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Digital Ethics of Teachers in the Intelligent Era and Solutions

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Abstract: With the advent of 5G networks, the Internet of Things, and artificial intelligence, humanity has entered the era of intelligence. However, the resulting inequitable distribution of information resources is reshaping the digital order of human society. The digital divide, exacerbated by algorithmic black boxes, privacy breaches, and data traps, is intensifying social injustices, while online digital blind spots are challenging the digital ethics of educators. This study begins with the concept of digital ethics, deconstructs the ethical dimensions of teachers' digital literacy in the context of digital transformation, bridges the ethical gap caused by technical challenges in teachers' instructional processes and students' self-directed learning, constructs an ecological ethical governance system that promotes the overall goodness of the network, refines the supply model of high-quality resources empowered by digitalization, and fosters an environment where technology aids emotional and humanistic care, thereby mitigating the lack of emotional experience due to the absence of virtual interaction.

Keywords: the age of intelligence, digital literacy, digital ethics

Introduction

With the rapid advancement of intelligent technologies, particularly the rise of generative artificial intelligence, the digital society is imposing higher demands on technology, philosophy, ethics, and human development. Governments around the world are intensifying their efforts to cultivate citizens' digital literacy to address the challenges posed by the profit-driven nature of the digital economy and the dynamics of digital political power. In response, the Chinese Ministry of Education released the "Teacher Digital Literacy" standards in 2022, which delineate five dimensions for educators: digital awareness, technological knowledge and skills, digital application, digital social responsibility, and professional development [1].Consequently, the digital transformation of education is continuously advancing, and the integration of teachers' identities into digital teaching has become an inevitable trend. In 2024, the Cyberspace Administration of China, along with 13 other departments, jointly issued the "Work Plan for the National Digital Literacy and Skills Enhancement Month 2024," further promoting the widespread adoption of digital literacy education [2].

However, the widespread application of digital technologies has also brought about numerous ethical issues, such as unequal information distribution, digital privacy rights, and algorithmic bias. These problems not only affect the diverse entities within the digital society but also trigger new social issues in the real world. Consequently, how teachers can navigate digital ethics in the process of digital teaching and help students resolve digital dilemmas has become a significant topic in the field of education. This paper, based on interpreting the concept of digital ethics and reviewing its developmental trajectory, sets the intelligent era as the overarching research context. Within this framework, it explores the dimensions of digital ethics, elucidates the technical challenges it faces, and proposes methods for mitigating associated concerns, aiming to provide a new perspective and approach for future teacher training initiatives.

Literature Review of Digital Ethics

As of December 2024, the number of online video users in China has reached 1.07 billion, an increase of 3.47 million compared to December 2023, accounting for 96.6% of the total internet user population. Among these, the number of short video users has reached 1.04 billion, representing 93.8% of the total internet users, while the number of micro-drama users has reached 662 million, making up 59.7% of the total internet user base [3]. Artificial intelligence technology has been integrated into various operational scenarios of short video production, including content planning, creation, promotion, personalized recommendation, and online marketing. For instance, the video generation model "Keling AI" has already attracted over 6 million users and has generated more than 65 million videos and 175 million images to date. Concurrently, AI technology can effortlessly facilitate face-swapping in short videos, with voice replication also achieving remarkable verisimilitude. The proliferation of virtual reality (VR) and augmented reality (AR) software on social media platforms undoubtedly entices netizens into digital traps. Moreover, the use of AI to clone celebrities or "resurrect" deceased individuals has sparked significant ethical controversies. Therefore, the proposition and implementation of the concept of digital ethics carry profound practical significance and broad application prospects.

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Research on digital ethics is relatively recent, and there exist numerous similar concepts. Searches within domestic databases such as CNKI and international databases like Web of Science reveal terms such as: technological ethics, data ethics, digital technology ethics, digital social ethics, and educational technology ethics, predominantly within the fields of communication studies, education, and sociology. A multitude of scholars have engaged in extensive academic discussions regarding the proposition and differentiation of these concepts. This paper will elucidate by citing the work of two scholars as examples.

One such concept is educational technology ethics. This definition originally emerged in 2005, introduced by Spanish scholar Katz, and has since spurred a growing body of related research within the domestic educational community. Among these, Zhao Leilei et al. (2023) posit that educational technology ethics can be regarded as the moral principles and guidelines concerning the relationships between technology and humans, technology and society, and technology and nature during the development and application of technology in educational settings [4].

Another concept is digital ethics. Wang Shuo et al. (2023) define digital ethics as the value concepts and behavioral norms that people need to follow when developing, disseminating, and applying digital technologies and products. Additionally, they approach digital ethics from the perspective of its content, arguing that it encompasses areas such as algorithmic ethics, data ethics, and artificial intelligence ethics. They further elaborate on these by categorizing them into individual, organizational, societal, and human levels [5].

This paper posits that digital ethics refers to the moral norms, values, and behavioral guidelines involved in the application of digital technologies. It encompasses various aspects such as data privacy, algorithmic fairness, technological transparency, and the protection of digital rights. Early discussions on digital ethics primarily focused on computer ethics, but with the proliferation of the internet, the scope gradually expanded to include network ethics. With the widespread adoption of artificial intelligence and big data, China has successively enacted the Cybersecurity Law, Data Security Law, and Personal Information Protection Law in 2022. However, the concept of digital ethics in the intelligent era has rarely been addressed. The connotation of digital ethics needs to be further enriched and deepened to include multiple dimensions such as algorithmic ethics and data ethics. At this juncture, the proposal of the concept of digital ethics also bears the significant responsibility of advancing Chinese-style modernization. Therefore, both theoretically and practically, there is an urgent need to enhance teachers' digital ethics.

The Development History of Digital Ethics

The intelligent era is not only dominated by artificial intelligence but is also inextricably linked to digital transformation. All of these developments impose higher demands on advancing the digital ethical literacy of contemporary education and teachers.

Firstly, teachers occupy the primary position in "teaching" and are the first stop in the digital transformation process. The digital ethical literacy of teachers directly impacts the progress of the overall digital transformation of national education and the quality of talent cultivation. Secondly, the digital ethical literacy of teachers also significantly influences their personal development. Some teachers, due to factors such as age and energy, have less exposure to new media, possess less sensitive digital awareness, and lack strong digital perception abilities, which adversely affects their teaching and research. For students, the positive or negative attitudes of teachers towards digital technology can subtly influence the social responsibilities of both parties, which is evident within the realms of morality and law. Therefore, based on these three considerations, this paper divides teachers' digital ethics into three dimensions, as illustrated in the following figure.

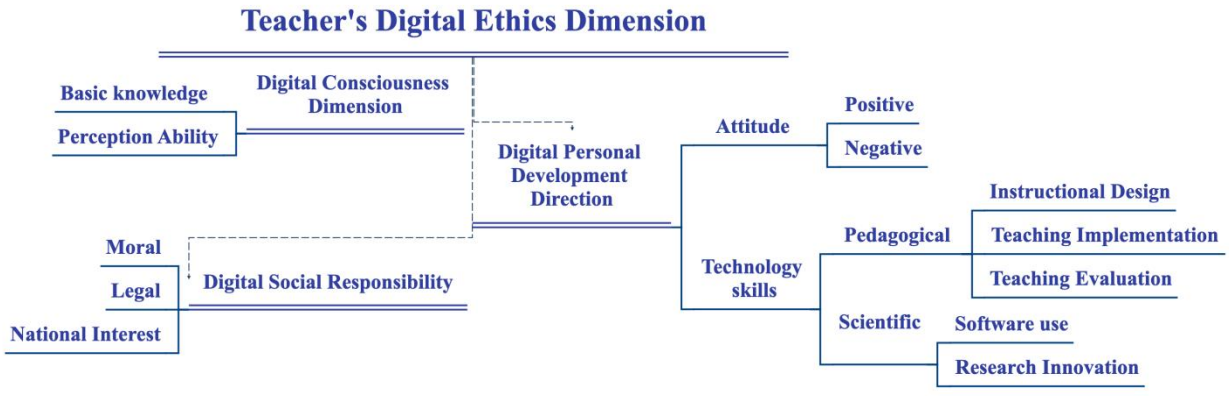

Fig. 1: Teacher's Digital Ethics Dimension

Digital Consciousness Dimension

Although digital technology has become an integral part of our daily lives, teachers' sensitivity to digital matters varies significantly due to factors such as age, time, and energy. The foundational knowledge of digital technology and the ability to perceive digital trends differ even more from person to person. This is because digital perception encompasses not only the protection of personal data privacy—such as safeguarding individual privacy during the collection, storage,

and use of data—but also the ability to enhance the transparency of technology within one's own capacity, ensuring an understanding of how technology operates. Only in this way can the fairness of algorithmic decision-making be maximally ensured, avoiding bias and discrimination. However, current academic research highlights several issues: the lack of uniform standards for teachers' digital competence, leading to chaotic and disorderly development directions; weak data awareness among teachers, resulting in poor effectiveness of data application; and insufficient data skills among teachers, leading to inadequate utilization of data value [6].This not only requires the appropriate integration of digital resources in schools but also necessitates teachers' personal acceptance of new knowledge and concepts. UNESCO's primary approaches to developing teachers' digital literacy focus on three aspects: resource self-sufficiency, framework application, and training initiatives, which have achieved significant success.

Digital Personal Development Direction

Undoubtedly, the most critical application of digital ethics lies in the process of digital teaching. Whether it is primary and secondary school teachers or university professors, the use of digital technology in teaching has become an undeniable reality. However, the effectiveness of such practices in the classroom often leaves much to be desired. On one hand, some teachers' understanding of digital technology may be limited to PowerPoint slides or short videos, and in some classrooms, it is not uncommon for teachers to play lengthy videos, reflecting a superficial grasp of digital tools. On the other hand, although various schools have widely implemented digital literacy training programs for teachers, some educators approach these initiatives with reluctance and a passive attitude, let alone engaging in practical exploration and innovation with digital technologies.

Given that "ethics" itself is a social norm aimed at harmonizing individual and societal interests, the emergence of digital ethics not only guides teachers in personal development and the adjustment of social relationships but also fosters students' aspirations for fairness, justice, and goodness in classroom learning and post-class practical assignments. Therefore, it is imperative for teachers to actively overcome their fears and apprehensions, building the confidence and determination to embrace these challenges.

Certainly, the concept of ethics is vast and complex, and it is often subject to misinterpretation, misunderstanding, and misuse. The concept of digital ethics is even more novel and challenging to grasp. Some teachers believe that since digital technology is involved, they should employ cutting-edge methods such as augmented reality (AR) and virtual reality (VR) to capture students' attention in the classroom. Regardless of the costs associated with using such technologies, the preparation required by teachers during lesson planning is already time-consuming and labor-intensive. While these technologies may initially spark students' enthusiasm, over time, they risk becoming mere gimmicks—used for the sake of technology itself or for creating a "wow" effect. Students may become immersed in the spectacle, losing sight of the actual content of the lesson. Moreover, this approach places undue pressure on other teachers.

Additionally, digital technology skills are increasingly applied in academic research. For many university faculty members, using various software tools to support and innovate in research is an invaluable approach. However, this raises questions about digital ethics, which involve understanding the principles of media, big data, and platforms. These principles can drive transformations in teaching theories, models, and methods, while also presenting potential ethical challenges.

The Dimension of Digital Social Responsibility

The digital realm has created a virtual cyberspace that rivals the real world, and the digital society it forms naturally encompasses the same range of ideas and behaviors as the physical world. "Responsibility" pertains to both "morality" and "national interests."

"Morality" is a form of consciousness that clearly distinguishes between "good" and "evil." It represents the principles and norms that guide human interactions with one another, with nature, and with society. In the digital society, all members entering the digital world should, in theory, adhere to certain behavioral norms, which form the foundation of respect and trust. Only then can effective digital collaboration take place, driving the progress of the digital society as a whole.

At the same time, morality is not only a summation of social relationships but also reflects the philosophical reflections of people across different historical periods on ethical phenomena. It deeply embodies concern, understanding, and care for all forms of life, serving as a command that constrains and standardizes normal social behavior. Generally, it manifests in the development of products, political propaganda, and cultural transmission within macro-level societal domains such as the digital economy, digital politics, and digital culture. These efforts are often more inclined toward businesses and political parties, ultimately reflecting the realization of overall national interests.

Currently, several countries have incorporated digital ethics into their teacher training systems. For example, Finland has made digital ethics a mandatory component of both pre-service and in-service teacher training, covering topics such as data privacy, cybersecurity, and digital citizenship responsibilities. The International Society for Technology in Education

(ISTE) in the United States has established the Educator Standards, which explicitly outline the ethical competencies educators should possess in the digital age, such as respecting student privacy and using digital resources fairly. These standards provide a global reference framework for educators, helping them better understand and practice digital ethics. The European Union has launched the "Digital Citizenship Education" project, developing a series of digital ethics educational resources for students of different ages, including online courses, games, and videos. These resources help students understand the potential risks of the digital world and learn how to use digital technologies safely and responsibly. Singapore has established the "Digital Ethics and Safety Committee," comprising representatives from the government, schools, parents, and businesses. This committee collaboratively formulates and implements digital ethics education policies, fostering communication and cooperation among stakeholders to create a safe and healthy digital environment.

In China, the Guidelines for Standardizing AI Ethical Governance were adopted in March 2023. These guidelines include principles such as human-centricity, sustainability, collaboration, privacy, fairness, sharing, external security, internal security, transparency, and accountability. Furthermore, the guidelines provide a detailed analysis of the sources of risks in AI ethics, application scenarios, and technical solutions, while also outlining an idealized standard for the current state of affairs. For example, they emphasize building consensus, creating governance models, promoting industry-academia-research integration, strengthening technical practices, bridging technological gaps, and leading high-quality development. It can be said that the Guidelines for Standardizing AI Ethical Governance represent a significant breakthrough in the application and development of digital ethics research in China, offering at least a reference template for further exploration. At this juncture, as China navigates unprecedented changes, challenges such as technological chauvinism, digital competition, digital protectionism, and digital discourse rights have introduced new adjustments and competitions. Teachers must clearly define their roles as educators and digital citizens, as their digital ethics will shape students' interpretations of the digital society.

In November 2024, the 41st General Conference of UNESCO adopted the Recommendation on the Ethics of Artificial Intelligence, drafted by experts from 24 countries. This recommendation defines the fundamental principles and values that should govern the development and application of AI technologies, divided into three parts: values, ethical principles, and policy guidance. It further guides the establishment of necessary legal frameworks to mitigate the negative impacts and potential risks of AI, ensuring that it benefits human development and innovation. This document represents the first global framework and common agenda for AI ethics in human history, achieving the broadest consensus among governments worldwide. It provides strong support for the next steps in formulating international regulations and technical standards for AI development, marking another victory for multilateralism.

The Solutions of Teachers' Digital Ethics

The digital ethics of teachers encompass dimensions of digital awareness, personal digital development, and digital social responsibility, each corresponding to distinct functions. To be competent in digital ethics, teachers must engage in learning and make breakthroughs in each dimension. The fundamental objective of enhancing the three dimensions of teachers' digital literacy is to improve their digital ethical literacy, promoting responsible and effective use of digital technologies in digital teaching environments. Only when teachers' awareness of digital ethics is significantly enhanced can they consciously adhere to digital ethical norms. Moreover, it is essential to conduct regular assessments of teachers' digital ethical literacy, monitor developments in digital technology, promptly identify issues, continuously update training content and methods, and refine solutions. Additionally, it is crucial to strengthen communication and collaboration between regions and among schools (institutions) to jointly explore effective ways to enhance teachers' digital ethical literacy. Specific details can be seen in Table 1.

Firstly, there should be no fear towards the emergence and development of new technologies. The core distinction between the intelligent era and the traditional internet era lies in its increased humanization and intelligence. DJI drones, Unitree's robotic dogs, and humanoid robots have already gained widespread popularity online. In this context, intelligent entities already possess a certain level of artificial intelligence and are more relatable to humans. Teachers can fully embrace the changes brought by the era and technology without resistance. By extensively conducting teacher training on digital ethics, establishing clear norms and guidelines, developing educational resources, creating collaborative mechanisms, utilizing technological means to strengthen supervision, and encouraging teachers to engage in practical applications, a safe, healthy, and positive digital learning environment can be fostered. This enables teachers to apply digital ethics in teaching and research.

Secondly, the most critical aspect of digital ethics is the authenticity and reliability of data. However, data hegemony, algorithmic discrimination, and digital regulation constrain digital privacy, digital public opinion, and digital polarization, with their concealment being difficult to detect. Furthermore, human labor in the digital environment is once again alienated, as Marx noted in the "Economic and Philosophic Manuscripts of 1844." The development and use of emerging technologies have complex impacts on society, with both positive and negative aspects. Therefore, the overall planning of the digital ethics system should include the "human" as laborers. Of course, the UNESCO's "Recommendation on the

Ethics of Artificial Intelligence" has repeatedly mentioned the addition of independent AI ethics officers or other corresponding mechanisms. Thus, during their tenure, teachers serve as the first line of defense for digital ethics.

Dimensionality	Step	Solution
Digital Consciousness Dimension	Target	Enhance teachers' understanding of the impact of digital technology and cultivate a positive and responsible attitude towards its use.
	Measure	Carry out digital ethics training: organize special lectures and workshops to explore the ethical challenges brought by digital technology, such as data privacy, algorithmic bias, cyberbullying, etc.
	Case Analysis	By analyzing real cases, guide teachers to think about ethical issues in the use of digital technology and explore solutions.
	Encourage Reflection	Encourage teachers to reflect on the use of digital technology in their daily teaching and attempt to integrate digital ethical principles into instructional design.
Digital Personal Development	Target	Enhance teachers' digital technology skills and promote their application in teaching, research, and other areas.
	Measure	Provide skill training: offer training courses on the use of digital tools, data analysis, online teaching, and other aspects to enhance teachers' digital skills.
	Case Analysis	Establishing a learning community: Encourage teachers to form learning groups, share their experiences in digital technology applications, and jointly explore new models of digital teaching.
	Research & Innovation	Provide teachers with resources and platforms for applying digital technology to educational research, and encourage the development of related research topics.
Digital Social Responsibility	Target	Guide teachers to establish a sense of digital social responsibility, maintain network security, and promote the positive development of digital technology.
	Measure	Strengthen network security education: carry out network security knowledge popularization activities to enhance teachers' awareness and protection skills of network security.
		Advocate for digital citizenship literacy: Guide teachers to lead by example and fulfill their digital citizenship responsibilities, such as respecting intellectual property rights, protecting personal privacy, and resisting online rumors.
		Policy support: Schools should formulate relevant policies to incorporate digital ethical literacy into the teacher assessment and evaluation system, and provide necessary resource guarantees.
	Case Analysis	Participate in digital social governance: Encourage teachers to actively participate in digital social governance, such as participating in the construction of online civilization, reporting online illegal activities, etc.
	Practical Activities	Technical support: Provide teachers with convenient and secure digital technology platforms and tools, and strengthen technical support and maintenance.
		Cultural creation: Create a positive and uplifting digital cultural atmosphere, encourage teachers to actively explore and innovate, and jointly promote the digital transformation of education.

Table 1.The Solutions to Enhancing Teachers' Digital Ethics Literacy

Lastly, teachers' digital ethics can also serve as an experimental field, ensuring substantive participation of all relevant stakeholders during the cultivation of teachers. This approach is more authentic and allows for the timely expression of their interests. Whether they are designers, producers, users, consumers, managers, or regulators, all parties can coordinate to form digital ethical system rules that meet the interests of all. Only in this way can the enthusiasm, creativity, and initiative of the working people be maximized under the new labor spatiotemporal context. This is the ultimate goal of digital ethics. Currently, the uneven development of information has led to a digital divide between the information-rich and the information-poor, exacerbating social divisions and resulting in digital addiction, digital refugees, and digital immigrants in real society.

Conclusion and Outlook

The advent of the intelligent era brings new opportunities and challenges to education. As an essential component of the digital society, digital ethics imposes new requirements on teacher training. By strengthening digital ethics education, enhancing teachers' digital literacy, and innovating teaching practices, teachers can better address ethical issues in the digital society, help students resolve digital dilemmas, exercise basic rights such as the right to know and choose in the digital society, and provide new ideas and perspectives for future educational development. This ensures that different groups can equally enjoy the conveniences brought by digital technology. Of course, digital humanities in the educational process should not be overlooked. Whether they are primary and secondary school teachers or university teachers, they should actively exert human subjectivity and warmth in actual teaching and research environments, which is the essence of education.

On January 28, 2025, Unitree robots made a stunning appearance at the Chinese Spring Festival Gala, spinning handkerchiefs, while DeepSeek became a symbol of the rise of Chinese artificial intelligence. The "Overall Layout Plan

for Digital China Construction" has been perfectly embodied. Building a digital China is not only an important engine for advancing Chinese-style modernization in the digital era and a powerful support for constructing new national competitive advantages but also brings about new international relations adjustments and competitions such as technological chauvinism, digital gaming, digital protectionism, and digital discourse power. This is of great significance and far-reaching impact for accelerating the construction of a digital China and comprehensively building a modern socialist country, as well as advancing the great rejuvenation of the Chinese nation.

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