



# The Application of Cross-Cultural Context Fusion Virtual Reality Technology in the Course of Film Art Creation

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**Abstract. Objectives:** Since the 21st century, with the rapid development of science and technology, China's education level and educational technology have been continuously improved, and the classroom model has been developed and upgraded in innovation, but in the case that digital technology has not been fully covered and China's educational resources are relatively scarce, there are still many practical courses that cannot be taught in the traditional classroom to obtain good educational effects.

The development of cinematography knows no borders, but the education of cinematography is limited by the different educational environments of different countries. As an international art, the education of cinematography can achieve better quality development through cross-cultural communication. The use of virtual reality technology in the art of filmmaking can break the time and space limitations between countries and enhance the degree of integration and innovation in education in a cross-cultural context. The study of film and television creation often requires students to have a lot of practical experience, but the equipment and venue funds required for its practical courses are more expensive and cannot meet the needs of most schools to create specialized teaching equipment and venues. The teaching equipment of film creation plus the course venue are two aspects that require later management and maintenance expenses, therefore, most of the film creation courses in domestic universities are still stuck in the traditional teaching mode.

In addition, the continuous updating of film creation technology makes teaching resources, teaching materials and teacher training lag behind, which affects teaching quality. The special nature of the film creation course makes it difficult to effectively restore the filming process by traditional graphic, visual and audio transmission methods, and the out-of-home practice is limited in terms of coordination, time and space. In the global epidemic environment, online learning is gaining more and more attention, but the film and television industry is in a "winter", which makes most film and television students lack of practice places where they can establish cooperation. Virtual reality technology in the film creation program for the restoration of the film set, that is, to build a virtual practice scene, is a way to break the limits of time and space to provide students with experience.

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Virtual reality technology, as a more important technology in various industries in recent years, is widely used in many fields, such as medical, construction, fashion, military, etc. At present, the teaching advantages of virtual reality technology have gradually come into playing in the field of education. Using virtual reality technology to build experimental apparatus, scenarios and equipment, students are less constrained by equipment as well as scenarios, more able to stimulate interest in the midst of an immersive classroom, enhance practical perceptions through virtual reality technology instead of hardware facilities, immersive learning, and enhanced learning efficiency.

On the other hand, it will also reduce the pressure of teachers in teaching, and can view student dynamics through virtual experiments, timely adjustment of teaching programs. The virtual scene practice is complemented by the teacher's classroom lecture, combining practice and theory, transforming the teacher-led classroom into students' spontaneous experiential learning, showing the abstract concepts through virtual reality, restoring the real scene of the film set placed in the plane in front of their eyes, allowing students' audio-visual senses to have a more realistic experience, crossing time and space in the virtual reality situation, kinetic interaction, allowing the theoretical learning in the construction of The "imaginary film set" built in the theoretical learning can be immediately shown in front of the eyes.

**Methods:** A sample of 32 students from a film creation course in a Chinese university was selected and divided into two groups: the experimental group and the control group, with 16 students in each group (8 male and 8 female students in each group), to confirm their knowledge of virtual reality technology and familiarity with its operation before the experiment. The 16 students in the control group will be taught in a traditional film creation course, mainly by a multimedia teacher who will show the process of film creation in graphic form; the 16 students in the experimental group will be led by the teacher and will be taught in the first half of the course, while in the second half they will enter an immersive virtual reality scenario using VR technology to experience the process of filming on a real film set and become familiar with the operation of each position. A questionnaire will be used at the end of the experiment to investigate students' engagement, interest, initiative, classroom satisfaction and learning outcomes.

**Results:** Through the experiments of both groups, it was found that students in the experimental group would be more engaged and interested in the course, have a higher understanding of the structure and operation of the set than students in the control group, and have significantly better satisfaction and knowledge absorption in the course than students in the control group. More than half of the students in the control group were inattentive and uninterested in the course content, and the data on the learning effect in the post-test were also poor.

**Conclusions:** It is clear from this study that virtual reality technology can provide a greater degree of convenience to the teaching of film creation practice by restoring the actual scenes on the film set, and that the traditional teaching mode may make the teaching effect "superficial" and prevent students from understanding and experiencing the real scene. The integration of virtual reality technology and traditional teaching methods produces a  $1 + 1 > 2$  effect, stimulating students' interest in learning, improving their learning efficiency, reducing lab construction costs, deepening students' understanding of realistic scenarios, and cultivating their innovative thinking and abilities.

Using the advantages of virtual reality technology to reform the classroom of film art creation in colleges and universities can improve students' intercultural communication skills while effectively supplementing the teaching content of international film creation, which helps promote the cultivation of intercultural excellent film talents. However, virtual reality technology can only be an "affordable substitute" for film creation practice courses. The unexpected events and responses that may occur in actual scenes cannot be restored yet, and students cannot learn to react and respond to unpredictable events in film creation in virtual reality scenes, so it should be combined with reality to make up for its shortcomings.

**Keywords:** AR technology · VR technology · Film art creation · Cross-cultural training · Teaching mode

## 1 Introduction

In the current teaching system of many universities, the teaching of film creation is a very important practical teaching course. For university majors related to film art, offering a course on film creation can not only further the image creation ability of film major university student groups and adapt to the current trend of image development, but also help to improve the quality ability of university students. However, the current situation of the film art creation course in universities shows that many students have deficiencies in their professional background, technical foundation and creative thinking, resulting in a great difference in the teaching effect of the film art creation course in universities among the student population. In particular, the high demand for equipment in film art has led to differences in the quality of education between universities of different economic strength, which requires universities to constantly explore new teaching methods in the process of teaching reform and research to address the problems in teaching film creation. The integration of virtual reality technology into the creative film arts curriculum is an emerging and effective way of reforming the creative film arts curriculum.

The film art creation course in higher education requires students to progress together in a number of areas including aesthetic expression, sound, editing, cinematography and scriptwriting, as well as to use a comprehensive range of skills in the process of film art creation practice. In a course like Film Art Creation Course, which is more practical than theoretical, it is difficult to achieve quality teaching in the traditional mode of teaching by practising and reproducing the process of filming on set. In traditional film art teaching, teachers usually guide students to work in teams to experience the whole process of film art from conception to text design to final formation. However, the constant development of the Internet and film-related technology in the new era has begun to make this traditional mode of teaching inefficient and time-consuming, and it is difficult for university students to obtain precise knowledge of film creation from the teacher's screen presentation or oral narration in a short period of time, so the teaching of film art creation has also taken on a higher level of demand. This means that the educators involved have to constantly update their teaching methods and course content systems in line with the developing market needs and industry standards, in order to prepare for a better adaptation to the social environment.

The practice of virtual reality technology in innovative classroom reform is the embodiment of new contextualized teaching and learning. Compared to traditional contextualized teaching, virtual reality technology-based teaching is more conducive to allowing students to have the ability to make up for the difference in subjective imagery in a contextualized setting, to gain a more intuitive visual memory in a virtual classroom, to retain more of the emotions brought about by visual images, and to be able to retrieve them in memory at any time, making the teacher's words and graphics in a traditional classroom figurative, allowing students to experience a real film set or film creation process from their visual senses, free of temporal and economic limitations. The emotions generated in the process and the exploration of the details of the learning content will be more beneficial. This study will analyse the feasibility of virtual reality technology in the future of film creation education through an experiment on the change of lectures involving virtual reality technology in a film art creation course. In a cross-cultural context, the application of virtual reality technology in film art education reform can also provide feasible solutions for film art education in different countries and regions, and provide theoretical support for the introduction of virtual reality technology in film art creation majors in different universities in different countries and regions.

## **2 Literature Review**

### **2.1 Virtual Reality Technology**

Virtual reality technology originated in the United States and has a wide range of applications in the field of education, providing educators with a new approach to teaching, deconstructing the traditional teaching model and offering unlimited possibilities for the development of people's educational technology. It expands the development of teaching methods and provides a new platform for pedagogical innovation [1]. Virtual reality (VR) technology and the interaction of 3D geometric models can put an end to the passive learning followed in traditional educational methods. They also facilitate useful exchanges between the different participants in the educational process [2]. The use of virtual reality in teaching is evident in medicine, the military, fashion, architecture and many more. A study by M Samadbeik, D Yaaghobi et al. exemplifies the feasibility of virtual reality in teaching clinical medicine, using virtual education technology for laparoscopic surgery training [3]. In addition to this, practical nursing training simulation software programs have been introduced in the USA where students can access electronic cases, make virtual appointments and can assess and then interact with patients in a virtual ward created by the program, as well as follow up on patient interventions, understand changes in the patient's condition in real time and be able to assess the patient and implement a care plan [4]. The practice of virtual reality technology in university physical education courses is also gaining good ground, as Yildirim, Gürkan's team combined VR technology with history education courses and found that interactive environments under VR virtual environments were found to be more effective in history courses and especially in presenting important events in history (e.g. wars, treaties, negotiations, discussions, etc.) compared to traditional teaching environments [5]. This visualization of non-concrete historical scenes also demonstrates the ability of virtual reality technology to reproduce what already exists in reality, but also to visualise what

is imagined, providing a technological channel for the teaching of different subjects. Liu Guiwen's team used 3D modelling techniques, stereo sound synthesis and other technologies to slimly explain the specific operations of building a physical education model as well as special treatments, which is an important breakthrough in the combination of virtual reality technology and university classroom reform [6]. Jin Yadi uses the Internet+VR courseware to apply VR technology to the teaching of the guzheng. The key is the design, production and application of VR teaching courseware. She believes that VR technology is essentially a tool used to create virtual information environments. This approach is inexpensive and can avoid the need for specialist VR terminals (e.g. VR helmets, VR simulation pods, gesture sensors, VR projectors, etc.) and instead uses desktop VR functions in the courseware to produce an economical virtual realm using personal computer terminals and their conventional external devices, forming a non-contact VR remote teaching and learning environment based on the Internet [7]. Weilong Wu, Hsu Y, Yang Q F et al. developed a landscape architecture SV-IVR learning system using virtual reality technology as a tool to effectively improve students' academic performance, learning attitudes and self-regulation without negatively affecting them [8]. Virtual reality technology has now been gradually tried and practiced in multiple areas of university education and is an important tool for future educational reform. This study focuses on analysing the interest of university students majoring in the art of film creation in virtual reality immersive classes and their learning outcomes, to analyse the feasibility of using virtual reality technology in the art of film creation course.

## 2.2 Curriculum and Teaching of Film Art Creation

The Film Art Creation course was created to train excellent film practitioners and talents in all sectors of the film creation process, and is a highly practical and professional course. As a highly practical discipline, researchers are committed to reforming education in ways that enhance the effectiveness of practical learning in the area of innovation in teaching methods. Sasha A. Barab and Thomas M. Duffy of Indiana University explain the concept of "field of practice" from the perspective of educational psychology, which is a place of learning based on a campus or classroom environment, where functional learning situations or environments are set up and created to achieve certain learning objectives by setting up and creating functional learning situations or environments [9]. From the point of view of the "field of practice", practical courses need to be developed in a functional and practical context, creating a professional learning context that can improve the inertia of knowledge caused by the traditional teaching model. The art of film creation, as an art of film and television, is itself a multimodal and comprehensive art, a discipline in which sound, image, animation, color and text are synergistically applied, especially in the current context of new media and media convergence, where new technologies and new ideas have become obsolete. The traditional teaching system of theoretical courses plus observation courses cannot meet the contemporary trends in film and television art education [10]. Therefore, the integration of virtual reality technology and film creation art courses can break the bottleneck of traditional teaching on top of practical classes and promote the reform of practical education with a hybrid teaching mode. Schuenemann's team has demonstrated in a study of the teaching methods in the subject of audiovisual language that students develop short films using a digital

platform and then use the virtual platform again for post-production work after shooting, an innovative and effective practical teaching of audiovisual language that makes the film-making process more flexible in terms of workplace and time, optimising media production. In addition, the use of digital communications in the development and completion of a film is closer to professional filmmaking standards than putting audiovisual content on a classroom screen [11]. To sum up, as a practical course, what is needed is an innovation of the teaching method and a comprehensive training programme for talents, and a reform of the education method following the progress of film technology.

### **3 Experiment Design**

#### **3.1 Participant**

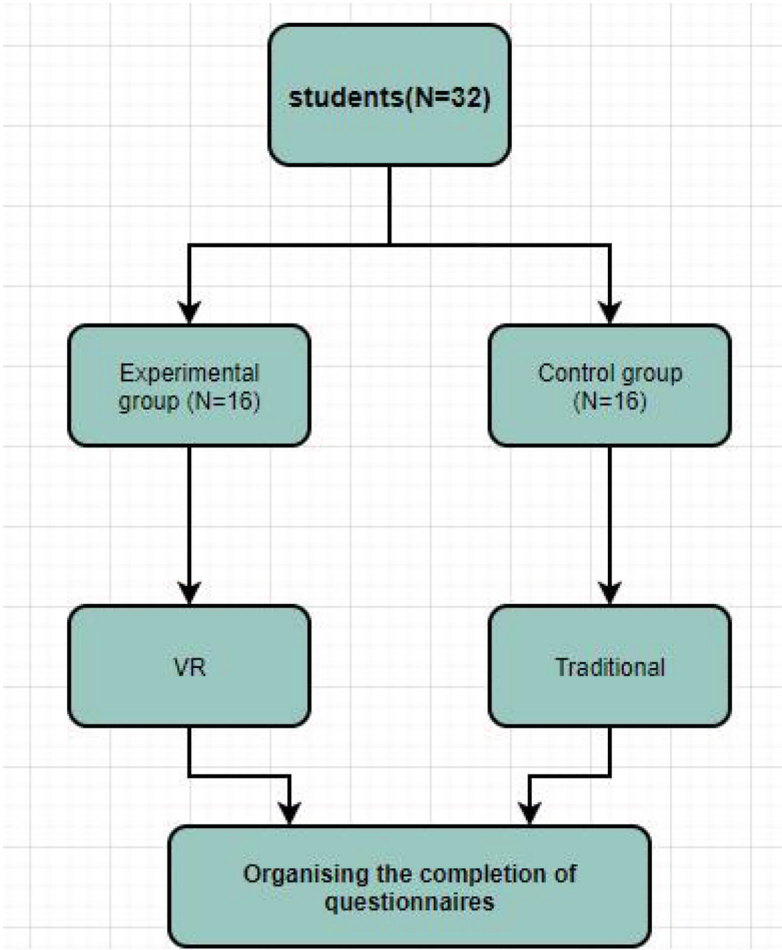
In this study, 16 students (8 male and 8 female) were randomly selected from a school in China as the control group and 16 students (8 male and 8 female) as the experimental group. There were no major differences in the basic information of the two groups, and all of them had taken a preliminary course on film art creation and had a preliminary knowledge of film creation. The control group used the traditional teaching mode, with the teacher teaching knowledge and operating demonstrations, while the experimental group used virtual reality technology for teaching, with the teacher using virtual reality for classroom teaching and the students using VR for learning. All the teaching activities of this experiment were conducted by a professor with a high level of knowledge and experience in teaching film creation for many years, and it was ensured that there were no major differences in the prior knowledge of the two groups before the teaching activities began.

#### **3.2 Measuring Tools**

The research instrument for this study was a questionnaire measuring two aspects of students' interest in learning and their confidence in learning. The questionnaires were divided into two different questionnaires for the experimental and control groups, each containing eight questions on a scale of 1–5.

#### **3.3 Experimental Process**

The experimental process is shown in Fig. 1. Before the experiment began, the professor introduced the film art creation course and gave a preliminary explanation of the relevant knowledge. After the initial presentation, the students in the experimental group were taught using virtual reality technology, while the students in the control group were taught in the traditional way.



**Fig. 1.** The experimental process

## 4 Experimental Results

### 4.1 Analysis of Interest in Learning

The independent sample t-test was used to analyse the differences between the experimental and control groups in terms of both confidence in learning and interest in learning in the process of participation in the film art creation course. The analysis of interest in learning, using the independent sample t-test method to analyse the experimental and control groups' knowledge of the film creation process, as shown in the Table 1 of differences between the experimental and control groups, showed that the familiarity with the content of the film art creation course: showed a 0.01 level of significance ( $t = -3.696$ ,  $p = 0.001$ ), as well as specific comparative differences can be seen, the experimental group's mean (2.25), which was significantly lower than the mean of the

control group (3.19). The level of interest in the film art and creative writing course was significant at the 0.01 level ( $t = -3.360$ ,  $p = 0.002$ ), and the difference in specific comparisons showed that the mean of the experimental group (2.13) was significantly lower than the mean of the control group (3.06). Satisfaction with the mode of delivery of the film art creation course: showing a 0.05 level of significance ( $t = -2.259$ ,  $p = 0.031$ ), as well as specific comparative differences, the mean of the experimental group (2.31) was significantly lower than the mean of the control group (2.94). Initiative in the film art creation course: showed a 0.01 level of significance ( $t = 2.936$ ,  $p = 0.006$ ), as well as a specific comparison difference which shows that the mean of the experimental group (2.31), was significantly higher than the mean of the control group (1.69). The total score showed a 0.05 level of significance ( $t = -2.654$ ,  $p = 0.013$ ), as well as a specific comparison difference that shows that the mean of the total score of interest in learning in the experimental group (9.00) is significantly lower than the mean of the control group (10.88). In conclusion, it can be seen that the experimental and control groups showed significant differences in the effects of their participation in the film art creation course in terms of interest in learning. Students who underwent immersive film art creation classes with virtual reality participation were generally somewhat more engaged, satisfied, interactive and knowledgeable than those who received traditional lectures. Students in the control group reported that the class was not very interesting, that it was difficult to be enthusiastic, and that they did not gain much knowledge of the basic content of the course, making them fewer effective learners. Students in the experimental group generally reported that they were more engaged in classroom interactions, gained more knowledge in the same amount of time, and were more satisfied and focused on the class than the control group.

**Table 1.** Research findings on learning interest

Learning interest	group	N	average	SD	<i>t</i>	<i>p</i>
<b>Familiarity with the content of the film art creation course</b>	Traditional	16	2.25	0.683	-3.696	0.001**
	VR	16	3.19	0.705		
<b>Satisfaction with the mode of delivery of the film art creation course</b>	Traditional	16	2.31	0.704	-2.259	0.031*
	VR	16	2.94	0.854		
<b>Level of interest in the film art creation course</b>	Traditional	16	2.13	0.806	-3.360	0.002**
	VR	16	3.06	0.772		
<b>Initiative in the film art creation course</b>	Traditional	16	2.31	0.602	2.936	0.006**
	VR	16	1.69	0.602		
<b>Total</b>	Traditional	16	9.00	2.066	-2.654	0.013*
	VR	16	10.88	1.928		

\*  $p < .05$ \*\*  $p < .01$



### 4.2 Analysis of Confidence in Learning

The independent samples t-test was used to analyse the learning confidence of the experimental and control groups on the process of film creation, as shown in Table 2. The results of the study showed that the knowledge of the process of film art creation: showed a 0.01 level of significance ( $t = -3.220, p = 0.003$ ), as well as specific comparative differences can be seen that the mean of the experimental group (1.56), would be significantly lower than that of the control group mean (2.25). The level of difficulty of the film art creation course was found to be significant at the 0.01 level ( $t = 2.825, p = 0.008$ ), and the difference between the experimental group’s mean (2.63) and the control group’s mean (2.00) was found to be significantly higher. Familiarity with the practical venue of the film art creation course: a 0.01 level of significance ( $t = -5.222, p = 0.000$ ), as well as a specific difference in comparison, shows that the mean of the experimental group (1.50) is significantly lower than the mean of the control group (2.56). The total score showed a 0.051 level of significance ( $t = -2.693, p = 0.011$ ), as well as a specific difference in comparison, which shows that the mean of the total learning confidence score for the experimental group (5.69) is significantly lower than the mean of the control group (6.81). In conclusion, it can be seen that the experimental group and the control group showed significant differences in their effectiveness in terms of learning confidence after participating in the film art creation course. When comparing the students in the experimental group with those in the control group, the students in the experimental group generally outperformed the students in the control group in terms of their knowledge of the film art creation process, their familiarity with film sets and their perceived difficulty level of the film art creation course. The students in the control group, who were still receiving traditional lectures, had difficulty in understanding specifically the knowledge of the film shooting process through written and oral accounts of its It was also difficult for the control students to understand the professional filming environment in their subjective imagination, and the course was more difficult for the control students because most of the time the process was relayed by the teacher through text and images, unlike the immersive participation of the experimental students. This

**Table 2.** Research findings on learning confidence

Learning confidence	group	N	average	SD	t	p
<b>Level of knowledge of the process of creating film art</b>	Traditional	16	1.56	0.629	-3.220	0.003**
	VR	16	2.25	0.577		
<b>Perceived level of difficulty of the film art creation course</b>	Traditional	16	2.63	0.619	2.825	0.008**
	VR	16	2.00	0.632		
<b>Familiarity with the practical venue of the film art creation course</b>	Traditional	16	1.50	0.632	-5.222	0.000**
	VR	16	2.56	0.512		
<b>Total</b>	Traditional	16	5.69	1.448	-2.693	0.011**
	VR	16	6.81	0.834		

\*  $p < .05$ \*\*  $p < .01$

shows that virtual reality technology can be very helpful in the delivery mode of practical classes, reducing the sense of tedium and boredom brought about by traditional classes, increasing students' interest, accessing information through more senses, improving the efficiency of learning and reducing the difficulty of learning.

## 5 Discussion and Conclusions

It is evident from this experimental study that, firstly, students who participated in the film art creation course with the integration of virtual reality technology were more interested and confident in learning compared to those who participated in the traditional classroom learning. Secondly, students who participated in a film art creation course with the integration of virtual reality technology were more proactive in interacting with the teacher and more satisfied with the way the class was taught with VR technology. Thirdly, students who participate in a film art creation course with virtual reality integration are able to acquire knowledge more efficiently and are more familiar with the practical environment than students in a traditional classroom. For practical courses such as film artistry, the traditional educational model, which relies on teacher-student interaction, is relatively boring and hardly satisfies the sense of vitality and engagement that practical courses should maintain. In teaching practice, film art creation often involves knowledge from many different majors and fields, so the requirements for students' practical ability and operational skills are relatively high. This requires university teachers to constantly change their teaching ideas, follow the current market development rules, and link the teaching method of combining virtual reality technology and traditional classrooms with film art creation courses, in order to cope with the film market's requirements for talents' abilities and meet the increasingly developing film creation technology. The integration of virtual reality technology into the university classroom not only enhances students' interest and confidence in learning, but also to a certain extent reduces human and financial resources for universities to carry out teaching activities, improves the quality of teaching in practical courses and cultivates higher quality and more technically proficient talents in the film industry. From a cross-cultural perspective, the current boom of the Internet, the innovative reform of virtual reality technology in film creation education also provides ideas and possibilities for teaching reforms in universities in different countries and regions around the world, and further promotes the advancement of professional education in film art creation worldwide. With the help of virtual reality technology, the reduction of geographical differences in education on the creative art of film can add to the further development of film education in the world in the future and can also contribute to the common development of global cinema.

Based on the results of this study, it is possible to offer some suggestions and perspectives for future research on VR practices in film art creation: the first point is that the use of virtual reality technology in practical classes should be adapted to different practical classes through different technical means, and that a single experiment still has limitations that are not interoperable. Secondly, too small a sample size can also lead to less precise experiments and should be more diverse, taking into account the different circumstances and roles of different samples to further enhance the professionalism of the experiment. Finally, the various technical problems that will arise in practice with

virtual reality are still unpredictable and will need to be upgraded in the course of continuous pedagogical reform, and these are directions that can be studied and focused on later.

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