Research on the Impact of Virtual Reality Technology on Traditional Education

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Received September 7, 2023 Revise October 13, 2023 Accepted October 19, 2023

Abstract

This paper is based on the effect of virtual reality technology (referred to as: VR technology) in the regular classroom application of vocational and technical schools, Virtual reality (VR) technology has been widely used in the field of education with its characteristics of immersion, interactivity and conceivability. However, the current virtual reality (VR) technology is still in the initial stage of development, and its application in the field of education is not widespread enough, and there are still some problems. Based on this, we investigate and analyze the impact of virtual reality (VR) technology on traditional education through research methods such as questionnaire survey method and literature research method. The survey results show that students welcome virtual reality (VR) technology, and virtual reality (VR) technology has a positive impact on traditional education in curriculum design, teaching mode and teaching methods, but the application of virtual reality (VR) technology in the field of education still has a lot of room for improvement. By analyzing the survey results, this paper aims to provide suggestions and guidance for the application of virtual reality (VR) technology in the field of education.

Keywords: Virtual reality technology; traditional education; immersive learning;

Introduction

In the current digital age, virtual reality (VR) has gradually become a hot focus in the field of education with its fascinating immersive experiences and the potential for educational innovation. The rapid development of virtual reality technology has brought new opportunities and challenges to education and teaching, and its unique

characteristics have made profound changes in the traditional education paradigm. By simulating real-world scenarios, virtual reality technology can provide a more vivid, interactive and personalized learning experience, which may affect the quality and effectiveness of education.

Traditional education has always been the main way of knowledge transfer, but its limitations in cultivating students' innovative thinking, practical ability and solving real-world problems have gradually emerged. The introduction of virtual reality technology has brought new teaching models and methods to education, which can allow students to participate in virtual scenes and explore knowledge through hands-on experience, thereby stimulating students' interest and enthusiasm. However, while the potential of virtual reality in education is widely recognized, its actual impact and effectiveness still require in-depth research and evaluation.

With the rapid development and popularization of information technology, virtual reality (VR) as a fascinating way of digital experience, has shown great potential in various fields. Virtual reality technology brings users from the real world to the virtual environment by creating an immersive feeling for them, and this immersive experience is gradually changing people's lifestyles, including the field of education, the medical field, and more.

The traditional education model emphasizes the knowledge transfer of teachers and the passive reception and learning of students. However, this model has certain limitations in cultivating students' innovative thinking, problem-solving ability and practical ability. With the change of educational philosophy, more and more education practitioners and researchers have begun to pay attention to how to integrate innovative technology into teaching to better meet the learning needs of students.

It is in this context that virtual reality technology has attracted widespread attention. It opens up new possibilities for education, deepening their understanding of knowledge by simulating real-world scenarios and allowing students to experience abstract concepts first-hand. Compared to traditional classrooms, virtual reality technology can provide students with a more immersive learning experience, enhancing their sense of participation and engagement. Through an interactive virtual environment, students can actually operate, explore and solve problems, thus developing stronger practical skills and teamwork.

The application of virtual reality technology in the field of vocational education has begun to achieve some impressive results. For example, in medical education, virtual surgical simulation allows medical students to practice surgery in a virtual environment to improve their hands-on skills. In history learning, students can

experience historical events through virtual reconstruction of historical scenes and enhance their perception of historical knowledge. In addition, applications such as virtual labs and virtual geographic expeditions also provide students with safer and more convenient learning paths.

However, although virtual reality technology has shown great potential in the field of education, its actual impact and effect need further research and verification. In particular, teaching effectiveness, teacher and student attitudes, and technical feasibility need to be discussed and evaluated in depth. Therefore, this study aims to deeply explore the impact of virtual reality technology on traditional education through empirical research, and provide substantive guidance for educational reform and technological integration.

As virtual reality technology (VR) gradually penetrates into traditional education, we face an important question: what impact does virtual reality technology have on traditional education, and how are these effects reflected in teaching effects and educational experiences? In order to explore this issue in depth, this study will discuss from the following two research questions:

The Impact of Virtual Reality **Immersion on Learning** Effectiveness: Can Virtual Reality Technology Improve the Teaching Effect of Traditional Education? Has virtual reality brought significant improvements in knowledge transfer, student engagement, and learning outcomes? Through actual data and pedagogical evaluations, we will explore whether virtual reality technology has had a positive impact in these key areas.

The impact of virtual reality **interactivity and engagement on learning** outcomes: Interactivity gives students more initiative in a virtual reality environment, allowing them to participate directly in the creation and exploration of course content. By interacting with the virtual environment, students can turn abstract concepts into concrete experiences by hands-on operations, simulation experiments, and even solving complex problems. This hands-on interaction stimulates students' curiosity and curiosity, enabling them to better understand and remember what they have learned.

1. Research objectives

The goal of this research is to conduct an in-depth investigation and analysis of the impact of virtual reality (VR) technology on traditional education, focusing on learning effects, experiences, and students' capabilities. Through the comprehensive use of questionnaire survey method and literature research method, the influence of virtual reality technology in traditional education is discussed. Survey students' attitudes

toward virtual reality technology: Understand students' views on the use of virtual reality technology in education, including their acceptance of virtual reality technology, expectations, and expectations for their educational effectiveness.

In summary, by achieving the above research objectives, this paper aims to explore the impact of virtual reality technology in traditional education, and to face the needs and challenges of modern education, virtual reality technology brings new opportunities and innovative possibilities to traditional education. In this context, we are committed to examining the following core questions: how virtual reality technology affects teaching and learning, teacher and student attitudes towards technology, and how technology improves students' capabilities.

Table1 Summary table of hypothetical questions

numbering	The problem assumes that
A1	The immersion of virtual reality technology has a positive impact on students' learning effect
A 2	The interactivity and participation of virtual reality technology have positive influence on students' learning effect

Through in-depth research on the above issues, this paper will comprehensively understand the role and potential of virtual reality technology in traditional education, and provide useful reference for the practice and policy formulation of virtual reality technology in education. In the following, we will first review the literature and explore the application and impact of virtual reality technology in education. Next, we will describe the research methods in detail, including questionnaire design, data collection and analysis methods. Finally, we will present and discuss the results of the research and summarize the practical implications of virtual reality technology in traditional education.

2. Literature Review

As an emerging digital tool, the application of virtual reality technology in the field of education has gradually attracted widespread attention in recent years. Researchers and educators are beginning to explore how virtual reality technology can be combined with traditional educational models to create more immersive, interactive, and engaging learning environments. The impact of virtual reality technology on

teaching effect, studies have shown that virtual reality technology has potential in improving teaching effect. By creating immersive learning environments, virtual reality technology can stimulate students' interest and engagement in learning. McMahan's (2019) study found that students who studied in a virtual reality environment performed better on after-class tests, suggesting that virtual reality technology helps deepen learning. In addition, virtual reality technology can also provide a personalized learning experience, adjusted to the needs and learning progress of students, so as to better meet the learning needs of students.

The study found that some teachers are positive about virtual reality technology, believing that it can stimulate students' interest in learning and create more interactive opportunities. However, there are also teachers who are concerned about the complexity of technology application and the need to adapt to new teaching methods (Akçayır & Akçayır, 2017). Students generally have a more positive attitude towards virtual reality technology, believing that it can enhance the learning experience and help them better understand the learning content.

The impact of virtual reality technology on students' learning outcomes, and virtual reality technology also has significant potential to improve students' abilities. By simulating real scenarios and situations, virtual reality technology can cultivate students' practical ability, innovative thinking and problem-solving ability. For example, in history learning, students can deepen their understanding of historical knowledge by experiencing historical events first-hand through virtual reconstruction of historical scenes. In addition, virtual reality technology can also provide hands-on training, such as virtual surgical simulations in the medical field, to help students practice and develop practical skills.

As can be seen from the above, the application of virtual reality technology in traditional education has attracted international attention. While there are some problems and challenges, the potential for positive impact cannot be ignored. In the future, we need to continue to make efforts in policy support, educational practice and technological development to give full play to the role of virtual reality technology in traditional education and teaching, create a more creative and in-depth learning experience for students, and promote innovative development in the field of education. Therefore, the application of virtual reality technology in traditional education is not only an innovation in learning experience, but also a change in educational concepts, which is expected to cultivate a new generation of learners who are more autonomous, innovative and adaptable. On the basis of continuous deepening research, we can expect

the continuous advancement of virtual reality technology in the field of education, bringing a better educational future for students and teachers.

Overall, virtual reality technology has had a positive impact on traditional education, bringing innovation to learning experiences, teaching models and methods. Despite some challenges, with the continuous development of technology and the deepening of educational practices, virtual reality technology is expected to continue to realize its potential in the traditional field of education, creating a richer and more engaging learning environment for students and teachers, and promoting innovation and progress in education.

3.Research Conceptual Framework

In this paper, the impact of traditional education is mainly reflected in the learning effect, so as to discuss the impact of virtual reality technology on traditional education.

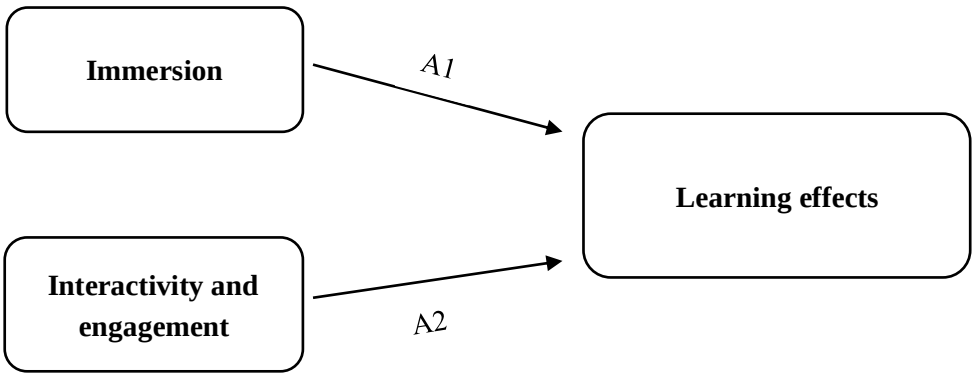

Figure1Research framework conceptual diagram

Valid Questionnaire Data Recovery:

In this study, 311 valid questionnaires have been successfully collected so far, based on the student population of Province G Vocational College. These valid questionnaires will become an important data source for our research, which will help us fully understand the application effect of virtual reality technology in traditional education and the views of respondents, and compile the questionnaires to obtain the distribution with different gender characteristics.

（1） Gender distribution

There were 18 3 male participants, accounting for 58.84% of the total research subjects; There were 128 female participants, accounting for 41 of the total number of participants16%。

（2） age distribution

There were 100 people aged 16-18, accounting for 16.86% of the total study subjects; There were 157 people aged 18-26, accounting for 53.29% of the total study subjects; 35 people over 25-35 years old, accounting for 17.71% of the total study subjects; There were 18 people over 35 years old, accounting for 12.14% of the total study subjects.

According to the distribution of research subjects, the research subjects are mostly 18-26 years old, which is basically consistent with our intended survey subjects, and the research subjects truthfully screen the range of virtual reality technology in the current use of the population.

The design and implementation of this questionnaire distribution and collection mechanism enables the research to fully explore the impact of virtual reality technology on changing traditional education through learning effects, and provides a reliable basis for subsequent data analysis and research. Through reasonable questionnaire design and scientific distribution and recycling mechanism, we can obtain a wide range of survey samples, so as to more fully understand the views and expectations of vocational college students on virtual reality technology in traditional education.

4.Researh Hypothesis

Immersive virtual reality technology can liberate the learning experience from traditional paper materials and slide presentations, creating a more engaging learning environment for students. This technology simulates real-world scenarios on multiple sensory levels, including visual, auditory, and tactile, providing a deeper, more engaging learning experience. The use of immersive virtual reality technology can stimulate students' interest and curiosity, prompting them to be more engaged in learning. Through this technique, students can participate in immersive activities such as simulation experiments, scenario simulations, and role-plays, leading to a better understanding of abstract concepts and complex theories. In addition, immersive virtual reality helps create personalized learning experiences that adapt to students' learning pace and style, improving learning efficiency and outcomes.

Hypothesis 1: The degree of immersion of virtual reality technology has a positive impact on students' learning outcomes.

The highly interactive and powerful interactivity of virtual reality technology brings new possibilities for education, which is expected to enhance the learning experience and enhance student engagement and understanding.

Interactivity is one of the important features of virtual reality technology, which allows students to no longer just passively receive information, but can actively participate in the learning process. Through virtual reality, students can interact with

the virtual environment in real time, explore and experience various situations, and thus gain a deeper understanding of complex concepts and theories. For example, in history classes, students can "experience" historical events through virtual reality technology to deepen their understanding of historical background and scenarios.

Hypothesis 2: Virtual reality technology interactivity and participation have a positive impact on student learning outcomes.

5. Research Methods and Design

In this study, we selected a random survey of vocational and technical schools, and collected a total of 311 valid questionnaires, which provided a solid data basis for the quantitative analysis of the results. A combination of quantitative and qualitative research methods to comprehensively explore the impact of virtual reality (VR) technology in traditional education. We mainly use the questionnaire survey method and literature research method, through data collection and comprehensive analysis of different dimensions, to fully reflect the performance of students' learning effect in the classroom and reflect the impact of virtual reality technology on traditional education.

5.1 data analysis

In the process of data analysis, SPSS26.0 is mainly used for data analysis and processing. According to the results of the questionnaire survey, the reliability analysis of Cronbach's α coefficient was conducted according to the data, and the questions that had no significant impact on the results were removed. When the Cronbach's α coefficient was higher than 0.8, the reliability of the current data was high. If the value is between 0.7 ~ 0.8, the reliability is good. If the value is between 0.6 ~ 0.7, it indicates that the reliability is acceptable. In summary, the next validity check can be carried out. If this value is less than 0.6, it indicates poor confidence. Finally, the final result is obtained by converting the results of principal component analysis.

5.2 Reliability test

Table 2 Reliability test results of formal questionnaire (N = 311)

Cronbach's α coefficient	The number of items	Number of samples
0.884	3	311

From the overall reliability test results, it can be seen that Cronbach's α coefficient is 0.884, which is greater than 0.7, so the overall reliability is good (Table 2).

5.3 Validity test

Table 3 Validity analysis test results 1(N = 311).

KMO test and Bartlett's test		
KMO value		0.745
	Approximate chi-square	507.843
Bartlett sphericity test	East wind	3
	P	0.000

Table 3 shows the global scale for testing the impact of virtual reality technology on learning effect. From the perspective of global validity, the approximate chi-square value of Bartlett sphericity test is 507.843, indicating that the data support factor analysis. The KMO value is 0.745, which indicates that the sample data has a suitable sample size and correlation during the analysis, and the reliability is high. The significance level P is 0.000, indicating that the Bartlett sphericity test results are statistically highly significant, which further supports the necessity of analysis. These results indicate that our dataset is suitable for analysis to further explore potential structures and associations..

5.4 Model result graph

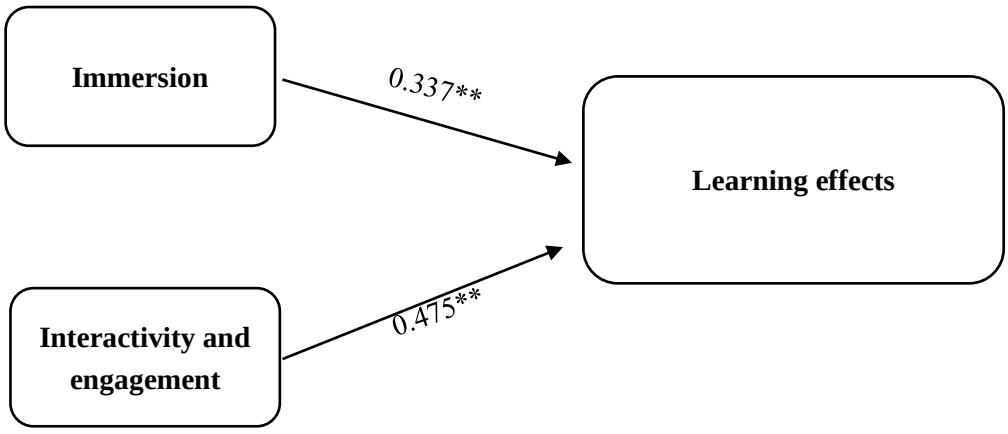

Figure -3 Model result diagram2

Table 4. Linear regression analysis results

	Regression coefficient	95% confidence interval	Collinear diagnostics	
			bright	Tolerance
constant	0.749**(5.106)	0.462 ~ 1.037	-	-
Immersion	0.337**(7.104)	0.244 ~ 0.430	2.021	0.495
Interactivity and engagement	0.475**(9.600)	0.378 ~ 0.573	2.021	0.495
Sample size	311			
R^2	0.611			
Adjust *R2*	0.609			
F	*F*（2，308）=242.038，p=0.000			

Dependent variable: Learning effect

D-W 值:1.890

* p<0.05 ** *p*<0.01 t value in parentheses

Table 3 model result plot and Table 4 linear regression analysis results show that immersion, interactivity, and engagement have positive correlation effects on learning effect.

6. Research Results

Based on the demonstration results of the above data, we can further explore the role of virtual reality technology in the field of education. The study found that immersion, interactivity, and engagement have a significant positive impact on learning outcomes. This provides us with strong evidence to support the use of virtual reality technology in education.

Virtual reality technology makes learners feel as if they are in a virtual environment with its engaging immersive experience. This deep sense of engagement can lead to higher concentration and a deeper learning experience that enhances learning. At the same time, the rich interactivity provided by virtual reality technology, such as interactive simulation and practical experience, creates a more realistic and dynamic learning environment for learners. These interactive elements help stimulate learners' curiosity, motivation and facilitate in-depth digestion and understanding of knowledge.

Based on the support of the above data, it can be concluded that there is a positive correlation between immersion and interactivity of virtual reality technology and participation, and learning effect. This also means that virtual reality technology may have a positive impact on traditional educational methods. By incorporating virtual reality technology, educators can create more engaging and interactive teaching experiences that stimulate students' interest in learning and drive their knowledge acquisition and skills development on a deeper level. However, when applying virtual reality technology to education, it is still necessary to fully consider the teaching objectives, content design and effective integration of technology to ensure the best learning outcomes.

7. Conclusion and Discussion

7.1 Conclusion

Virtual reality technology has a positive impact on traditional teaching. Virtual reality technology in vocational education has been basically applied in the course of teaching, but in the actual teaching, the application is not widely enough, and there are still some application problems. Therefore, in the application process of virtual reality technology in vocational education, we should pay attention to the improvement of virtual technology teaching content and analyze all aspects as far as possible, so that students can better receive important learning content in the learning process. More importantly, we should pay attention to the combination of theory and practice, and should not stop at virtual technology learning and ignore practical classes, but pay attention to the cultivation of students' hands-on ability. Focus on the combination of content and presentation form of virtual reality technology. At the same time, we should also pay attention to continuous exploration, continuous optimization and continuous improvement in practice, hoping that virtual reality technology can play a greater role in education..

1) Analysis of the application status of virtual reality (VR) technology in vocational school education

After analysis, it is found that there are certain differences in students' understanding, mastery and use of virtual reality (VR) technology, and there are also some differences in the process of learning and use.

2) Research prospect of the integration of virtual reality (VR) technology and traditional education

- Research focus: Integration of virtual reality technology and vocational education

The development of virtual reality technology provides a new direction for the teaching of vocational education, which has the characteristics of simulating the real environment, high simulation, and strong immersion, which can provide students with an immersive experience and is conducive to cultivating students' interest and enthusiasm for learning. Therefore, it is of great theoretical and practical significance to carry out research on the application of virtual reality technology in vocational school education. First of all, the application of virtual reality technology to vocational education teaching can help students better understand and master relevant theoretical knowledge and promote the improvement of students' learning effect. Secondly, carrying out virtual reality technology application research in vocational school education is conducive to students' understanding of virtual reality (VR) technology related knowledge and cultivating students' innovation ability. Finally, the application research of virtual reality technology in vocational school education is conducive to teachers improving their professional skills and promoting their professional growth.

However, the current research on the integration of virtual reality technology and vocational education is not deep enough. Therefore, in the future research process, we should start from the following aspects: first, combine the actual needs and characteristics of vocational school education and teaching to select the application mode of virtual reality (VR) technology and vocational education integration; The second is to start from theoretical research and explore the application law of virtual reality (VR) technology in vocational school education; The third is to conduct in-depth research on the problems arising in the integration of virtual reality (VR) technology and vocational education, and put forward corresponding countermeasures.

- Research difficulties: realize the effective integration of VR virtual reality and traditional education

In order to effectively integrate VR virtual reality with traditional education, it is necessary to realize the organic combination of VR virtual reality and traditional education, first of all, the content of VR virtual reality should be reasonable, scientific and accurate, and can meet the learning needs of students; Secondly, it is necessary to optimize the production technology of VR virtual reality and improve its production level; Thirdly, it is necessary to continuously improve the teaching application mode of VR virtual reality and integrate traditional educational elements into VR virtual reality; Finally, it is necessary to strengthen the interaction between teachers and students, and

improve the learning effect of students through the interaction between teachers and students.

At the same time, the following points need to be paid attention to in the research process:

First, in terms of theoretical research, we should study the theoretical basis of VR virtual reality application in vocational school education in depth, and strengthen the theoretical basis research on its integration with traditional education.

Second, in terms of practical operation, we should better play the advantages of VR virtual reality in vocational school education, and pay attention to the optimization and improvement of virtual reality (VR) technology.

The third is to strengthen the training and study of teachers, so that they can master more practical and effective teaching methods and teaching methods.

The fourth is to give full play to the strength of schools, enterprises, society and other parties to jointly promote the integration of VR virtual reality and traditional education, and create a good environment for its development.

7.2 Discussion

Through a survey of students at a vocational and technical school, we can draw the following conclusions:

7.2.1 Virtual reality (VR) technology has had a positive impact on traditional education in terms of curriculum design, teaching mode and teaching methods, but the setting of course content needs to be improved, and the design of some teaching content still has shortcomings;

7.2.2 The application of virtual reality (VR) technology in the field of education needs to be strengthened, and schools should actively explore the application of virtual reality (VR) technology in the field of education, and actively improve from the aspects of curriculum design, teaching mode, teaching methods, etc.;

Through this survey analysis, we can draw the following recommendations:

- Schools should further strengthen the application of virtual reality (VR) technology in the field of education, strengthen cooperation with relevant personnel in professional fields, and promote the application of virtual reality (VR) technology in the field of education.
- Schools should further improve the curriculum design, teaching mode, and teaching methods of virtual reality (VR) technology in the field of

education, and actively explore the application of virtual reality (VR) technology in the field of education.

At the same time, according to the survey results, the following two suggestions are provided for the future research direction of virtual reality (VR) technology in traditional education:

7.2.3 **Deepen curriculum integration and design:** Develop targeted teaching plans for different subjects, organically integrate VR technology into course content, and create a richer and more practical virtual learning experience

7.2.4 **Provide educator training and support:** The survey results show that students have certain expectations for educators' abilities in the use of VR technology. Therefore, it is recommended that schools and educational institutions provide training and support to educators to help them better master and use VR technology.

7.3 Conclusion

This study investigated the impact of virtual reality (VR) technology on their traditional education for vocational and technical school students and found:

(1) Students welcomed virtual reality (VR) technology, and believed that virtual reality (VR) technology has a positive impact on traditional education in terms of curriculum design, teaching mode, teaching methods, etc.;

(2) Students have a positive attitude towards virtual reality (VR) technology, believing that virtual reality (VR) technology can allow them to see the learning content more comprehensively, and can give them an immersive feeling;

(3) students believe that the interactivity and participation of VR technology has a positive impact on current education;

At present, virtual reality (VR) technology is still in the initial stage of development, and its application in the field of education is not extensive enough, mainly with the following problems:

(1) Teachers' understanding of virtual reality (VR) technology is not deep enough, and the use is not proficient enough;

(2) Some teachers are not familiar with the characteristics and application methods of virtual reality (VR) technology;

(3) Teachers do not take into account students' interests and learning needs when designing the curriculum;

(4) Students' understanding of virtual reality (VR) technology is not comprehensive enough;

(5) There is still a lot of room for improvement in the application of virtual reality (VR) technology in the field of education.

Based on the above survey results, this study suggests that teachers should actively learn relevant knowledge and skills, and become familiar with and master the characteristics and application methods of virtual reality (VR) technology as soon as possible. When designing the course, students' interests and learning needs should be considered, and appropriate teaching content should be selected according to students' interests and learning needs. Teachers should continuously improve their own teaching level in order to better apply virtual reality (VR) technology to provide students with better teaching services.

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