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A Review on Integrating Generative Artificial Intelligence into Moral Education Classroom Teaching

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Abstract: ***With the rapid advancement of generative artificial intelligence (GenAI) technology, its integration into education has become an inevitable trend. As a core discipline for shaping students' values and critical thinking, moral education faces both significant opportunities and unprecedented challenges in the age of AI. This paper aims to systematically review and synthesize existing literature to explore practical approaches, potential risks, and future directions for integrating GenAI into classroom teaching in moral education. Adopting a literature review methodology, this study systematically retrieves and analyzes relevant academic journals from both domestic and international sources, summarizing, comparing, and critically examining research on the application of GenAI in moral education. The review reveals that GenAI holds transformative potential for moral education classrooms. It can greatly enhance interactivity and contextualization by generating realistic moral dilemma scenarios and simulating multi-perspective dialogues, thereby fostering students' deeper ethical reasoning while providing personalized learning support. However, the integration process also entails certain risks, including potential inherent biases in GenAI outputs, data privacy and security concerns, the possible erosion of genuine teacher-student ethical dialogue, and the risk of students becoming overly reliant on AI tools at the expense of independent thinking.***

Keywords: Generative Artificial Intelligence; Moral Education; AI Ethics; Classroom Teaching; Educational Technology.

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1. Introduction

In recent years, artificial intelligence (AI) technology has developed rapidly and become deeply integrated into various fields of social life. It has sparked numerous new ethical issues and controversies, to which traditional moral frameworks often respond with a noticeable lag, even resulting in a certain "ethical vacuum" that fails to provide effective solutions [1]. Against this backdrop, the state has attached great importance to AI education and introduced a series of supportive policy guidelines. As a core curriculum aimed at fulfilling the fundamental goal of fostering virtue and nurturing talents, the primary school Morality and Rule of Law course bears the critical responsibility of guiding students to understand rules, develop ethical awareness, and establish a sense of rule of law. However, the new landscape of "digital existence" shaped by AI technology is challenging the teaching content traditionally based on interpersonal ethics and tangible social contexts [2]. Therefore, exploring how to effectively integrate AI into primary school Morality and Rule of Law teaching is not only a necessary response to the talent development demands of the intelligent era but also a practical task in promoting curriculum innovation and development.

1.1 Definition of Key Concepts

Artificial Intelligence Education (AIED) can be defined as an interdisciplinary practice field driven by AI technologies, which reconstructs the educational ecology through multi-role involvement and multi-scenario applications, aiming to optimize talent cultivation models and enhance human-machine collaboration capabilities.

According to the framework proposed by Xu and Ouyang, the roles of AI in education can be categorized into

three dimensions: an *instrumental role*, where AI serves as a teaching platform or intelligent tool to directly address instructional needs, assess performance, and provide real-time feedback [3][4]; a *supportive role*, where AI aids educational decision-making and designs personalized learning paths through data mining and learning analytics [5]; and an *agential role*, where AI acts not only as a teaching subject but also as an autonomous interactive entity [6]. Current AIED practices primarily focus on the first two roles, emphasizing applications in teaching, learning, assessment, and management [3]. Its technological extensions include intelligent tutoring systems, adaptive learning algorithms, and educational data modeling, all of which fundamentally aim to reconstruct educational processes intelligently by simulating human cognitive mechanisms.

Liu and Zhong argue that AIED exhibits distinct interdisciplinary characteristics: at the technical level, it relies on computer science, mathematics, and neuroscience [7]; at the application level, it requires the integration of theoretical paradigms from pedagogy, psychology, and ethics [8]. This dual nature necessitates that AI literacy cultivation combines domain-general competencies, such as algorithmic thinking and data ethics, with domain-specific abilities, such as the integration of disciplinary teaching and AI.

In the future, AIED is expected to transcend its instrumental limitations and evolve toward relationship reconfiguration. As a *mentor*, AI will reshape teacher-student power structures and knowledge transmission modes; as a *learner*, it will facilitate deep cognition through reverse teaching; and as a *peer*, it will construct distributed cognitive systems based on human-machine collaboration [9].

In the context of primary school *Morality and the Rule of Law* classrooms, AI education specifically refers to teachers developing age-appropriate teaching cases based on real-world AI application scenarios. Through moral education methods such as role-playing and dilemma discussions, students are guided to analyze ethical conflicts, legal issues, and social responsibilities embedded in technology, ultimately fostering a value system centered on "technology serving humanity" and a behavioral consciousness aligned with "digital citizenship."

Artificial Intelligence Ethics Education (AIEE) is a specialized educational field dedicated to fostering ethical decision-making capabilities in the development, application, and governance of artificial intelligence technologies. It seeks to establish ethical consensus for human-machine societal collaboration through the integration of interdisciplinary knowledge and contextualized practical approaches. According to Tuovinen's framework, AIEE emphasizes the development of five core competencies: understanding moral principles and legal constraints across the AI lifecycle; identifying ethical risks such as those related to privacy, fairness, and transparency; evaluating the societal impact and potential harms of AI systems; analyzing the benefits and limitations of technological applications within broader historical and cultural contexts; and embedding ethical principles like fairness algorithms and explainability frameworks into AI system design.

Tuovinen further highlights the dual interdisciplinary nature of AIEE, which manifests both in its research objects and methodologies. The field integrates knowledge systems from diverse disciplines such as computer science, philosophy, law, and sociology, while methodologically, it moves beyond the rigid "top-down" deductive approach of traditional normative ethics. Instead, it embraces situationalist methods that emphasize stakeholder negotiation and multidisciplinary collaboration within specific technological contexts to achieve ethical consensus [10].

In practice, AIEE is guided by principles such as problem-orientedness and multi-stakeholder engagement. Problem-orientedness requires that solutions to ethical issues transcend single-disciplinary boundaries by incorporating perspectives from technology developers, policymakers, and the public. Multi-stakeholder engagement demands that teaching entities possess both technological ethical literacy and critical social science thinking. Rooted in universal educational ethics, AIEE also fulfills a cultural-sharing mission by promoting equitable access to AI benefits and preventing knowledge monopolies and technological divides. Its educational purpose aligns with Professor Fan Hao's concept of "ethical emancipation," fostering subjectivity while advancing educational equity [11].

At its core, AIEE aims to cultivate learners' ethical judgment and responsible behavioral literacy in AI technology applications. Through systematic curriculum implementation, it guides students to achieve a triple cognitive construction: recognizing ethical conflicts arising from technological socialization; critically reflecting on the interactions between technology and interpersonal ethics, social norms, and environmental ethics; and practicing technology use in accordance with common human values. In the context of primary school *Morality and the Rule of Law* courses, AIEE leverages age-appropriate AI cases to create moral scenarios that help children form a value recognition of "technology for good" and internalize this awareness as conscientious behavior in digital society

[12].

1.2 Scope of the Research

Currently, the integration of digital and intelligent technologies with ideological and political education has become a significant research topic. However, explorations focusing on specific subject courses, particularly in primary school Morality and Rule of Law courses, and their deep integration with artificial intelligence (AI) remain insufficient. To systematically understand the current state of research, this study conducted advanced searches in the China National Knowledge Infrastructure (CNKI) and Web of Science databases using core themes such as "artificial intelligence + course teaching," "big data + course teaching," and "deep integration of ideological and political education with information technology." The search was limited to literature published between January 2010 and May 2025, with "Peking University Core" and "CSSCI" as the primary source categories for Chinese literature. The results clearly indicate that there is currently limited research on the deep integration of digital and intelligent technologies, especially AI, with primary school Morality and Rule of Law courses.

Given the relatively weak foundation of specialized literature on "AI + primary moral education," particularly from the perspective of case-based teaching pedagogy, this literature review expands its scope in the following ways: on the one hand, it examines the theoretical and practical experiences of applying AI technologies to general course teaching; on the other hand, it delves into teaching models of AI ethics education itself, as well as relevant research progress in AI-enabled ideological and political education. The underlying logic of technology application, ethical considerations, value integration strategies, and pedagogical methodologies in these areas provide important theoretical references and practical insights for this study's exploration of practical pathways for integrating AI into primary school Morality and Rule of Law courses. Therefore, this review will systematically synthesize research findings from the aforementioned related fields to lay a theoretical groundwork for subsequent research focusing on the practical approaches to integrating AI into primary school Morality and Rule of Law teaching.

2. Research on Integrating Artificial Intelligence into Curriculum Teaching

2.1 Disciplines and Modalities of Integrating Artificial Intelligence into Curriculum Teaching

The integration of artificial intelligence (AI) into educational disciplines demonstrates a significant technological bias and distinct variations across different educational stages. At the basic education level (K-12), AI incorporation is primarily realized through programming as a medium and maker project-driven designs to facilitate instruction. Platforms such as STEAM and robotics courses are employed to teach algorithms using tools like Scratch and Python, emphasizing a "hands-on" practical approach [13][14]. Maker projects often drive the design of AI-powered intelligent devices, integrating multidisciplinary knowledge from electronic engineering, data science, and other fields [15].

In higher education, instructors mainly utilize virtual laboratories and technology-enabled methods for teaching. For example, virtual laboratories leverage AI digital humans and knowledge graph technologies to enhance comprehension in specialized courses [16]. Interdisciplinary technology empowerment is also evident, such as the application of virtual fitting technology in fashion design courses to achieve three-dimensional structural visualization [17]. Research by Li Yuxin et al. indicates a larger volume of studies on AI in higher education, with applications predominantly focused on virtual laboratories, online education platforms, and educational robot systems [18].

Belkina and Daniel observe notable disciplinary variations in AI application. Within linguistic disciplines, AI-related research constitutes the highest proportion, but it predominantly focuses on instrumental functions such as intelligent speech assessment and chatbot technologies, lacking critical engagement with linguistic and cultural transformations. Even in humanities and social sciences applications, ethical issues are often merely tacked on as ancillary discussion points. For instance, discussions on algorithmic bias and privacy protection are typically embedded only within technical courses, without dedicated curriculum design. Research on social impact is absent, with very few analyses in history or sociology courses examining AI's reshaping effects on employment structures and power dynamics [13].

Current challenges in integrating AI into classroom teaching primarily involve tool dependency and cognitive risks, superficial cognitive engagement, and the exacerbation of educational inequality due to resource disparities. While

intelligent tools can lower the threshold for understanding abstract concepts and stimulate learning interest [19], there is a crisis of cognitive superficiality—overreliance on ready-made tools may lead students to neglect underlying logic, resulting in a "black-box" understanding [20]. The resource gap amplifies educational inequality: schools in developed regions can implement software-hardware collaborative projects, while resource-constrained areas may only have access to basic software tools [21]. Teaching methods are also limited, as project-based learning (PBL) and interdisciplinary curriculum designs are constrained by teacher training and infrastructure [22].

In summary, AI integration primarily focuses on higher education and tends to emphasize STEM disciplines, particularly programming-related subjects. In these fields, AI often appears as a teaching tool within classroom instruction. Due to uneven regional educational resource development and the immaturity of AI technology, the large-scale application of AI-assisted teaching tools remains challenging at present. Therefore, it is essential to promote the integration of AI into primary education in a resource-light and convenient manner, leveraging its interdisciplinary nature, considering the characteristics of primary school students, and adapting to practical circumstances.

2.2 Instructional Content for Integrating Artificial Intelligence into the Curriculum

Research on artificial intelligence (AI) education in the K-12 stage, both domestically and internationally, indicates that its integration into the curriculum requires systematic design based on students' cognitive characteristics at different educational levels, spanning two dimensions: knowledge structure and ethical awareness. At the primary school level, teaching focuses on building foundational concepts, helping students understand the "forms of existence" and "functional boundaries" of AI in a concrete manner [23]. The content primarily includes basic definitions of AI—such as "machine systems capable of mimicking human intelligence"—as well as the identification of typical application scenarios, like voice assistants and image recognition technologies. In this process, technological awareness is often initiated through "unplugged activities," such as using paper cards to simulate the image classification process of convolutional neural networks or through role-playing games to comprehend the interactive logic of the Turing test, thereby transforming abstract concepts into experiential, embodied cognition [24].

At the junior secondary level, the teaching emphasis gradually shifts toward analyzing the principles and mechanisms of AI, with the core question focusing on "how AI works." This stage often employs visual tools to deconstruct technical processes, including core concepts in machine learning such as supervised learning and feature extraction, as well as foundational frameworks in natural language processing, such as word vectors and semantic parsing [25]. Students begin to preliminarily explore algorithmic models, developing simple AI functions through low-code platforms, such as training classification models to recognize handwritten digits, thereby building a practical understanding of technical implementation pathways.

At the senior secondary level, the focus advances to the deconstruction of complex systems, guiding students to uncover algorithmic black boxes and explore the mathematical and logical foundations behind them, such as probabilistic reasoning and Bayesian networks. Simultaneously, cross-disciplinary integration is emphasized, combining AI principles with subjects like physics and biology. This is concretely demonstrated through agent-based modeling to simulate ecosystem evolution or exploring the application of game theory in autonomous driving decision-making. Teaching at this stage emphasizes cultivating students' systemic thinking and scientific modeling capabilities [26].

At the level of ethical awareness, AI education primarily revolves around three layers: cognition of ethical principles, enlightenment of social responsibility, and cultivation of ethical decision-making abilities. The primary and junior secondary stages focus on identifying technological risks, such as analyzing cases of algorithmic bias or data privacy breaches. The senior secondary stage further discusses the long-term impacts of AI on employment structures and information ecosystems, guiding students to engage with broader social issues. Additionally, through activities like role-playing, students attempt to address technological ethical dilemmas in simulated scenarios—such as balancing personal preferences with the value of information diversity in the design of social media recommendation algorithms—thereby fostering their ability to navigate ethical trade-offs and decision-making in complex contexts [27].

In summary, the teaching content of AI in basic education primarily reflects an understanding of concepts and applied operations, while at the senior secondary level and beyond, it gradually shifts toward model development and creation. It is worth noting that current curricula still relatively lack in-depth exploration of the social impacts

and ethical risks of AI, urgently requiring further deepening in terms of cross-disciplinary integration and contextualized ethical teaching.

2.3 Instructional Methods for Integrating Artificial Intelligence into Teaching

Scholars have noted distinct variations in the integration of artificial intelligence across different disciplines. According to research by Wu and Chen, in STEM fields, over 60% of AI-related courses adopt collaborative project-based learning approaches that emphasize technical practice, engineering thinking, and algorithmic implementation skills [28]. In contrast, Liu and Zhong found that only 12% of courses in humanities and social sciences employ scenario-based teaching methods, focusing instead on analyzing value conflicts and emphasizing ethical reflection and critical evaluation of societal impacts [29]. Meanwhile, Lee and Kwon observed that in the arts, AI integration is being piloted in pioneering schools through human-machine co-creation methods, which explore the fusion of technological empowerment and aesthetic expression, though such approaches have not yet been widely adopted [30].

In STEM fields, there is a tendency toward technological idolization, which overemphasizes tool manipulation while neglecting ethical considerations related to technology. In humanities and social sciences, ethical discussions are often marginalized, treated as supplementary modules within technical courses rather than being developed into independent teaching frameworks or evaluation standards.

At the K-12 level, the use of AI is predominantly guided by collaborative learning, with 72% of AI courses involving group efforts to develop technical prototypes or analyze ethical issues. Gamified learning remains underutilized, with only 11% of courses incorporating game mechanisms—such as points and narrative tasks—to reduce cognitive load. Interactive learning represents another area of weakness, with only 42.86% of courses achieving deep human-machine interaction, such as dialogue with AI teaching assistants to debug code errors. On the other hand, inquiry-based learning shows stronger penetration, with 65% of STEM courses employing "problem chains" to guide technical exploration [30].

In summary, these teaching methods can be categorized into two main types: first, those that treat AI as a teaching tool to facilitate interactive and experiential learning through constructed scenarios, or as a platform for collaborative learning, where AI assists in implementing instructional activities and exploring problems; second, traditional lecture-based approaches that focus on delivering AI-related concepts and principles to students.

2.4 Assessment Methods for Integrating Artificial Intelligence into Teaching

According to the "Generative Artificial Intelligence Application Guidelines" on evaluation, generative AI supports teachers in introducing multi-agent collaboration mechanisms into teaching assessment and collaborative processes. For example, AI can assume different roles to assist in evaluation, or help establish evaluation criteria to support teachers in conducting assessments, thereby promoting teaching reflection and strategy optimization. When innovating educational evaluation through AI, it is crucial to strengthen human review and critical judgment, avoid directly using AI outputs as evaluation conclusions, and prevent algorithmic biases from leading to misjudgments of disadvantaged groups.

Liu and Zhong indicate in their research that current studies show AI competency assessment in education exhibits a hierarchical preference in methods, with qualitative approaches being dominant, followed by quantitative measurements and mixed-method evaluations. The assessment dimensions focus on three core areas: knowledge construction (e.g., understanding algorithmic principles), affective attitudes (including ethical judgment and technological confidence), and thinking development (covering systems thinking and computational thinking). Based on the varying knowledge levels at different educational stages, distinct evaluation methods are adopted. At the high school level, quantitative methods are inclined to be used to assess students' AI knowledge; in basic education, qualitative approaches are predominantly employed to evaluate primary school students' AI thinking. Mixed methods are mostly used to assess middle school students' affective attributes [31].

In summary, AI can both play roles in evaluation and serve as an evaluation tool to assist teachers in developing criteria for assessment. Based on Kohlberg's theory of cognitive development, different evaluation methods—quantitative, mixed, and qualitative—are suited to assessing knowledge, affect, and thinking, respectively, according to the learning stages. Simultaneously, teachers must consider AI-related risks when conducting evaluations.

2.3 The Unique Value and Limitations of Integrating Artificial Intelligence into Curriculum Instruction

Currently, generative artificial intelligence is exhibiting vigorous development in the field of education, with researchers exploring its diverse empowering values for classroom teaching from various perspectives. From the perspective of classroom teaching scenarios, generative AI can comprehensively empower multiple scenarios such as teaching, learning, assessment, and tutoring, providing targeted support [32]. In terms of the teaching process, it can facilitate the determination of teaching objectives, the supply of teaching content, the selection of teaching methods, the implementation of teaching activities, and the execution of teaching evaluations [33]. Regarding teaching models, it enables personalized education through human-machine collaborative "dialogic learning" and "argumentative learning," while also cultivating students' higher-order thinking skills by providing personalized learning support [34]. From the perspective of classroom interaction dynamics, it can transform the traditional teacher-student binary structure into a teacher-AI-student ternary interactive framework [35]. In terms of teaching effectiveness, it enhances the completeness and creativity of teaching outcomes, the role immersion and interactivity of the teaching process, the intelligence and innovation of teaching methods, as well as the generative and personalized nature of teaching evaluations [36].French et al. argue that AI creates complex, authentic problems that students must solve, providing a platform for innovative thinking and solution development that would be impossible without AI [37]. Murillo Ligorred et al. suggest that AI introduces entirely new ways of learning or interacting with materials, fundamentally transforming the educational experience [38].

However, AI also brings many risks. Academic integrity is challenged, and assessment mechanisms may become unbalanced; over-reliance may lead to addiction, potentially weakening the role of teachers; inaccurate information transmission may restrict knowledge levels; and inadequate ethical awareness may make it difficult to address ethical risks [39]. Research by Kim and Lee et al. found that although students may have experience using AI technologies, they might not understand the underlying knowledge and ethical issues. As long as AI profoundly impacts people's daily lives, AI literacy can become one of the essential 21st-century technical skills that students should learn to enhance their learning and lives [39].

3. Current Status of Artificial Intelligence Ethics Education

3.1 Classification of Artificial Intelligence Ethical Issues

Scholar Yan Kunru points out that "artificial intelligence is designed to meet the purposes of the design subject by creating intelligent machines [40]." Therefore, the development of AI can be regulated through "a combination of external regulations such as laws and rules, internal self-discipline through ethics, and even the 'object-oriented discipline' of intelligent machine design" [41]. Scholar Zhou Tao argues that "seemingly objective data and rational algorithms can also produce non-neutral outcomes." Due to the substantive human influence behind data and algorithms, they are inherently not value-neutral; however, because of the widespread use of intelligent technology, the discrimination they cause is more difficult to detect and eliminate [42]. Consequently, the exploration of design ethics in artificial intelligence has become a key focus in academia, primarily concentrated in the following two areas.

In terms of data ethics, scholars Viktor Mayer-Schönberger and Kenneth Cukier, in their book *Big Data: A Revolution That Will Transform How We Live, Work, and Think*, discuss the transformative era ushered in by big data, exploring changes in thinking, business, and management in the big data era. They also reflect on the risks of "letting data dominate everything," including "the ubiquitous 'third eye,'" "the secondary use of privacy," "prediction and punishment," and "data dictatorship" [43]. They argue that inherited, implicit human subjective biases still exist in intelligent data mining. "These pre-existing exclusionary and unfair data operation patterns, along with society's habitual reliance on intelligent data mining, mean that historically disadvantaged or vulnerable groups continue to suffer from unfair intelligent data decision outcomes," thereby increasing the difficulty of attributing legal or moral responsibility for such injustices.

In terms of algorithmic ethics, scholar Christopher Steiner, in his book *Automate This: How Algorithms Came to Rule Our World*, uses rich case studies to elaborate in detail how algorithms shape, transform, and even control modern life. Based on algorithms, "you have a 41% chance of becoming Lady Gaga," "for better or worse, money, speed, and technology always go hand in hand," and even "algorithms can become arbiters of life" [44]. Scholar Burrel specifically explores how to ethically think about and prevent "opacity" in machine learning algorithms. He proposes "incentivizing professionals to conduct classified reviews and management of opaque algorithms,

while strengthening public education on AI algorithms, so that more people become familiar with the AI programming process to avoid the pitfalls of opaque algorithms" [45]. Scholar Sun Baoxue believes that algorithms have become "a critical nexus regulating the relationships among humans, machines, and society." As a result, ethical issues arising from algorithms are becoming increasingly prominent. The problem domain of algorithmic ethics specifically includes "the autonomy characteristics of algorithms, their application scenarios, and the dilemmas of accountability." Based on this, more effective analysis and mitigation of algorithmic ethical risks can be achieved [45].

3.2 Current Status of Integrating Artificial Intelligence into Moral Education

Current AI ethics education exhibits significant deficiencies at the practical level. Empirical research indicates that ethical content is severely underrepresented in classroom teaching. Wu and Chen's analysis of 98 teaching cases revealed that only five addressed ethical issues, reflecting a systematic neglect of this domain within the education system [46]. Jang further notes that most AI literacy frameworks fail to adequately incorporate critical training on technological risks, social biases, and humanistic impacts [47]. Although scholars like Belkina emphasize the need to address the multidimensional implications of generative AI (GenAI) [48], Murillo-Ligorred's research on the ethical and legal dimensions of deepfake technology [49], and Bernabei's empirical study on AI trust and social impact highlight the complexity of ethical education, these findings have not been effectively translated into teaching resources [50].

Zhang Zhidan argues that AI presents multifaceted challenges to the subjects of ideological and political education, including interdisciplinary knowledge interaction, grasping cutting-edge academic developments, and driving pedagogical innovation [51]. Xu Xu expresses concern that teachers may partially or entirely cede their educational authority to technology [52]. Yang Rencai worries that human subjectivity may be overlooked in the process of human-technology integration [53]. Zhou Shuang et al. emphasize the urgent need to redefine the subject-object relationship in ideological and political education within AI environments [54]. Li Yaoxi suggests that AI technology may solidify young people’s thinking patterns [55], while Ren Fengqin points out that generative AI poses a potential threat to the status of educational subjects [56].

The academic community is increasingly recognizing the importance of AI ethics education. Scholar Touretzky explicitly advocates for AI ethics as a key component of literacy education, proposing cross-level curricula to foster responsible technology development and application [57]. Xie Juan, based on reconstructing educational scenarios in the era of large models, proposes an "ethics-first" principle. This approach involves constructing a technology governance framework through proactive risk assessment, standardizing educational innovation paths by tracing motivations, and optimizing moral decision-making in intelligent environments through consequence prediction [58].

Scholars have proposed stage-specific implementation paths tailored to cognitive development characteristics. Lin et al. demonstrated via quasi-experiments that elementary education should employ contextualized methods like augmented reality for ethical perception training; junior secondary education should focus on ethical decision-making in applied scenarios; while senior secondary education requires cultivating systemic ethical evaluation capabilities for complex issues [59]. Chiu et al. developed a three-dimensional framework treating "AI ethical norms" and "socio-technical impact" as independent teaching modules, structurally linked to foundational knowledge and collaborative skills [60]. This model has been validated in Southworth’s empirical research [61].

Zhao Qingsi emphasizes that achieving deep integration hinges on comprehensively enhancing teachers’ modern information technology literacy [62]. Li Nan et al. advocate strengthening foundational talent development and promoting data sharing [63]. Qin Xiaohua recommends updating teaching philosophies, improving technical capabilities, constructing VR teaching environments, and refining support mechanisms to facilitate the integration of practical teaching in ideological and political education with VR technology [64]. Li Huajun et al. propose innovating talent cultivation concepts and enhancing teachers’ professional expertise [65]. Zhai Le suggests practical pathways such as strengthening digital literacy training for teachers and students and fully leveraging human subjectivity [66]. Xiang Juan recommends building collaborative platforms and enhancing information literacy among educators and learners [67], while Feng Lin identifies cultivating subject literacy as a critical aspect of promoting the digitization of ideological and political education [68].

Despite the success of ethics-integrated education models in engineering fields [69], ethical content in AI education still faces implementation challenges. Garrett et al. note that current curricula exhibit a significant "selective

teaching" tendency, where ethics modules are often treated as optional supplements rather than core components. This disconnect between theory and practice reveals structural deficiencies in supporting systems such as teacher training mechanisms and teaching evaluation standards, underscoring the urgent need for follow-up research to establish operable implementation frameworks [70].

3.3 Instructional Themes and Content in Artificial Intelligence Ethics Education

Artificial intelligence ethics education has evolved into a multidimensional and interdisciplinary thematic teaching system, encompassing both philosophical inquiries into values and solutions to specific technical ethical issues. Scholar Zhang Shuhan points out that generative artificial intelligence harbors five types of ethical risks in ideological and political education: subjective cognitive biases, pervasive information bias, the withdrawal of teacher-student interaction, the looming digital divide, and the resurgence of technological hegemony [71]. Zhang Ce et al., while discussing big data applications, noted that risks of ethical misconduct have begun to emerge [72]. Chang Yanhui specifically highlights the risks of infringing upon personal privacy and other rights when applying big data technology [73]. Dong Yuanyuan analyzes the ethical risks brought by AI, including loss of self-identity, the erosion of teacher-student relationships, and the submergence of value consensus [74].

Su Ming and Chen Bateer, based on Marxist theory, propose five dimensions for examination: the value dimension focuses on AI's educational value and holistic human development; the equity dimension explores potential educational inequalities triggered by technology; the human nature dimension critiques the risk of human alienation in the educational process; the responsibility dimension interrogates power dynamics and capital interplay in technological applications; and the ultimate goal dimension evaluates whether AI education aligns with the concept of free development [75].

Yim proposes a four-dimensional interdisciplinary teaching model: the philosophical dimension examines value prioritization and responsibility-sharing in moral dilemmas; the economic dimension analyzes labor market impacts and fairness in resource allocation; the legal dimension investigates accountability mechanisms and privacy protection frameworks; and the ecological dimension balances technological innovation with environmental sustainability. This interdisciplinary approach helps foster a systematic understanding of AI ethics [76].

Touretzky et al. emphasize the teaching of ethical principles in data use, including: privacy protection mechanisms; techniques for detecting and correcting dataset biases; and understanding the role of humans in AI systems [77]. Kong et al. supplement this with a socio-cultural perspective, focusing on maintaining human autonomy, ensuring technological fairness, and promoting social welfare. Chiu suggests incorporating foresight on how AI will transform future work into teaching content [78]. Du Haichao believes that the innovative application of AI in education is significantly reflected in the deep mining and personalized presentation of teaching content [79]. Existing research indicates three core teaching themes: risks in technological application, issues of systemic bias, and challenges of privacy protection. These involve societal discussions on AI's potential harms; the formation mechanisms and correction strategies of algorithmic discrimination; and ethical norms covering the entire cycle of data collection, storage, and use.

3.4 Instructional Methods for Artificial Intelligence Ethics Education

Chen Kun argues that in the context of big data, there is a deficiency in the ability of ideological and political education to effectively utilize new media technologies [80]. Zhai Le points out that current ideological and political education faces challenges such as fragmented data and limited analytical capabilities [81]. In response to these challenges, scholars have proposed various strategies.

Scholars Wu Jiadi and Xia Tianmei note that a combination of lecture-based and discussion-based methods is widely adopted, emphasizing the design of theoretical instruction, classroom seminars, and applied case studies to guide students in applying ethical principles to solve practical problems. Simultaneously, blended learning approaches leveraging online platforms enhance interactivity and teaching effectiveness through group discussions, debates, peer evaluations, and practical activities. Scholars stress the importance of integrating multiple perspectives and collaborative learning activities (e.g., case studies, group projects) to deepen students' systematic understanding of ethical issues.

Du Haichao suggests that scenario-based teaching aims to foster profound psychological and cognitive experiences

through emotional resonance, particularly via virtual scene replication enabled by AI. "By using virtual simulation technology to cloudify, simulate, and virtualize the subjects, objects, content, and methods of ideological and political courses," it provides an unprecedented immersive learning environment for these courses [82]. Ma Wenqi believes that AI-enabled ideological and political teaching should breakthrough by transforming pedagogical methods. It offers teachers the space, resources, tools, and media to implement authentic scenario-based teaching, design embodied immersion learning activities, and conduct data-driven learning assessments. This diversifies teaching interactions, enriches knowledge acquisition, enables scientific learning diagnostics, and makes autonomous learning, inquiry-based learning, project-based learning, and experiential learning classroom norms. It allows students to consciously accept "truths" through profound learning experiences, thereby enhancing classroom effectiveness and vitality [83].

Some scholars propose creative practices to stimulate students' emotional cognition and ethical reflection abilities, including: Narrative creation methods, such as creative story writing [84] and comic strip design [85], to simulate controversial social issues in fictional scenarios; Gamified teaching, which uses contextualized tasks to drive students to explore the boundaries of technological ethics; Role-playing methods, requiring students to adopt multiple stakeholder perspectives to confront interest conflicts and moral dilemmas in technology applications. These methods provide a safe emotional projection field, enabling students to translate abstract ethical principles into concrete decision-making practices.

To ensure a balance between teaching innovation and educational effectiveness, scholar Magana advocates for the use of design-based research (DBR) [86]. This framework involves iterative experiments in naturalistic classroom settings to systematically test the effectiveness of teaching strategies, such as tracking the impact of role-playing on students' ethical decision-making abilities. DBR not only supports the dynamic adjustment of teaching methods to meet technological advancements but also validates the achievement of teaching objectives through rigorous evaluation systems, providing a scientific improvement path for AI ethics education.

Literature indicates that AI ethics education has formed a tripartite teaching methodology system encompassing "traditional–innovative–evaluative" approaches. It emphasizes the integration of theoretical reflection and practical application while focusing on enhancing students' ethical sensitivity and problem-solving abilities through emotionalized and contextualized teaching innovations.

3.5 Assessment Methods for Artificial Intelligence Ethics Education

Wiese et al. propose distinct evaluation models based on different teaching methodologies, which can be broadly categorized into three types: For practical teaching and hybrid assessment mechanisms, courses involving technical design experiments or AI model development tend to employ hybrid evaluation approaches. For instance, quantitative technical metrics are used to validate students' operational skills, while qualitative reports assess their ethical judgment capabilities. For group projects and qualitatively dominated evaluation, teaching activities centered on group collaboration—such as interdisciplinary ethics discussions and multi-role simulation exercises—primarily rely on qualitative assessment tools. These include peer evaluations, reflective journals, and discussion record analyses, with purely quantitative methods rarely adopted. This model emphasizes evaluating students' critical communication skills and their ability to construct ethical consensus. For case studies and quantitatively oriented evaluation, case-based teaching methods (e.g., analyzing technology misuse scenarios) often employ quantitative tools such as ethical decision-making inclination scales and risk perception scorecards to measure changes in students' cognitive awareness. This approach emphasizes standardized testing of students' ability to apply ethical principles [87].

Biagini et al. suggest that the evaluation of AI ethics education should transcend single-disciplinary dimensions and instead construct a four-tier assessment system encompassing the following dimensions: The knowledge dimension, which uses standardized tests to evaluate students' understanding of AI principles; The operational dimension, which assesses technical application skills through project-based practices; The critical dimension, which employs reflective reports and ethical dilemma discussions to evaluate critical thinking abilities; The moral dimension, which observes students' internalization of ethical principles such as justice and responsibility through case analyses and role-playing activities. This framework emphasizes the multidimensional alignment of evaluation tools with teaching objectives [88].

Du Haichao argues that in ideological and political education, modern information technologies such as big data can be utilized to analyze students' learning behaviors and characteristics, enabling intelligent evaluation. This

approach provides customized learning resources and pathways for each student, facilitating personalized learning [89]. Scholars Ma Wenqi and Yang Xiulian contend that AI's powerful computational capabilities support the scientific analysis of learning data. By employing multimodal analysis technologies—such as clustering algorithms and neural networks—teachers can integrate and mine data on students' psychological states, facial expressions, behavioral actions, and physiological indicators to construct accurate learner profiles. Based on machine learning and computer graphics technologies, the analysis results can be visualized using bar charts, radar charts, and other forms. Furthermore, by incorporating affective computing and deep learning, it becomes possible to assess implicit qualities such as students' emotional development and value internalization. This promotes multidimensional diagnosis of ideological and political literacy, moral cultivation, legal awareness, and personality traits, thereby optimizing teaching strategies and fostering classroom innovation [90].

Research indicates that the evaluation methods for AI ethics education must dynamically select assessment tools based on teaching strategies, ethical issues, and competency development objectives to achieve the synergistic growth of technical skills and ethical literacy.

4. Conclusion

This study builds upon an important foundation: theoretical discussions on AI ethics challenges and societal impacts are increasingly mature, and the practical application of AI in classroom teaching is continually improving. GenAI holds revolutionary potential for moral education classrooms. It can significantly enhance interactivity and contextualization by generating realistic moral dilemma scenarios and simulating multi-perspective dialogues, thereby fostering deeper ethical reasoning among students. Additionally, it provides personalized learning support, such as instant feedback and adaptive content generation. However, there remains a noticeable gap in systematic research focusing on AI ethics education within lower-grade moral education curricula. Moreover, the integration process entails significant risks. The literature widely highlights concerns including potential inherent value biases in GenAI outputs, data privacy and security issues, the risk of undermining authentic teacher-student ethical dialogue, and the tendency for students to develop overreliance on AI tools at the expense of independent critical thinking.

First, although there has been extensive academic discussion on ethical issues raised by AI (such as privacy and fairness), few studies delve into the unique challenges that AI technology poses to specific core moral values (e.g., privacy rights, fairness) in elementary school ethics and rule-of-law courses. Existing research largely remains at a macro level or focuses on technology application in higher grades, lacking detailed analysis tailored to the cognitive characteristics of upper elementary students regarding how AI specifically deconstructs and impacts the established values within the curriculum.

Second, there is still a shortage of localized case designs and teaching approaches in international AI ethics education that focus specifically on elementary classrooms, particularly those centering on specific rights to guide students in understanding how AI impacts traditional moral issues. Current practices either lean heavily toward technical tool application or feature superficial case designs, failing to effectively construct a cognitive process that guides students to deeply analyze "how AI reshapes traditional moral issues."

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