

Retraction

Retracted: Influence of Digital Technology on Ideological and Political Education in Colleges and Universities under 5G Era

Scientific Programming

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

- [1] S. Lin, "Influence of Digital Technology on Ideological and Political Education in Colleges and Universities under 5G Era," *Scientific Programming*, vol. 2022, Article ID 9004385, 12 pages, 2022.

Research Article

Influence of Digital Technology on Ideological and Political Education in Colleges and Universities under 5G Era

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With the advancement of digital technology, new means and methods are being offered in education to enhance teaching-learning. The use of technology in educational interventions has a positive impact on the students' functional, cognitive, and psychomotor skills. This study aims to improve the teaching mode of ideological and political education (IPE). The research work intends to enhance enthusiasm of college students for ideological and political course (IPC). Based on 5G technology, the rising virtual reality (VR) technology is proposed in this study to improve IPC in colleges and universities. To begin with, the background of IPE and VR technology is introduced. Next, the current college students' attitudes toward IPE and VR technology are investigated by a questionnaire survey. Finally, based on the red hero culture, the VR system for IPE is designed. Results of the evaluation show that the students who have been the members of the Communist Party have the highest degree of interest for IPC in colleges and universities. Endorsing the fact, about 29.7% college students and 26.81% university students who were members of the communist youth league favored for IPC, while only 14.29% of the masses showed interest for IPC. As a whole, 25.2% of all the students participated in the survey showed their interest for IPC. One of the main reasons behind the results is the teaching mode and means that attract students for IPC. At present, 84.11% of the ideological and political teachers give a lecture of IPC via PPT, while 67.29% of the students prefer the Internet platform as a means of IPC. About 73.4% of the students know VR and are interested in the application of VR to IPC. They believe that VR can help them understand the knowledge of IPC and has broad prospects in improving the teaching quality of IPE. The designed VR system for IPE which is used in colleges and universities has four modules, namely, the preamble module of graphic history, the hero wall module, the hero art sculpture module, and the scene experience module. This system can help realize the objective of IPE in colleges and universities and provides a reference for the application of VR in enhancing IPE.

1. Introduction

Digital technology transforms information such that to be recognized, processed, stored, analyzed, and transmitted by computers [1]. The 5G technology provides environmental support for other technologies in digital technology [2]. 5G technology is the acronym to fifth-generation mobile communication technology. The technology is a new broadband mobile communication technology with low delay, high speed, and multiple connections [3]. It is designed for the needs of the Internet of Things (IoT) and for the mobile Internet. Now, it has become the central link of the Internet of Everything [4, 5]. The rapid development of

5G technology promotes the development of the digital technology [6].

Virtual reality (VR) came into being at the end of the last century. Initially, VR was used in military and medical fields [7]. With the development of mobile communication technology, it is rapidly applied in various fields. Reason behind the widespread use of VR is due to its ability to visualize content and concepts and its support for immersive experience [8]. The traditional teaching mode of ideological and political education (IPE) in colleges and universities lacks innovation and only focuses on learning theoretical knowledge [9, 10]. Therefore, key objective of this study is how to combine new technologies with IPE so that to uplift

education. By incorporating the emerging technologies in IPE, it will become easy to improve students' ideological awareness. Moreover, with less effort students' thoughts can be molded and a scientific outlook of life, world, and values can be better instilled to the students.

In view of the lack of attraction of IPE, this study introduces the mingling of VR: a realist digital technology, to improve the teaching mode of IPE in the era of 5G. The opportunities and obstacles involved in mingling VR in IPE are properly studied from the relevant literature. Moreover, questionnaires are used to investigate the current situation and problems of IPE in colleges and universities. Following that, a new teaching mode of ideological and political course (IPC) is designed in accordance with the standards of VR. A significant contribution of this research work is the novelist idea proposed incorporating VR in IPE. Keeping in view the theoretical knowledge and empirical facts, a VR-based system is designed to enhance IPE in colleges and universities. Conceiving the mingling of VR and IPE for the first time, this study provides a direction for the development and promotion of IPE in colleges and universities. To sum up, this study focuses on how to extend, in the prevailing 5G era, the diverse applications of VR to the domain of IPE. Most of the contents of IPE are based on historic events and hence are difficult for the students to conceive and remember. The proposed system offers an interesting platform using which such contents will be effectively imparted.

2. Research Progress

According to the literature of VR, the technology of VR has been in use in education since the 1990s. The technology has also been extensively utilized for science and medical education and has gained considerable achievements [11]. For example, some researchers have combined VR with biology teaching, helping students to intuitively understand the function and structure of human eyes [12]. Also, some scholars avail VR applications for the teaching of history to simulate historical events by creating a specific virtual world. Such practices open up new possibilities in pedagogy and achieve good effects [13]. In addition, researchers use VR in the designing of simulation system for medical and clinical practices. In such immersive systems, students experience medical practices on replica of patients. This greatly improves the efficiency of classroom teaching, enriching the clinical experience of medical students and helping them to perform with self-confidence [14, 15]. Research work on the combination of VR and IPE begins in 2011 [16, 17]; since then, a number of the related research studies have been carried out. Some scholars in the field refine the module and function designing of VR according to the characteristics of IPE [18]. The advent of 5G era provides a new perspective for the combination of VR and IPE [19].

The teaching mode of IPE varies from country to country. Ideological and political education in the USA focuses on the creation of a moral and cultural atmosphere, mainly through publications, posters, and network platforms [20]. British IPE for youngsters pays more attention to their moral education on the mass media, including radio,

television, newspapers, and social platforms [21]. In 1982, IPE has become one of the compulsory courses for college students in China. The teaching of IPE is attained by campus media and social networks, whereas the teaching mode is constantly updated with the passage of the time.

From the relevant literature of IPE, it is found that the IPE in China is carried out through Internet. Moreover, the literature of VR technology and IPE manifests that VR cum IPE in colleges and universities is mostly based on the research carried out in abroad. Mostly, the domestic research is rested on theories. With this research work, a VR system for IPE in colleges and universities is proposed to explore the role of VR in improving the teaching quality of IPE in colleges and universities.

3. Materials and Methods

It is conclusively evident that digital technology, particularly VR, can effectively raise the speed and depth of teaching-learning process. This section presents the nexus of VR and IPE to improve teaching mode in colleges and universities.

3.1. Theoretical Basis behind the Combination of VR and IPE.

A strong theoretical background aids in connecting with the existing sphere of knowledge. Related and relevant theories regarding VR and IPE were thoroughly studied. The current problems in IPE in colleges and universities were also considered in proposing the innovative method of VR-based IPE. The framework of the proposed research work is shown in Figure 1. As clear from the figure, the research is divided into six phases. Out of the six stages, the existing problems of IPE in colleges and universities and the combination of VR and IPE are the core.

3.1.1. Characteristics of VR. VR is a comprehensive technology that integrates multimedia technology, computer graphics technology, human-computer interaction technology, multimedia technology, stereo display technology, network technology, simulation technology, and other technologies. It aims to provide users with immersive experience. The VR system for IPE is described in Figure 2.

Figure 2 shows that the VR system consists of an input device, an output device, a database, a computer, and an application software. The computer presents a virtual world in the output device by providing real-time rendering calculation for VR. Then, the user inputs the data into the device and transmits it to the computer. Finally, the computer shows the information back to the output device after calculation, and the interaction ends. The database is used to store data in the VR system and provide information for system operation. The application software is used to build a virtual world with the required materials.

The technology of VR offers many advantages to be used in education. From the previous research, the advantages of VR are summarized in Figure 3. Figure 3(a) shows that VR has the characteristics of a strong immersion, strong interaction, and multisensory experience. Figure 3(b) shows that VR has a large number of data, many kinds of products,

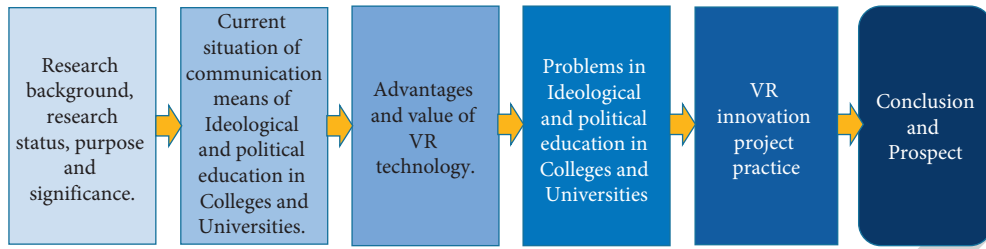


FIGURE 1: Research framework.

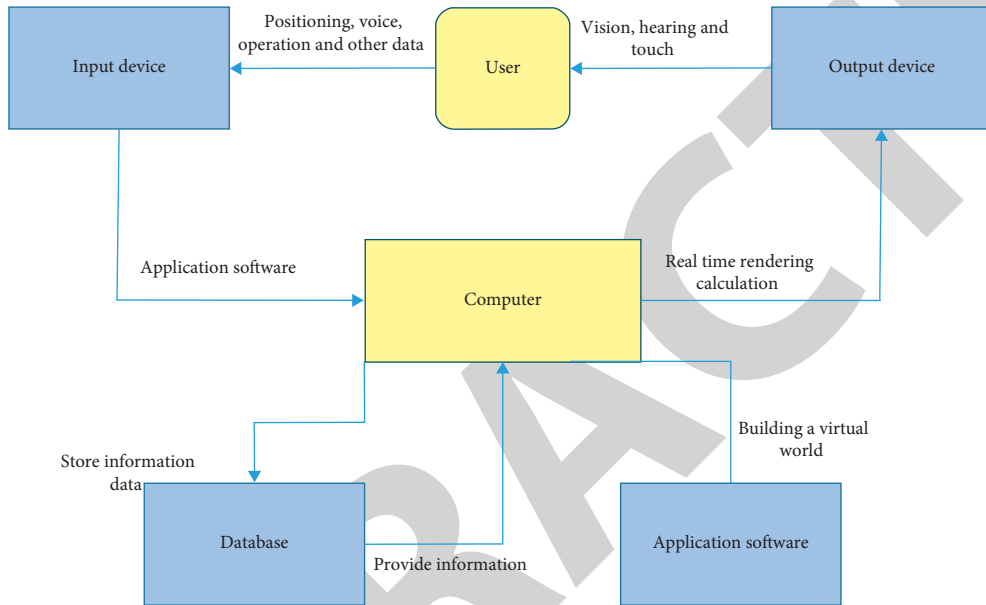


FIGURE 2: VR system framework.

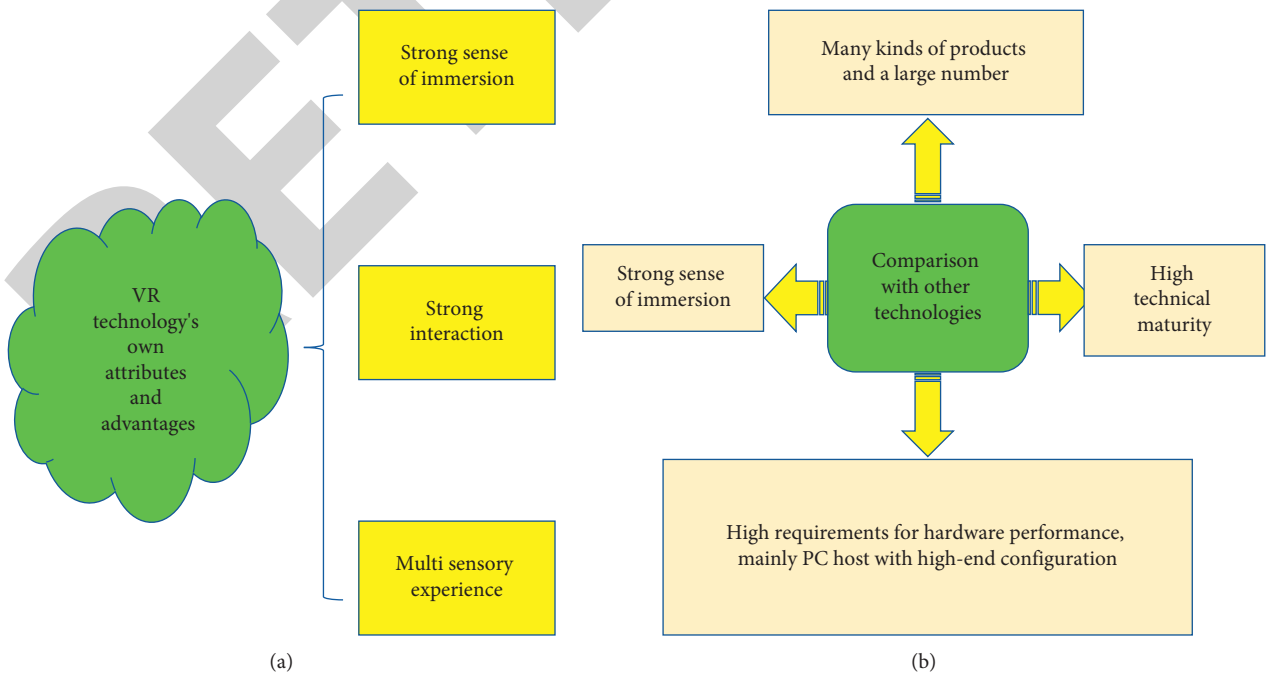


FIGURE 3: Advantages of VR technology ((a) the attributes and advantages of VR technology, (b) the comparative advantages of VR technology and other common technologies).

good hardware performance, mature technical ability, and strong immersion. It overlays the composite elements such as materials, texts, and 3D objects on the image to complete the combination of real world and virtual world. MR may realize the interaction between virtual and reality, which is still in the exploratory stage. XR is the integration of MR, AR, VR, and other technologies.

3.1.2. Combination of VR and IPE in Colleges and Universities. The theoretical background of the combination of VR and IPE in colleges and universities is shown in Figure 4. The figure illustrates that there are three main problems in IPE in colleges and universities: ① it emphasizes theoretical knowledge rather than practice; ② the teaching mode is constant for the students with different cognitive abilities and personalities; ③ there is little interaction between students and teachers.

These problems are summarized by the literature review, and the solutions proposed by some experts are shown in Figure 4(b). They suggest that the interaction between teachers and students should be enhanced, more practical activities of IPE should be designed, and the teaching mode should be diversified.

3.1.3. Values of the Combination of VR and IPE. The values of the combination of VR and IPE in colleges and universities are shown in Figure 5.

Figure 5 shows that the application values of VR to IPE in colleges and universities include that the combination is a useful exploration in education in the new era. Immersion experience strengthens the communication between students and what they have learned. Multiple presentation forms of ideological and political content help students understand complex concepts and teachers change their minds, breaking the limit of time and space, improving teaching efficiency, and reducing costs.

3.2. Survey about the Combination of VR and IPE in Colleges and Universities. VR is combined with IPE in colleges and universities to explore the role of VR in IPE in colleges and universities. Firstly, a questionnaire is designed to expound the current situation of IPE in colleges and universities and its teaching mode. The questionnaire survey is conducted online and anonymously. The survey subjects were the students in a university. A total of 220 questionnaires are distributed, and 210 valid questionnaires are collected, with an effective rate of 95.5%. In addition to the basic information of the participants, the main items of the questionnaire are shown in Table 1.

Table 1 shows that the content of the questionnaire mainly includes students' evaluation of IPE in colleges and universities, students' characteristics, and students' familiarity of VR. The reliability and validity of the questionnaire are tested by Cronbach's alpha reliability coefficient α and Bartlett's spherical test. The calculation is performed by equations (1)–(3).

$$\alpha = K \frac{(1 - \sum \sigma_i^2 / \sigma_T^2)}{(K - 1)}. \quad (1)$$

In (1), K is the total number of items in the questionnaire, σ_i^2 is the score variance of item i , $\sum \sigma_i^2$ is the sum of variance, and σ_T^2 is the total score variance. The calculation results show that the reliability coefficient of the questionnaire is greater than 0.8, indicating that its reliability is acceptable.

$$x^2 = - \left[n - \frac{(2p + 11)}{6} \right] \ln |R|. \quad (2)$$

$$df = \frac{p(p - 1)}{2}. \quad (3)$$

(2) and (3) are used to test the validity of the questionnaire. n is the number of data, and $|R|$ is the value of the determinant of the correlation coefficient matrix. The results show that p is greater than 0.7, indicating that the validity of the questionnaire is good.

3.3. VR System Presentation. A VR-based system for IPE is designed that includes the history of the communist party and the major events about it including the oath ceremony of the party and the stories of heroes. It is used to create a virtual exhibition hall, in which the real situation is simulated so that students can perceive the real experience. VR is combined with theatre, oil painting, sculpture, and other artistic forms to create an interactive and crosstemporal experience system. The simulation of revolutionary historical events, cultural relics stories, and classic moments are experienced by films and TV series. VR combines the oath of the party with some heroes' stories in the revolution and construction, and students can immerse in the stories one after another. The VR system consists of four modules, as shown in Figure 6.

As shown in Figure 6, the designed VR system for IPE in colleges and universities has four modules, namely, the historical preamble module, the hero character wall module, the hero character art sculpture module, and the scene experience module. The historical preface module is the introduction part of the whole system. Students can know about the history of the Communist Party in this module. The hero character sculpture module contains the art sculpture of heroes in different times, which is presented in the form of animation. The contents to be displayed include the classic moments of heroes such as the Five Zhuangs in Langshan, the Flying Luding Bridge, Dong Cunrui's bombing bunker, the antiepidemic fighters, and the antiflood heroes. The hero character wall module is a supplementary scene of the hero character sculpture module, in which many heroes are displayed in animation. The scene experience module includes the scenes of seventeen pines and Dong Cunrui's bombing fort. The form of 3D modeling animation makes students feel the scene and the spirit of the revolution.

The modeling tools used include 3DMax and Maya. Photoshop is used as the image material, Unity 3D as the

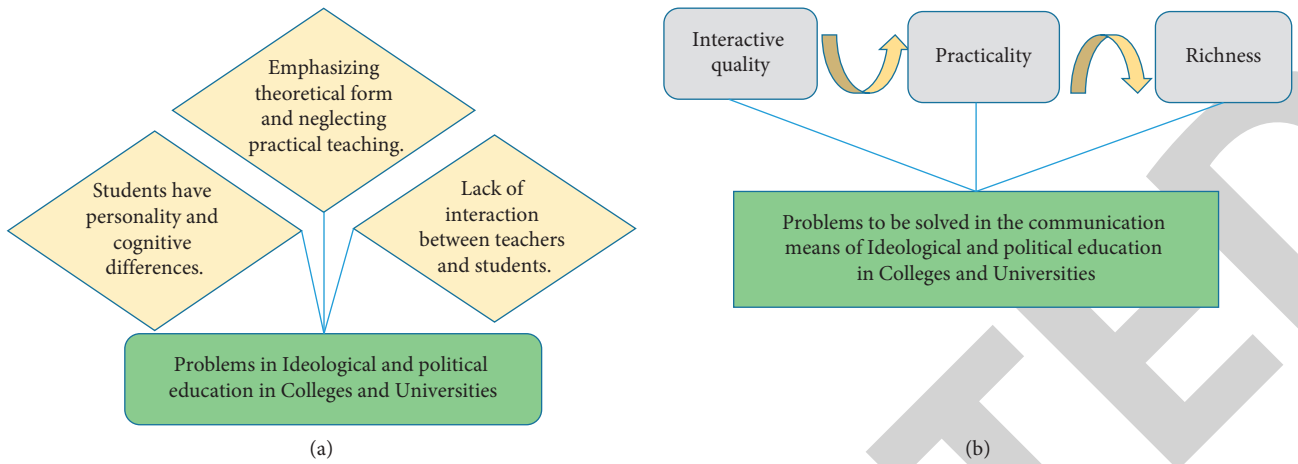


FIGURE 4: Problems in ideological and political education in colleges and universities ((a) problems in ideological and political education in colleges and universities, (b) problems that need to be solved in the communication means of ideological and political education in colleges and universities).

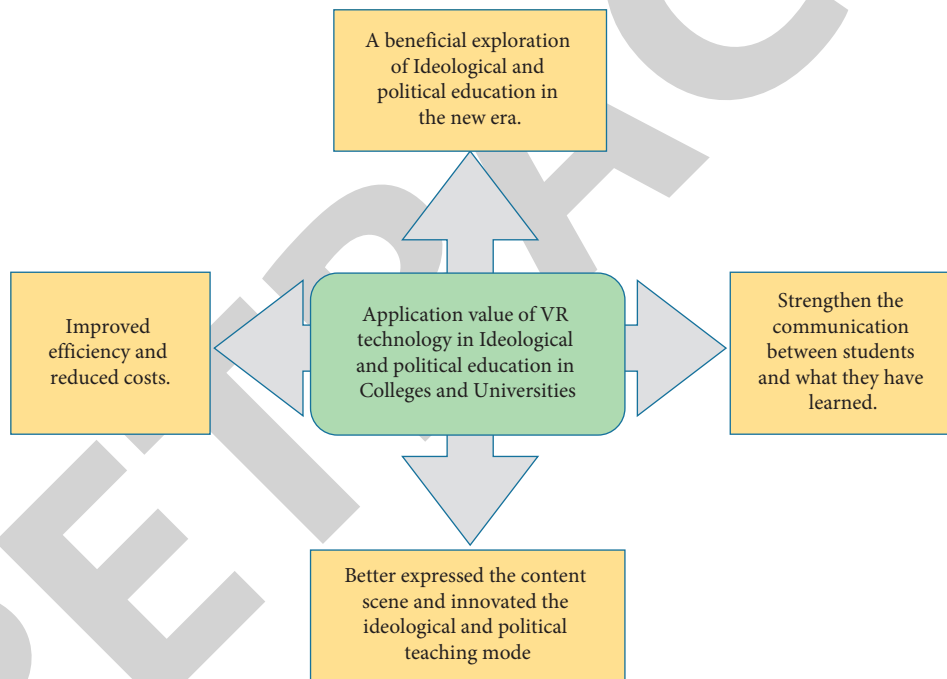


FIGURE 5: Application values of VR to ideological and political education in colleges and universities.

TABLE 1: Setting of main items in the questionnaire.

Numbers	Items
4	Enthusiasm/love for IPC
5	Reasons for liking ideological courses
6	Reasons for dislike of IPC
7	Evaluation of current IPC
8	Teachers' teaching modes and means of IPE
9	What kind of teaching means do you like?
10	Which means do you like for IPE?
11	Familiarity of VR
12	Ways to know about VR
13	Attitude toward the application of VR to IPE
14	Is it helpful to understanding the ideological and political knowledge through VR?

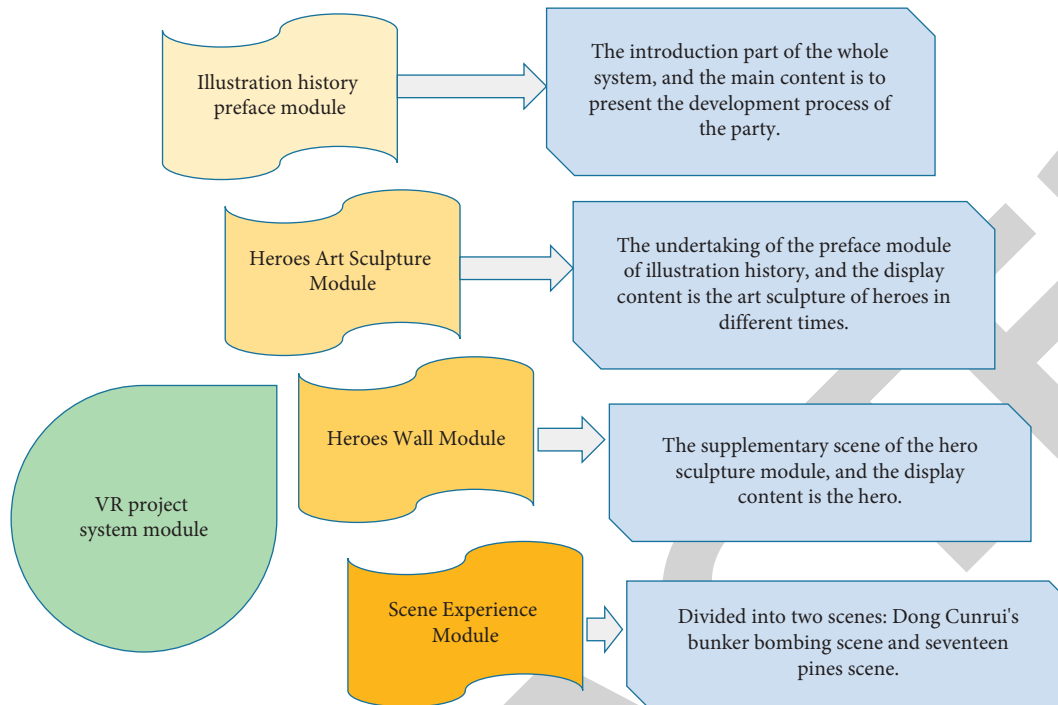


FIGURE 6: VR system module design.

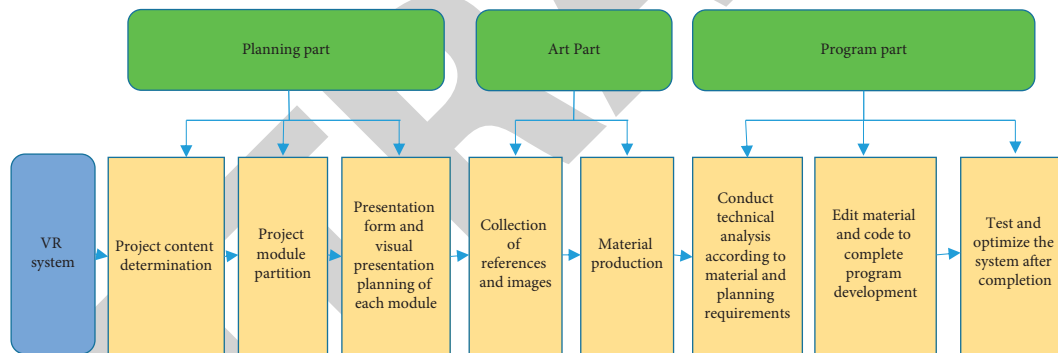


FIGURE 7: System development flowchart.

program, and C language as the development language in the system. The development process of system is shown in Figure 7.

As shown in Figure 7, the VR system first plans the visual presentation effect and form of each module, and then analyzes the interaction and technology of each module. After that, it carries out the preliminary production and resource preparation, and finally tests and develops the application program with the required technology and prepared resources. The model materials needed by the VR system are shown in Figure 8.

As shown in Figure 8, two of the four modules in the VR system for IPE need model materials, namely, the scene experience module and the hero sculpture module. Since the two modules are represented by sculpture, characters and 3D scenes, the material of each module needs to be made and sorted out.

The manufacturing steps of the system are introduced by taking heroes as examples; see Figure 9. In the figure, the manufacturing process of the VR system for IPE is depicted. The steps are as follows. First, MakeHuman software is used to download the basic human body. The centimeter in the setting is changed into meter. After the skeleton is deleted, the Fbc file format of the character is exported. Maya is used to open the file and set the first option. Second, the clothing is plated and exported after adjustments according to the classic scene of Dong Cunrui's bombing bunker. Then, the ZBrush is imported for engraving, and the low module is exported and opened in Maya. Finally, the normal AO is baked in Substance Painter, and the required format map is thus derived.

The pictures used in the VR system are 2D pictures and 3D panoramas for creating actual effects and for fully immersive tours. The audio of the VR system is divided into character dubbing and bystander to render and create an

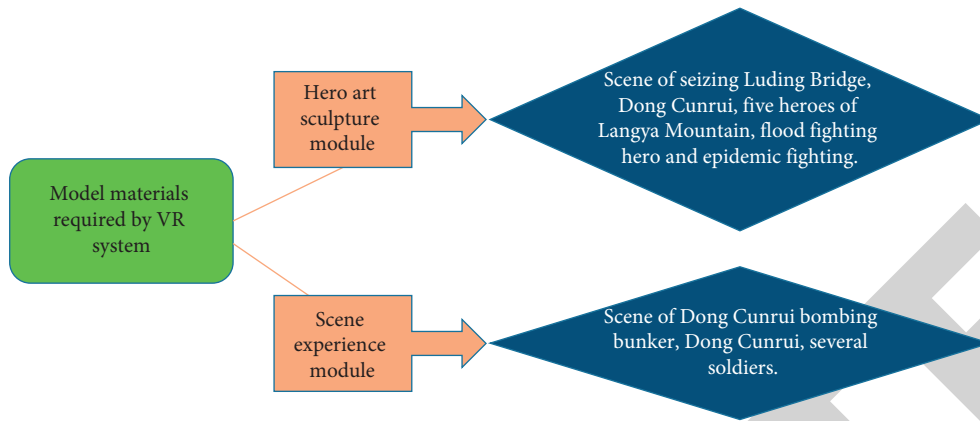


FIGURE 8: Model materials required for the system.

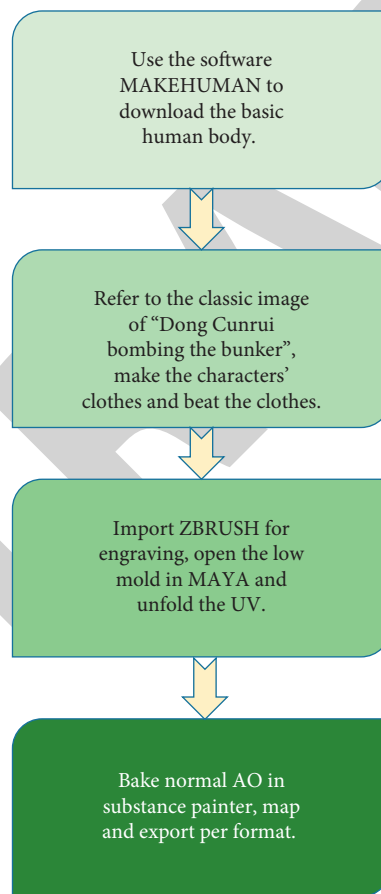


FIGURE 9: Manufacturing steps of the VR system.

attractive atmosphere. The program development of the system is shown in Figure 10.

The development process of the system was needed to be carried out under certain conditions. For instance, one of the conditions was to use Unity 3D as the development platform and SteamVR Plugin as the development tool. Figure 10 shows the core of the system, where the effect is realized by animated software. All the production resources are imported into the Assets directory under Unity. Resource management is carried out in the Project panel, and resource

files are set for scene building. The required presentation form is created in the Scene panel, and the subordinate relationship of objects is set in the Hierarch panel.

4. Results and Discussion

A systematic assessment is carried out in the research based on the inputs obtained from the questionnaire. Statistical analysis is performed to shape the findings for onward research activities.

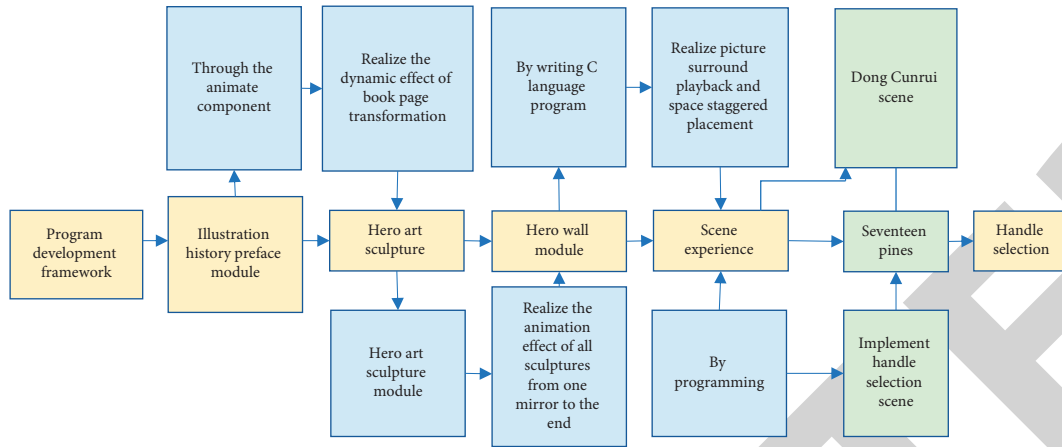


FIGURE 10: Program development framework.

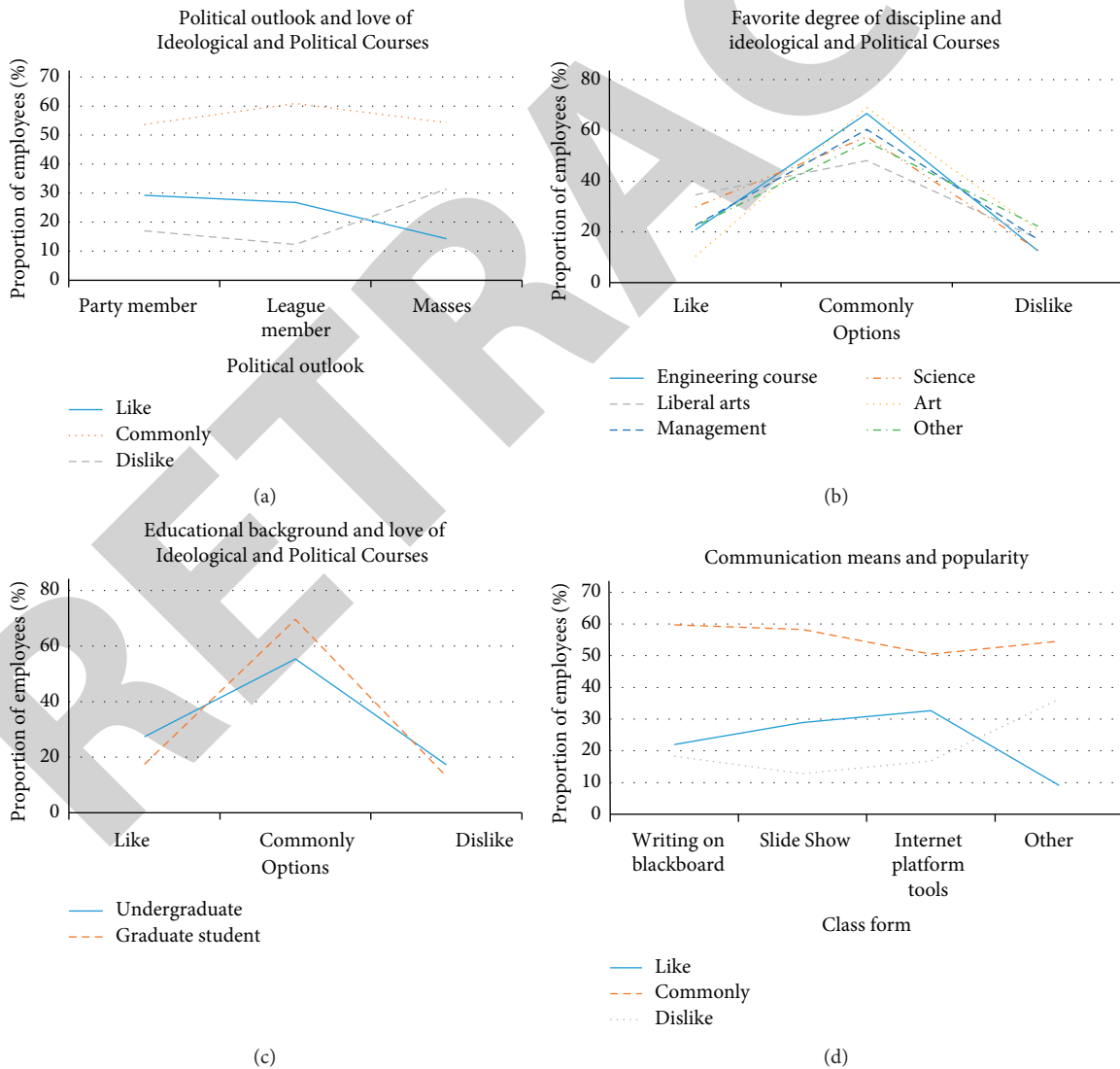


FIGURE 11: The degree of preference for IPC ((a) the relationship between the four political features and the degree of preference for IPC, (b) the relationship between the major and the degree of preference for IPC, (c) the relationship between the educational background and the degree of preference for IPC, and (d) the relationship between the form of class and the degree of preference for IPC).

4.1. Analysis of the Survey Results of IPE and Its Teaching Means in Colleges and Universities. The reliability of the questionnaire is 0.88, and its validity is 0.78, indicating that the questionnaire is satisfactory enough. Since the research is on IPE, more attention is paid to the political status of the participants selected. Among them, the students who have been a member of the Communist Party account for 19.1%, whereas those who have been a member of the communist youth league take up to 64.5%. The observed proportion of the masses is 16.4%. The education levels of the students were relatively balanced; 78.5% have bachelor's degree, and 21.5% have master's degree. The students' curiosity for IPC in universities is shown in Figure 11.

As shown in Figure 11, the members of the Communist Party have the highest degree of love for the IPC in colleges and universities with a proportion of 29.7%. 26.81% of the members of the communist youth league love the IPC, and 14.29% of the masses have the lowest degree of love for the IPC. 34.62% undergraduate students have the highest preference for IPC, and the proportion is higher than that of graduate students. The students who turn to the Internet platform as the teaching means of IPC are the most, accounting for 32.67%. Generally, a minority of the students love IPC, and most of them have a neutral attitude toward the course. Most students who like IPC choose the Internet platform as the teaching means, indicating that students' love for the course is related to the teaching means.

In the survey of the love for IPC in colleges and universities, the students who love IPC account for 25.2%, the students who have a neutral attitude account for 58.4%, and those who do not like IPC account for 16.4%. The survey results of students' love for IPC are analyzed in Figure 12, where 1–5 represent the reasons for liking the IPC, the reasons for disliking it, and the evaluation of the IPC. 1–5 correspond to the reason for liking the course, and they represent the followings, namely, helping to shape their outlooks on life, world, and values, feeling teachers' lectures interesting, teachers' teaching means innovative, teachers' personal charm attraction, and other. 1–5 also represent the reasons for disliking the IPC, and they refer to having difficulty to understand the knowledge, feeling the teacher lectures boring, hating passive education, feeling the course isolated from reality, and disliking the teacher. Besides, 1–5 represent the evaluation of the current IPE in colleges and universities, and they are the outdated teaching mode, keeping pace with the times, helping for personal growth, and disconnecting with reality.

As shown in Figure 12, more than 80% of students who like IPC think that the teacher's teaching mode is interesting, and 74.3% of the students who do not like IPC think that the teacher's lecture is boring. More than half of the students think that the teaching mode of IPC in colleges and universities is outdated. After the survey results of the love of IPC are analyzed, it is found that the teaching means and teaching mode are important reasons affecting students' love for the course.

The analysis of the teaching means of IPC and students' preference for the teaching means are shown in Figure 13.

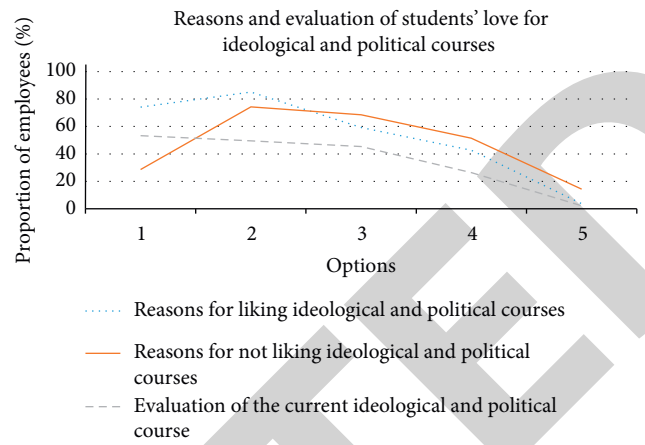


FIGURE 12: Reasons and evaluation of students' love for ideological and political courses.

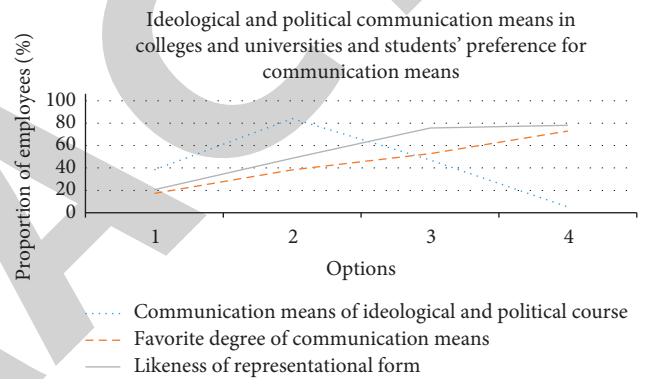


FIGURE 13: College ideological and political communication means and students' preference for communication means.

1–4 in Figure 13 represent the teacher's teaching means, and they are text blackboard writing, PPT, Internet platforms, and other. 1–4 also represent the preferred teaching means of IPC, including newspapers and magazines, books, television broadcasting, and Internet platform tools. 1–4 symbolize the students' favorite teaching means of IPE, and they include text blackboard writing, plane books, three-dimensional graphics, and animation.

As indicated in Figure 13, 84.11% of teachers give their lectures via PPT, while 67.29% of students prefer the Internet platform as the teaching means of IPC. And more than 70% of students prefer the teaching means of 3D stereoscopic display. In conclusion, the VR system for IPE should take 3D pictures as the main teaching means, which conforms to the requirement of college students and IPE in colleges and universities.

Students' familiarity of VR and the acceptance of its application to IPE are shown in Figure 14.

Figure 14 shows that 73.4% of the students know about VR and are interested in the application of VR to IPE. They believe that VR helps to understand the knowledge of IPC. 83.33% are not interested in the combination of VR and IPE in colleges and universities because they know nothing about

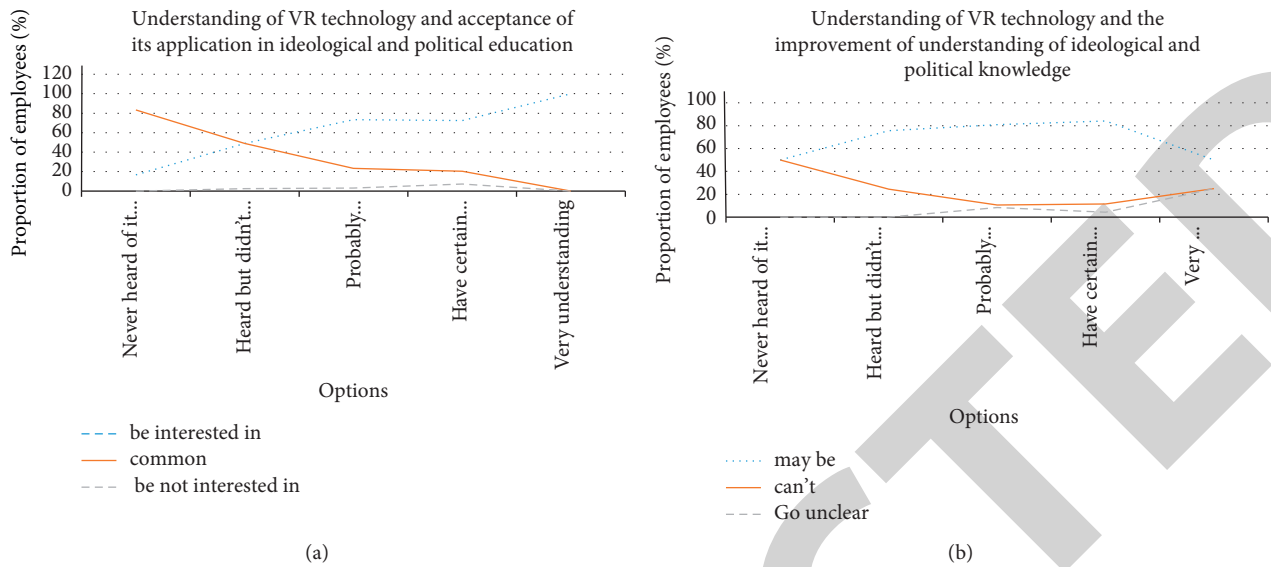


FIGURE 14: Understanding of VR technology and acceptance of its application in ideological and political education ((a) acceptance of VR technology application, (b) help of VR technology to ideological and political learning).

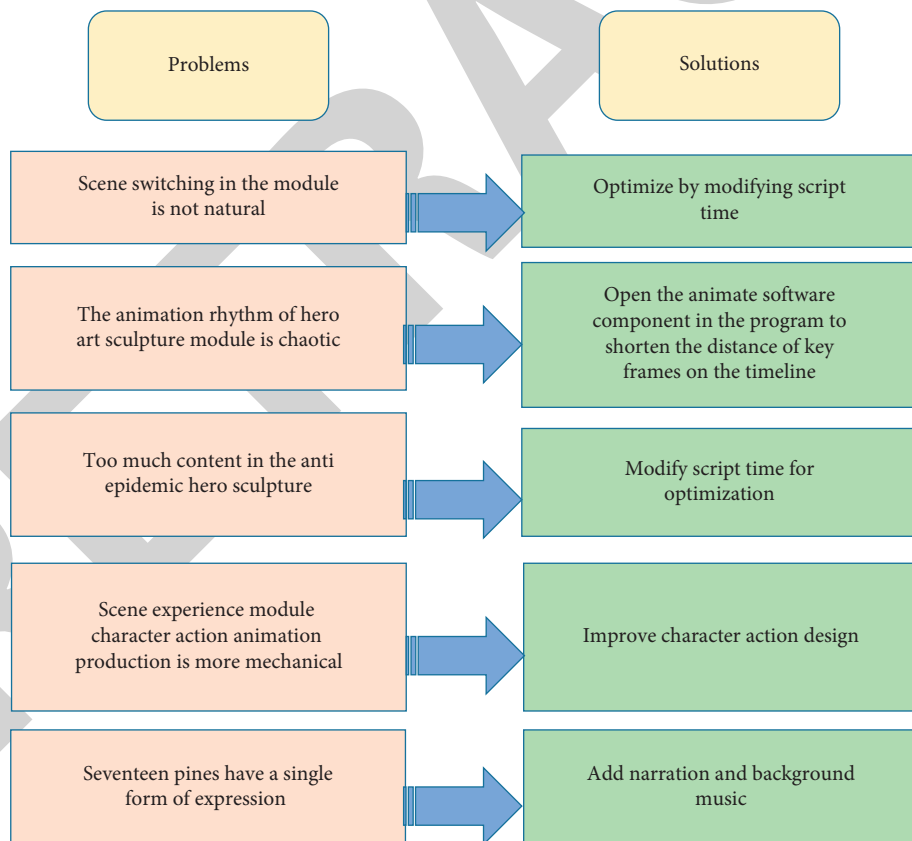


FIGURE 15: Problems and solutions in the testing of ideological and political education VR system.

VR, but they have a neutral attitude to the application of VR to IPE. It is concluded that the application of VR to IPE remains to be discussed. As a whole, students support the combination of VR and IPE, indicating that VR has a broad prospect for applying to IPE.

5. Testing and Optimization of the VR System

The VR system for IPE privileges the students to attain a strong sense of immersion. The interactive experience of the scene module enables students to personally experience the

role of revolutionary martyrs. However, there are also some shortcomings to be optimized in the test for which the corresponding solutions are proposed; see Figure 15.

As shown in Figure 15, the VR system for IPE needs to be optimized because the switching of the scene is not smooth, the animation rhythm is chaotic, the data size is large, the time given is short, the action of the character in the animation is machinery, and the scene is single. The corresponding solutions are the time of the script should be lengthened, the scene switching should be optimized, the key frames on the time axis should be shortened to optimize the rhythm in the animation, the content of the script should be cut, the action of the character should be improved, and monologue and background music should be added.

6. Conclusions

A VR system for IPE is constructed to diversify the teaching means of IPC in colleges and universities and enhance students' love for IPC under the background of 5G. A questionnaire survey is carried out to explore the current situation of IPE in colleges and universities and students' familiarity with VR. The results show that the acceptance of VR to IPE is high, and VR has a positive effect on improving the teaching quality of IPE. This study lays the foundation for the development of VR in the field of IPE. However, the VR system constructed is not optimized, and the impact on IPE in colleges and universities is not quantified, which will be the research direction in the future. Findings of the research study reveal that the students who are curious in education and have basic knowledge of VR (about 73.4%) preferred to use VR in IPE. Most of the teachers and students favored the use of technology in the teaching-learning process of IPE. About 84.4% of teacher chooses to deliver lecture using PPT, while 70% students preferred for 3D stereoscopic display-based teaching. The statistical findings testify the fact that the technology of VR is adequately suitable in the realm of IPE. As augmented reality (AR) is prevailing in educational and industrial sectors, we are planning to extend the research and to use AR in IPE. In our future AR-based IPE system, a historic object will be superimposed in current real-world environment. This will make the teaching of IPE more interesting, comprehensible, and absorbing.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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References

- [1] S. Walan, "Embracing digital technology in science classrooms—secondary school teachers' enacted teaching and reflections on practice," *Journal of Science Education and Technology*, vol. 29, no. 2, pp. 431–441, 2020.
- [2] R. P. Antonioli, I. M. Guerreiro, D. A. Sousa et al., "User-assisted bearer split control for dual connectivity in multi-RAT 5G networks," *Wireless Networks*, vol. 26, no. 2, pp. 3675–3685, 2020.
- [3] S. Ali, A. Ahmad, Y. Faheem, M. Altaf, and H. Ullah, "Energy-efficient RRH-association and resource allocation in D2D enabled multi-tier 5G C-RAN," *Telecommunication Systems*, vol. 74, no. 1, pp. 129–143, 2020.
- [4] K. Kaur, S. Kumar, and A. Baliyan, "5G: a new era of wireless communication," *International Journal of Information Technology*, vol. 12, no. 9, pp. 619–624, 2020.
- [5] D. G. Park, J. W. Oh, and J. P. Jeong, "SFSH: a novel smart factory SDN-layer handoff scheme in 5G-enabled mobile networks," *Journal of Ambient Intelligence and Humanized Computing*, vol. 12, pp. 1–13, 2020.
- [6] K. A. Alezabi, F. Hashim, S. J. Hashim, B. M. Ali, and A. Jamalipour, "Efficient authentication and re-authentication protocols for 4G/5G heterogeneous networks," *EURASIP Journal on Wireless Communications and Networking*, vol. 2020, pp. 412–417, 2020.
- [7] G. Koutitas, S. Smith, and G. Lawrence, "Performance evaluation of AR/VR training technologies for EMS first responders," *Virtual Reality*, vol. 27, pp. 1–12, 2020.
- [8] M. N. Varga, R. Merrison-Hort, P. Watson, R. Borisjuk, and D. Livingstone, "Tadpole VR: virtual reality visualization of a simulated tadpole spinal cord," *Virtual Reality*, vol. 25, no. 1, pp. 1–17, 2020.
- [9] A. Ríos and N. Pelechano, "Follower behavior under stress in immersive VR," *Virtual Reality*, vol. 27, pp. 1–12, 2020.
- [10] M. Granato, D. Gadia, D. Maggiorini, and L. A. Ripamonti, "An empirical study of players' emotions in VR racing games based on a dataset of physiological data," *Multimedia Tools and Applications*, vol. 27, pp. 1–30, 2020.
- [11] R. M. S. Clifford, H. Engelbrecht, S. Jung et al., "Aerial firefighter radio communication performance in a virtual training system: radio communication disruptions simulated in VR for Air Attack Supervision," *The Visual Computer*, vol. 37, pp. 1–14, 2020.
- [12] H. Coelho, M. Melo, J. Martins, and M. Bessa, "Correction to: collaborative immersive authoring tool for real-time creation of multisensory VR experiences," *Multimedia Tools and Applications*, vol. 79, pp. 1–2, 2020.
- [13] D. Edler, J. Keil, T. WiedenlÜbbert, M. Sossna, O. Kühne, and F. Dickmann, "Immersive VR Experience of Redeveloped Post-industrial Sites: the Example of "Zeche Holland" in Bochum-Wattenscheid Immersive Erfahrung umstrukturierter post-industrieller Standorte in VR: das Beispiel der "Zeche Holland" in Bochum-Wattenscheid," *KN - Journal of Cartography and Geographic Information: Kartographische Nachrichten*, vol. 69, no. 1–2, pp. 267–284, 2019.
- [14] K. Okada, M. Yoshida, T. Itoh, T. Czauderna, and K. Stephens, "VR system for spatio-temporal visualization of tweet data and support of map exploration," *Multimedia Tools and Applications*, vol. 78, no. 23, pp. 32849–32868, 2019.
- [15] F. Q. Zhang, T. Y. Wu, J. S. Pan, G. Ding, and Z. Li, "Human motion recognition based on SVM in VR art media interaction environment," *Human-centric Computing and Information Sciences*, vol. 9, no. 1, pp. 1–15, 2019.

- [16] H. J. Joo and H. Y. Jeong, "A study on eye-tracking-based Interface for VR/AR education platform," *Multimedia Tools and Applications*, vol. 79, pp. 1–12, 2019.
- [17] N. Vretos, P. Daras, S. Asteriadis et al., "Exploiting sensing devices availability in AR/VR deployments to foster engagement," *Virtual Reality*, vol. 23, no. 4, pp. 399–410, 2019.
- [18] H. Y. Wu, W. Z. Luo, N. Pan et al., "Understanding freehand gestures: a study of freehand gestural interaction for immersive VR shopping applications," *Human-centric Computing and Information Sciences*, vol. 9, no. 3, pp. 1–31, 2019.
- [19] D. J. Harris, G. Buckingham, M. R. Wilson, and S. J. Vine, "Virtually the same? How impaired sensory information in virtual reality may disrupt vision for action," *Experimental Brain Research*, vol. 237, no. 11, pp. 2761–2766, 2019.
- [20] S. Huang, "Augmented reality and virtual reality: the power of AR and VR for business," *Information Technology & Tourism*, vol. 21, no. 3, pp. 457–459, 2019.
- [21] F. Q. Zhang, Q. M. Wei, and L. Q. Xu, "An fast simulation tool for fluid animation in VR application based on GPUs," *Multimedia Tools and Applications*, vol. 79, pp. 1–24, 2019.