Innovative Approaches for AI-Driven Mainstream Cultural Education in Higher Education

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Abstract: Amid the digital transformation of education, leveraging Artificial Intelligence (AI) to empower mainstream cultural education in higher education is crucial for fulfilling the fundamental mission of "cultivating virtue and talent", thereby enhancing the effectiveness of education. Currently, mainstream cultural education faces several challenges, including outdated resource formats, a lack of innovative dissemination channels, and insufficient synergy in educational efforts. AI holds significant potential for enhancing mainstream cultural education in higher education: through data profiling and intelligent monitoring, the precision and efficiency of educational processes can be improved; through technologies such as digital twins and the metaverse, cultural experiences can be enriched; and through cross-format transformation and AI-based content generation, educational resources can be updated to facilitate cross-cultural integration. To this end, it is essential to construct a new educational model characterized by "technological empowerment, coordinated mechanisms, and controllable risks". This involves establishing intelligent education platforms, innovating collaborative educational systems, consolidating the collaborative guarantee mechanisms, and promoting the genuine empowerment of intelligent technologies for the high-quality development of mainstream cultural education in higher education.

Keywords: Artificial Intelligence; Mainstream Cultural Education; Precise Empowerment; Immersive Experience; Collaborative Mechanism

1. Introduction

"The prosperity of culture leads to the prosperity of the country, and the strength of culture leads to the strength of the nation" [1]. As a spiritual treasure, red culture embodies the core value of seeking rejuvenation for the nation and happiness for the people. Red culture, as a crucial component of China's mainstream culture, embodies the nation's spiritual pursuit and value orientation, serving as an important vehicle for ideological and moral education in universities. National policies emphasize the coordinated advancement of "deepening the inheritance of the red gene" and "promoting the digital transformation of education" [2], expanding the space and platforms for practical education and online education[3]-guidelines that have pointed out the direction for education work in the new era. At present, intelligent technology has brought new opportunities and changes to higher education. However, the traditional red cultural education model in higher education has problems such as rigid educational methods and insufficient utilization of resources, which make it difficult to meet the needs of college students in the new era. Against this backdrop, exploring the value and practical paths of empowering red cultural education in higher education with artificial intelligence is not only an inevitable trend in line with technological development but also a key to enhancing the effectiveness of education and cultivating new era talents capable of shouldering the great responsibility of national rejuvenation.

2. Review of the Current Situation of Red Cultural Education in Higher Education

2.1 The "Source" of Education through Red Culture Needs to be Revitalized

Red culture serves as the source of vitality for nurturing people, and the exploration and full utilization of its resource connotations are the fundamental prerequisites for empowering and educating people. However, at present, colleges and universities still face difficulties in applying

intelligent technologies to activate red cultural resources, resulting in insufficient vitality at the source of education. One is the insufficiency in content exploration, which weakens the educational foundation. Overall, the content ecosystem of red culture is in an unbalanced state: on the one hand, a large amount of content is often merely copied and simply pieced together during the process of exploration, gradually losing its uniqueness and depth, and falling into the predicament of homogenization; on the other hand, the risks and hidden dangers of content mining are prominent. Not only are there problems such as the difficulty in ensuring the authenticity of information and the mixture of harmful information, but also some contents misinterpret historical facts, which leads to the damage of the integrity and seriousness of red stories. For instance, the red stories of Dong Cunrui and Liu Hulan are deeply touching, but due to the differences in their historical backgrounds, they are hard to evoke empathy among contemporary students. The combined effect of these issues has led to the fact that the historical weight and spiritual appeal that red culture should possess have not been fully explored. Second, insufficient utilization of resources restricts the effectiveness of education. From the perspective of resource utilization, red culture is profound in connotation and closely linked to specific history. Although digital applications have been attempted in many aspects, there are still challenges in how to more precisely disseminate the application methods and scenarios to the contemporary student group. The younger generation has grown up in the information age and is rather resistant to traditional didactic communication methods. They are also easily influenced by the complex and diverse online information, resulting in an insufficient reception of red culture. What is more worthy of attention is that students' understanding of red culture and their ability to transform this understanding into self-disciplined online behavior are insufficient, which has exacerbated the predicament of the low conversion rate of red culture in the digital space. This lack of content exploration and resource utilization makes it difficult for red culture to truly penetrate the hearts of young people, thus restricting the full play of its educational effectiveness.

2.2 The "Path" of Educating People through Red Culture Needs to be Innovated

An unobstructed path for red culture education significantly impacts the formation of college students' values and their behavioral practices, and is crucial to achieving its educational effectiveness. However, the current lack of innovation in the educational path of red culture hinders the transmission of the red gene to contemporary young students. One is that the application of technology is highly formalized. At present, the application of intelligent technology in the process of educating people through red culture mostly remains superficial and fails to deeply explore its potential. In the classroom, the presentation forms of red cultural resources are mostly static two-dimensional graphics and text or one-way videos, and the presentation methods of teaching content are mostly "report-style" and "speech-style", etc. Such presentation methods expose the weakening of scene reproduction and the insufficiency of situational experience in current classroom teaching, and also reflect the lack of teaching visualization and multi-dimensional tools. In social practice, although some universities organize students to experience red cultural scenes in an immersive way through VR or AR technology, such technologies merely serve as carriers for visits and displays, lacking behavioral guidance for students when faced with value choice situations. This kind of educational approach still fails to break through the predicament of traditional educational methods that place students in a passive receiving role. It lacks both contextualized emotional immersion and interactive participation design, resulting in a weakened appeal and influence of red culture in education. The second is the disconnection between behavioral guidance and actual needs. The existing red cultural resources are confronted with problems such as lagging updates, single acquisition channels, and rigid presentation forms, making it difficult for them to adapt to the dynamic and segmented information acquisition habits of contemporary students. Moreover, in the process of educating and disseminating red culture, the discipline, dedication, and sense of mission in red culture are rarely transformed into issues close to reality, such as honesty and law-abiding, hard work and dedication, and financial services for the people. There is also a lack of guidance on

contemporary qualities such as Internet risks and anti-fraud awareness, thus weakening the contemporary appeal of red culture. In conclusion, the disconnection between the formalization of this technological application and behavioral guidance makes it difficult for students to form emotional resonance and deep memory, thus hindering the unity of knowledge imparting, emotional cultivation, and value shaping.

2.3 The "Body" of Red Culture in Educating People Needs to be Coordinated

The collaborative effectiveness of various elements of red culture in educating people is directly related to the integration of educational resources and the implementation of practices. The current insufficient coordination among educational subjects, carriers, and mechanisms has restricted the formation of an educational synergy. The first issue is the imbalance in the interaction among educational subjects. There are connection gaps among different departments of the education system. A regular and efficient linkage mechanism has not yet been established in links such as theoretical interpretation, activity organization, and dissemination promotion. For instance, when some universities carry out red-themed practical education, insufficient coordination in scheduling between teaching management and activity planning affects student participation rates. There is still room for improvement in the collaborative efficiency among families, schools, and communities. Due to the incomplete connection mechanism, rich digital red resources such as red sites and community streets have not been effectively integrated into the main channels of the university's education system. The second issue is the insufficient integration of digital carriers. The construction of intelligent platforms lags behind. The resource synchronization rate between offline physical exhibition halls and online cloud platforms is low. The intercommunication rate between school-based resource libraries and social platforms is low. The data connection rate between VR teaching applications and course evaluation systems is also low. This makes it difficult for students' practical achievements to be timely and effectively converted into credits or other recognitions, which easily weakens students' motivation to sustain participation. The third issue is the insufficient optimization of the evaluation system. At present, most universities tend to focus more on explicit indicators such as the number of events, the number of participants, the number of media reports, and the click-through rate of platforms when conducting evaluations, but they overlook the profound effectiveness of red culture in educating people, especially its actual impact on shaping students' values and transforming their behaviors. More crucially, a dynamic monitoring mechanism for internalizing values has not yet been systematically established. For instance, does students' absorption of red cultural content in cyberspace translate into self-disciplined behavior? What is the correlation between the investment in red cultural education in schools and students' self-disciplined behavior? At present, there are few explorations in this area of investigation and research, and the tools for assessment are also lacking. It is evident that the insufficient synergy among the various elements of the education system directly affects the complete construction of the educational closed loop of "cognition-experience-practice".

3. The Value Implications of Artificial Intelligence Empowering Red Cultural Education in Higher Education

3.1 Enhance the Precise Effectiveness of Education through Precise Customization

The existing artificial intelligence technology can integrate data and technology, consolidate existing resources, and build a precise educational system that covers data collection, targeted delivery, dynamic optimization, and collaborative education, thereby enhancing the effectiveness of red cultural education. Firstly, data profiling enables targeted content delivery. Intelligent platforms can leverage big data analysis to accurately capture students' learning trajectories and cognitive characteristics, analyze their emotional states and acceptance thresholds, and thereby create digital portraits to achieve personalized learning planning and tailored content. For instance, when students browse the theme content related to the Long March, the system can initiate an immersive VR simulation of the Xiangjiang Campaign in real time based on their digital portraits, making the educational supply meet the students' needs as if it were a private customization. This kind of

data empowerment can not only solve the predicament of individual differences being ignored and educational information being homogenized in traditional education, but also reduce the cost of information screening, activate students' intrinsic motivation in the balance of supply and demand, and ensure the efficient connection between relevant cultural content and students' needs. Secondly, intelligent monitoring empowers collaborative co-cultivation. By leveraging artificial intelligence to dynamically optimize the educational process, along with continuous monitoring and intelligent iteration mechanisms[4], the system accurately identifies students' ideological and behavioral patterns. It enables scientific judgments on their learning trends and value formation processes, allowing for prompt adjustments to educational strategies. At the interaction level, the decentralized knowledge dissemination approach reshapes the relationship between teachers and students. Teachers transform from knowledge transmitters to knowledge guides, and students change from passive recipients to "co-builders" of red stories, enhancing students' sense of participation and identity in learning. The precise customization of artificial intelligence not only demonstrates the scientific nature of technological empowerment but also upholds the educational principle of differentiated instruction, bringing about a paradigm revolution in the education of red culture from experience-based to precise, and from one-way indoctrination to two-way interaction.

3.2 Expand the Forms of Cultural Experience through Multi-Dimensional Scenarios

Artificial intelligence technology can create diverse and three-dimensional experience scenarios, transforming red culture from static inheritance to dynamic immersion and from a single form to a complex presentation. At the level of scene concretization, digital twin and 3D modeling technologies can achieve cross-temporal and spatial restoration of historical scenes[5], enabling high-fidelity reproduction of revolutionary sites in the digital space. For instance, the former site of the Zunyi Conference has broken through language limitations through 3D scanning technology, transforming the wood grain details and strategic map into visual language. The "Nanmewan Spinning Wheel" in Yan'an recreates the working scene of the spinning wheel through AR technology. Students can operate the virtual spinning equipment to experience the entire spinning process. The VR battlefield of the Hundred Regiments War simulates the vibration of beacon fires through haptic feedback devices. From the display of memories to the experience of scenes, the patriotic emotions behind the cultural relics are concretized, transforming history from text into visible, tangible, and perceptible cultural textures. At the level of scene specialization, the metaverse platform can break through the limitations of time and space through the integration of multiple technologies[6] to build specialized application scenarios. For instance, the Red Culture Museum, developed using digital twin technology, allows students from all over the world to visit online simultaneously. Meanwhile, teachers can play the role of a guide in this process, leading students to jointly create "red culture" themed drama works through an intelligent platform. Meanwhile, with the help of blockchain rights confirmation technology, classic red stories can be transformed into animation products that are convenient for cross-border dissemination, and AI-generated anchors can interpret the abstract values in red culture through dynamic and vivid narrative methods. The application of these distinctive scenarios has broken through the spatio-temporal boundaries of the dissemination of red culture. Through immersive experiences, it has transformed historical narratives into tangible and perceptible dynamic expressions, promoting the diversified transformation of the identities of communication subjects and enabling red culture to move from static text to multi-dimensional expression.

3.3 Expand the Scope of Resource Dissemination through Value Infiltration

Artificial intelligence can break through geographical boundaries and provide technical support for the precise dissemination and in-depth infiltration of red cultural resources. At the level of resource form renewal, artificial intelligence can break through the predicament of the single presentation method of traditional red cultural resources. Through cross-form transformation and intelligent generation technology, it can transform materials such as text, images, audio, and video into diverse

forms like knowledge graphs, animations, rap, and dramas, which not only conform to the cognitive habits of contemporary students but also provide customized content for learners from different cultural backgrounds. For instance, the teaching short videos generated by Sora, which boasts features such as high-fidelity physical simulation, complex scene construction, and optimization of teaching adaptability[7], enable red stories to reach the audience more effectively and enrich the dissemination forms of educational resources. At the level of cross-cultural infiltration, algorithmic recommendation has reshaped the audience's reception logic with its personalized, real-time, and diverse characteristics. Algorithms can be precisely embedded into students' interest circles, stimulating their autonomous dissemination through sharing mechanisms, thereby breaking through the limitations of the stratification of information exchange among student groups. This characteristic of personalization can break the information cocoon and enable the influence of red culture in education to expand exponentially. The metaverse technology, with its characteristics of integrating the virtual and the real, user co-creation, sustainability, and high realism, has opened up a channel for value resonance. This technology can build a global "audience pool". Its multi-language processing technology can transform cultural contents such as "red spirit" and "red culture" into common human values like "pursuing fairness" and "pursuing justice", and then spread red culture from the circle of college students to global Internet users through decentralized dissemination methods. The renewal of this resource form and its cross-cultural infiltration have enabled red culture to transcend regions and time through digital dissemination methods[8].

4. Innovative Paths for Empowering Red Cultural Education in Universities with Artificial Intelligence

In response to the predicament of red cultural education in higher education as discussed in the previous text, and in combination with the value implications of artificial intelligence empowerment, this paper proposes the following innovative paths to achieve the high-quality development of red cultural education in higher education truly empowered by artificial intelligence.

4.1 Build an Intelligent Education Platform through Technological Integration

The core of artificial intelligence empowering the education of red culture lies in the deep integration of technological elements and educational scenarios. It is necessary to build an intelligent platform integrating data, scenarios, and carriers with systematic thinking. Firstly, it is necessary to improve the data foundation of red cultural resources. Through natural language processing (NLP) technology, the scattered revolutionary documents, oral history, and site images should be structured. A cross-school and cross-regional knowledge graph of red culture should be established to form a resource library covering material culture, spiritual culture, and institutional culture, providing precise content support for targeted delivery[9]. For instance, the "Red Gene Bank" jointly developed by Tsinghua University and the Yan'an Revolutionary Memorial Hall has achieved high-precision digital modeling of cultural relics through intelligent technology, laying a digital foundation for the intelligent retrieval and scene restoration of red culture. Secondly, develop immersive interactive scenarios, using real historical events as the background, and create a "Red Theater" through digital twin technology, VR virtual reality technology, and AR augmented reality technology[10]. This allows students to participate in historical events such as "Seizing Luding Bridge" and "Clearing Land in Nanmudwan" as virtual characters, enhancing their understanding of historical events in immersive historical scenarios. This approach deepens the emotional identification with the red culture through information exchange. Finally, promote the integration of educational carriers through technology. Technology should be applied to connect the existing "Intelligent Ideological and Political Platform" with the "Red Cultural Resource Library", thereby building a "Red Cloud Platform" that integrates VR resources from red sites nationwide. This enables students to book offline tours and experiences via mobile terminals. During this process, the platform needs to avoid the formalistic tendency of "technology for technology's sake", ensuring that the spiritual core of red culture is not diluted in the combination of technology and reality, and truly

achieving a virtuous cycle of "technology serving culture and culture empowering education".

4.2 Optimize the Collaborative Education System through Mechanism Innovation

To make significant progress in the education of red culture, it is necessary to carry out collaborative innovation of "teacher-led-technology-empowered-student-centered", and enhance the effectiveness of education through the deep integration of intelligent technology and humanistic guidance. Firstly, in terms of teacher leadership, the "dual-teacher classroom" model needs to be implemented. Teachers are responsible for guiding, interpreting, and correcting values, while AI tools undertake the transmission of knowledge and the construction of scenarios[11]. In the creation of the "Digital Drama of Red Martyrs", teachers guide students to explore historical details to enrich the script content of red stories. AI uses technologies such as motion capture and voice synthesis to transform the script into dynamic images. Through the ingenious combination of history, art, and technology, the red genes are endowed with "digital intelligence" wings[12]. The "dual-teacher classroom" model provides in-depth guidance for red culture education. Secondly, in terms of the students' subjectivity, it is necessary to stimulate their subjective initiative. Students should be encouraged to research red culture using intelligent tools. For instance, students can collect oral historical materials online and use NLP technology to organize and analyze them, thereby helping to form a digital oral archive of red culture. This process cultivates their information literacy and cultural sense of responsibility in practice. Finally, an intelligent evaluation feedback mechanism should be established. Technologies such as micro-expression recognition and attention tracking should be used to analyze students' cognitive engagement in virtual scenes in real time. Based on this data, personalized learning reports for students should be generated to provide data support for teachers to adjust subsequent teaching strategies. During the above process, it is necessary to be vigilant against the dissolution of students' subjectivity by technology and prevent students from falling into the trap of "passively accepting AI push notifications". Teachers should ensure that technology always serves the all-round development of people through methods such as questioning, guidance, and value enlightenment, so as to achieve the educational goal of "collaborative education and cultivating people through culture".

4.3 Build a Solid Barrier for Intelligent Education through Risk Prevention

To address ideological risks, data security risks, and educational ethics risks, it is still necessary to establish a risk prevention and guarantee system for artificial intelligence to empower red cultural education. First of all, it is necessary to strictly control the content review process. A dual-control mechanism of "algorithmic review + manual rechecking" should be established. Specifically, when content is algorithmically reviewed, keyword libraries aligned with a specific value system are embedded to conduct an ideological tendency analysis. The manual review team is responsible for the examination of historical facts and the judgment of value orientation, to prevent the fictionalization and entertainment interpretation of red stories[13]. For instance, when developing "red culture animation", it is necessary to ensure that the character portrayal conforms to historical truth and avoid tendencies such as distorting and entertaining revolutionary heroes. Secondly, it is necessary to strengthen data security protection. Standards for the collection, storage, and use of data on intelligent platforms must be formulated to clarify the rights and responsibilities of all parties. To prevent precious historical materials from being tampered with or misused, blockchain technology can be applied to authenticate and trace the origin of red cultural resources. To prevent the leakage of personal information, students' interactive data can be protected through encrypted transmission and anonymization processing. Universities can jointly establish "Red Culture Data Security Laboratories" with technology enterprises to regularly conduct vulnerability scans and risk assessments. Finally, an ethical review system needs to be established. An ethics review committee comprising ideological and political experts, technical engineers, and student representatives should be established to conduct pre-reviews of AI application scenarios. For instance, when developing the "Red Culture Metaverse", it is necessary to assess whether the virtual scenes contain content that triggers

historical nihilism tendencies or whether there are scenes that cause students to be overly addicted to the virtual world. In conclusion, when designing the above-mentioned risk prevention systems, it is necessary to strike a balance between technological innovation and ethical norms. While encouraging technological exploration, a red line of "what cannot be done" should be drawn to ensure that the education of red culture always proceeds in the right direction.

5. Conclusion

In the context of digital transformation in education, artificial intelligence has brought new opportunities and challenges to the education of red culture in higher education. Many practical difficulties exist in the current red cultural education in higher education, restricting the improvement of the effectiveness of red cultural education. Artificial intelligence empowers the education of red culture in higher education, enhancing the precise effectiveness of education through precise customization, expanding the forms of cultural experience through multi-dimensional scenarios, and broadening the scope of resource dissemination through value infiltration, highlighting significant value implications. To advance red culture education in the future, universities should fully leverage the advantages of artificial intelligence. They should promote the deep integration of artificial intelligence and red cultural education from three aspects: building intelligent education platforms, optimizing collaborative education systems, and consolidating intelligent education barriers. They should also optimize practical paths and invigorate the vitality of red culture. This will provide solid support for cultivating a new generation capable of shouldering the great responsibility of national rejuvenation.

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