World Journal of Educational Research
ISSN 2375-9771 (Print) ISSN 2333-5998 (Online)
Vol. 12, No. 5, 2025
www.scholink.org/ojs/index.php/wjer

Original Paper

GAI-Enabled Primary School Ideological and Political Education: Prospects, Risks, and Pathways

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Received: August 11, 2025 Accepted: September 13, 2025 Online Published: September 26, 2025

doi:10.22158/wjer.v12n5p51 URL: http://dx.doi.org/10.22158/wjer.v12n5p51

Abstract

Generative Artificial Intelligence (GAI) is reshaping ideological and political education in primary schools by enabling dialogic inquiry, multimodal interaction, immersive simulation, and narrative assessment. While these capabilities support the construction of technology-enhanced moral learning models, they also introduce risks such as algorithmic bias, teacher role marginalization, experiential simplification, and emotional reductionism in evaluation. Grounded in theories of cognitive development and moral education, this study proposes a four-dimensional framework to mitigate these risks: (1) developing value-aligned adaptive models, (2) fostering human-machine teaching symbiosis, (3) designing integrated virtual-real learning contexts, and (4) implementing evidence-based growth narratives. The research offers both theoretical and practical pathways for leveraging GAI to enhance the quality and integrity of moral education in the digital age.

Keywords

Ideological and political education, generative artificial intelligence, moral education, primary education, AI ethics, educational digitalization

1. Introduction

The new era presents transformative opportunities for ideological and political education. The fundamental educational mission necessitates active engagement with technological revolution. Generative Artificial Intelligence (GAI), characterized by multimodal content generation, contextualized interactive experiences, and adaptive learning support, is substantially reshaping educational ecosystems. The emergence of ChatGPT in 2022 marked significant progress in natural language understanding, while the 2024 Sora model enabled dynamic text-to-video generation.

Domestic models including DeepSeek-R1 further promoted technological accessibility through open-source ecosystems. This evolution from imitative to creative intelligence transforms both knowledge production mechanisms and value transmission pathways, representing crucial progress toward fulfilling fundamental educational objectives while aligning with digital transformation trends in the GAI era (Zheng & Zhang, 2025). These developments respond to essential guidance regarding ideological and political education enhancement. Within big data contexts, the integration of artificial intelligence technologies emphasizes both the necessity of moral education modernization and the inevitability of digital transformation (Jiang, Du, & Xie, 2021).

Mental health education constitutes another vital component of school ideological and political work, significantly influencing individual development and social stability (Li, 2024). In primary school moral education, technological integration produces dual effects. The concretization of abstract values through virtual scenarios, combined with personalized emotional support through AI companions, enables novel approaches to integrating knowledge, emotion, intention, and action. However, algorithmic biases introduce risks including narrative distortion, deviation, disembedment, and substitution. Maintaining cultural authenticity remains imperative (Wang, 2025), requiring clear value orientation in visual narratives and protection of traditional cultural elements. Educators must prevent alienating narratives resulting from virtual immersion (Zhang, 2025), particularly during critical value formation stages. Current research predominantly focuses on higher education, with insufficient attention to alignment between children's cognitive development and moral education principles, highlighting the need for localized practical frameworks. Grounded in official guidelines and incorporating embodied cognition and situated learning theories, this study examines three dimensions: innovative GAI applications in dialogic construction, embodied interaction, situational immersion, and developmental evaluation; child-specific risks including content bias, agency dissolution, practical weakening, and emotional fragmentation; and synergistic pathways involving value anchoring, human-machine collaboration, virtual-real integration, and evidence-based assessment. This research provides theoretical and practical paradigms for improving ideological and political education while contributing to cultivating generations capable of national rejuvenation.

2. GAI Applications in Primary School Ideological and Political Education

As an innovative technological paradigm enabling intelligent content creation through natural language processing, GAI demonstrates significant potential in developing pedagogical resources, innovating interactive formats, constructing learning contexts, and providing evaluative feedback. Its capabilities in contextualized expression, personalized response, and dynamic generation facilitate the concretization of abstract values and sophisticated presentation of complex social phenomena, establishing new pathways for value-based enlightenment education and creating advanced models of technology-enhanced moral instruction.

2.1 Cognitive Construction Through Dialogic Inquiry

GAI employs reinforcement learning and chain-of-thought reasoning to develop interactive dialogic frameworks aligned with children's cognitive patterns. Designed according to cognitive development mechanisms, it supports students in concrete operational stages who rely on contextual experiences for moral cognition formation. The transformation of values into continuous, inquiry-based question-answer sequences addresses persistent challenges including conceptual abstraction and delayed feedback in traditional classrooms. During interactive sessions, the system detects emotional tendencies and cognitive gaps through attention mechanisms, dynamically adjusting dialogue depth and scope. In integrity education modules, using dialogic workshop platforms, technology decomposes moral principles into lifelike situational dialogues. Textbook scenarios concerning stranger response protocols enable generative AI to produce branched dialogue trees simulating realistic risk situations, enhancing decision-making skills through practical simulation. This approach guides students toward understanding relationships between behavioral consequences and social norms through structured inquiry. Such human-machine Socratic dialogue facilitates self-organizing moral cognition reconstruction through continuous reflection, promoting the transition from value memorization to behavioral internalization, consistent with developmental patterns in GAI-enhanced environments (Wang, 2023).

2.2 Embodied Learning via Multimodal Interaction

GAI serves as digital instructional partner, establishing human-machine symbiotic relationships through voice interaction, virtual avatars, and somatosensory devices. Sensorimotor intelligence theory emphasizes the role of physical actions in rule internalization. Within embodied cognition frameworks, technology integrates children's physical movements, verbal expression, and moral experience through three-dimensional role-playing, gesture recognition, and affective computing. Practical implementations include augmented reality kits creating virtual roles combined with textbook activities simulating real-world experiences, fostering embodied understanding through tactile feedback. This methodology transforms abstract concepts into tangible somatic and affective memories. Student behavior simulation through physical actions reinforces rule awareness, while embodied interaction overcomes limitations of disembodied learning by integrating values through bodily schemas. The approach catalyzes moral emotion internalization through behavioral imitation and situational practice. Built upon intelligent environments and enhanced through methodological innovation, it strengthens classroom engagement and teacher effectiveness, unlocking the potential of contemporary ideological and political education. GAI-enabled instructional dimensions encompass a tripartite model integrating environment optimization, methodology transformation, and pedagogical enhancement (Ma & Yang, (2025).

2.3 Experiential Immersion in Simulated Environments

Utilizing cross-modal generation and digital twin technologies, the system creates instructional situations aligned with children's lived experiences. Activity-based teaching anchors moral knowledge in concrete operations. Through semantic understanding and scenario simulation, textbook content

transforms into tangible, immersive environments enabling contextualized moral knowledge transfer. In patriotic education, virtual society engines generate community scenes recreating mutual aid events during public health crises. Textbook requirements for campus mapping enable generative AI construction of three-dimensional dynamic models where environmental scanning triggers augmented reality narratives, deepening institutional belonging through virtual-real integration. Data linkage from environmental surveys facilitates real-time simulation of ecological solutions, while platform support enables connection between virtual actions and real-world charity. This integrated virtual-real context maintains cognitive authenticity while enhancing engagement through gamification mechanisms. Students progress through perception-understanding-identification sequences in embodied experiences, improving situational relevance and emotional permeability. This methodology promotes intergroup understanding and acceptance, strengthening national identity more effectively than superficial engagement (Yang, Luo, Jiang et al. (2024). Instructional strategies should combine to support comprehensive contextualized teaching, where experiential immersion builds interpersonal trust and mediates between perceived understanding and national identity. Learning situations should emphasize embodied cognition while balancing structured and emergent elements.

2.4 Developmental Narrative Through Growth-Oriented Assessment

Leveraging educational big data, GAI establishes dynamic, visual moral education evaluation systems. Schema evolution theory emphasizes tracking cognitive development through behavioral documentation. Multimodal data—including vocal recordings, expression analysis, and interaction logs—combined with natural language processing and affective computing, enables real-time analysis of value cognition and developmental trajectories. Integration of wearable device data and learning analytics generates visual representations such as moral development trees. For time management activities, AI analysis of task duration produces personalized efficiency profiles. Combined with resilience metrics from instructional materials, the system creates emotional thermal maps. This process-oriented evaluation transcends quantitative scoring, enabling children to intuitively comprehend growth through narrative presentation. It provides educators with intervention frameworks, achieving assessment that promotes development (Gao, Wang, He et al, 2025). Growth-oriented evaluation visualizes developmental pathways through behavioral timelines documenting honesty progression and thermal mapping illustrating cooperation dynamics. While utilizing intelligent technology, implementation should incorporate multidimensional, multi-subject assessment to preserve moral education's fundamental values while addressing contemporary requirements (Li & An, 2024).

3. Potential Risks in GAI Implementation

Technological integration presents dual effects. While GAI expands instructional possibilities, its limitations—including algorithmic opacity, data dependency, and simulation constraints—may pose substantial risks to value formation, necessitating critical examination.

3.1 Cognitive Bias in Content Generation

GAI training on extensive internet data introduces implicit bias risks. Developmental theories indicate primary school children at conventional levels demonstrate susceptibility to authoritative influence. Immature cognitive capacities increase vulnerability to misinformation. Cultural biases, historical inaccuracies, and other problematic content in training corpora may be replicated; model hallucination might generate fabricated moral scenarios, often diverging from official guidelines or ethical standards. GAI characteristics potentially cause pedagogical innovation delay, quality reduction, and professional decline (Hou & Wang, 2025). For instance, manufactured social events addressing integrity principles detach value education from reality. Textbook cases utilizing authentic community situations to foster vigilance, if replaced by artificial low-risk scenarios, undermine practical understanding. Unstructured knowledge fragments may induce cognitive overload, hindering establishment of stable value frameworks and compromising guidance effectiveness. Embedded ethical modules combining moral philosophy and technology, supported by cross-disciplinary collaboration, represent optimal artificial intelligence education governance (Bai & Yu, 2025). Risk mitigation should utilize technology's supportive and corrective functions through human-machine collaboration, technical mastery enhancement, and transcending instrumental rationality to elevate innovation quality.

3.2 Role Confusion in Human-Machine Relationships

Anthropomorphic interactions may alter classroom power dynamics. Over-reliance on technology for lesson preparation and interaction design may diminish human warmth and pedagogical wisdom. Artificial intelligence-induced spatiotemporal compression causes ecological contamination, reducing authentic experience (Shen, Zhou, Lu et al., 2025), potentially deviating from educational purposes. For students, instant answer mechanisms inhibit critical thinking development. Predetermined conclusions in collectivism discussions replace value realization through peer discourse. Textbook emphasis on teacher-student emotional connections, if substituted by artificial emotional feedback, could undermine relational education. Role confusion amplifies ethical risks across software, hardware, environmental, and human dimensions (Wang, Li, Wang et al., 2024). More seriously, children might equate machine responses with genuine care, transferring emotional identification from teachers to technology, weakening education's affective foundation.

3.3 Immersion Limitations in Virtual Environments

Highly simulated digital environments enhance engagement but risk replacing authentic experiences. Virtual behaviors lack social constraints. Virtual community service modules emphasize knowledge-action integration, but generated environments face three constraints: simplified scenarios inadequate for social complexity replication; low-stakes decisions lacking real consequences; fragmented experiences from immersive devices disrupting multisensory connections. Prolonged immersion may cause digital desensitization. Textbook surveys requiring field research and solution design, if reduced to virtual games, eliminate empathetic experience regarding social realities, reducing responsibility to point-based tasks. This virtual-real imbalance weakens education's social practice connection. Extended immersion also severs sensory connections; virtual reality moral scenarios inhibit

tactile peer communication, contradicting social interaction's role in moral development. While virtual reality enhances emotional resonance, it risks constraining practice to virtual actions (Wu & Li, 2023) : excessive dependence may lead to student addiction to virtual environments, reduce teacher-student interaction depth, confine values to emotional identification, and hinder internalization-externalization processes.

3.4 Reductionist Data Assessment

Behavior-based evaluation improves efficiency but risks reducing development to numerical indicators. Multiple intelligence theories criticize singular quantitative moral assessment. Reconstruction must incorporate physical experience, balance technical and bodily wisdom, integrate quantitative and qualitative evaluation, and accommodate individual differences and artificial intelligence-enabled longitudinal assessment (Lu, 2025). Affective computing's mechanical micro-expression recognition often misses complex emotions like shame or pride. In family themes, parental sacrifice nuances might be ignored by artificial intelligence counting superficial actions while overlooking subtle emotional expressions, missing emotional depth. More seriously, moral capability mappings may become labeling tools. Emotional struggles in overcoming challenges might be simplified to progress metrics, severing emotional sequences of adversity and triumph. Following moral evaluation system implementation, students labeled weak in cooperation faced implicit exclusion in groups. When development becomes quantifiable parameters, and moral development systems rank altruism numerically, child subjectivity may be overshadowed by data performance, eroding emotional connection and resonance.

4. Optimization Strategies

Addressing dual effects requires a comprehensive framework encompassing value guidance, human-machine collaboration, situational integration, and evidence-based evaluation. This must adhere to child-centered perspectives and moral essence, achieving synergy between technological tools and educational principles.

4.1 Developing Morally Adaptive Models

To address general model bias, utilization of moral education knowledge graphs on national platforms facilitates specialized foundation construction. aggregation of structured data: ministerial guidelines, national excellence course resources, and provincial practice cases enables moral ontology development based on developmental stages. Focus on three layers: data tier—filter children's corpus to block inappropriate content; algorithm tier—implement value verification to prioritize theoretical perspectives on collective-individual relationships; output tier—develop child-appropriate language conversion to transform abstract theories into relatable narratives. For family education themes, traditional ethical knowledge graphs prevent artificial intelligence kinship errors. Research proposes three-layer enabled nonlinear learning agent models incorporating knowledge graphs in state transitions for adaptive pathway planning (Huang, Yu, & Wang, 2024). Practical applications demonstrate adaptive models improve content accuracy and reduce historical inaccuracies. Vertical transformation maintains

technological advantages while establishing value protection mechanisms.

4.2 Building Human-Machine Symbiotic Ecosystems

Clarification of human-machine boundaries follows developmental theory principles, where teachers lead value-based tasks: utilize artificial intelligence systems for preliminary learning analysis, automatically assessing value tendencies in compositions, but retain professional judgment to identify superficial positivity; employ national platform's intelligent preparation systems for materials, but design emotional immersion independently, incorporating meaningful pauses in storytelling. For students, establish three-phase guidance: cognitive phase—permit artificial intelligence inquiry with supervision, e.g., explaining concepts; reflective phase—transition to group debates, e.g., discussing leadership rules; practical phase—technology-free engagement, e.g., community service. Textbook reading sections requiring comprehension of state educational measures, while teachers explain legal provisions, artificial intelligence interpretation of literary works expands teaching community. Classroom practice indicates artificial intelligence-assisted emotional interaction modes improve critical thinking scores. Human-machine task differentiation enables technology to amplify rather than replace pedagogical expertise.

4.3 Creating Integrated Virtual-Real Learning Contexts

According to ecological theory, addressing immersion limitations requires three-dimensional scenario chains. Spatially—develop navigation systems to integrate integrity education into physical environments, e.g., scanning objects to initiate moral narratives; temporally—utilize digital growth records to connect classroom simulations with life practice, e.g., synchronizing virtual activities with real actions; socially—construct home-school-community platforms where artificial intelligence generates service proposals, reviewed by educators for practical implementation. For example, combining family themes with augmented reality domestic scenes guides children to recognize and respond to care. This aligns with school merit systems where students exchange virtual points for practical opportunities, demonstrating improved knowledge-action integration in assessments. Virtual-real design maintains technological benefits while grounding character development in lived experience.

4.4 Implementing Growth-Oriented Evidence-Based Assessment

Transcending reductionist data requires dual-axis models. For textbook teacher-student narratives, qualitative calibration prevents artificial intelligence judging emotional proximity by performance metrics. The explicit axis utilizes multimodal collection: voice emotion analysis captures empathetic expressions, forming digital moral profiles. The implicit axis incorporates qualitative methods: structured interviews with artificial intelligence analysis, micro-expression recognition for complex emotions, social drama for peer interactions, role-play responsibility observation. Final presentation through dynamic dashboards: emotional thermal maps for collective moral atmosphere, growth timelines for individual progress, early warning systems for intervention guidance, qualitative cases for significant events. Practical application shows improved educator recognition of emotional

development areas, students report assessment understands inner states, satisfaction increases. This technological-humanistic approach ensures data serves life development narratives.

5. Conclusion

GAI integration presents paradigm-shifting opportunities while risking value alienation. Research indicates intelligent tools can accelerate moral cognition internalization through embodiment during formative stages, but algorithmic transparency issues may undermine transmission reliability. The central tension involves technological efficiency logic versus moral infiltration principles—when platform virtual stimuli overwhelm authentic experience, and data systems replace teacher-student relationships, education faces alienation where instrumental rationality supersedes essence.

The solution requires child-centered technology ethics. Practical experience demonstrates: building vertical models on knowledge structures, connecting community practice through augmented reality for complete cycles, and implementing guided mechanisms in sociocultural frameworks can make technology a moral developmental resource. Future work should develop affective computing modules aligned with moral neural mechanisms; adapt large models for child appropriateness; establish ethical governance alliances for educational technology under policy requirements. Only by situating computational power within human wisdom, and ensuring technological ecosystems serve holistic child development, can the original purpose of virtue cultivation be maintained during technological advancement, securing the value foundation for national rejuvenation.

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