the codes of freedom, autonomy, consent were reached. The codes of freedom and autonomy that emerged in the theme of freedom and autonomy were detected in five studies. In two studies, findings related to the freedom code were found. In the studies where WT and AFS were used, the participants stated that the artificial intelligence tool restricted their freedom. Ethical issues raised included concerns among students that FitBit's constant pressure on them was a restriction of their freedom, while in another study, students expressed concerns that excessive dependence on an AI system would prevent them from working independently. As stated in the AI ethics guide prepared by the High-Level Expert Group on AI (2019), developers of AI tools should prevent AI from limiting people’s freedom and autonomy.

Another code that emerged within the scope of freedom and autonomy is autonomy. In two studies, findings on autonomy were found and the participants stated that the artificial intelligence tool should not restrict autonomy. As stated by Ryan and Stahl (2021), artificial intelligence tools should be developed taking into account user autonomy, users should have control over the existing tool while using artificial intelligence tools. Another code that emerged in this context is consent. Consent code was found in a study. Participants stated that the consent of the person should be applied for the use of personal data. Similarly, Ryan and Stahl (2021) stated that artificial intelligence developers should not use personal data inappropriately.

Within the scope of responsibility, the codes of responsibility, liability, acting with integrity among the ethical principles stated by Ryan and Stahl (2021) could not be reached, while findings regarding the accountability code were found. The code of accountability code that emerged from the theme of responsibility was found in two studies, and the teachers participating in the studies stated that the maintenance and repair of R should be done by the school or the supplier. As stated by Ryan and Stahl (2021) on this issue, the supervision and impact assessments of artificial intelligence tools should be done in an accountable manner.

Trust theme came to the forefront with trustworthiness code. In one of the studies, the code of trustworthiness was prominently highlighted, with participating students expressing notable concerns regarding data security. In the study by Nevaranta et al. (2020), and the research by Li et al. (2021), in which they revealed the perceptions regarding data security and ethics of learning analytics, the researchers concluded that the students participating were significantly concerned about data security. In this context, as stated by the European Parliament (2022), Digital Decisions (2019) and Ryan and Stahl (2021), AI should be designed to ensure the trust of participants and researchers should prove that the tool being used is reliable.

In the context of the beneficence theme, beneficence, well-being, peace, social good, common good, sustainability codes were not reached, while only the code benefits was found. In one study, researchers reached the code of benefit as a secondary ethical principle. Participants expressed their concerns about the usefulness of the artificial intelligence tool. In this context, as stated by Ryan and Stahl (2021), artificial intelligence tools should be designed to benefit people as much as possible.

In the research, no findings were found regarding the themes of sustainability, dignity, solidarity and sub-codes related to these ethical principles determined by Ryan and Stahl (2021). When the studies included in the research are examined, it is seen that the participants mentioned the ethical principle of privacy the most, and the principles of trustworthiness, benefits, consent, inclusion, justice, explainability and security were emphasised the least. While AI tools raised ethical concerns for a majority of the participants, they did not raise any ethical concerns for some of them. In this context, in the study coded P14, the researchers associated the discomfort of only a few of the 133 undergraduate students with their data being collected and monitored by others with the period when the effects of COVID-19 were being felt intensely. According to the researchers, the transition to online education during this period caused a positive change in students' attitudes towards AI tools. However, the absence of ethical concerns may be related to the fact that artificial intelligence tools were not fully introduced to the participants and that the participants were not aware of the ethical literature on this subject. Studies have shown that pre-research participants generally already have experience with AI tools through video clips, workshops, pilot courses and online courses.

Suggestions

According to the results of the research, there are suggestions for researchers and practitioners.

- The studies were related to the AFS, WT, R and LA subtypes of AI, whereas no papers looked at AI ethics related to the AS, ILS, BD, AAS, IoT and DL subtypes

from the participants' point of view. Studies on these technologies of AI can be conducted and participants' perceptions and ethical concerns can be revealed.

- In the studies discussed, data were generally collected with questionnaires and focus-group interviews. Other data collection tools could be adopted for the purpose of bringing more ethical problems to light.
- In the studies available to this systematic review, teachers and students were picked as the sample groups. Future research could consult parents to identify other ethical issues caused by the use of AI.
- In this context, in studies carried out with AI tools, pilot applications should be carried out by introducing the AI tool in a broad context to both participants and researchers, and the AI literacy of the participants should be improved.

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All authors contributed equally to the research and writing stages of the article.

Conflicts of Interest

There is no conflict of interest between the authors.

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