Enhancing Civic Education And Moral Quality Through Network Culture And Virtual Reality

Hao Jian*

Shijiazhuang College of Applied Technology, Shijiazhuang 050081, China

Corresponding author. E-mail: 2003100157@sjzpt.edu.cn

Received: May. 14, 2025; Accepted: Jun. 29, 2025

Aim: This paper examines the impact of network culture on students' moral development and proposes practical ways to enhance students' moral quality in their online networks, thereby supporting their self-development and growth. Methods: Current big data is characterized by unstructured heterogeneity, large quantity, and complexity due to the rapid growth of data in social networks, biological networks, the Internet of Things, and other mobile computing applications. Results: Combining the current informationization boom with technologies such as VR, civic education resources are being developed to create realistic environmental effects through the simulation design of characters, scenes, weather, and sound. Conclusion: The integration of deep learning technology and civic education breaks through the limitations of space and time, increasing the vividness and interactivity of civic education, helping to spread and promote the spirit of network culture, and promoting the development of civic education in a more efficient and effective direction.

Keywords: Network Culture; Quality and Connotation; Civics Education; Virtual Reality (VR) Technology

http://dx.doi.org/10.6180/jase.202604_29(4).0010

1. Introduction

The ideological and political courses strengthen college students' understanding of themselves, improve students' self-cultivation, love the motherland, love the people and love the Communist Party of China, motivate college students to enhance their sense of responsibility and mission, and at the same time, cultivates college students' patriotism, and then re-establishes the three views of college students and consolidates and deepens them through practical teaching [1–3].

However, while the Internet brings us enjoyment, it also hurts our moral quality, especially that of college students. Complex cultures characterise the Internet world, and since college students' views are not yet fully mature, their ability to discriminate and distinguish right from wrong is limited, and their understanding of Internet culture is prone to deviation, which leads to a decline in moral quality [4]. Student morality is significantly influenced by psychological development, as it fosters enhanced empathy, impulse control, and moral decision-making. Immature students are more likely to act unethically and impulsively, whereas mature students can critically evaluate online content, consider the repercussions, and behave properly. By combining immersive technologies like VR with civic education, students can practice moral reasoning in dynamic, realistic settings, thereby promoting psychological development. Sareddy and Kumar (2025) [5] utilised VR, LiDAR, and Reinforcement Learning to create adaptive physical education environments. Our proposed work adopts this AI-driven strategy to personalize civic education experiences in virtual settings. This enhances engagement and promotes a deeper understanding of morals and civic values through interactive learning. Virtual reality (VR) technology enhances civic education by creating immersive, interactive environments that simulate historical events and moral

dilemmas, allowing users to engage with these experiences in a more engaging and meaningful way. Through cloud-based deployment, the platform ensures scalable access across devices, including VR headsets, mobile terminals, and large screens. High-fidelity rendering using Unreal Engine 4 enables realistic visualizations and real-time interactions. Personalized narratives, 3D audio, and quizzes foster emotional engagement, ethical reasoning, and active participation. The integration of network culture helps students critically navigate digital content while reinforcing civic values. Survey results indicate a strong student preference and improved learning outcomes with virtual reality (VR) over traditional teaching methods. In the virtual world, college students are not restrained. In a relatively free environment, they will make some behaviours that do not meet the requirements of moral quality, and even be influenced by bad information and break the law, which, together with the fact that college students are not yet mature psychologically and curious about the outside world, leads to their weak sense of mission and responsibility [6]. The proposed model enhances the accuracy of assessing immersive VR-based Civic education by utilising an optimised learning algorithm [7]. It supports effective Civic and moral instruction through networked virtual environments, aligning to enhance Civic education and moral quality. To improve education management, Ganesan (2021) [8] utilised AI and Cloud Computing for smart and efficient platforms. Our work leverages this technique to optimise VR content delivery and learner adaptation in civic education, ensuring enhanced learning experiences, accessibility, and dynamic content flow.

In recent years, there have been some irrational patriotic behaviours among our nationals, especially among adults, which is truly incredible. In the case of the Diaoyu Islands, for example, it is legitimate for the people to defend the sovereignty of the national territory, and it is the responsibility of the people for the rise and fall of the country [9]. However, these so-called patriots have shown their patriotism by gathering and stirring up trouble, beating and smashing domestic Japanese cars, and turning their emotions to their compatriots. Still, they have not helped maintain the sovereignty of the Diaoyu Islands but have caused economic losses to their compatriots, which is a dangerous and unpatriotic act. This should prompt us to reflect deeply on the current ideology and politics of college students [8]. In Gudivaka's (2021) [10] research, AI and big data were used to analyse student performance for dynamic teaching adaptation. I employed this adaptive mechanism in virtual civic education, allowing real-time content refinement based on user interaction, which boosts the relevance and impact of moral and civic lessons delivered through VR.

Our proposed study on enhancing civic education and moral quality through network culture and virtual reality leveraged the statistical analysis and data analytics strategy presented by Kodadi (2022) [11] to personalize learning experiences, monitor user engagement, and ensure secure, adaptive civic learning environments within immersive digital platforms. Network culture is an evolving digital culture that is manifested and experienced through online interactions and content sharing, having an impact on students' moral thinking and actions. Furthermore, while network culture cultivates transparency, digital fluency, and civic discourse, there is an opportunity for students to engage with misleading information, observe unethical behaviour, and encounter extremist views. In moral education, we must consider the role of network culture as an influence - particularly for college students still developing critical thinking and moral reasoning skills - that can either advance moral development or act as potentially harmful influences, depending on how college students interpret and engage with digital content.

This study aims to integrate virtual reality (VR) technology into civic education to enhance students' engagement, moral reasoning, and historical understanding through immersive learning environments that overcome traditional teaching limitations.

2. Related works

In the context of the new era, effectively implementing patriotism education in the practical teaching of college Civics classes is not only a theoretical problem but also an operational one [12]. Students experience participation in real, practical learning activities as they acquire knowledge and cultivate skills through their immersion in the practice base, facilitated by real investigations, seminars, and guidance and support from teachers. However, in the real practical teaching process, due to objective factors such as the existence of most colleges and universities in China with few Civics teachers, many students, limited practical bases cooperating with schools, insufficient funds for practice, or due to insufficient preparation, immaturity, and failure to guarantee safety matters, the practical teaching effect of Civics class in most colleges and universities in China in recent years has not been satisfactory [13]. Various problems have also emerged, resulting in the practical teaching of the Civics class being the weak link in the cultivation of talents in China [14]. The development of traditional teaching methods urgently needs the integration of information technology. This study utilises VR teaching, characterised

by high immersion, real-time interaction, and rich imagination, to address the shortcomings of traditional teaching [15, 16].

3. Material and methods

In this research, we examine the benefits and drawbacks of current VR teaching application modes before focusing on how to create a Civic Science teaching platform using VR technology to help improve the calibre and connotation of college students, as shown in Table 1.

3.1. Platform design ideas

Through the use of cutting-edge technologies like virtual reality and the network cultural resource management department, the Civic Education Cloud Platform uses the promotion of network quality and connotation of spirit as the forerunner, the spirit of the Party in the new era as the guide, innovation as the leader, and learning and education as the centre [17]. The Network Cultural Resource Management Department plays a central role in the Civic Education Cloud Platform by curating, managing, and integrating digital cultural resources to support ideological and moral education. It ensures content quality, aligns materials with patriotic and socialist values, and works with technical teams to embed these resources into immersive VR experiences. Additionally, it bridges policy and technology, oversees the full content lifecycle, and supports the platform's expansion, ensuring that the promotion of network culture and spiritual connotation is both meaningful and effective. This allows them to jointly create a "display, education, cultural propaganda" based on the rich network of cultural resources. There is integration with the Civic and Political Education cloud platform. The field of civic and political science education has been fully expanded to create an ecosphere of civic and political science education that is jointly developed, shared, and advanced in collaboration with party and government organisations, schools, and the general public [18]. The Civic Education Cloud Platform not only raises the technical quality of online education but also enhances the ethical quality of civic education. It provides immersive, interactive learning experiences across many platforms through innovative technologies, including cloud computing and virtual reality. At the same time, it fosters patriotic values and cultural identity through historic re-enactments and emotionally engaging content, thereby combining high network quality with civic spirit. The Civic Education Cloud Platform utilises historical events as its core material, leveraging cloud computing, a real-time rendering engine, and other technical support to combine various hardware terminals, thereby providing users with highquality services, as shown in Fig. 1.

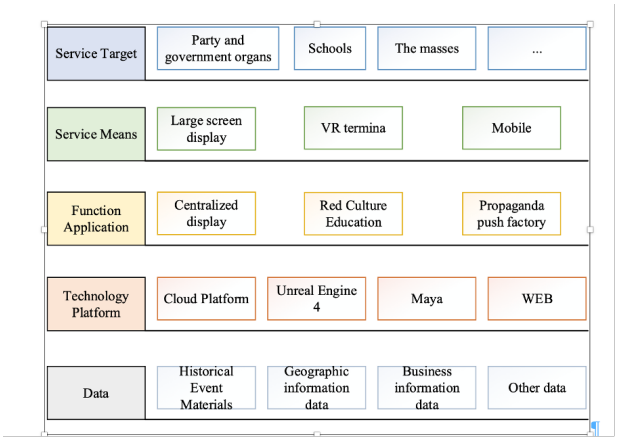


Fig. 1. The overall architecture of the platform

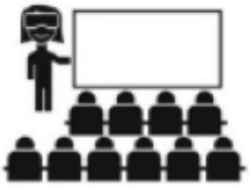
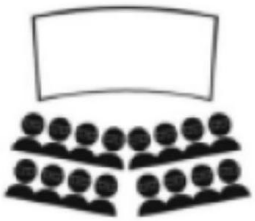
3.2. Platform architecture design and application planning

The cloud-based system architecture provides better support for massive data storage and management, concurrent task rendering, and complex scene rendering, among other benefits [19]. As shown in Fig. 2, to enhance the flexibility of the Civic Education Cloud Platform and alleviate the performance requirements of the platform for application terminals, the platform will utilise a multi-end application deployment model in the cloud. Centralised storage, real-time resource deployment, and remote access across multiple terminals are all made possible by the cloud-based architecture, which also enhances the Civic Education Platform's operational scalability and flexibility. Large-scale data can be effectively managed and disseminated through cloud deployment, including interactive content, immersive VR scenarios, and historical simulations. While parallel rendering, smooth updates, and adaptive scaling are made possible to support a variety of usage scenarios, from mobile devices to high-end VR systems and large screen installations, this lessens the performance load on local devices.

3.3. Cloud deployment

The platform contains data resources from several network quality and culturally significant old sites, which can subsequently be extended to cover more than forty network quality and culturally significant old sites. It is stored in the cloud server using the cloud deployment. Tasks such as resource data downloading, scene rendering and video stream distribution can be completed according to user usage to meet different application scenarios.

Table 1. VR teaching application mode comparison table

Model for a VR teaching application	Graphical	Advantages	Disadvantages
VR and mobile VR in one application mode		It may gather in regular classrooms or labs simultaneously to accommodate more people. It is portable and features a powerful VR all-in-one machine for immersive and interactive experiences.	There is less technical substance, experience, and interaction with mobile VR devices.
Host VR application mode		Students can get the finest individual experience with the highest levels of immersion and interaction.	Poor portability, greater equipment and space requirements, and higher costs.
Host VR + Large screen application mode		Ideal for large classrooms, it addresses the issue of multiple people attending the experience simultaneously.	The experience is poor, immersion is weak, and students do not fully immerse themselves in the virtual reality environment.
VR stereoscopic projection application mode		Strong sense of presence and immersion.	It is more challenging to spend on equipment and content creation because there are fewer audiences available at the same time and location.

3.4. Data Privacy and Security Management

Data privacy and security management in cloud storage and online interactions involve encryption, regular backups, access control mechanisms, and continuous monitoring of access logs and audit trails. Encryption is used during storage and transmission, while role-based access control and identity management restrict data access to authorized users. Regular backups and geographically

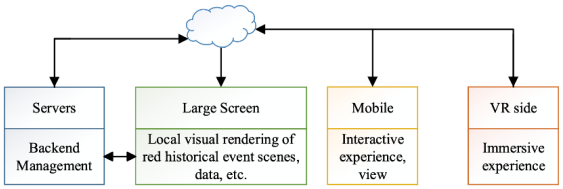


Fig. 2. System application model

distributed servers ensure data availability and protection against system failures and cyberattacks. Data minimisation, Secure login methods, and secure communication channels, such as HTTPS and encrypted messaging, safeguard data exchange. Transparency is maintained through clear privacy policies and user agreements that align with legal frameworks such as PIPL or GDPR. Platforms like Civic Education Cloud Platform offer scalable and secure data delivery.

3.5. Large screen display

The large-screen display system has the characteristics of high resolution, fine picture quality, and single-application mode, which requires a high rendering ability of the computer and is generally deployed in fixed places, such as exhibition halls [20]. This mode will utilise local deployment of highperformance servers and download data resources from the cloud for local rendering, enabling the visualisation of Civic Education scenes with stunning visual effects.

3.6. VR Experience

According to the application mode, VR glasses are mainly divided into three categories: cell phone boxes, head-mounted displays, and VR all-in-one machines. The cell phone box is used as a rendering terminal for VR rendering, utilising the cell phone as a virtual scene. Its rendering capability and display accuracy are limited by the cell phone's hardware performance [21]. The head-mounted display itself only serves as a display terminal and requires an external computer for image computation and rendering. The VR all-in-one machine features a built-in display, gyroscope, and other modules with strong computing power, making it easy to carry and deploy. Therefore, the Civic Education Cloud Platform uses the VR all-in-one machine as an immersive experience terminal. The VR-based civic education platform fosters critical thinking, empathy, moral reasoning, and immersion in authentic historical settings, all of which improve learning outcomes. Students gain a deeper understanding of historical events, examine complex political issues, and consider moral dilemmas by modelling emotionally charged scenarios and moral conundrums. Through interactive, first-person design, passive learning is transformed into experiential education, fostering analytical skills and promoting responsible behaviour and patriotic values.

The VR machine is connected to the platform via the Internet for downloading and updating resources. The user selects different scenes for the touring experience through the interactive handle. The VR machine renders parallax left- and right-eye images in real-time according to the direction of the field of view and projects them onto the screen of the VR machine to build a highly immersive three-dimensional image, as shown in Fig. 3.

Fig. 3. VR experience effect map

3.7. Mobile end experience

The mobile terminal is mainly used as a temporary experience terminal. Users log in through the platform interface, select the scene they need to experience, and then have the scene rendered by the cloud and transmitted to the mobile terminal for presentation via video streaming. The experience device itself does not require resource downloading and rendering calculation, which greatly reduces the dependence on hardware performance. The proposed method focuses on customizing VR content for various user groups and educational levels, especially in civic and moral education. The platform offers various VR modes, including mobile VR, host VR systems, and large-screen projection modes. Hardware configurations are based on user levels, with basic users using mobile terminals or 3D menus and advanced learners using head-mounted VR. The platform offers personalised, interactive experiences, real-time guidance, and narrative-driven scenarios. Scenarios are structured as narratives with adjustable pacing and interaction complexity, allowing elementary-level users to understand voiceovers and visuals while also engaging older and more advanced users in complex interactive re-

constructions. Feedback is collected through quizzes and surveys, ensuring accessibility and effectiveness for a wide range of users.

3.8. Key Technologies

The VR environment uses Unreal Engine 4's sophisticated rendering techniques to produce realistic and engaging civic education experiences. Real-time scene rendering, terrain simulation using geographic data, high-precision yet optimised 3D models, and depth-enhancing parallax stereoscopic images are some of its key characteristics. 3D audio that is coordinated with user input is an integral part of sound design. The system incorporates interactive features via blueprint programming and allows cloud-based rendering for mobile access.

3.9. Large Terrain Simulation Technology

The real-time degree of the scene in the virtual environment, the visualisation range of the scene, and the scene's details all have a direct impact on the visualisation effect of the final presentation. Currently, the primary method for producing large landscapes involves using a Digital Elevation Model (DEM) to generate a base model with height information and a Digital Orthophoto Map (DOM) to create a largescale geographic environment. To achieve a better experience effect, the Civic Education Cloud Platform generates terrain scenes according to the real geographic data information of the old red sites, and based on the traditional DEM+DOM technology method, the vegetation system provided by Unreal Engine 4 (UE4) is used to generate more realistic ground cover according to the ground texture information, which makes the scene effect more realistic and delicate. The specific effect is shown in Fig. 4.

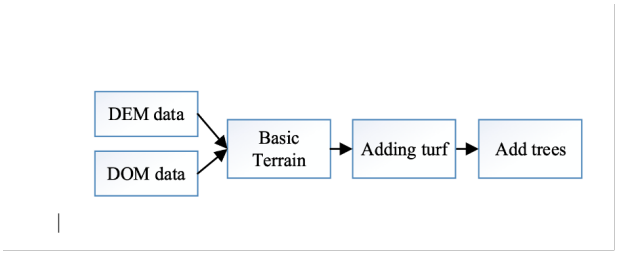


Fig. 4. Large terrain simulation

3.10. High-precision modeling techniques

To achieve a good picture effect, it is necessary to restore the old red sites and historical events with high precision. However, the screen presentation of the Civic Education Cloud Platform is based on real-time rendering by the UE4 engine, and the larger the amount of model data is, the more serious the consumption of system resources is, and the lower the system operation efficiency is. To achieve a good experience, the system's refresh rate should generally be greater than 30 Hz for non-immersive experiences and 60 Hz for immersive experiences. Deep optimisation of virtual scene resources is necessary to meet the functional and rendering quality requirements, thereby reducing the load pressure on the platform hardware. Next-generation modelling technology utilises normal baking to retain the details of high-precision models in the form of mapping, and the mapping is then applied to low-mode models to achieve the same appearance as high-precision models. The next-generation modelling method can obtain good visual effects and does not waste system resources due to the excessive number of model faces.

3.11. Platform Implementation

3.11.1. Technical route

The Civic Education Cloud Platform is developed by combining virtual reality (VR) technology with Civic Education resources. Firstly, the material is collected and organised, including photos, videos, and text materials. Next, according to the materials, Maya modelling software is used to refine the modelling and animation of key scenes and characters, and the surrounding terrain is restored based on real geographic information data. The UE4 engine is adopted as the primary platform for visualising virtual scenes in Civic Education, and the human-computer interaction interface and interaction logic are constructed using blueprint programming. Cloud storage and deployment are used to provide services such as resource download and online rendering for multiple types of end users.

3.12. Functional design and implementation

3.12.1. Scene visualization

The system utilises UE4 as the virtual scene visualisation engine, enabling realistic and real-time rendering effects. The engine supports real-time rendering of different weather environments, road environments, natural light, ambient light and reflections. UE4 strikes a balance between system operation efficiency and rendering quality, providing powerful light sources, materials, shadows, and reflections to handle the visualisation of complex scenes with high quality and speed. The environment, lighting and materials can be changed in real-time, and it can render the environment, lighting and materials in real-time and realistically. UE4's excellent real-time rendering capabilities provide a strong guarantee for the visualisation of Civic Education scenes.

In the process of developing the Civic Education Cloud Platform, the most important aspects are the scene and

character design. The high degree of restoration of historical events is closely related to scene design. To immerse visitors, historical scenes must be meticulously restored to match historical images. Using software, scene elements such as mapping materials and lighting are reasonably developed to ensure a more imaginative scene. In addition to realistic scenes, character design is also crucial. To make the image of historical figures more realistic and vivid, a comprehensive understanding of the characteristics of each historical figure, including their appearance, posture, and attire, is required. The scene effect is shown in Fig. 5.

Fig. 5. Revolutionary virtual scene restoration

3.12.2. *Sound Simulation Design*

The accuracy of information processing in the brain can be improved by correlating auditory and visual effects, thereby avoiding the overload of a single information channel. VR is not only a visual simulation but also a three-dimensional simulation of various types of sounds in the scene is particularly important. The main sounds in this training system include. (1) Background sound: The scene environment is analysed to identify the main background sound types, locations, and approximate volume. By setting the pronunciation virtual body at the corresponding position in the virtual environment and setting a certain random change value for simulation, a more realistic effect is achieved. (2) Event sound: Historical event virtualisation restoration primarily involves the sounds of guns, explosions, punch lines, character dialogues, and narration introductions, among other elements. Through the program control, according to the virtual scene events, interactive instructions trigger the corresponding sound content to achieve an integrated audio-visual display effect. (3) 3D menu design: In the immersive experience environment, to quickly and conveniently perform operations and function selection, the platform provides visitors with a 3D menu. The corresponding operations are performed after selecting the menu through the preset buttons of the VR handle, as shown in Fig. 6.

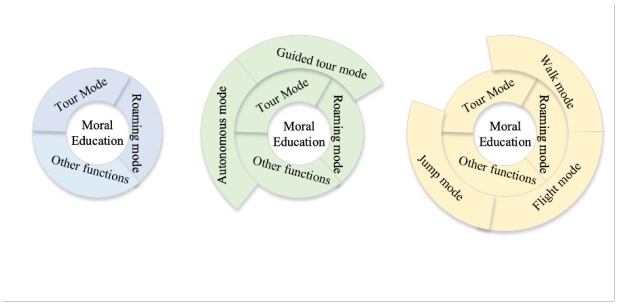


Fig. 6. 3D menu design

(4) Virtual roaming: Visitors can roam freely through the virtual scenes of the selected historic sites in the Civic Education line, browsing images, texts, and statues within the historic sites. (5) Interaction design: The primary purpose of design is to enable users to interact more effectively with the system. Humancomputer interaction design should focus on system ease of use, process simplicity, blind spot testing, error and exception prompting, user environment testing, and other key aspects. The Civic Education System uses UE4's unique blueprint programming for HCI design and development. The visualisation scripting class is well-suited for creating interactive resources, such as opening and closing doors, object picking, animation triggering, sound triggering, and material transformation. It can respond according to the user's operation, location and voice recognition to achieve autonomous, automated and intelligent human-computer interaction effects. (6) Plot design: In the display process, a space-oriented storytelling approach is employed to create a sequence of events, utilising rhythms such as opening and closing, as well as hurrying and loosening, which enables visitors to better integrate into the spatial environment. The Civic Education System takes historical events as prototypes, adopts artistic design means, introduces the background of events with voice explanation, presents the process of events with interactive 3D animation, shows the results of events with graphic materials, builds a complete interpretation process of historical events, and forms a complete script in line with historical facts. It allows users to participate in the entire process of events from a first-person perspective, gaining a more realistic, shocking, and empathetic experience and further enhancing their understanding of the Red Spirit. (7) Navigation and interpretation: The virtual robot plays a voice or projects a video display according to the user's location

on the tour, as shown in Fig. 7. This navigation method utilises a combination of modern technology and historical events to enhance the overall system's interactivity and interest.

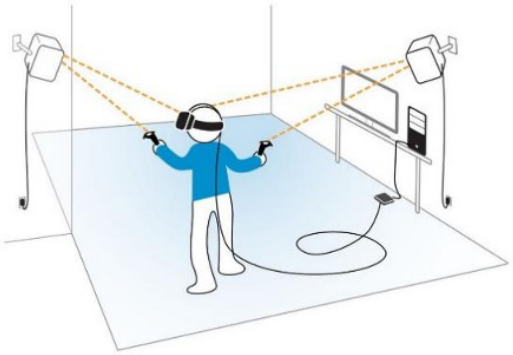


Fig. 7. Navigation Tips

(8) Interactive quiz: To present data on the tour's effect, the platform provides corresponding quiz assignments based on the tour's content. After the tour, the background program performs statistical analysis of the user's answers, generating report cards and graphical statistical reports.

3.13. User Data Collection and Learning Analytics

The VR platform gathers information about user interactions through immersive experiences and postactivity tests. This includes information on user behaviour, such as scene selection, navigation habits, and quiz response accuracy. To evaluate learning engagement, material comprehension, and satisfaction, these data points are examined. The analytics provide educators with feedback to improve their teaching methods and guide iterative platform upgrades.

The study aimed to assess a VR-based civic education platform using student surveys and a case study. The platform was designed to convey moral and historical lessons through educational technology. The results showed significant levels of student engagement, with over 80% reporting intense immersion and 96% favouring VR over conventional approaches. The platform utilised VR all-in-one machines to generate parallax left- and right-eye images in real-time, delivering realistic recreations of historical scenes through high-precision modelling, 3D sound design, large-scale terrain simulation, and interactive storytelling. Interactivity was achieved through features such as human-computer interaction, 3D menus, virtual roaming, interactive quizzes, and voice-based navigation. Over 80% of the students acknowledged the interactive nature of the VR platform during the learning experience. The proposed method enhances emotional and cognitive engagement by combining 3D sound, interactive narration, and virtual robots. The platform utilises 3D sound simulation to enhance immersion by spatially positioning sounds within the virtual world. Background and event sounds are activated dynamically based on user activities and location, resulting in a coordinated audio-visual experience. Integrated with the Unreal Engine 4 (UE4) engine, the system dynamically adjusts sound direction and intensity in real-time. This realistic audio design promotes cognitive processing, decreases information overload, and converts learners into active participants, hence making the educational experience more engaging and successful. The Civic Education Cloud Platform integrates virtual reality and cloud infrastructure to enhance civic and moral education. It uses cloud servers to store and manage largescale cultural data, supports multiple user terminals, and uses real-time rendering powered by Unreal Engine 4. The platform supports interactive features, including narrative-driven content, 3D menus, and virtual roaming, which engage users and offer an accessible and scalable educational experience.

4. Case study

Through visiting and experiencing the virtual learning platform, we can understand the vigorous development and changes in information technology, and instil patriotism, a socialist spirit, as well as advanced ideas of modern educational technology in students. The VR learning platform's most significant feature is its ability to create immersive environments for students, allowing those who are unable to physically visit the site to overcome time and space constraints. To increase educational equity, they can visit and study within the VR platform, experiencing real-time interaction with its resources. Learning in virtual reality settings allows us to fully embrace the "sky is the limit" approach to classroom instruction. The VR platform, created using VR technology, allows students to immerse themselves in and experience it personally, making them more confident in the development of information technology in China and updating their original cognitive view of media.

There are eleven questions in all, including single-choice, multiple-choice, and free-play options. Students majoring in educational technology at a university who had taken this course were the primary recipients of the questionnaires. As students of educational technology, some students reported that they knew nothing about virtual reality (VR) technology. Of course, other students reported that they were more familiar with VR technology, and the majority of students had some knowledge of it. This suggests that many students are adept at actively understanding the

development of new concepts and are also concerned about the advancement of educational technology, which they are aware of through various channels, including Immersive VR technology. Fig. 8 displays the statistical results.

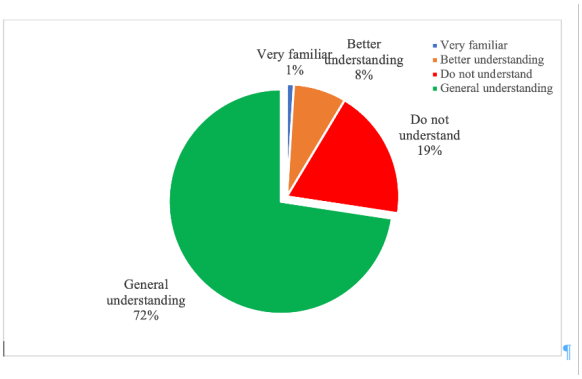


Fig. 8. The questionnaire asks about their familiarity with immersive virtual reality

Just 54% of the students had ever used virtual reality before visiting the VR platform, and the majority of them believed it to be more realistic. Forty-six per cent of pupils have never used virtual reality. As a result, it suggests that VR needs to gain greater traction and that more people should recognise its benefits. Fig. 9 illustrates the scenario of completing the questionnaire.

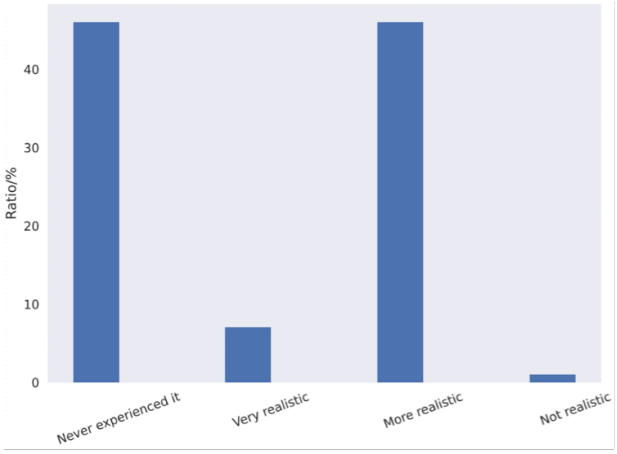


Fig. 9. The questionnaire asking if you have already used immersive virtual reality technology

According to Fig. 10, the students preferred this new classroom teaching method, as evidenced by the fact that 38% of them were very satisfied and 58% were more satisfied with the Civic Science practice taught in the classroom using a virtual reality (VR) teaching platform.

Fig. 10 The findings of your poll about your level of satisfaction with the hands-on instruction of the political

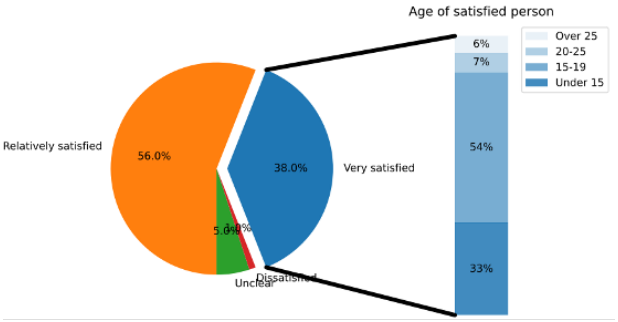


Fig. 10. The questionnaire asking if you have already used immersive virtual reality technology

science and civics course using a virtual reality teaching platform

5. Result and discussion

The results of this research align with the growing evidence that highlights the experiential potential of immersive technologies-especially VR-in education. More than 80% of the students in the research described a positive experience with VR-based civic education, which aligns with [4], who found that immersive VR enhances problem-solving and engagement by creating highly interactive learning environments. Immersive VR environments enhance learning by reducing cognitive load and improving information retention compared to traditional approaches. They design focused, multimodal experiences that simplify complex subjects, encourage deeper knowledge, and engage students with interactive, first-person learning. The student response demonstrates high satisfaction and higher test results, highlighting the usefulness of VR, albeit its influence can vary depending on design quality and equipment accessibility. In the same vein, the revelation that 96% of students favoured learning through VR compared to conventional learning testifies to the motivational advantage of immersive media, as discussed by [3], whose observation was that improved learner intention toward e-learning platforms emerged amid the pandemic.

The high satisfaction and willingness to adopt VR learning observed here also validate previous work by [2], who noted how VR applications bridge the gap between theoretical knowledge and understanding in civil engineering education. While the context differs, both studies emphasise how experiential learning through VR enhances conceptual understanding and emotional investment.

Yet, the proposed method also reported that immersion and interaction were usually strong, but the conceptualisation and engagement aspects were weaker in certain instances. This is supported by the findings of [6], which

reported that although VR has great promise, technical constraints and instructional design issues can compromise learning performance. This implies that any future development of the Civic Education Cloud Platform must focus on instructional scaffolding and narrative consistency for conceptual clarity.

Additionally, the platform's use of storytelling and recreation of historical events is consistent with recent debates on VR and moral education [17], [19], which posit that immersive environments can promote empathy and ethical thinking-essential components of civic education. This research's focus on virtual historic site experiences as a means of transmitting moral and civic values exemplifies VR's potential as both an instructional aid and a medium for developing effective and ethical learning aspects.

Lastly, the efficiency of the platform in increasing student motivation and engagement also aligns with [10], who promoted VR-based global citizenship education through the integration of artistic design and interactive storytelling. Virtual reality (VR) technology enhances civic education by offering realistic, interactive, and immersive experiences that captivate pupils more than conventional techniques. Students can virtually experience historical events through it, including interactive features that promote active involvement and enhance learning through sound, narration, and quizzes. VR has been well welcomed, with 96% of students choosing it over traditional instructional methods. It also makes sites more accessible for students who are unable to physically visit them. This also enhances the pedagogical viability of integrating civic content with interactive digital tools for cultivating richer learning experiences.

6. Conclusion

With the development of VR and the gradual reduction of hardware costs, red virtual education is expected to evolve in the future. The three-dimensional visualization platform of civil and political education, which is characterized by high simulation, strong interdependence, convenient use, rich digital resources and strong scalability, can break through the space-time constraints and let visitors feel the scenes of revolutionary martyrs fighting in their blood and unable to leave their homes in their environment. It plays an important role in the development of civic education, the popularisation and cultivation of network quality, and the promotion of cultural spirit.

7. Declarations

8. Funding

There is no specific funding to support this research.

9. Data availability

The experimental data used to support the findings of this study are available from the corresponding author upon request.

10. Conflicts of interest

The authors declared that they have no conflicts of interest regarding this work.

11. Code availability

Not applicable.

12. Author contributions

Hao Jian contributed to the design and methodology of this study, as well as the assessment of outcomes and writing of the manuscript.

References

[1] D. Wu, H. Shen, and Z. Lv, (2021) *"An artificial intelligence and multimedia teaching platform based integration path of IPE and IEE in colleges and universities"* **Journal of Intelligent & Fuzzy Systems *40***(2): 3767–3776. DOI: https://doi.org/10.3233/JIFS-189312.

[2] C. Wang, Y. Tang, M. A. Kassem, H. Li, and B. Hua, (2022) *"Application of VR technology in civil engineering education"* **Computer Applications in Engineering Education *30***(2): 335–348. DOI: https://doi.org/10.1002/cae.22445.

[3] M. Saleem, S. Kamarudin, H. M. Shoaib, and A. Nasar, (2021) *"Influence of augmented reality app on intention towards e-learning amidst COVID-19 pandemic"* **Interactive Learning Environments**: 1–15. DOI: https://doi.org/10.1080/10494820.2021.1996592.

[4] P. Araiza-Alba, T. Keane, W. S. Chen, and J. Kaufman, (2021) *"Immersive VR as a tool to learn problem-solving skills"* **Computers & Education *164***: 104121. DOI: https://doi.org/10.1016/j.compedu.2020.104121.

[5] M. R. Sareddy and V. Kumar. "Virtual Reality Meets AI: Revolutionizing Physical Education with LiDAR and RL". In: *2025 8th International Conference on Electronics, Materials Engineering & Nano-Technology (IEMENTech)*. IEEE, 2025, 1–6. DOI: https://ieeexplore.ieee.org/abstract/document/10959637.

[6] N. Alalwan, L. Cheng, H. Al-Samarraie, R. Yousef, A. I. Alzahrani, and S. M. Sarsam, (2020) *"Challenges and prospects of VR and augmented reality utilization among primary school teachers: A developing country perspective"* **Studies in Educational Evaluation *66***: 100876. DOI: https://doi.org/10.1016/j.stueduc.2020.100876.

[7] H. Qin, Y. Zhang, and J. Wei, (2025) *"Virtual Reality (VR) Technology in Civics Practice Teaching Evaluating the Effect of Immersive Experience"* **International Journal of Advanced Computer Science & Applications *16***(3): DOI: 10.14569/ijacsa.2025.0160350.

[8] T. Ganesan, (2021) *"Integrating artificial intelligence and cloud computing for the development of a smart education management platform: Design, implementation, and performance analysis"* **International Journal of Engineering & Science Research *11***(2): 73–91.

[9] K. Y. Chin and C. S. Wang, (2021) *"Effects of augmented reality technology in a mobile touring system on university students' learning performance and interest"* **Australasian Journal of Educational Technology *37***(1): 27–42. DOI: https://doi.org/10.14742/ajet.6327.

[10] B. R. Gudivaka, (2021) *"Designing AI-assisted music teaching with big data analysis"* **Journal of Current Science & Humanities *9***(4): 1–14.

[11] S. Kodadi, (2022) *"Integrating statistical analysis and data analytics in e-learning apps: Improving learning patterns and security"* **International Journal of Emerging Technologies in Learning (iJET) *16***(4): 1–10.

[12] C. Zhang, G. Shan, and B.-H. Roh, (2024) *"Fair Federated Learning for Multi-Task 6G NWDAF Network Anomaly Detection"* **IEEE Transactions on Intelligent Transportation Systems**: DOI: https://doi.org/10.1109/TITS.2024.3120018.

[13] M. Sanz-Prieto, G. de Pablo González, and N. de Pablo Sánchez, (2024) *"Art Project Virtual Reality for Global Citizenship Education"* **Technology, Knowledge and Learning**: 1–27. DOI: https://doi.org/10.1007/s10758-024-09539-0.

[14] S. N. Alsubari, S. N. Deshmukh, A. A. Alqarni, N. Alsharif, and H. T., (2022) *"Data Analytics for the Identification of Fake Reviews Using Supervised Learning"* **CMC-Computers, Materials & Continua *70***(2): 3189–3204. DOI: https://doi.org/10.32604/cmc.2022.015285.

[15] M. Li, (2024) *"Integration of Traditional Cultural Elements Into Civics Teaching Practice in Colleges and Universities Based on Internet Distance Education"* **International Journal of Web-Based Learning and Teaching Technologies *19***(1): 1–11. DOI: https://doi.org/10.4018/IJWLTT.2024010101.

[16] F. A. Al-Mekhlafi, R. A. Alajmi, Z. Almusawi, F. M. Abd Al GAlil, P. Kaur, M. Al-Wadaan, and M. S. Al-Khalifa, (2020) *"A study of insect succession of forensic importance: Dipteran flies (Diptera) in two different habitats of small rodents in Riyadh City, Saudi Arabia"* **Journal of King Saud University-Science *32***(7): 3111–3118. DOI: https://doi.org/10.1016/j.jksus.2020.03.001.

[17] K. Ahir, K. Govani, R. Gajera, and M. Shah, (2020) *"Application on VR for enhanced education learning, military training and sports"* **Augmented Human Research *5***(1): 1–9. DOI: https://doi.org/10.1186/s41133-020-0013-1.

[18] T. Harrison, (2024) *"Virtual reality and character education: Learning opportunities and risks"* **Journal of Moral Education *53***(2): 219–239. DOI: https://doi.org/10.1080/03057240.2024.2089327.

[19] U. Salamah, N. Naysilla, and E. Juliadi, (2024) *"Current Social Studies Learning: Technology-Based Learning Media for Character Education"* **Edutechnium Journal of Educational Technology 2**(1): 25–42. DOI: https://doi.org/10.34259/ejt.2.1.25-42.

[20] N. Kurian and B. Hajir, (2024) *"Should we stop talking about empathy: Virtual reality, refugee children and the ethics of technology-mediated moral education"* **Journal of Moral Education *53***(4): 699–716. DOI: https://doi.org/10.1080/03057240.2024.2089328.

[21] M. Zhang, (2024) *"Research and Practice of Moral Education for Primary School Students in the Context of Digital Education"* **Journal of Interdisciplinary Insights 2**(1): 51–66. DOI: https://doi.org/10.37265/jii.2024.2.1.51-66.