Research on the Optimization Strategy of Integrating VR into Ideological and Political Courses in Colleges and Universities from the Perspective of College Students

—Practical Reflection Based on the Virtual Reality Project of the Red Army Martyrs Memorial in the Sichuan-Shaanxi Revolutionary Base

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Abstract

Aiming at the practical problem that virtual reality (VR) technology is widely used in ideological and political courses in colleges and universities but the actual effect of educating people is insufficient, this study is based on the iterative practice and reflection of the VR project of "Red Army Martyrs Memorial Hall in Sichuan-Shaanxi Revolutionary Base Area". The research finds that there are three core cruxes in the current VR ideological and political practice: interaction surface, narrative hollowing and target dissociation. Therefore, the research constructs a content model with "scene immersion-emotional resonance-value formation" as the core, and puts forward a set of systematic optimization strategies: by reconstructing participatory interaction mechanism and belief construction narrative, driving VR teaching to return to education standard and strengthening value guidance.

Keywords

Virtual Reality, Ideological and Political Education in Colleges and Universities, Red Culture, Teaching Optimization

1. Introduction

1.1. Research Background

Against the backdrop of China's vigorous promotion of the national education

digitalization strategy, how to leverage digital technologies to empower the dissemination and education of red culture has become a crucial research issue. General Secretary Xi Jinping has emphasized that education digitalization serves as an "important breakthrough point" for cultivating new development advantages, and he has affirmed the effectiveness of applying modern technologies in ideological and political (I&P) courses to "enhance their sense of the times and attractiveness" (Xi, 2016). As a frontier technology, Virtual Reality (VR) has been introduced into university-level I&P education because of its capacity to vividly present red cultural resources—regarded as "the most valuable spiritual wealth". However, many existing VR projects remain at a superficial stage of "technology plus", focusing primarily on scene reproduction while neglecting deeper integration with students' cognitive needs and the fundamental goals of moral cultivation. Such surface-level applications deviate from the core spirit of Xi Jinping's call that "'the Big I&P Course' must be put to good use and must be closely connected with real life" (Xi, 2021), making it difficult to substantively enhance instructional quality.

1.2. Research Motivation

During the development of the VR project for the Martyrs Memorial Hall of the Sichuan-Shaanxi Revolutionary Base Area, the research team completed the initial project design based on extensive literature review, and subsequently invited university students from different disciplinary backgrounds as target users to experience the system and provide feedback. Preliminary evaluation results indicated that although the system achieved a high level of visual performance and technical implementation, deficiencies remained in the instructional experience and value-guiding functions of red culture. This aligns with existing studies that caution against overreliance on technology at the expense of pedagogical depth. Based on these findings, the team followed an iterative logic of "problem identification - feedback validation - continuous improvement", continuously optimizing the project design and instructional content. Therefore, this study raises a central question: How can a VR-based I&P education project be designed to better align with university students' cognitive needs while providing strong value guidance?

2. Observed Issues in Project Implementation

2.1. Project Overview

The core development objective of the project is to employ VR technology to reconstruct the spatial environment of the memorial hall and key revolutionary historical scenes, thereby transforming red cultural resources into visualized instructional media for university-level ideological and political (I&P) education. By restoring historical settings and presenting revolutionary artifacts, the project aims to help students intuitively perceive the revolutionary journey, commemorate the deeds of martyrs, and ultimately achieve a deep integration of red spirit inheritance with the educational goals of I&P instruction.

The initial design of the project consisted of three core modules, each with

clearly defined functions and roles:

Scene Reconstruction Module: Utilizing panoramic imaging techniques, this module precisely restores the core areas of the memorial hall, prioritizing authenticity and immersion at the visual level.

Artifact Display Module: Featuring representative revolutionary artifacts from the memorial hall's collection, this module presents them as static 3D models. Students may click on each artifact to view basic information.

Historical Narrative Module: Built upon a linear timeline, this module combines textual narration with historical photographs to connect major events of the Sichuan-Shaanxi Revolutionary Base Area, forming an "event-chain" style presentation.

In its early stage, the project primarily adopted an "immersive browsing" format. Students, after putting on VR headsets, could only switch viewpoints and perform basic clicking actions. Overall, the experience lacked opportunities for active exploration and deep interaction.

2.2. Identification and Analysis of Three Core Issues

To precisely identify shortcomings, the research team collected feedback through a combined approach of multi-dimensional investigation and data validation. Following the principle of "covering diverse cognitive backgrounds and ensuring representativeness", the team recruited 120 university students from different majors as target users. The team conducted a structured questionnaire survey and performed comprehensive data analysis on the responses.

The questionnaire contained 20 items across three dimensions—"interaction experience", "narrative perception", and "educational effectiveness"—and yielded 115 valid responses. Cross-analysis of the data revealed three interrelated core issues that hindered instructional effectiveness:

1) Superficial Interaction (Interaction Surface)

Survey results show that under the "interaction experience" dimension, users rated "visual immersion" highly (mean score: 4.7 out of 5), while the rating for "sense of participation and autonomy" was significantly lower (mean score: 2.8). In open-ended responses, phrases such as "passively following along" and "like watching a 3D movie" appeared frequently. This phenomenon creates an "interaction surface", defined as a state where users perform frequent physical actions (such as clicking or looking around) but lack deep cognitive engagement or logical processing. These subjective impressions were corroborated by behavioral data: although the average duration of each session was 15 minutes, the average number of active interactions (valid clicks or event triggers) per user was only 4.3. The current design fails to provide cognitively engaging tasks, placing students in a state of passive information consumption.

2) Hollowed-Out Narrative (Narrative Hollowing)

In the questionnaire, users assigned high scores to the "accuracy of historical event representation" (mean: 4.5), but significantly lower scores to the "emotional impact of revolutionary spirit" and "resonance with historical figures" (means: 2.5

and 2.3, respectively). This reflects the issue of "narrative hollowing", where the external form of the historical story is restored with high fidelity, but the internal spiritual core and emotional value are absent. During interviews, students generally recalled key historical events, yet when asked, "What sustained the revolutionary pioneers through adversity?", their answers tended to be vague. This indicates that the narrative remains at the level of visual reference-matching without effectively revealing the underlying convictions (Zeng & Wu, 2024).

3) Detachment from Educational Objectives (Target Dissociation)

Within the "educational effectiveness" dimension of the questionnaire, a pronounced gap emerged between the score for "novelty of the technological experience" (mean: 4.8) and that for "perceived gains in ideological and political theory learning" (mean: 2.1). This disparity illustrates "target dissociation", a condition where the technological means (VR novelty) become the primary focus, causing a separation from the ultimate educational goal of moral cultivation. Word-frequency analysis showed that terms like "immersive" dominated, while value-oriented terms like "responsibility" were rare. This confirms that without strong value-oriented guidance, technology risks becoming alienated from its intended role (Zhang, 2024).

4) Establishing a Feedback-Oriented Evaluation Model

Traditional instructional evaluation is often teacher-centered. In contrast, the model constructed in this study aims to transform students' subjective experiences and behavioral data into quantifiable indicators. Its core purpose is not only to assess the effectiveness of instructional optimization but also to provide teachers with precise data support for continuously refining instructional design, thereby forming a closed loop that connects "students' learning conditions" with "teachers' pedagogical research" (Tang & Li, 2024).

This model adopts the previously discussed progressive logic of "cognition-affection-value" as its structural framework, and for each dimension it sets specific and measurable evaluation indicators:

Cognitive Domain: This dimension measures students' gains in knowledge acquisition and critical thinking. Evaluation is conducted primarily through objective knowledge tests and task-completion performance.

Affective Domain: This dimension evaluates students' emotional engagement and depth of immersion during the experience. Data are obtained from subjective rating scales and objective behavioral tracking (e.g., dwell time).

Value Domain: As the final evaluative focus, this dimension assesses students' internalization of core values embodied in red culture. Measurement relies on value-identification scales using specific Likert-type statements, such as "After this experience, I feel a stronger personal responsibility to inherit the revolutionary spirit" (rated 1 - 5), and qualitative content analysis (coding and analyzing value tendencies reflected in students' open-ended responses after the VR session).

By integrating weighted data across these three dimensions and multiple sources, the system generates an overall evaluation of learning effectiveness.

3. Optimization Strategies in Response to Identified Issues

3.1. Constructing an Integrated Content Model of "Scene Immersion - Emotional Resonance - Value Formation"

During the preliminary implementation of the VR project for the Sichuan-Shaanxi Martyrs Cemetery, a core problem became evident: although VR can effectively create a sense of "virtual presence", we lacked a methodological framework to translate this sensory presence into the ideological and political (I&P) education goal of "value identification".

To address this gap, and drawing on David Kolb's experiential learning theory, we proposed an integrated content model termed Immersion-Resonance-Formation (IRF Model). In this model, scene immersion serves as the entry point into a cognitive situation; emotional resonance functions as the transformative bridge linking experience and meaning; and value formation represents the final goal, where value internalization is achieved.

3.2. Developing an Interactive Participation Mechanism Centered on Artifact Inquiry and Historical Role-Playing

This component aims to address deficiencies in instructional interaction design and to enhance scene immersion. Traditional digital exhibitions often lack depth, making students mere observers (Luo & Su, 2025). To overcome this, the project introduces an interactive participation mechanism built around revolutionary artifact inquiry and historical role-playing.

1) Artifact Restoration

We selected representative artifacts—such as damaged martyr manuscripts—for students to restore on a virtual workbench. This task aligns with the "Scene Immersion" stage of the IRF model. The purpose is not to teach restoration techniques, but to enable students, through a careful and focused process of "hands-on restoration", to gain a deeper understanding of the manuscript's content, facilitating an initial transition from scene immersion to emotional resonance (Wang & Zhu, 2024).

2) Artifact Information Analysis

After an emotional foundation is established, the interaction moves into a deeper stage of cognitive inquiry. Students take on the role of "historical researchers", identifying inscriptions and comparing them with documents. This process supports the "Emotional Resonance" stage by allowing students to uncover the human stories behind the objects. This "academic research"-oriented form of interaction embeds I&P educational goals within the pleasure of exploration.

3) Comparative Artifact Study

Students compare artifacts from different periods, analyzing similarities and differences. This approach helps students situate individual artifacts within a broader historical narrative. It cultivates an understanding of the revolutionary struggle's grand historical arc, directly facilitating the transition to the "Value Formation" stage by highlighting historical continuity.

4) Historical Role-Playing

Historical role-playing is deeply integrated with the artifact inquiry processes. Based on historical authenticity, we designed multi-level, interactive role-playing scenarios.

Task-driven dimension: Each character's core tasks correspond tightly to historical events.

Choice-branching dimension: Two types of decisions are embedded—factual decisions and value-based decisions. Making these value-based choices (e.g., how to distribute scarce resources) forces students to actively practice the values they are learning, solidifying the "Value Formation" process.

Consequence feedback dimension: Multi-dimensional feedback is provided, enhancing the sense of participation.

3.3. Advancing Deep Classroom Integration Oriented toward Faith Formation

Optimization strategies must go beyond functional upgrades of the VR system itself. Therefore, this study proposes deeply embedding VR into the pre-class, in-class, and post-class stages.

1) Pre-Class Guidance: Stimulating Inquiry Motivation through "Preparatory Thinking"

Traditional VR instruction often places students directly into immersive experiences without preparation, resulting in a cognitive "cold start". To resolve this issue, the first step in the optimization pathway is to stimulate motivation before class through online platforms (web or mobile). In this stage, students can:

a) Review essential historical background and key figures related to the VR content to build preliminary knowledge structures;

b) Interact with 3D models to preview and familiarize themselves with key revolutionary artifacts;

c) Complete pre-class reflective questions designed by instructors, entering the immersive session with clear problem awareness and inquiry goals.

This stage transforms students from "blank slates" into "prepared explorers", laying the groundwork for deeper participation during class.

2) In-Class Immersion: Reconstructing Historical Presence through "Active Participation"

The in-class stage is central to fostering emotional resonance and value impact. The optimization strategy focuses on replacing passive reception with situated, participatory mechanisms. Examples include introducing "scripted role-play" inspired by mystery-game formats, enabling students to confront historically grounded moral dilemmas, or assigning group-based inquiry tasks (e.g., artifact analysis based on clues requiring team collaboration and decision-making).

Through embodied cognition, students personally experience the complexity of historical situations and the revolutionary pioneers' steadfast convictions. This transforms grand historical narratives into concrete and deeply felt personal ex-

periences, creating fertile ground for the emergence of belief and value commitment.

3) Post-Class Internalization: Driving Value Elevation through "Real-World Connection"

The learning cycle must be completed through post-class internalization and extension; without this stage, the impact of VR may fade quickly. To ensure lasting value formation, an online learning platform can be developed to support:

Student review and sharing of personalized VR experience pathways and interaction data generated by the system;

Completion of online assessments that include detailed analytical explanations, consolidating cognitive gains;

Participation in guided discussions on a dedicated forum, allowing students to exchange perspectives and deepen reflection.

Through these mechanisms, a one-off VR experience is transformed into a sustainable, reviewable, and discussable learning cycle. This ensures that the immediate emotional impact of VR becomes a stable, internalized value identity, enabling students to complete the conscious construction of belief.

4. Conclusion and Prospects

4.1. Research Summary

The central contribution of this study lies in proposing and validating a systematic optimization pathway that reorients VR-based ideological and political education toward its fundamental mission of fostering character and strengthening value guidance. To achieve this, we introduced the "Immersion-Resonance-Formation" triadic model and a comprehensive set of interactive strategies. Grounded in a real VR project, this research distilled front-line student feedback into design principles with broader applicability.

4.2. Future Prospects

The findings of this study offer new directions for VR-based ideological and political education, yet its future development still holds extensive potential.

First, in terms of technologies, future studies may integrate generative AI to elevate interactions from scripted branching dialogues to open-ended conversations (Bian, 2023).

Second, regarding the adaptability of the model, while this study focused on red culture, the IRF model and interactive mechanisms (artifact restoration, role-playing) possess high transferability. They can be adapted for other cultural heritage subjects, such as traditional Chinese culture education or legal history education, by modifying the specific narrative content while retaining the "experience-empathy-internalization" logical structure.

Third, it is important to acknowledge the challenges in practical implementation. High-fidelity VR content development requires significant financial investment and technical expertise, which may be a barrier for some institutions. Addi-

tionally, the new teaching model places higher demands on instructors' digital literacy, necessitating comprehensive teacher training programs to ensure effective integration of technology and pedagogy.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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