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The Dimensional Composition and Interpretation of Digital Ethics- A Grounded Theory Study Based on Existing Literature

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Abstract

This paper employs the grounded theory approach to conduct an in-depth analysis of the dimensional composition of digital ethics and its application in digital societies. Based on journal articles sourced from CNKI (China National Knowledge Infrastructure), the study reveals five core dimensions of digital ethics through qualitative analysis: meta-rules, digital governance order, the public-private boundary in digital societies, rational logic in the digital age, and ethical risks. The research suggests that the development of digital ethics should facilitate the free flow of information and knowledge sharing, and establish a digital community to promote overall social progress. The study points out that the level of institutionalization of norms is crucial in determining the ethical state of digital societies, and there exist differences in the level of institutionalization of digital ethics across different regions. Therefore, this paper advocates for the construction of an inclusive digital ethics framework that accommodates the needs and expectations of diverse societies.

Keywords: Digital Ethics, Dimensional Composition, Grounded Theory, Diverse Societies.

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1. Problem Introduction

The digital transformation of education is an unavoidable prerequisite for adapting to societal changes and the passage of time, as well as an important tool for advancing educational equity in the digital context (Jiang Hongchi et al., 2024; Li Yangjie, 2024). With the rapid advancement of digital technology, many aspects of society have undergone fundamental transformations. Concepts like digital schooling and the metaverse have progressed from novelty to ubiquity, becoming driving factors in social evolution. However, this approach has resulted in ethical difficulties such as data privacy violations and algorithmic discrimination, demonstrating the lack of a digital ethical order (Zhu Mingting et al., 2024). The advancement of digital technology not only promotes economic growth and social progress, but it also threatens old ethical values. As the digital transformation of education progresses, digital ethics issues have steadily become the focus of public attention. Technology ethics, algorithmic ethics, and data ethics are among the many areas covered by digital ethics (Wang Shuo et al., 2023). These ethical challenges revolve around how to ensure the harmonious cohabitation of technological growth and human values, as well as how to improve overall social welfare while respecting individual rights and interests.

Native ethical forms are the prevailing lifestyles and cultural customs in a place of residence (Feng Shusheng, 2024), i.e., the value concepts and behavioral norms that should be followed when dealing with relationships between people, people and society, and people and nature (Li Zhengfeng et al., 2022). The academic community has yet to reach an agreement on the definition of digital ethics, but in general, digital ethics refers to the ethical principles and behavioral norms associated with digital transformation, digital information, and technology development and application in digital societies (Wang Shuo et al., 2023). Existing research demonstrates that digital ethical challenges span numerous levels, including citizens' digital literacy, data rights, algorithmic ethics, and so on (Li Zhengfeng et al., 2022). Algorithms and technologies, in particular, are becoming increasingly crucial in people's lives, and rapid iteration and misuse of technology have become common tensions in digital societies. For example, the open sharing of data versus the exposure of personal privacy, individuals trapped in "information cocoons" during the "information explosion" era, the conflict between developed social media and fragmented psychology, and the coexistence of precise recommendations and algorithmic black boxes (Wang Tianfu, 2021). These difficulties also affect generative artificial intelligence, which is built on algorithms. Existing research indicates that the "algorithmic system" has become an external alienating force of domination, control, and governance over organizations and their members (Liu Tianyu et al., 2023), and issues such as "regulatory overload" and "power reorganization" are prominent in the era of artificial intelligence (Cheng Le, 2024). As a result, several academics have raised concerns about algorithmic control (Sun Baoxue, 2019). These papers contribute significant views and theoretical foundations to our understanding of digital ethics. The academic community has had in-depth discussions on these ethical issues from various perspectives, including the conceptual evolution and constituent elements of digital literacy (Wang Youmei et al., 2013), the legal characteristics of data rights (Li Aijun, 2018), and classic algorithmic ethics

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questions such as transparency, arbitrary evaluations, and unequal impacts (Shen Wei, 2024).

Despite previous research offering a basic grasp of digital ethics, there are significant gaps in its core aspects, conceptual interpretations, and attribute perspectives. Currently, scholarly conversations about digital ethics are wide and generalist. Many scholars are actively researching related notions of digital ethics, such as technology ethics, algorithm ethics, and data ethics (Wang Shuo et al., 2023), but few researchers analyze the constituent features of digital ethics from an ontological standpoint. Wang Shuo and Li Zhengfeng, among others, have provided insightful perspectives on the relationship between digital ethics and digital transformation (Wang Shuo et al., 2023; Li Zhengfeng et al., 2022, 2020). Meanwhile, relevant academic research on digital ethics stresses a practical approach with the goal of addressing real-world concerns. Overall, previous research has produced some results, but from an ontological standpoint, this is insufficient. For example, the relationship between digital ethics and digital transformation has not been thoroughly investigated, and the deconstruction of the essence of digital ethics is similarly limited. Furthermore, how to explore the concept of digital ethics from an ontological standpoint, as well as how to better apply digital ethics principles in practice, are areas that deserve greater investigation in the current study.

This work provides a valuable analysis of this subject within the context of Chinese culture, with the goal of enriching understanding in this sector. This study uses the grounded theory research approach to thoroughly examine the constituent dimensions of digital ethics, investigate its concepts and qualities, and address how to apply these ethical principles in digital transformation. In brief, this study seeks to answer the following questions: What concepts and characteristics are included in the constituent aspects of digital ethics? How are these notions and qualities to be understood? How do these dimensions and qualities interact to create a cohesive system?

In conclusion, this study will delve into the constituent dimensions, conceptual interpretations, and attribute perspectives of digital ethics, with the goal of assisting with the digital transformation of education while also providing theoretical references and policy insights for the benign governance of digital societies. We hope that our research will promote responsible innovation in digital technology and ensure the peaceful coexistence of technological growth and human values.

II. Literature Review

In scholarly discussions on digital ethics, Arnautu (2006) emphasized the reshaping effect of Internet technology on social institutions, claiming that technological advancement and social development are inextricably linked. He examined the ethical implications of digital technology for human cultural practices. However, as digital technology has advanced, the digital society has progressively become a significant aspect of people's life, sometimes known as "Second Life." In this setting, established norms and standards are unable to meet the ethical requirements of digital humans. Essentially, digital ethics has evolved into a set of principles and ideals that internet users should adhere to in digital places. Brown (2014) described "digital morality" as an individual's ability to engage in thoughtful involvement in digital settings, highlighting

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the significance of investigating and creating the digital society. Although this approach emphasizes individuals' viability in a digital society, it overlooks social dynamics and individual flexibility during the digital transformation process. The digital society, being a virtual realm built on digital technology, has intrinsic anonymity, allowing individuals to freely create digital identities, integrate into digital life, and access services such as digital education, news, and healthcare. The growing adoption of digital technology needs a rethinking of ethical dilemmas in the digital setting. Following this practical emphasis, numerous researchers have done in-depth investigations of digital ethics from a variety of disciplinary viewpoints. Mutula (2011), for example, raised ethical and trust concerns in the field of digital academics, whereas Milton (2015) critiqued the instability, unreliability, discontent, and high costs connected with digital healthcare programs. According to Joiner's (2019) research, the profession of social work requires the cultivation of a highly caring digital ethics awareness, which is severely lacking in the existing education system. Furthermore, investigations by Ott et al. (2022) and Paltiel et al. (2023) have verified the significance and techniques for increasing digital ethics in school instruction.

Faced with the challenges of digital transition, experts have offered many frameworks for developing digital ethics. Ward et al. (2014) examined the decline of traditional journalism ethics and the growth of digital journalism ethics, calling for the establishment of a radical media ethics. Nemat et al. (2023) attempted to solve the problems of digital transformation by applying digital moral principles and conducting an organizational feasibility analysis using the PaRA tool. Kantar et al. (2021) introduced the Flourishing Ethics Theory, which aims to create a universally applicable moral framework for digital ethics that incorporates both humanistic issues and the impact of technology repercussions. However, adopting these philosophical insights at the operational level is challenging. García-Marzá's (2023) proposal for dialogical digital ethics builds on the European Commission's 2019 "Ethics Guidelines for Trustworthy AI."

While existing research primarily employs quantitative analysis methods and statistical tests to assess the current state and issues of digital ethics in various fields, and some scholars have examined the controllability of technology using policy texts, these studies offer limited assistance in developing digital ethics systems appropriate for different regions. The digital society is a reflection of the actual world, impacted by economic and cultural variables, and the level of development of digital technology varies significantly by location. As a result, how to construct a digital ethics framework based on local reality is an important subject that deserves further investigation. As a representative of Eastern culture, China's significant achievements in digital ethical system study can help to enhance and develop the existing knowledge system.

III. Research Methodologies and Data Sources

This study use a grounded theory methodology to carefully evaluate and develop a theoretical framework for digital ethics. The research data predominantly derive from journal articles about "digital ethics" within the China National Knowledge Infrastructure (CNKI) academic resource database. Through the rigorous application of screening criteria, including journal ranking, keyword alignment, and content

evaluation, 24 articles from the "Chinese Social Sciences Citation Index (CSSCI)", "Peking University's Core Journal Guide", and "China's Core Journals of Humanities and Social Sciences (AMI)" were ultimately chosen as research samples.

This study utilized a modified grounded theory coding method during the qualitative data processing procedure. The analytical process is delineated into three phases: the first-level coding phase, wherein initial conceptual categories and their dimensional attributes are discerned through labeling; the second-level coding phase, which seeks to elucidate the interconnections among various categories and identify core categories accordingly; and the third-level coding phase, where the relationships among categories are further refined, culminating in the construction of a theoretical model to interpret the data. This study also performed a theoretical saturation test to guarantee the comprehensiveness of conceptual categories and the saturation of the theory. This study utilized policy documents, including "Ethical Norms for New-generation Artificial Intelligence" and "Action Plan for Enhancing Digital Literacy and Skills of All Citizens," as reference standards to guarantee the practical relevance and applicability of the research findings, given the substantial implications of digital ethics in the empirical realm. Initially, we performed first-level categorization on the gathered literature, establishing categories such as "digital rights" and "technology risks" that encapsulate the primary topics of the texts. Consequently, a thorough coding of the literature materials and content was executed in accordance with the first-level coding procedures, leading to the refining of several categories. Subsequently, we performed a comparative analysis between the categories established through coding and policy texts, omitting specific procedures like labeling, while instead identifying newly introduced dimensions and features, finally constituting all the categories presented in this paper.

It is important to emphasize that data collection and analysis were conducted concurrently. Coding analysis was conducted following the compilation of relevant literature, and the findings informed the subsequent phase of data gathering. This multi-faceted analytical approach seeks to furnish comprehensive insights and theoretical backing for scholarly discourse and practical implementations in digital ethics.

Table 1 Analysis Table of Attributes and Dimensions

Serial Number	Category	Attribute	Dimension
1	Meta-Rule		Macro-Ethics
			Social Welfare
			Universal Sharing
			Data Social Morality
			Digital Community
2	Governance Order	Value Orientation	Principle of Technology Taking a Back Seat
			Pursuit of Goodness, Truth, and Beauty
			Supremacy of Life Rights
		Hard Ethics	Formal Regulations
			Public Data Flow
			Information Security
			Transparency and Openness
			Full Chain Supervision
3	Individual Rights	Digital Individual Rights	Personal Data Protection

		and Interests	Informed Consent
			Unity of Rights and Responsibilities
			Principle of Benefit Transfer
			Digital Happiness
		Digital Social Environment	Organizational Ethical Atmosphere
			Trust Capital
			Digital Resources
			Digital Cost Investment
			Public Good
4	Ethical Risks	Individual	Digital Divide
			National Sovereignty
			Usage Safety
		Subjectivity Reflection	Human-Machine Relationship
			Human Subjectivity
			Substantial Participation of Subjects
5	Rational Logic	Technological Rationality	Ethics of Algorithm Design
			Non-Exclusivity
			Controllability
		Technological Rationality	Definition of Legitimacy
			Professional Ethics

IV. Characteristics and Aspects of Digital Ethics

In ethics, "ethics" is typically defined as a collection of rules and principles designed to direct the conduct of individuals and groups in social interactions (Wang Donghua, 2011). In the digital era, digital ethics has become a vital research domain, concentrating on the adaptation and application of conventional ethical principles within a digital context. This study, informed by existing literature and grounded theory research methods, posits that the essential dimensions of digital ethics should include four principal connotations: meta-rules, digital governance order, public-private boundaries in the digital society, and rational logic in the digital age.

（1） **Meta-Rules**

In the context of digital ethics, meta-rules are essential, embracing the foundational concepts of macro-ethics and offering philosophical moral norms and standards for individuals and interactions in the digital era. Jiang Bixin et al. (2024) contend that the development of a digital ethical framework necessitates particular emphasis on two fundamental meta-rules: "Do not inflict upon others what you would not wish to experience yourself" and "Broaden your empathy towards others and engage in self-reflection." The meta-rules of digital ethics provide the framework for building the digital society, and technological advancement along with ethical principles in the digital realm should embody contemporary humanistic traits.

These principles mandate that all acts and decisions inside the digital realm must strive to improve societal well-being and guarantee equitable access to the benefits of digital technological advancements for every individual in society. The advancement of digital ethics ought to facilitate the unrestricted exchange of information and the dissemination of knowledge, fostering a digital community to propel societal growth.

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(2) Digital Governance Directive

The digital governance framework encompasses the ethical values of digital ethics and the formal regulations of stringent ethics, including a comprehensive regulatory system for digital technology enforced by regulatory authorities and the governance structure developed by governing entities within the digital society. Consequently, it is imperative to adhere to the principles of cultural diversity and inclusivity within the framework of digital globalization, honoring the most generally recognized value systems. A study on global governance indicates that despite variations in public comprehension of data ethics among diverse cultural contexts, there exists a fundamental agreement on ethical principles like transparency, accountability, and justice (Zhu Mingting et al., 2024). Targeted strategies must be developed for various areas and cultural circumstances, contingent upon enhancing the digital governance capacities and digital governance literacy of governing bodies. Certain scholars assert that ethical concerns must be handled with greater sensitivity during the educational digitization process (Qi Zhanyong et al., 2024).

This dimension highlights the significance of ethical principles and value orientation in digital governance, asserting that technological advancement and implementation must adhere to the pursuit of goodness, truth, and beauty while ensuring that technological progress aligns with the long-term interests of human society. Simultaneously, it is essential to protect individuals' fundamental rights from being undermined in the quest for technological advancement, particularly in public services like education and healthcare.

(3) The Demarcation Between Public and Private in the Digital Society

The private border in the digital society emphasizes the safeguarding of individual rights and the actualization of digital personal rights and interests. Principles such personal data protection, informed consent, and the unity of rights and responsibilities underscore the need of respecting and safeguarding personal privacy and data in the digital realm. The notion of benefit transfer necessitates reconciling individual goals with societal public interests in the development and exploitation of digital resources to guarantee equitable distribution and sensible use of these resources. Moreover, notions like organizational ethical climate and digital investment in trust capital underscore the necessity of fostering an environment that promotes individual growth and collective well-being in the digital society. The inherent qualities of data necessitate that digital individuals assume associated obligations and sacrifices when utilizing digital services; nonetheless, this allocation of rights and interests should adhere to the notion of public good.

The digital society is undergoing rapid development, presenting numerous ethical issues in the digital domain. Diverse digital expenses signify distinct digital social contexts. Despite the inclusivity of digital technology, the digital divide continues to expand due to regional political and economic disparities (Huang Jin et al., 2011). Economically advanced nations frequently employ digital infrastructure development to mitigate this disparity, whereas underdeveloped regions exhibit more disadvantages as latecomers (Geng Xiaomeng et al., 2020). The security of data utilization in digital

technologies has not been universally assured. The identifiability of data necessitates an elevated level of data protection, compelling us to critically evaluate the concept of state sovereignty inside the digital realm. The current significant issue is the necessity to thoroughly contemplate the obfuscation of subjectivity caused by big data (Liu Qiang, 2022). This ambiguity stems from the influence of data and platforms on personal cognition, interference in individual decision-making, and regulation of lifestyles. This necessitates doing research and evaluation of human-computer interactions at a technical level, highlighting the significant involvement of human participants and enhancing the practical importance attributed to digital entities.

（4）Rational Logic in the Digital Era

The digital era necessitates logical reasoning from digital citizens. Digital individuals must exhibit fundamental logical reasoning to evaluate the diverse representational symbols of the digital society based on dataization. In the digital society, symbols of meaning and value are referenced and represented, with individuals relying on their logical faculties to discern their precise implications.

The rational logic of the digital era emphasizes design at both technical and institutional levels, examining the integration of ethical considerations into technological advancement. Technical rationality necessitates compliance with the concepts of non-exclusivity and controllability in algorithm design to guarantee that technological applications do not yield inequitable effects on particular groups or persons. Institutional rationality underscores the necessity of a definitive legal and institutional framework to govern and regulate the utilization of digital technology, hence preserving social fairness and order. Professional ethics mandate that technology practitioners adhere to ethical standards in their professional endeavors, thoroughly assess the ethical implications of technology, and assume accountability for societal and environmental impacts.

This study conducts an in-depth analysis of the aforementioned four dimensions, aiming to provide a theoretical foundation and practical guidance for establishing an effective set of digital ethics norms in the digital society.

Figure 1 Model for the Construction of Digital Ethics
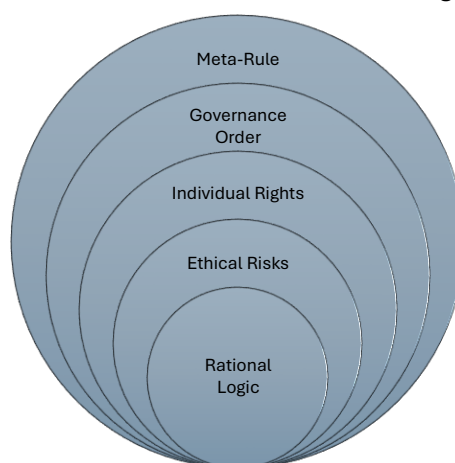
V. Type Analysis: Ethical Frameworks in the Digital Society

In the preliminary coding phase of qualitative research, this study has effectively

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established conceptual categories for theoretical advancement. The ensuing effort of secondary coding is to uncover and refine the fundamental categories of digital ethics. This research will disclose the fundamental categories of digital ethics through a comprehensive evaluation and associative analysis of the coding results.

1. Structure of the Story

This research presents a fundamental hypothesis: Each digital citizen that engages with the online realm is an autonomous entity inside the digital society, and their progression in this environment is shaped by both personal and societal influences. The role of digital ethics is to direct and regulate individuals' conduct inside the digital society. Digital individuals must be integrated into a developed digital environment, encompassing critical network infrastructure, varied online platforms, dynamic social networking spaces, and affordable cultural exchanges, all of which together make a cohesive online ecosystem. This process is affected by regional development levels and digital infrastructure capabilities, with notable disparities in network costs between developed and underdeveloped regions that digital individuals must initially surmount. Moreover, digital individuals must be "granted access" to the digital society, necessitating the possession of relevant cultural knowledge and cognitive skills to navigate regional internet ecosystems. The extent of normalization in the digital society influences individuals' access capacities, whereas adaptable digital individuals can comprehensively grasp the meta-rules of digital ethics and acknowledge and assert their individual rights across various digital social contexts. Governance institutions are tasked with overseeing digital environments and facilities, ensuring interoperability between the digital realm and the physical world, addressing ethical risks within the digital society, and mitigating these risks through normative measures. Digital technology developers must exhibit advanced rational thinking skills beyond those of the average individual to guarantee the controllability and security of technological development and implementation.

2. Conceptualization

The study reveals that, despite the comparatively low construction costs associated with the digital society and the capacity of various regions to engage in and benefit from digital life through network infrastructure, substantial disparities exist in digital ethical systems among regions. Digital individuals can traverse other digital communities through the internet, although the impact of the digital ethics from their "origin" persists. It is more crucial to examine the origins of these disparities than to simply explore their expressions. Comprehending "norms" inside the digital society, particularly the characterization of macro-ethics in meta-rules, is essential for elucidating these disparities. The "norms" of digital society, whether institutionalized or non-institutionalized, influence its development and endure throughout its operating cycle. Consequently, "norms" emerge as the central category in this study, with all other categories interconnected and impacting their developmental trajectories.

3. Pattern Formation

As previously stated, "norms" exhibit two characteristics: institutionalized and non-institutionalized. We conduct cross-classification utilizing its features and

dimensions to establish four patterns (Table 2).

Table 2 Analysis of Attributes and Dimensions of "Norms"

Intensity / Basis	Strong	Weak
Institutionalization	A	B
Non-institutionalization	C	D

- A suggests that the digital society regards digital ethics as highly institutionalized, exemplified by the explicit legislation and governance of digital ethics inside the European Union, which may be deemed "normative."
- B suggests that the digital society regards digital ethics as institutionalized but with diminished rigor. The United States exhibits greater openness about digital ethics than other areas and cultures; nonetheless, its digital society is well developed, which may be deemed "relatively normative."
- C suggests that the digital society regards digital ethics as predominantly non-institutionalized, which may be deemed "non-normative."
- D signifies that the digital society regards digital ethics as non-institutionalized yet with diminished rigor, which may be interpreted as "not particularly normative."
- This classification elucidates the disparities in norm production across various digital societies, offering a theoretical foundation for subsequent comparative analyses and policy development.

VI: Conclusions and Discussion

This study use the grounded theory research approach to explore the fundamental features of digital ethics and their implementation in digital societies. This study identifies five fundamental characteristics of digital ethics by coding and analysis of extensive literature: meta-rules, digital governance order, ethical dangers, the public-private boundary in digital societies, and rational logic in the digital era. These aspects include both macro-ethical concepts and specific behavioral norms that persons ought to adhere to in digital environments. In the establishment and advancement of digital societies, meta-rules serve as fundamental guiding principles for digital ethics, highlighting the improvement of collective social welfare and the significance of inclusive and shared advantages. The digital governance framework emphasizes the ethicality and security of technological development and application, necessitating collaboration among regulatory and governance entities to uphold a fair and transparent digital landscape. The demarcation between public and private in digital societies focuses on safeguarding individual rights and underscores that individuals must assume associated responsibilities and obligations while utilizing digital services. Ultimately, rational reasoning in the digital world necessitates that technical advancement integrates ethical considerations to guarantee that technology remains manageable and inclusive.

This study concludes that the degree of institutionalization of norms is a critical determinant of the ethical condition of digital societies. An extensively institutionalized digital ethics framework can more effectively govern the conduct of individuals and organizations, mitigate ethical hazards, and foster the robust advancement of digital

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societies. Nonetheless, variations exist in the degree of institutionalization of digital ethics across diverse geographies and cultural contexts, hence requiring the pursuit of an inclusive digital ethics framework within the framework of globalization to address the requirements and expectations of various cultures.

This study underscores the significance of digital ethics education. Given the proliferation and utilization of digital technology, it is imperative to improve the digital literacy and abilities of the general populace. The school system must include digital ethics into its curricula to foster ethical awareness and responsibility, empowering individuals to make judicious judgments in digital contexts.

This study has some drawbacks. Significantly, sample selection and geographical limitations indicate that the data primarily derives from the China National Knowledge Infrastructure (CNKI) academic resource database, which may inadequately reflect global digital ethics practices and theoretical advancements. This may restrict the universal applicability of the research findings and the validity of international comparisons. This study employs the grounded theory research approach, which is based on qualitative analysis and may exhibit limits regarding statistical universality and generalizability. Grounded theory, emphasizing data-driven theory construction, may occasionally neglect existing ideas and conceptual frameworks. This study primarily engages in theoretical creation through literature reviews, allowing future researchers to empirically validate the practicality and usefulness of the theoretical framework. Digital ethics constitutes an interdisciplinary research domain, and prospective studies can comprehensively examine it by synthesizing viewpoints from technology, society, law, and philosophy.

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