

Research on the Construction and Practice of Immersive Teaching Model for Ideological and Political Education in Higher Education under the Perspective of Digital Empowerment

Quan He

School of Medical Technology of Xiangtan Medicine & Health Vocational College, Xiangtan 411104, Hunan, China

Corresponding author: Quan He (e-mail: 18273235858@163.com)

ABSTRACT The widespread application of digital technology in university ideological and political education provides new opportunities for overcoming abstract content, insufficient participation, and limited emotional resonance. Based on the perspective of digital empowerment, this study constructs an immersive teaching model for ideological and political education in higher education through a four-stage process of “virtual scene-behavioral interaction-cognitive feedback intelligent evaluation.” Virtual reality and augmented reality technologies are first used to build immersive learning environments and enhance emotional experience. Intelligent interactive terminals and semantic recognition systems are then introduced to dynamically capture learning behaviors. A learning analytics model is used to conduct data mining and learning-path feedback, while a multidimensional intelligent evaluation system integrates process and outcome assessment. A comparative experiment involving 800 students from a comprehensive university shows that the experimental group’s learning interest increased by 42.6%, classroom participation increased by 37.8%, the average ideological identification score increased by 0.84 on a five-point scale, and overall learning satisfaction reached 91.5%.

INDEX TERMS digital empowerment, immersive learning, ideological education, virtual reality, learning analytics

I. INTRODUCTION

As a core component of moral education, ideological and political education in higher education institutions bears the important mission of guiding students’ thoughts and values, while simultaneously instilling the professional ethics and craftsmanship spirit essential for the sustainable advancement of the industry. This educational framework directs student behavior toward social responsibility by integrating the historical legacy and innovative transformation into the broader curriculum of value shaping [1,2]. However, current educational practices still suffer from prominent problems such as abstract teaching content, insufficient student participation, and one-way teaching methods, leading to a weakening trend in the effectiveness of ideological and political education. At the same time, digital transformation has become an important driving force for the development of higher education, and digital technologies such as Artificial Intelligence (AI) and Virtual Reality (VR) have provided new pathways for cultivating talents in higher education. In the context of digital education, how to leverage digital empowerment to achieve precise, contextualized, and

interactive ideological and political education has become an important issue that urgently needs to be addressed. Traditional education models rely excessively on teacher lectures and text transmission, making it difficult to evoke deep emotional resonance and value recognition among students. Immersive teaching, characterized by highly realistic virtual scenarios and dynamic interactive experiences, can achieve a multi-dimensional integration of “knowledge acquisition—emotional experience—value internalization,” injecting new vitality into ideological and political education [3,4]. However, current research focuses primarily on technological applications, lacking exploration of systematic theoretical models and practical pathways from the perspective of digital empowerment. This directly hinders the innovative development of ideological and political education.

Based on the theory of digital empowerment and the current state of ideological and political education in universities, this study constructs an innovative immersive teaching framework that integrates the digital simulation of craftsmanship. By viewing educational modernization through this lens, the model allows students to engage with

the industrial spirit and cultural heritage of the industry within a virtual, highinteraction learning environment. It also discusses the avenue of profound assimilation between digital technology and ideological and political education through a four-stage process of virtual scene - behavioral interaction - cognitive feedback - intelligent evaluation to achieve the systematization of teaching design and quantification of the effects of teaching. The goal of the study is to overcome the thinking block of the old ideological and political education, create a new educational model in which the student is the center of interest and the experience allows them to identify [5,6] and need to transform the courses of ideology and politics theory from the transmission of knowledge to a resonance of the values. The study innovations are: first, the notion of digital empowerment is logically built into the model of ideological and political education creation; second, an intelligent feedback is created along with learning analytics support; third, the empirical research confirms the role of this model in enhancing the learning interest of students, classroom performance and political identification, which provides a theoretical framework and practical paradigm of the digital transformation of ideology and political education in universities [7,8].

II. THEORETICAL FOUNDATION AND RESEARCH PERSPECTIVE

The digital empowerment theory has its origins within the context of the information technology revolution and focuses on reconstruction and efficiency enhancement of the traditional systems by use of digital technology. Digital empowerment in the sphere of education is reflected in the rationalization of the teaching environment, mental form and interaction process when using technologies like Big Data, Artificial Intelligence (AI) and Virtual Reality (VR). Its main connotation is to stimulate the change in the modes of disseminating knowledge using the power of technology intelligence, and bring to fruition the re-structuring of educational resources, streamlining of learning tracks, and smart decisions in teaching. Its features are the synergy of intelligent perception, dynamic feedback and accurate services in three dimensions, as well as, encourage structural reconstruction of the education ecosystem with the help of technological penetration. Digital empowerment may be used in the ideological and political education to overcome the boundaries of time and space, simulate an engaging interactive and data-rich learning experience, encourage the change of students who are passive receivers of information to active constructors and give theoretical grounds and technical base in order to create an exciting teaching system [9,10].

Ideological and political education is being digitalized that indicates a systematic rebuilt of educational ideas, pedagogical forms, and relations of roles [11,12]. The digital intervention has changed the nature of teaching as it is no longer a transmission of knowledge but a cognitive construction, as teachers become more than transmitters

of knowledge, they become learning guides and situation designers, and students become active participants in the learning process and meaning co-constructors. This logic of transformation has a theoretical foundation in both the immersive experience theory and the cognitive participation theory in stressing on the synergistic mechanism of environment, behavior, and emotion. Immersive experience aids in the students to immerse themselves into the ideological and political environment into the ideological resonance and depth in cognition in their learning, with cognitive participation theory bolstering the depth of comprehension and the reflective process with interaction. Finally, on the level of the educational value, a rational closed circle of technology-motivated-subjective participation-value recognition is established in such a way that digital transformation is not just a source of innovation but also a significant possibility of reforming ideological and political education ideologies.

Immersive learning has its theoretical bases in constructivist learning theory and the experiential learning theory. Constructivism is based on the assumption that learning involves actively creating meaning in real life or simulated situations with a strong focus on contextual and socially interactive nature of knowledge and therefore offers a cognitive perspective to immersive learning. Instead, experiential learning theory presupposes the idea of promoting profound learning that is based on the cyclical process of experiencereflection-conceptualization-practice, which is most consistent with the interactivity and perceptualism of immersive learning. The digital media has helped introduce cognitive, emotional, and value-level aspects in the ideological and political education field and create a system of technology and educational psychology dual support. Building up extremely immersive conditions through the use of technologies, including VR and AR, students will be able to reach a gradual internalization of knowledge-emotion-will-action complex in virtual conditions, which will allow reinforcing the value resonance and ideological identification, and giving a good theoretical ground to the ideological and political educational innovativeness in universities.

III. DIGITAL-ENABLED IMMERSIVE TEACHING SYSTEM

A. VIRTUAL SCENE

The initial stage of the immersive model of ideological and political instruction is the stage that the virtual scenario stage is based upon. It is focused on creating a very immersive learning experience based on the Virtual Reality (VR) and Augmented Reality (AR) technologies. The essence of this phase is creating virtual pedagogic situations rich in intellectual specifics and affecting the heart or soul, according to the themes of political theory. Such situations involve experiencing existing social problems, reenacting past experiences, and practicing policies which facilitates cognitive awareness and emotional recognition. As a matter of fact, 3D modeling and an interactive system in real-time recreate multi-dimensional teaching situations and enable

students to participate in a multi-sensory experience in the visual, auditory, and behavioral levels, creating emotional resonance and value experiences. Moreover, the system is able to record information using the eye movements of the students and dwell time when getting into the scenario.

B. BEHAVIORAL INTERACTION

This phase uses the multimodal data acquisition technology (a voice, actions, facial expression, touch, etc.) to realize the multidimensional interaction between students and teachers, and students and virtual characters, which creates a teaching ecosystem that includes a combination of human-machine-environment. The system is able to semantically identify what students are saying to each other, what they are talking about, their emotional tendencies and level of knowledge mastery thus dynamically producing tailored teaching feedback. Moreover, smart communication makes it possible to engage in group learning and role-play teaching. According to the data observation and the weight of the interaction nodes, teachers can change the instructional mode on the background and transform the learning process to a more active and interactive and questioning mode instead of a passive acceptance, thereby increasing the liveliness and experiential nature of ideological and political education.

C. COGNITIVE FEEDBACK

By mining, analyzing, and visualizing multidimensional learning data, cognitive path tracking and dynamic optimization are achieved. This study constructs a multi-indicator learning analysis model, including elements such as learning frequency, interaction depth, emotional investment, and reflection level, to assess cognitive progress and generate personalized feedback reports. The system generates learning maps based on algorithmic analysis, visually presenting students' learning transfer paths in a virtual environment, providing teachers with controllable decision-making support. Table 1 shows the core indicator system of the learning analysis model.

Through the dynamic visualization analysis of this model, teachers can identify students' learning bottlenecks and develop precise intervention plans, achieving a closed-loop improvement from data to teaching decisions.

IV. RESEARCH DESIGN AND IMPLEMENTATION PROCESS

In this research, the experimental context was a political theory course in a full-fledged university; hence, the sample size of 800 undergraduate students was chosen, and a quasi-experimental study design was used to group and interfere. According to the major and learning foundation, the students were randomly split into an experimental group and a control group, and 400 students were randomly distributed in each of the groupings. The experimental condition followed digitally-enabled immersive teaching model whereas the control condition followed the traditional classroom lecture teaching method. The teaching team also taught both groups,

to be consistent in teaching content and speed, hence ruling out influence of teacher factors. The duration of the experiment was 16 weeks, which is one semester of classroom instruction and extracurricular activities, and the learning paths were documented, and findings were compared on a single platform. This study was approved by the Ethics Committee of Xiangtan Medicine & Health Vocational College, and was performed in accordance with the principles of the Declaration of Helsinki. All eligible participants signed an informed consent form. The technological system used in the research consisted of the three main modules: first, the system of VR and AR devices to give the opportunity to create immersive situations and participate in learning using multi-sensory experiences; second, the semantic recognition and learning analysis system that will allow capturing the language interactions, emotional states and behavioral data of students in real-time; and third, intelligent evaluation platform using artificial intelligence algorithms to monitor personal learning performance and evaluate the effectiveness of a group. A visual dashboard allowed teachers to track the learning engagement, cognitive distribution, and concentration on the topic of political theory to control the processes and provide the dynamic intervention.

The research method was a five-step process, including the pre-testing, model implementation, post-testing, data collection and analysis and feedback. Baseline data was provided in the form of a thought identification scale, a learning interest questionnaire and classroom participation observation records in the pre-testing phase. During the middle term, the system would automatically store the data of the learning process, as well as the frequency of interaction. During the post-testing stage, isometric tests were performed, and the system data was integrated to have extensive analysis. Data were collected anonymously to ascertain privacy and reliability of data. There were four dimensions of evaluation indicators that included cognition, emotion, participation, and outcome which guaranteed the completeness and comparability of the results. Statistical analysis was done using SPSS 26.0. First, the test of normality and equal variances was conducted on experimental and control groups. Second, significant differences in the time pre-intervention and postintervention were analyzed by paired-samples t-tests and independent-samples t-tests. Lastly, the effect size was determined to determine the influence of the teaching model on the learning interest, classroom participation, and the identification of thoughts. In the meantime, the data visualization technology was employed to demonstrate important indicators (including participation time distribution, frequency trend of interaction, and emotion fluctuation curve) to demonstrate the correlation between learning behavior and changes in thought in immersive teaching. Table 2 shows the research implementation and data collection framework.

The study design ensured the closed-loop nature of the experimental logic and the scientific rigor of the data analysis, providing solid empirical support for verifying the

TABLE 1. Core Indicator System of Learning Analytics Model

Indicator Categories	Specific indicators	Data source	Evaluation function
Learning behavior	Login frequency and operation duration	System logs, endpoint monitoring	Measuring participation
Interaction depth	Number of times spoken, semantic relevance	Speech recognition and text analysis	Assess mental activity
Emotional investment	Facial expression recognition, tone of voice	Video analytics system	Assessing the level of emotional identification
Cognitive Reflection	Self-evaluation log, discussion feedback	Learning portfolio data	Measuring the degree of cognitive internalization
Results	Test scores, task completion rate	Teaching platform database	Verify learning effectiveness

TABLE 2. Research Implementation and Data Acquisition Framework

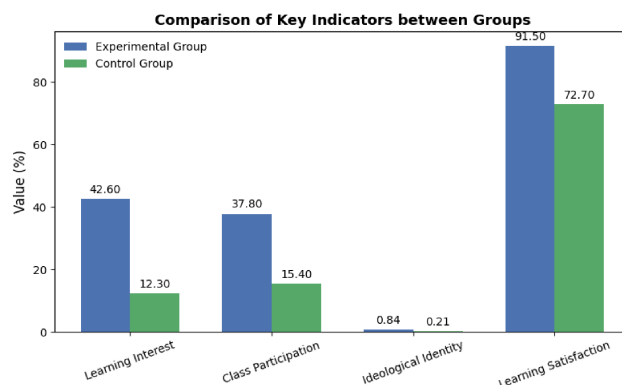
stage	Main tasks	Data types	Assessment Objectives
Pre-testing phase	Questionnaire on Learning Interest and Ideological Identification	Quantitative questionnaire data	Obtain baseline level
Implementation phase	Immersive teaching (experimental group) vs. conventional teaching (control group)	Behavioral and interaction data	Monitoring participation
Mid-term feedback	System learning trajectory analysis and teacher observation	Platform Behavior Log	Optimize the teaching process
Post-testing phase	Learning Outcomes and Internalization Assessment	Test scores and semantic text data	Comparing teaching effectiveness
Data Analysis	Statistical testing and visualization	Numerical and semantic fusion data	Validation of significance and model effects

effectiveness of the digitally-enabled immersive teaching model.

V. RESULTS ANALYSIS AND DISCUSSION

A. KEY DATA ANALYSIS RESULTS

Statistical results based on 16 weeks of experimental data show that the immersive teaching model under the digital empowerment perspective significantly improved learning interest, classroom participation, ideological identification, and learning satisfaction. The experimental group students showed particularly significant improvements in learning enthusiasm and course experience. Comparison of learning analysis system and SPSS statistical results revealed that the experimental group's learning interest increased by an average of 42.6% compared to the pre-test, classroom participation increased by 37.8%, ideological identification increased by an average of 0.84 points on the 5-point scale, and overall learning satisfaction reached 91.5%, while the control group showed lower changes. The significance test ($p < 0.05$) indicates that this model is statistically significant in promoting cognitive participation, emotional resonance, and value internalization. Overall, the deep integration of digital empowerment and immersive experience significantly enhanced students' sense of engagement and identification with ideological and political education content. Figure 1 shows the visualized data.

**FIGURE 1.** Visualized Data Display

As shown in Figure 1, the experimental group significantly outperformed the control group in several core indicators, demonstrating the stability and potential for widespread application of this educational model.

B. THEORETICAL EXPLANATION OF THE RESULTS

The results of the research show that there is progressive logical mechanism of immersionidentificationaction. The immersive teaching, by the experience of living in the virtual world, emotional stimulation, allows students to create the psychological resonance in the experience, and develop their knowledge in terms of the cognitive processing, thus creating the stable value identification and behavioral internalization. Technology has two functions in this process: First, it diversifies cognitive inputs and broadens of associative thought by means of the multimodal interaction; Second, it streamlines the learning trajectory by supplying the student with the data-driven feedback and, as a result, allows him or her to enter into the state of the cycle

of self-awareness reflection and correction-re-engagement in the learning process. Accordingly, the digital empowerment technology does not just re-build the logic of the classroom but also offers a new direction of ideological and political education: intelligent decision-making + personalized education.

C. EXISTING PROBLEMS AND OPTIMIZATION DIRECTIONS

Although the outcomes of the experiment confirmed a high level of effectiveness of this model, a number of difficulties are still in the implementation. To start with, VR and AR gadgets are expensive and maintenance and updates of technologies impose pressure on budgets and resources of institutions. Second, the flexibility of teachers to digital teaching models is not the same and thus requires some systematic training in order to enhance their technical literacy and design ability of teaching. Third, the stability and data security of the platform system are yet to be optimized. Moreover, disciplinary features and geographical conditions limit the portability of the model. To resolve these problems, the subsequent research should provide light cloud-based technologies, build an interactive developmental platform in teachers, and create a standardized, adaptable teaching model gradually to realize sustainable digital innovation of ideological and political education in universities.

VI. CONCLUSION

Digital technology facilitated in the immersive mode of teaching allows for the effective integration of ideological education with the digital visualization of craftsmanship, encouraging multi-layered changes in value internalization through the simulated experience of heritage. By experiencing the precision and labor discipline inherent in the industry within a virtual environment, students achieve a deeper identification with the professional ethics and innovative spirit required for industrial modernization. The teaching process produces the fusion of the contextualization, interactivity and cognitive feedback intelligent evaluation by building a four stage system of virtual scenario-behavioral interaction-cognitive feedback intelligent evaluation which is a fluid process that links the senses experience to ideological resonance. The model does not only streamline the teaching framework and cognitive track but enhances subjectivity and reflective nature of students in the teaching process which propels the shift of ideological and political education to be more of an experience rather than knowledge delivery. The study confirms the theoretical and practical possibility of digital technology in supporting the education innovation and improving the effectiveness of education and offers a new direction of development and application of ideological and political education within the universities. Future research must prioritize the interdisciplinary integration of engineering simulations and ideological education models to enhance the digital pedagogy system and produce high-quality educational outcomes. By optimizing these synchro-

nized frameworks, the curriculum can effectively merge the technical precision of spinning and weaving with moral guidance, creating significant opportunities for a modernized, value-driven learning environment.

AUTHOR CONTRIBUTIONS

Quan He designed, collected and analyzed the data, and drafted the manuscript. Quan He conducted the study, critically revised the manuscript for important intellectual content, and gave final approval of the version to be published. Quan He participated fully in the work, take public responsibility for appropriate portions of the content, and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

CONFLICTS OF INTEREST

The author declares no conflict of interest.

HUMAN RESEARCH SUBJECTS

This study was approved by the Ethics Committee of Xiangtan Medicine & Health Vocational College, and was performed in accordance with the principles of the Declaration of Helsinki. All eligible participants signed an informed consent form.

FUNDING

This research was supported by,

This paper is a research result of the 2023 Hunan Province Higher Education Ideological and Political Work Research Project "Research on Enhancing the Leading Power of Mainstream Ideology among College Students in the New Media Environment" (Project Number: 23C82).

ACKNOWLEDGEMENTS

Not applicable.

REFERENCES

- [1] L. Huang, "The ideological and political education principles contained in the Communist Manifesto and their practical transformation," *Journal of Dali University*, vol. 10, no. 3, pp. 51–57, 2025.
- [2] Y. Dai and L. Cheng, "Methods for the interactive operation of ideological and political education and social subsystems," *Journal of College Counselors*, vol. 17, no. 4, pp. 32–39 + 97, 2025.
- [3] Z. Jia, "An Exploration of the Practical Path of Integrating the Spirit of the Founding of the Communist Party into the Online Ideological and Political Education of College Students," *Journal of Beijing University of Science and Technology (Social Sciences Edition)*, vol. 42, no. 1, pp. 24–30, 2026.
- [4] J. Zhang, J. Li, Y. Wang, and S. Zhang, "An Exploration of Ideological and Political Education for Post-graduate Students in Traditional Chinese Medicine Under the Guidance of Famous Traditional Chinese Medicine Practitioner Studios," *Journal of Hebei North University (Natural Science Edition)*, vol. 42, no. 2, pp. 49–51 + 56, 2026.
- [5] S. Huang and X. Wang, "Introduction, Alienation and Control: Risks and Countermeasures of Ideological and Political Education Narratives Based on Recommendation Algorithms," *Journal of Hohai University (Philosophy and Social Sciences Edition)*, vol. 27, no. 1, pp. 9–17, 2025.
- [6] X. Liu, Z. Xiantong, and H. Starkey, "Ideological and political education in Chinese Universities: structures and practices," *Asia Pacific Journal of Education*, vol. 43, no. 2, pp. 586–598, 2023, doi: 10.1080/02188791.2021.1960484.

- [7] G. Zhu and T. Tao, "Strategies for ideological and political education in colleges and universities from the perspective of general education," *Academic Journal of Humanities & Social Sciences*, vol. 4, no. 11, pp. 18–23, 2021, doi: 10.25236/AJHSS.2021.041104.
- [8] H. Xiaoyang, Z. Junzhi, F. Jingyuan, et al., "Effectiveness of ideological and political education reform in universities based on data mining artificial intelligence technology," *Journal of Intelligent & Fuzzy Systems*, vol. 40, no. 2, pp. 3743–3754, 2021, doi: 10.3233/JIFS-189408.
- [9] T. Chen, "Research on the dilemma and breakthrough path of ideological and political education in colleges and universities in the era of big data," *Journal of Higher Education Research*, vol. 3, no. 2, pp. 203–206, 2022, doi: 10.32629/jher.v3i2.757.
- [10] H. Wan, "Evaluation Methods of Ideological and Political Education in the Context of Modern Distance Education," *Advances in Educational Technology and Psychology*, vol. 7, no. 16, pp. 32–46, 2023, doi: 10.23977/aetp.2023.071605.
- [11] M. Li, "Research on the Innovation and Breakthrough of Ideological and Political Education in Colleges and Universities," *Curriculum and Teaching Methodology*, vol. 6, no. 13, pp. 33–37, 2023, doi: 10.23977/curtm.2023.061307.
- [12] X. J. Lou, S. Cao, Y. Shao, et al., "Research status and emerging trends of ideological and political education in nursing in China: A bibliometric analysis," *Education Science and Management*, vol. 1, no. 3, pp. 169–178, 2023, doi: 10.56578/esm010305.