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Research Article

The ethical issues in generative artificial intelligence: A systematic review

Üretken yapay zekâdaki etik sorunlar: Sistematik bir inceleme

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Abstract

As generative artificial intelligence (generative AI) technology rapidly develops, new tools are being introduced to the market, and its use in many areas, from education to healthcare, is quickly increasing. Therefore, ethical research must keep pace with these developments and address the new challenges. In this way, AI can benefit society and prevent potential harm. This study was conducted to identify ethical issues in the use of generative AI, highlight prominent issues, and provide an overview through a systematic literature review. A systematic search was conducted in Scopus, Web of Science, and ScienceDirect databases to retrieve articles examining ethical aspects of generative AI with no year restrictions. The search terms were "generative artificial intelligence," "generative AI," "GenAI," or "GAI," with the combination of "ethic," "ethics," or "ethical." Studies were selected using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. Forty-three articles were included in the review after the screening process. According to the research results, the "justice and fairness" principle was emphasized in all the articles examined. The least examined ethical principles were the principle of "solidarity", which expresses unity in society or group, and the principle of "dignity", which means the value an individual feels for himself and his rights. The authors of the 43 articles are mainly from the United States (n = 31), followed by China (n = 15) and the United Kingdom (n = 13). Of the 43 articles reviewed, 41 mentioned ChatGPT, albeit as an example. This study reviews the literature on the ethical use of generative AI and presents challenges and solutions.

Keywords: Generative Artificial Intelligence, Ethics, Ethical Issues, PRISMA

Jel Codes: M0, M1, M10

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Öz

Üretken yapay zekâ (ÜYZ) teknolojisi hızla gelişirken, pazara yeni araçlar sunulmakta ve eğitimden sağlık hizmetlerine kadar birçok alanda kullanımı hızla artmaktadır. Bu nedenle, etik araştırmalar bu gelişmelerle birlikte ilerlemeli ve ortaya çıkan yeni zorlukları ele almalıdır. Bu şekilde, yapay zekanın olası zararları önlenebilir ve topluma fayda sağlanabilir. Bu çalışma, üretken AI kullanımındaki etik sorunları belirlemek, öne çıkan konuları vurgulamak ve sistematik bir literatür taraması yoluyla genel bir bakış sağlamak amacıyla gerçekleştirilmiştir. Üretken yapay zekanın etik yönlerini inceleyen makaleleri belirlemek için Scopus, Web of Science ve ScienceDirect veri tabanlarında sistematik bir arama yıl kısıtlaması eklemeden yürütülmüştür. Arama "generative artificial intelligence", "generative AI", "GenAI" veya "GAI," ile "ethic," "ethics," veya "ethical" terimleri kullanılarak gerçekleştirilmiştir. Çalışmalar, "Sistematik İncelemeler ve Meta-Analizler için Tercih Edilen Raporlama Öğeleri yönergeleri (Preferred Reporting Items for Systematic Reviews and Meta-Analyses-PRISMA)" kullanılarak seçilmiştir. Tarama sürecinden sonra, araştırmaya 43 makale dahil edilmiştir. Araştırma sonuçlarına göre, incelenen makalelerin tamamında "eşitlik ve adalet" ilkesine vurgu yapıldığı görülmüştür. En az incelenen etik ilkeler ise toplumda ya da grupta birliği ifade eden "dayanışma" ilkesi ile bireyin kendisine ve haklarına duyduğu değer anlamına gelen "saygınlık" ilkesidir. 43 makalenin yazarlarının ülke bilgileri Amerika Birleşik Devletleri (n = 31), Çin (n = 15) ve Birleşik Krallık (n= 13) şeklindedir. İncelenen 43 makaleden 41'inde örnek olarak da olsa ChatGPT'den bahsedilmiştir. Bu çalışma, ÜYZ'nin etik kullanımına dair literatürü inceleyerek, etik kullanıma ilişkin zorlukları ve çözüm yollarını ortaya koymaktadır.

Anahtar Kelimeler: Üretken Yapay Zekâ, Etik, Etik Sorunlar, PRISMA

JEL Kodları: M0, M1, M10

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Introduction

The term "Artificial Intelligence (AI)" was first used in 1955 within the scope of the study titled "The Dartmouth Summer Research Project on Artificial Intelligence." McCarthy et al. (1955) proposed an AI study group at Dartmouth College in Hanover, New Hampshire, in the summer of 1956 to investigate how machines could use language, form abstractions and concepts, solve problems unique to humans, and improve (McCarthy et al., 2006, 12). AI is a collection of information processing systems that, with the help of knowledge and resources at their disposal, can adapt to their surroundings (Wang, 2019). UNICEF proposed another definition, which is more detailed and accepted by the Organisation for Economic Co-operation and Development (OECD) and the European Union member states (Holmes et al., 2022). According to this definition, AI refers to machine-based systems that, given a set of human-defined goals, can make predictions, recommendations, or judgments affecting the real or virtual environment. AI systems interact directly or indirectly with humans and their environments. They operate autonomously and can modify their actions based on context awareness (UNICEF, 2021, 16). AI includes various techniques, including machine learning, image recognition, and deep learning (DL) using artificial neural networks (Kar and Kushwaha, 2023). In addition to these techniques, natural language processing (NLP) allows computers to understand and interact with human language naturally, facilitating tasks like machine translation and voice assistance. (Gupta et al., 2024).

The development of already popular tools such as ChatGPT and MidJourney and the entry into the market of newer generative AI products such as Microsoft's Bing and Google's Bard have increased public interest in AI (Vinchon et al., 2023). Two months after its public release, OpenAI's ChatGPT reached 100 million users, breaking the record for the fastest-growing consumer application (Hu, 2023). Generative AI technology uses deep learning models to produce content resembling human language or images responding to complex and diverse cues (Lim et al., 2023). Generative AI is an AI system designed to produce content or output. These outputs depend mainly on the data on which the systems are trained. Unlike traditional AI systems trained to perform specific tasks, generative AI models are designed to imitate patterns in data (Wakunuma and Eke, 2024). The growing availability of large datasets and advancements in deep learning have accelerated the development of generative AI. Its ability to produce data that resembles real-world features can effectively tackle challenges such as data augmentation, anomaly detection, and creative content generation (Bandi et al., 2023). One of the most famous examples of generative AI is the chatbot, a software-based electronic system that can mimic conversations by identifying and responding to specific keywords or phrases. The chatbot can be incorporated into various platforms, including messaging services, websites, and mobile applications (Salvagno et al., 2023). A chatbot is a conversational agent interacting with users in a specific domain or topic using natural language sentences. Its predefined knowledge base helps it develop answers to user queries using NLP (Lalwani et al., 2018). Generative AI that converts text to images is emerging as a system that automates parts of the human creative process in generating high-quality digital artwork. Unexpectedly, an artwork created by Midjourney won an art competition, outperforming human artists (Zhou and Lee, 2024).

More powerful tools for generative AI will emerge as models are trained with more data. This could result in creating highly realistic virtual actors and assisting in producing video games and movies. Generative AI has the potential to produce architectural designs, innovative art, and fashion trends. In healthcare, it can facilitate the synthesis of new drug compounds, enhance medical imaging analysis, and create personalized treatment plans. The Generative AI market size is expected to grow at an annual growth rate of 46.47% and reach a market volume of USD 356.10 billion by 2030 (Statista, 2024). Statista data shows the market size in generative AI in Figure 1. Salesforce's latest research on generative AI usage among the US, UK, Australian, and Indian populations shows that the public is divided into users and non-users. Among those surveyed, 73% of Indians, 49% of Australians, 45% of Americans, and 29% of the UK population use generative AI (Salesforce, 2024). According to the McKinsey (2024) report, 2023 was the year generative AI was discovered worldwide. In 2024, organizations started using this new technology and derived business value from it. In McKinsey's latest Global AI Survey, 65% of respondents reported regular use of generative AI in their organizations. Three-quarters predict it will cause significant or disruptive changes in their industries in the coming years (McKinsey, 2024).

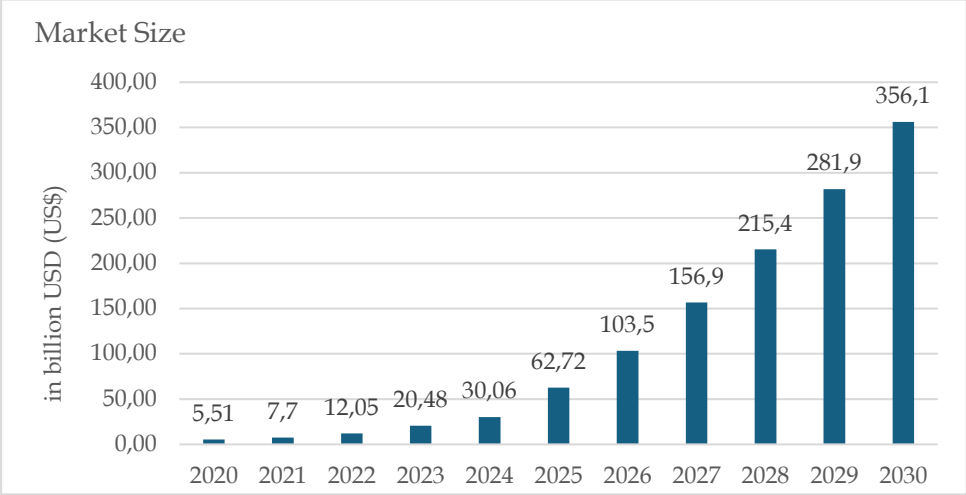

Figure 1: The Size of the Generative AI Market

Source: Statista Market Insights (2024)

However, while employees in Salesforce research see the benefits of generative AI, they are also concerned about managing risks and learning the skills needed to fully leverage the rapidly evolving technology (Salesforce, 2024). According to Salesforce's (2024) research, over half of organizations see cybersecurity as the primary barrier to generative AI adoption. Along with the impact on professions and jobs, AI systems can influence individuals through the potential for misinformation to be easily generated and spread, potentially harming individuals and democratic processes (Schick, 2023). Various stakeholders have attempted to define broad policy guidelines for AI application across disciplines, industries, and economic sectors (Vetter et al., 2024). Scholars have begun to track the status of regulatory initiatives regarding AI worldwide. In 2020, the Ethical Guidelines for Trustworthy AI were presented to the EC by the High-Level Artificial Intelligence Expert Group (Karimian et al., 2022, 540). Respect for human autonomy, fairness, harm prevention, explicability, and privacy protection are essential principles for trustworthy AI (EC, 2019).

When the relevant literature is examined, various literature review studies on the ethical use of AI are seen. Möllmann et al. (2021) conducted a systematic literature review of 853 peer-reviewed journals and conferences on ethical evaluations of AI in digital health and examined 50 relevant articles. These articles categorized non-maleficence, beneficence, autonomy, justice, and explicability as five main ethical principles. Ashok et al. (2022) examined 59 articles through a systematic literature review and identified 14 digital ethics implications related to the use of AI. Ryan (2023) examined the social and ethical implications of using AI in agriculture. The analysis conducted with MAXQDA 2020 data analytics software provided a quantitative view of the ethical principles found in 21 articles. Jobin et al. (2019) conducted a content analysis on 84 documents containing ethical principles or guidelines for AI and revealed 11 ethical values and principles. Stahl and Eke (2024) compiled a list of ethical issues generated by three approaches to the ethics of emerging technologies: "predictive technology ethics" (ATE), "a framework for ethical impact assessment of information technology" (EIA), and "ethical issues of emerging ICT applications" (ETICA). Studies are being conducted in different fields regarding the ethical use of AI. However, when the research is specified as "generative AI," it is seen that the studies have been conducted in recent years, and their number is limited. Generative AI is a technology with enormous potential, but using this potential responsibly and ethically is critical to ensure that it is used for the benefit of society. Farina et al. (2024) present ethical, sociological, and political implications, highlighting the dangers that may arise regarding the use of generative AI models. Bukar et al. (2024) considered ChatGPT one of the generative AI models and identified ten ethical concerns by questioning the need to restrict or legislate its use. The analysis results show that the most critical concerns are "copyright, legal, and compliance issues," "privacy and confidentiality," "academic integrity," "incorrect reference and citation practices," and "safety and security concerns," respectively. Moulaei et al. (2024) conducted a literature review to identify generative AI's applications, benefits, and challenges in healthcare. According to the 109 studies reviewed, primary challenges included "generating inaccurate or fictional content," "unknown source of information and fake references for texts," and "lower accuracy in answering questions."

This study aims to identify ethical issues in the use of generative AI, highlight prominent issues, and provide an overview through a systematic literature review. The research questions designed for this purpose are:

RQ1: What are the main characteristics (research areas, research methods, countries of researchers, and generative AI tools reviewed) of articles on the ethical use of generative AI?

RQ2: What are the fundamental principles for ethical generative AI use?

Method

PRISMA is used as a systematic guide for including individuals in the compilation during the data collection process, including the stages of searching and evaluating the obtained data (Liberati et al., 2009). The PRISMA method is a guideline consisting of 27 sub-items. This method is suitable for describing the stages of a systematic review well. These stages include developing eligibility criteria, describing information sources, search strategies, study selection processes, results, and data synthesis (Moher et al., 2015). The current systematic approach selected studies addressing ethical issues in generative AI, following the PRISMA methodology. The data used in the study were obtained from Scopus, Web of Science, and Science Direct databases. Ethics committee approval was not obtained because the data within this scope did not require it.

Search strategy

Three different databases, Web of Science, ScienceDirect, and Scopus, were searched for the literature review. These databases contain numerous studies in various disciplines. Table 1 displays the search words and their combinations used in the search process.

Although the history of generative AI studies dates back to ancient times, generative AI technologies are new. For this reason, no date restrictions were added to the searches. In total, 621(only articles) studies were obtained from the searches as of July 23 2024.

Table 1: Details of the Search Process Information

Database	Search Location	Search Words	Publication Type
Scopus	Title OR Abstract OR Keywords	("generative artificial intelligence" OR "generative AI" OR "GenAI" OR "GAI") AND ("ethic*")	Articles
Web of Science	Title OR Abstract OR Keywords	("generative artificial intelligence" OR "generative AI" OR "GenAI" OR "GAI") AND ("ethic*")	Articles
Science Direct	Title OR Abstract OR Keywords	("generative artificial intelligence" OR "generative AI" OR "GenAI" OR "GAI") AND ("ethic" OR "ethics" OR "ethical")	Articles

Source: Created by the author

Eligibility criteria

After the screening process, inclusion and exclusion criteria were determined.

The inclusion criteria for the review were as follows:

- Articles (including early access)
- Articles were written in Turkish and English.
- Have full-text access
- Have references to the included studies
- Focus on the application area of disciplines

The criteria for exclusion in the review were as follows:

- Summaries of workshops, conference papers, book chapters, review article
- Studies in languages other than Turkish or English
- Non-peer-reviewed publications
- Unavailable full text
- Did not focus on the application area of disciplines

Six hundred twenty-one studies were included in the selection process after screening. First, the studies within the scope of the research were determined by examining the title and abstract. In the first process, duplicate (230), irrelevant (264), and not in English or Turkish (3) studies were determined and excluded from the review. In the second stage, full texts were examined, and studies focused on the research purpose were determined. Studies that were in the form of a literature review were excluded from the review. Studies that did not focus on the research purpose (70), literature reviews (6), and full texts that could not be accessed (5) were excluded from the review. Finally, 43 studies were identified. The PRISMA flow chart is shown in Figure 1.

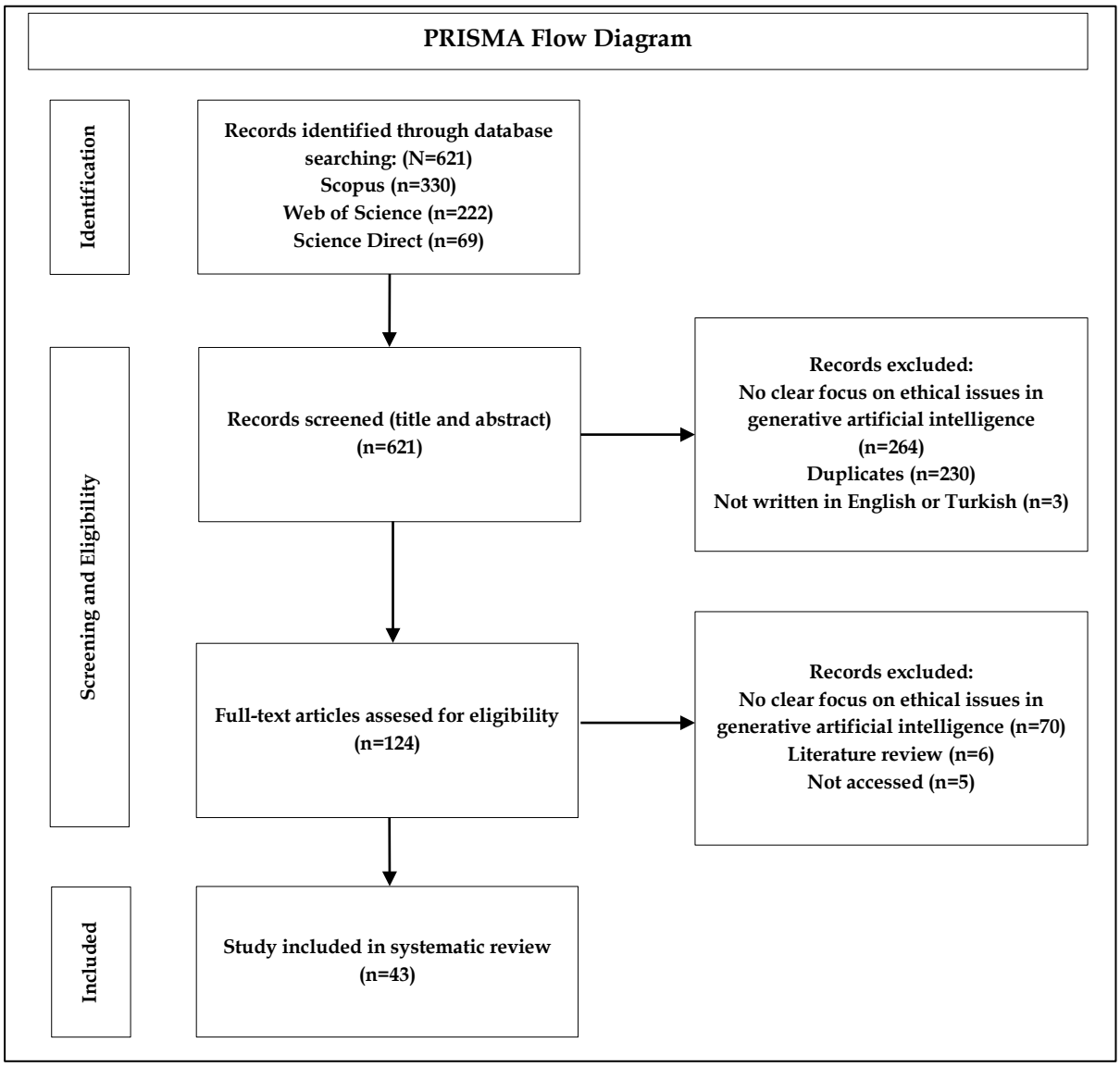

Figure 1: PRISMA Flow Chart

Source: Created by the author

Characteristics of the studies

The Microsoft Excel program created a table with the characteristics of 43 articles suitable for the search strategy. Of the 43 articles included in the research, 18 examined the ethical use of generative AI in education. Surveys were conducted with students (Chan, 2023; Cheng and Lee, 2024; Higgs and Stornaiuolo, 2024; Rojas, 2024; Ross and Baines, 2024; Zhu et al., 2024), and semi-structured interviews were conducted with academicians or teachers (Fassbender, 2024; Van Wyk, 2024). Other studies included in the research examined ethical issues in different fields, such as health, finance, public administration, and chemical engineering. Four studies (Chan, 2023; Higgs and Stornaiuolo, 2024; Rojas, 2024; Ross and Baines, 2024) used a mixed methods research method. Chan (2023) utilized an online survey of closed-ended and open-ended questions. Higgs and Stornaiuolo (2024) integrated survey data with focus group discussions. Rojas (2024) used a Likert-scale questionnaire incorporating multiple-choice and short-response formats—Ross and Baines (2024) combined survey results with examples generated using ChatGPT prompts.

Table 2: The Characteristics of Eligible Studies

Author(s)	Journal	Research Area	Research Type	Method Design	Participants	GAI Technology
Alam et al. (2023)	Frontiers in Medicine	Education	Conceptual	Literature review		General GAI such as ChatGPT
Bartlett and Camba (2024)	International Journal of Interactive Multimedia and Artificial Intelligence	Education	Qualitative	Literature review and case study	image-generative AI prompt	Image-GAI Technologies
Bendel (2023)	AI & Society	General	Conceptual	Literature review		Image Generators DALL-E 2, Stable Diffusion, and Midjourney
Chan (2023)	International Journal of Educational Technology in Higher Education	Education	Mixed method	Online survey, Closed-ended and Open-ended questions	457 students, 180 teachers and staff	General GAI Technologies
Cheng and Lee (2024)	Journal of Media Ethics	Education	Quantitative	Survey	313 Student	GAI such as ChatGPT
Cheng and Liu (2023)	International Journal of Legal Discourse	EU and USA Ethical Documents	Qualitative	Thematic intertextuality analysis	29 AI ethical documents	General GAI Technologies
Daniel and Xuan (2024)	Digital Chemical Engineering	Chemical Engineering	Conceptual	Literature review		General GAI Technologies
Dong and Chen (2024)	Computer Law & Security Review	Regulations of GAI in China	Qualitative	Legal texts and literature review		General GAI such as ChatGPT
Fassbender (2024)	English Teaching: Practice & Critique	Education	Qualitative	Multiple case studies, semi-structured interviews, ChatGPT logs	2 English teacher	ChatGPT
Fischer (2023)	Journal of Information Technology Teaching Cases	Organization and Exam Boards	Qualitative	Literature review, case study	AQA is one of England's largest exam boards	ChatGPT and others LLM
Gallent Torres et al. (2023)	Revista ELectrónica de Investigación y EValuación Educativa	Education	Conceptual	Literature review		General GAI Technologies
Hamed et al. (2024)	Iscience	General	Qualitative	Literature review and ChatGPT prompt cases		GAI Such as Bard, ChatGPT
Harrer (2023)	eBioMedicine	Health and Medicine	Conceptual	Literature review		General GAI Technologies
Higgs and Stornaiuolo (2024)	Reading Research Quarterly.	Education	Mixed method	Survey and focus group	63 students for the survey and three focus groups, each with four students	General GAI Technologies
Hu (2024)	Education and Information Technologies	Education	Quantitative	Experimental research	135 students	General GAI Technologies
Khan and Umer (2024)	Heliyon	Finance	Conceptual	Literature review		ChatGPT
Khoury et al. (2024)	Otolaryngology-Head and Neck Surgery	Health (Otolaryngology)	Qualitative	Literature review, Case study	Patients	General GAI Technologies
Klenk (2024)	Ethics and Information Technology	General	Conceptual	Literature review		General GAI Technologies

Author(s)	Journal	Research Area	Research Type	Method Design	Participants	GAI Technology
Oniani et. al. (2023)	Digital Medicine	Medical Service	Qualitative	Document analysis		General GAI such as ChatGPT, Bing, Midjourney, Bard
Ooi and Wilkinson (2024)	British Journal of Guidance & Counselling	Psychotherapy and Counseling	Qualitative	Literature review and document analysis	British Association for The (Counselling Professions, 2018). 2(American Counseling Association, 2014). 3(Australian Counselling Association, 2022). 4(Lembaga Kaunselor Malaysia, 2019).	General GAI Technologies
Pack and Maloney (2024)	TESOL Quarterly	Education	Conceptual	Literature review		General GAI Technologies
Parker et al (2023)	The Qualitative Report	Qualitative Research (Interview)	Conceptual	Literature review		General GAI such as ChatGPT
Piller (2023)	Rupkatha Journal Interdisciplinary Studies in Humanities	Academic Writing	Qualitative	Analysis of a hypothetical scenario		ChatGPT
Rana et al. (2024)	Technovation	Information Technology (IT) and Information Technology-Enabled Services (ITeS) Companies	Quantitative	Survey	384 managers	General GAI Technologies
Rojas (2024)	Journal of Chemical Education	Education	Mixed method	Likert-scale multiple choice and short-response format	53 students	ChatGPT
Ross and Baines (2024)	The Journal of Classics Teaching	Education	Mixed method	Survey and ChatGPT prompt examples	89 students	GAI such as ChatGPT
Salah et al. (2023)	International Journal of Public Administration	Public Management	Conceptual	Literature review		ChatGPT & Bard
Segers (2024)	International Journal of Ethics Education	Education	Conceptual	Literature review		General GAI Technologies
Sharples (2023)	Learning: Research and Practice	Education	Qualitative	Literature review and ChatGPT prompt examples		GAI such as ChatGPT
Singh Chauhan (2024)	Computers & Technology	General and Biomedical	Conceptual	Literature review		General GAI such as ChatGPT and Dall.E
Sison et al. (2023)	International Journal of Human-Computer Interaction	General	Qualitative	Literature review and technical specifications review		ChatGPT

Author(s)	Journal	Research Area	Research Type	Method Design	Participants	GAI Technology
Stahl and Eke (2024)	International Journal of Information Management	General	Qualitative	Literature review and combined three approaches (ATE, ETICA, EIA)		ChatGPT
Summers et. al. (2024)	Nurse Education in Practice	Education	Qualitative	Semi-structured interviews	13 nursing students	General GAI Technologies
Tortora (2024)	Frontiers in Psychiatry	Forensic Psychiatry and Criminal Justice	Conceptual	Literature review		General GAI Technologies
Van Wyk (2024)	Journal of Applied Learning & Teaching	Education	Qualitative	Semi-structured interviews	8 academicians	General GAI Technologies
Vandemeulebroucke (2024)	European Journal of Physiology	Healthcare Medicine	Conceptual	Literature review		General GAI Technologies
Vetter et. al. (2024)	Computers and Composition	Education	Qualitative	Case study	1 student	ChatGPT
Wakunuma and Eke (2024)	Philosophies	Africa	Qualitative	Literature review and combined three approaches (ATE, ETICA, EIA)		General GAI such as ChatGPT
Wörsdörfer (2024a)	Global Business and Organizational Excellence	E.U.'s Artificial Intelligence Act	Qualitative	Document analysis	E.U.'s Artificial Intelligence Act (AIA)	General GAI Technologies
Wörsdörfer (2024b)	Philosophy & Technology	US and EU	Qualitative	Document analysis	Comparative analysis of the EO and AIA	General GAI Technologies
Yang et al. (2024)	Asia Pacific Journal of Education	Education	Conceptual	Literature review		General GAI Technologies
Yorks and Jester (2024)	Human Resource Development International	Human Resource Development	Qualitative	Literature review and interview	15 human capital practitioners	General GAI Technologies
Zhu et al. (2024)	International Journal of Human-Computer Interaction	Education	Quantitative	Survey	226 students	General GAI Technologies

Source: Created by the author

Ninety-eight authors wrote the 43 articles included in the review. The analysis results according to the authors' countries are presented in Figure 2.

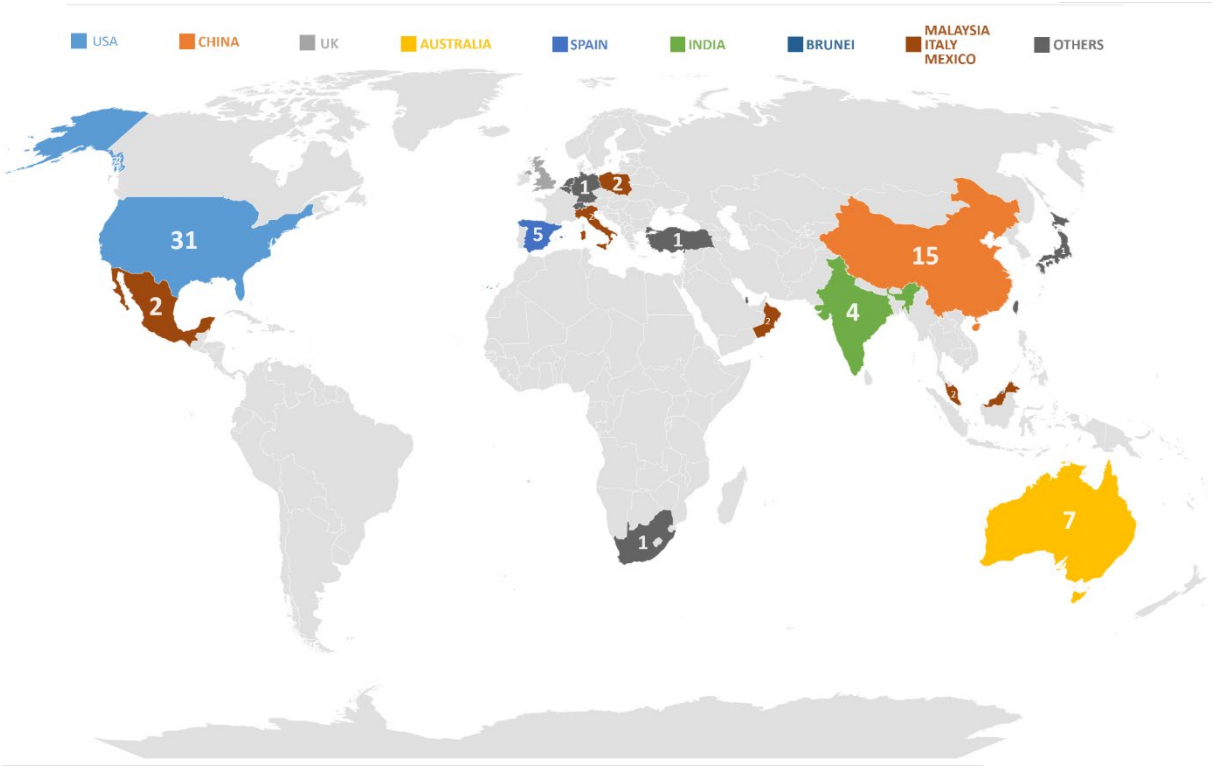

Figure 2: Distribution of the Authors' Country

Source: Created by the author

The authors of the 43 articles are mainly from the United States (n = 31), followed by China (n = 15) and the United Kingdom (n = 13). In addition to the top three countries, the 43 articles have authors from developed and developing countries, including Australia, Spain, India, Brunei, Italy, Malaysia, Mexico, Oman, Poland, Belgium, Germany, Japan, the Netherlands, Türkiye, and Vietnam.

Of the 43 articles reviewed, 41 mentioned ChatGPT, albeit as an example. Only two studies (Vandemeulebroucke, 2024; Wörsdörfer, 2024b) did not mention the ChatGPT model. Seven studies (Fassbender, 2024; Khan and Umer, 2024; Piller, 2023; Rojas, 2024; Sison et al., 2023; Stahl and Eke, 2024; Vetter et al., 2024) conducted their research on ChatGPT, while 1 study (Salah et al. 2023) researched ChatGPT and the Bard model. 2 studies (Bartlett and Camba, 2024; Bendel, 2023) conducted their research on image generative AI models such as DALL-E 2, Stable Diffusion, and Midjourney.

Ethical issues

The MAXQDA tool was used to analyze the frequencies of words related to ethical principles in the studies included in the systematic review. MAXQDA is a software designed for qualitative and mixed-method data analysis (Marjaei et al., 2019). It works with various data formats, including "text documents, excel spreadsheets, PDFs, images, website data, audio or video recordings, SPSS files, bibliographic records, focus group discussions, and YouTube comments" (Maxqda, 2024). The ethical principles in the articles examined within the scope of the research were determined based on the values and principles of Jobin et al. (2019), as well as different principles expressed by Stahl and Eke (2024).

Jobin et al. (2019) conducted a content analysis on 84 documents containing ethical principles or guidelines for AI and revealed 11 ethical values and principles. Stahl and Eke (2024) compiled a list of ethical issues generated by three approaches to the ethics of emerging technologies: "anticipatory technology ethics" (ATE), "a framework for the ethical impact assessment of information technology" (EIA), and "ethical issues of emerging ICT applications "(ETICA). The ethical principles and keywords are presented in Table 3. Table 4 shows the frequency of ethical principles and keywords in articles, and Table 5 shows the distribution of ethical principles in articles.

Table 3: Ethical Principles Keywords for Coding

Ethical principle	Keywords
Beneficence	Benefits/beneficence, well-being, peace, social good, common good
Dignity	Dignity
Freedom & autonomy	Freedom/unfreedom, autonomy, consent, choice, liberty
Justice & fairness	Justice, fairness, consistency, inclusive/inclusiveness/inclusivity equit/equity/equitability/equitable, equality, (non-)bias, (non-)discrimination, diversity, accessible/accessibility, reversible, social sorting, remedy, redress, distribution, inclusion
Non-maleficence	Non-maleficence, security/cybersecurity, safety, harm/harmful, integrity (bodily or mental), precaution, prevention, non-subversion, Protect/Protection/Protectable/Protecting
Privacy	Privacy, confidential/confidentiality, private
Responsibility	Responsibility, accountability, liabilities/liability, acting with integrity
Solidarity	Solidarity, cohesion
Sustainability	Sustainability, environment/ environmental, energy
Transparency	Transparent/transparently/transparency, explainability, (in)explicability, understandability, interpretability, disclosure, opacity, openness, traceability
Trust	Trust/trustworthy/trustworthiness, reliable/reliability/reliably

Source: Jobin et. al (2009, 7); Stahl and Eke (2024, 10-11)

Justice and fairness

Justice and fairness are the most common (n=43) principles in the articles included in the study. The principle of justice and Fairness in AI technology aims to ensure that everyone is treated equally and fairly and that AI applications do not lead to discrimination (Ashok et al., 2022; Fischer, 2023). Wakunuma and Eke (2024) highlight the importance of AI governance and state that AI governance arrangements should include establishing robust regulatory frameworks and ethical guidelines to combat bias and discrimination, especially in the African context. According to Tortora (2024), individuals in the Global North are gaining early access to state-of-the-art AI tools while marginalized groups are left behind. This creates problems of unequal access and exacerbates existing inequalities in the technological landscape. Bendel (2023) addresses bias, discrimination, racism, and sexism in AI-generated images, drawing attention to problematic stereotypes in depictions of women and people of colour. For example, women are often presented with long hair, large eyes, large breasts, and a childlike face. Men are usually quite angular in face and body, while their stance is confident and combative. The programs have a cultural bias because they are primarily English language-based, and the images used for training are mainly from Western culture (Breithut 2022, as cited in Bendel, 2023).

Responsibility and accountability

The principle of responsibility is included in 42 articles. The principle of responsibility primarily concerns the regulation of AI designers, implementers, and operators, including legal liability. For example, some purposes, such as healthcare diagnosis or driving, require high reliability, accuracy, human judgment, empathy, and expertise. So, it is essential to consider AI systems' nature and potential errors and the harm they may cause users (Cheng and Liu, 2023). Dong and Chen's (2024) study examines service providers' legal responsibilities within the governance framework of generative AI in China. The paper asserts that service providers must ensure compliance with legal and regulatory requirements, protect intellectual property rights and personal information, and provide risk warnings. Sison et al. (2023) examine the misuse of ChatGPT in academic studies. The article addresses the issue of ChatGPT outputs being considered plagiarism and strategies to ensure scholarly integrity in AI-enhanced learning environments. Van Wyk (2024) discusses the relationship between using generative AI tools in education and academic integrity. The article focuses on how generative AI-based chat tools such as ChatGPT can prevent academic cheating and what preventive strategies can be implemented to protect academic integrity.

Table 4: Ethical Principles and Keyword Frequency in Articles

Ethical principle	Number of documents	Keywords	Number of documents	Frequency
Justice and Fairness	43/43	Bias	35/43	400
		Fair/Fairness	31/43	155
		Equity/Equitability/Equitable	23/43	88
		Discrimination/Non-Discrimination	23/43	84
		Accessible/Accessibility	28/43	75
		Justice	20/43	71
		Diversity	21/43	48
		Consistency	22/43	45
		Inclusive/Inclusiveness/Inclusivity	14/43	40
		Inclusion	13/43	25
		Redress	6/43	18
		Equality	11/43	13
		Remedy	5/43	11
		Distribution	8/43	10
		Reversible	1/43	1
		Social sorting	1/43	1
Responsibility and Accountability	42/43	Responsibilities/Responsibility	36/43	239
		Accountability	24/43	182
		Academic integrity/Scholar integrity	16/43	102
		Liabilities/Liability	10/43	37
Non-maleficence	41/43	Protect/Protection/Protectable/Protecting	25/43	206
		Harm/Harmful	32/43	177
		Security/Cybersecurity	27/43	149
		Safety	25/43	137
		Integrity	25/43	69
		Non-maleficence	7/43	19
		Prevention	6/43	10
		Precaution	5/43	5
Trust	40/43	Trust/Trustworthy/Trustworthiness	34/43	198
		Reliable/Reliability/Reliably	34/43	141
Beneficence	38/43	Beneficence/Benefit	37/43	331
		Well-being	13/43	42
		Social good	3/43	4
		Common good	2/43	3
		Peaceful	2/43	2
Transparency	36/43	Transparent/Transparently/Transparency	33/43	280
		Disclosure	20/43	84
		Explainability	15/43	55
		Traceability	4/43	17
		Opacity	9/43	12
		Interpretability	5/43	9
		Explicability	4/43	6
		Openness	5/43	6
		Inexplicability	1/43	1
		Understandability	1/43	1
Sustainability	36/43	Environment/Environmental	34/43	201
		Sustainability	13/43	44
		Energy	11/43	25
Freedom and Autonomy	36/43	Autonomy	23/43	108
		Choice	22/43	51
		Consent	23/43	51
		Freedom/Unfreedom	10/43	17
		Liberty	1/43	1
Privacy	35/43	Privacy	35/43	261
		Private	14/43	42
		Confidential/Confidentiality	13/43	32
Dignity	11/43	Dignity	11/43	22
Solidarity	5/43	Solidarity	3/43	4
		Cohesion	3/43	4

Source: Created by the author

Table 5: Distribution of Ethical Principles in Articles

References	Justice and Fairness	Non-maleficence	Responsibility	Transparency	Beneficence	Trust	Privacy	Sustainability	Freedom and Autonomy	Dignity	Solidarity	Total
Wörsdörfer (2024b)	73	95	17	12	3	17	32	29	6	1	0	285
Wörsdörfer (2024a)	65	85	23	36	5	23	20	17	6	3	0	283
Singh Chauhan (2024)	40	54	7	12	123	3	10	12	8	2	1	272
Dong and Chen (2024)	11	45	96	46	10	12	23	3	8	0	0	254
Stahl and Eke (2024)	58	27	23	20	59	12	15	12	20	4	4	254
Wakunuma and Eke (2024)	99	18	10	10	50	9	18	15	11	4	1	245
Oniani et al. (2023)	46	39	37	34	8	30	21	2	20	0	0	237
Rana et al. (2024)	51	3	34	31	8	6	6	14	26	0	0	179
Cheng and Liu (2023)	35	47	25	19	3	10	22	3	3	2	0	169
Chan (2023)	46	21	31	24	2	5	18	11	2	0	0	160
Gallent Torres et al. (2023)	24	16	50	12	5	3	9	13	1	0	0	133
Harrer (2023)	32	22	15	21	3	16	4	10	7	0	0	130
Tortora (2024)	53	15	8	18	2	2	9	11	11	0	0	129
Sison et al. (2023)	34	24	15	12	3	21	12	0	6	1	0	128
Daniel and Xuan (2024)	4	36	10	10	4	24	2	20	0	0	0	110
Vandemeulebroucke (2024)	27	7	3	5	1	2	4	39	9	2	0	99
Khan and Umer (2024)	28	21	9	12	4	7	11	5	1	0	0	98
Ooi and Wilkinson (2024)	12	17	18	6	9	6	19	1	4	0	0	92
Parker et al (2023)	32	15	6	5	2	10	9	3	3	0	0	85
Vetter et al. (2024)	25	6	14	1	7	20	1	1	6	0	0	81
Fischer (2023)	25	5	6	15	4	9	3	3	4	1	1	76
Yorks and Jester (2024)	25	14	3	11	8	4	8	1	2	0	0	76
Higgs and Stornaiuolo (2024)	33	19	3	2	4	3	0	3	8	0	0	75
Piller (2023)	19	6	1	36	3	2	2	4	1	0	0	74
Cheng and Lee (2024)	20	15	5	3	5	1	15	1	6	0	0	71
Zhu et al. (2024)	18	7	7	3	9	13	7	7	0	0	0	71
Salah et al. (2023)	20	7	3	10	2	4	8	1	3	0	0	58
Yang et. al. (2024)	22	4	11	5	4	2	4	1	0	0	0	53
Bendel (2023)	7	16	13	0	0	1	5	1	7	1	0	51
Klenk (2024)	5	2	1	2	0	24	2	2	13	0	0	51
Van Wyk (2024)	7	14	20	0	5	2	0	0	3	0	0	51
Summers et al. (2024)	16	11	2	0	9	5	0	5	0	0	0	48
Pack and Maloney (2024)	20	4	1	6	1	6	1	1	3	0	0	43
Hamed et al. (2024)	2	5	2	23	3	6	1	0	0	0	0	42
Barlett and Camba (2024)	16	12	4	1	0	0	0	0	5	0	0	38
Ross and Baines (2024)	5	4	1	1	4	2	0	13	0	0	0	30
Alam et al. (2023)	3	2	12	5	2	2	1	2	0	0	0	29
Hu (2024)	9	1	1	1	0	8	2	2	4	0	0	28
Khoury et al. (2024)	8	8	3	0	2	3	1	0	1	0	0	26
Fassbender (2024)	1	0	6	1	4	0	10	1	1	0	1	25
Rojas (2024)	2	0	2	0	1	3	0	0	6	0	0	14
Sharples (2023)	5	2	2	0	0	1	0	0	2	1	0	13
Segers (2024)	2	1	0	0	1	0	0	1	1	0	0	6
Total	1085	772	560	471	382	339	335	270	228	22	8	4472

Source: Created by the author

Non-maleficence

The principle of non-maleficence is included in 41 articles. References to non-maleficence are generally based on safety and security. Chan (2023) draws attention to the potential negative impacts of misuse of AI technologies on student learning outcomes and critical thinking skills, particularly in assessment and teaching. The article highlights the importance of protecting students from academic misconduct. Oniani et al. (2023) stated that healthcare is critical to patient safety, and errors in these systems can further harm patients. Rojas (2024) states that using generative AI in writing harms critical thinking and blocks learning opportunities. Students may miss out on developing creative writing skills by relying solely on AI-generated content. Harrer (2023) warns that spreading misinformation and biased content can cause significant harm, especially in evidence-based sectors such as health and medicine. Singh Chauhan (2024) has emphasized the importance of regulations to prevent harm from using generative AI and has made assessments in the context of the rules provided by the EU AI Act. Sison et al. (2023) emphasize the importance of protecting individuals and society from ChatGPT's potential harms, such as deception, manipulation, and misinformation. They comprehensively discuss the potential harms

that could be caused by using ChatGPT as a "weapon of mass deception," including its role in facilitating academic fraud, disinformation campaigns, and criminal activity.

Trust

The principle of trust is included in 40 articles. Trust is a central component of the interaction between humans and AI (Jacovi et al., 2021). Khan and Umer (2024) emphasize the importance of accepting and using ChatGPT's AI-based decision-making power and financial professionals' intuitive decision-making ability based on their experiential knowledge to make accurate and reliable financial decisions. Cheng and Liu (2023) emphasize the importance of AI systems' trustworthiness, especially the principles of transparency and explainability. Salah et al. (2023) examine the applications of generative AI tools such as ChatGPT and Bard in public administration research. They recommend additional validation techniques for any data generated by ChatGPT or Bard. Researchers must balance AI tools with other methods to ensure their work is rooted in human experience and expertise.

Beneficence

The principle of trust is included in 38 articles. The majority of articles acknowledge the potential benefits of AI. Rana et al. (2024) discuss the benefits of using generative AI to improve organizational performance, provide better customer service, increase employee productivity, and reduce customer complaints. Chan (2023) highlights the potential of generative AI to support students and help them develop their skills. Harrer (2023) stated that using generative AI in healthcare will reduce administrative tasks, allowing doctors to devote more time to patients. It can also help medical students learn complex concepts more efficiently. It can be used as a valuable tool in patient communication by simplifying medical language. According to Tortora (2024), using generative AI in forensic psychiatry can help perform advanced behavioural analyses and facilitate a more comprehensive assessment of the patient's condition.

Transparency

The principle of transparency is included in 36 articles. The articles highlight the importance of transparency in building trust in AI and ensuring that these systems are used responsibly and ethically. Khan and Umer (2024) emphasize that in the context of ChatGPT's use in finance, processes need transparency and accountability in light of regulations such as the European General Data Protection Regulation (GDPR) and the White House's Office of Science and Technology Policy (OSTP) Blueprint for AI Bill of Rights. Ooi and Wilkinson (2023) highlight the need for disclosure and transparency in communication about AI use to stakeholders in the Singapore Model AI Governance Framework context. Wörsdörfer (2024b) highlights the need for explainability in high-risk AI systems in the European Union's Artificial Intelligence Act. Similarly, Harrer (2023) highlights the importance of explainability in AI systems in healthcare to ensure that healthcare professionals and patients can understand and trust the decisions made by these systems.

Sustainability

The principle of sustainability is included in 36 articles. As the WHO (2021, 30) indicates, "AI systems should be designed to minimize their ecological footprints and increase energy efficiency so that use of AI is consistent with society's efforts to reduce the impact of human beings on the earth's environment, ecosystems and climate." Vandemeulebroucke (2024) comprehensively covers the environmental impact of AI systems, highlighting the environmental costs associated with AI, such as energy consumption, CO2 emissions, water use, and e-waste. Tortora (2024) assessed the computational power required to train generative AI models and maintain their physical infrastructure from a climate policy perspective. The article emphasizes evaluating the environmental impact of AI development and identifying strategies to mitigate it. A more sustainable and environmentally responsible approach to AI research, development, and deployment is essential. Wörsdörfer (2024b) stated that Biden's Executive Order on AI does not see AI as a risk factor for climate change and does not address the increased greenhouse gas emissions and e-waste problem associated with AI. Ross and Baines (2024) expressed student concerns about carbon emissions associated with generative AI. Daniel and Xuan (2024) emphasize AI's potential contribution to sustainability efforts, such as optimizing energy use and developing new materials for green technologies.

Freedom and autonomy

The principle of freedom and autonomy is included in 36 articles. Rana et al. (2024, 25) define AI autonomy as the ability to "conduct tasks without human intervention." Their study explores how the perceived autonomy of generative AI impacts its adoption and use within organizations. Oniani et al. (2023) emphasize that preserving human autonomy in healthcare is vital to ensuring that patients

receive care that aligns with their preferences and values and that clinicians can provide treatment as they see fit without undue influence from the AI system. Respecting autonomy in the decision-making process prevents adverse events and poor clinical outcomes and improves doctor-patient relationships and quality of care. Vandemeulebroucke (2024) examines the concept of autonomy in the context of AI systems' impact on healthcare professionals and patients. The author emphasizes that less involvement in decision-making processes can affect the autonomy of both groups.

Privacy

The principle of privacy is included in 35 articles. Privacy is commonly discussed in the context of data protection and security (Jobin et al., 2019). Chan (2023) emphasizes the importance of protecting sensitive student and staff information, stating that data privacy and security are needed when using AI technologies in higher education. Oniani et al. (2023) noted that patient data in healthcare applications is sensitive and could be harmful if leaked. The authors emphasize the need to protect patient data privacy and prevent breaches, advocating for robust security measures and "Health Insurance Portability and Accountability Act (HIPAA)" compliance in AI systems. Wakunuma and Eke (2024) identify potential negative privacy impacts of generative AI as the risk of personal data leakage and the complexity of obtaining adequately informed consent. The authors emphasize the importance of integrating privacy-preserving techniques and consent mechanisms into generative AI models. Gallent Torres et al. (2023) express the potential for GAI to violate privacy by collecting and using student and faculty data on digital platforms, emphasizing the importance of protecting this data and implementing cybersecurity policies to prevent unauthorized access.

Dignity

In this study, as in Jobin et al. (2019), the principle of "dignity" is less examined than other principles. The principle of dignity is included in 11 articles. According to the research results of Jobin et al. (2019), AI should not reduce human dignity but rather respect, protect, or even increase it. Vandemeulebroucke (2024) expressed concern that as AI systems begin to take over specific tasks, they may reduce the participation of healthcare professionals in decision-making processes, which may affect their sense of professional dignity. Stahl and Eke (2024) list dignity as one of the ethical issues associated with emerging information and communication technologies, including generative AI systems such as ChatGPT. Cheng and Liu (2023) identify dignity as one of the themes in AI ethics documents. However, they acknowledge that more clarification and consensus are needed on its specific meaning and implications in AI. They emphasize this with the statement, "The design of ethical guidelines and the formulation of legal policies for generative AI ought to uphold human dignity, with the welfare of human beings as the paramount value." (Cheng and Liu, 2023, 47).

Solidarity

As in the study by Jobin et al. (2019), the principle of "solidarity" is the least examined principle in this study. The principle of solidarity is included in 5 articles. Stahl and Eke (2024) expressed concern about the gap between those who can access and use ChatGPT and those who cannot exacerbate existing social divisions. Wakunuma and Eke (2024) examine the potential for generative AI systems like ChatGPT to impact African social structures and institutions positively. The authors point out that these systems can promote social cohesion, but such benefits will be lost if the models are trained on biased and discriminatory datasets.

Conclusion

The increasing growth of AI and concerns about its social impacts have led to increased resources being used to understand these systems, minimize their harms, and improve societal well-being (Orr and Davis, 2020). Generative AI, huge language models (LLMs) such as ChatGPT, can potentially revolutionize various fields. Generative AI has a wide range of applications, from providing personalized learning experiences in education (Rojas, 2024; Chan, 2023) to assisting with diagnostic support and treatment planning in healthcare (Harrer, 2023; Tortora (2024), facilitating recruitment and employee communication in human resource management (Yorks and Jester, 2024; Andrieux et al. 2024), and expanding forms of artistic expression in the creative arts (Vinchon et al., 2023). The rapid rise and adoption of generative AI are reshaping how organizations do business and individuals' daily lives. However, adopting generative AI poses significant ethical challenges and issues that must be overcome. Bias, fairness, transparency, security, and the role of humans necessitate responsible and ethical handling of generative AI applications.

Most of the articles included in the review are studies conducted in education. Generative AI has gained attention for its ability to provide personalized learning and instructional support. However, educators

should consider ethical issues surrounding generative AI tools, such as academic integrity, impact on critical thinking skills, unfair advantage given to some students, cheating, plagiarism, unauthorized use of data, and misinformation. In healthcare, generative AI can help in areas such as diagnostic support, treatment planning, and patient communication, but attention should be paid to challenges related to how data biases will affect system decisions, the confidentiality of patient and healthcare professional data, the possibility of providing false or harmful information, and how will affect the professional reputation of healthcare professionals. According to the research results, all articles' 11 ethical principles examined are absent. Similar to the research results of Jobin et al. (2019), the principles of "solidarity" and "dignity" appear to be the least examined ethical principles. All articles emphasized the principle of "justice and fairness." When the keyword frequencies determined for the principles are taken into account, the top three studies are Wörsdörfer (2024b), Wörsdörfer (2024a) and Singh Chauhan (2024), respectively.

This review is essential for evaluating the current situation and establishing a basis for future research. While the review reveals the complexity and multidimensionality of ethical issues in using generative AI, it also shows that further studies are needed to solve these issues. This research provides a valuable contribution to understanding the ethical dimension of generative AI and developing a more responsible and conscious approach in this area.

This scope review is limited to studies up to July 2024. Since the review was limited to generative AI, the studies on the specified databases were conducted in 2023 and the first half of 2024. Considering that the use of generative AI technology has become widespread with ChatGPT, studies on the subject will increase as new applications are launched on the market and usage increases. Future research can examine the ethical issues that may arise for different and new generative AI applications. In addition, due to time and resource constraints, only the articles were focused on, and the specified databases were limited. Future research can be expanded to include different sources. In addition, the ethical dimensions of AI can be examined in more depth by adopting multidisciplinary approaches. For example, combining law, sociology, psychology, and technology will allow for a more comprehensive analysis of AI's social, individual, and legal impacts. Another focus could be examining long-term effects. The long-term social, economic, and psychological impacts of AI applications used today on individuals and societies are still not fully understood. Therefore, future research should analyze the potential long-term consequences of these technologies and aim for social benefit.

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