

Feasibility study of VR immersion technology in psychotherapy

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Abstract. The research object of this paper is the innovation of the application mode of VR immersion technology in psychotherapy. This paper put forward relevant optimization policies through the discovery of the problems existing in the application process of VR immersion technology in psychotherapy. First of all, the background of VR immersion technology and the status quo of the technology in psychotherapy are discussed. And then the importance of VR technology in psychotherapy is deeply analyzed. Based on the above content, the problems existing in the application of VR technology in psychological aspects are put forward and including the shortage of applied talents and the insufficient application of VR social psychotherapy services. Finally, on the basis of finding these problems, this paper puts forward some targeted optimization strategies.

Keywords: VR immersion technology; Psychotherapy; Application mode innovation.

1. Introduction

With the development and progress of science and technology, computer performance and the software technology of its connotation is also improving constantly. As far as the current situation is concerned, VR technology is most widely used in our life and is most frequently used in the game entertainment. After VR technology using in the game entertainment, it directly brought an earth-shaking change in players' sense of game experience. It enables games to be transformed from flat to three-dimensional and from just playing games to be the players who are personally on the scene to increase and enrich the sense of experience and delicacy of the game. But with the continuous application of VR technology in people's life and moving to maturity progressively, can find that VR technology not only can be applied in games, but also can put it into society. For example, apply VR technology to industries such as health care industry or education industry[7], so as to enlarge the characteristics and advantages of the VR technology and increase the availability of VR technology to benefit society.

2. The overview of VR immersion technology and psychotherapy

2.1 The background of VR technology

In the process of understanding VR technology can find that VR technology is a kind of virtual data or virtual scene through head-mounted display devices, VR glasses and so on to convey perceptual information and visual information to people and provide people with a scene that has a feeling of "virtual reality". At present, the VR technology has been widely applied in the games, it can not only bring people a new sense of reality of game, but also can enable the players to truly realize the combination of virtual and real and allow oneself to be personally on the scene to interact with NPC in the game world and build own world in the game, so as to realize the own high degree of freedom game experience. It is precisely because VR technology can bring people a "virtual reality" life similar to the development mode of the original universe, in the process of people playing games through VR technology, people will more expose people's most essential things, such as personality characteristics, style and the true desires of heart[1].

In the process of playing games, people will reveal their most essential things, such as personality[2], style of conduct and true inner desires. Therefore, the application scope and functions of VT technology can't stop in the game field and bring players a super realistic game experience. It should be applied to a greater extent in the fields conducive to the development of society and used the characteristics of the "virtual reality" to help solve the problems in the process of social development. Such as the psychological department with long cure time in the medical and health industry. For example, take VR technology as a bridge to build a more acceptable platform for patients and through the VR technology to achieve the display of hypnosis or psychological theater to reduce the degree of patients' internal defense to help medical

institutions improve the amount of information about patients' condition, so as to realize the effective application of VR technology in the medical and health industry[3].

2.2 The innovation of VR technology in psychotherapy

After understanding VR technology, it is not difficult to find that VR technology is not only a medium that can take people out of reality and into the virtual world, but also a new era technology with full particularity. As we all know, the feature of VR technology is to realize scene reproduction or scene construction. If VR technology is applied to psychotherapy, it can greatly shorten patient' time required for the various questionnaire surveys and personal state observation in the process of psychotherapy[6]. After combining VR technology with psychotherapy, patients can enter realistic simulation of the immersive scene through VR technology and enter the scene provided by VR technology for patients in a more realistic or realistic state. And in the meantime[13], the relevant treatment units can collect and analyze patient data through the data and behavior reflected by the patient during the detection process using the VR technology and make a comprehensive diagnosis based on the performance and the actual behavior of patients in VR scene[4], so as to speed up the understanding speed and diagnosis efficiency of medical units for patients' personal behavior, personality characteristics and real condition to help medical institutions relieve patients' pressure. It enables medical institutions to provide more efficient prescription for the patients who need psychotherapy and helps the patients recover quickly[5].

3. Questionnaire report

3.1 The background of survey

With the continuous application and gradual maturity VR technology in people's life, it can be found that VR technology not only can be applied in the aspect of the game, but also can put it into society. Under the current social background, people are under pressure to survive, resulting in great psychological pressure and serious psychological problems, the number of depressed people is increasing year by year. Apply VR technology to the psychotherapy treatment, enlarge the characteristics and advantages of VR technology and improve the availability of VR technology to carry out psychotherapy for people[10].

3.2 The content of survey

Through the systematic analysis of VR technology and the empirical study of the questionnaire survey combined with VR technology and psychotherapy[11], we learned about the professionals' understanding degree of the VR and the problems and needs in psychotherapy. At the same time, we also learned about the degree of patients' understanding of VR and the degree of acceptance of the new application of VR technology. And based on this basis, we analyzed the main challenges and opportunities faced by the application of VR technology in psychotherapy.

3.3 The object of survey

Through the network survey, the object of survey comes from college students and employment workers all over the country as well as some psychotherapy professionals. The difference of professionalism makes the survey scope of the questionnaire wider, the answers to the questions more representative, the data more accurate and the survey results more scientific[12]. The questionnaire is fill in without using the real-name system to ensure the authenticity of the data.

A total of 30 questionnaires were sent out in this survey, 27 questionnaires were effectively received with a recovery rate of 90%, including 16 boys and 11 girls.

3.3.1 The correlation analysis of questionnaire

Correlation analysis is used to study the relationship between quantitative data, including whether there is a relationship, the degree of closeness and so on. The logical relationship between correlation analysis and regression analysis is that: there is a correlation relationship before there is a regression relationship. Correlation analysis only needs to focus on two values: correlation coefficient and significance value. First, we should pay attention to the significance value, which ranges from 0 to 1. If it is less than 0.05, it indicates that there is a significant. If it is significant (* sign in the upper right corner of the result indicates that it is related. Otherwise, it is not related). After having a relationship, the degree of closeness directly depends on the size of the correlation coefficient. Generally, above 0.7 indicates that the relationship is very close. Between 0.4 to 0.7 indicates that the relationship is close and between 0.2to0.4 Indicates that the relationship is normal.

If the value of correlation coefficient is less than 0.2, but it still presents significance (* sign in the upper right corner, one * calls 0.05 level significant and two * call 0.01 level significant. Significance means that the occurrence of the correlation coefficient is statistically significant and common, not accidental), it indicates that the relationship is weak, but there is still a correlation.

It can be seen from the table, there is a significant correlation between "What do you think of the therapeutic effect of traditional one-on-one psychotherapy " and "How was your mood at the beginning of the therapy ", between "What do you think of the therapeutic effect of traditional one-on-one psychotherapy "and "How much trust did you have in the effectiveness of psychotherapy before therapy begins"[9].

Correlations						
		What do you think of the therapeutic effect of traditional one-on-one psychotherapy	How was your mood at the beginning of the therapy	How much trust did you have in the effectiveness of psychotherapy before therapy begins	Do you know VR technology	Would you like to try psychotherapy in the form of VR immersive psychological theater
What do you think of the therapeutic effect of traditional one-on-one psychotherapy	Pearson Correlation	1	.673**	.577**	0.309	0.070
	Sig. (2-tailed)		0.000	0.002	0.116	0.730
	N	27	27	27	27	27
How was your mood at the beginning of the therapy	Pearson Correlation	.673**	1	.530**	0.140	-0.085
	Sig. (2-tailed)	0.000		0.004	0.487	0.673
	N	27	27	27	27	27
How much trust did you have in the effectiveness of psychotherapy before therapy begins	Pearson Correlation	.577**	.530**	1	0.336	0.209
	Sig. (2-tailed)	0.002	0.004		0.087	0.296
	N	27	27	27	27	27
Do you know VR technology	Pearson Correlation	0.309	0.140	0.336	1	0.075
	Sig. (2-tailed)	0.116	0.487	0.087		0.710
	N	27	27	27	27	27
Would you like to try psychotherapy in the form of VR immersive psychological theater	Pearson Correlation	0.070	-0.085	0.209	0.075	1
	Sig. (2-tailed)	0.730	0.673	0.296	0.710	
	N	27	27	27	27	27

** Correlation is significant at the 0.01 level (2-tailed).

Figure 1. Correlation analysis of treatment style and efficacy trust

3.3.2 The analysis of regression

The significance value corresponding to "How was your mood at the beginning of the therapy " and "How much trust did you have in the effectiveness of psychotherapy before therapy begins" are both less than 0.05 is to indicate that "How was your mood at the beginning of the therapy " and "How much trust did you have in the effectiveness of psychotherapy before therapy begins" both have a significant impact on "What do you think of the therapeutic effect of traditional one-on-one psychotherapy ".

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.721*	0.520	0.480	0.434

a. Predictors: (Constant), How much trust did you have in the effectiveness of psychotherapy before therapy begins, How was your mood at the beginning of the therapy

Figure 2. Regression model of pre - psychotherapy and efficacy trust

ANOVA ^a						
Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	4.893	2	2.447	13.007	.000 ^b
	Residual	4.514	24	0.188		
	Total	9.407	26			

a. Dependent Variable: What do you think of the therapeutic effect of traditional one-on-one psychotherapy
b. Predictors: (Constant), How much trust did you have in the effectiveness of psychotherapy before therapy begins, How was your mood at the beginning of the therapy

Figure 3. Regression analysis of traditional one-to-one psychotherapy and effectiveness trust

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.541	0.332		1.632	0.116
	How was your mood at the beginning of the therapy	0.357	0.117	0.510	3.060	0.005
	How much trust did you have in the effectiveness of psychotherapy before therapy begins	0.246	0.134	0.307	1.839	0.078

a. Dependent Variable: What do you think of the therapeutic effect of traditional one-on-one psychotherapy

Figure 4. Regression analysis of the effect of traditional one-to-one psychotherapy

3.3.3 The analysis of difference

The significance value of different ages in "What do you think of the therapeutic effect of traditional one-on-one psychotherapy "and "How was your mood at the beginning of the therapy" is less than 0.05 is to indicate that there are significant differences between different ages in both.

		Descriptives				95% Confidence Interval for Mean		Minimum	Maximum
		N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound		
What do you think of the therapeutic effect of traditional one-on-one psychotherapy	Under 18 years old	3	2.67	0.577	0.333	1.23	4.10	2	3
	18 to 35 years old	23	2.13	0.548	0.114	1.89	2.37	1	3
	35 to 60 years old	1	1.00					1	1
	Total	27	2.15	0.602	0.116	1.91	2.39	1	3
How was your mood at the beginning of the therapy	Under 18 years old	3	3.67	1.155	0.667	0.80	6.54	3	5
	18 to 35 years old	23	2.70	0.703	0.147	2.39	3.00	1	4
	35 to 60 years old	1	1.00					1	1
	Total	27	2.74	0.859	0.165	2.40	3.08	1	5
How much trust did you have in the effectiveness of psychotherapy before therapy begins	Under 18 years old	3	3.00	0.000	0.000	3.00	3.00	3	3
	18 to 35 years old	23	2.57	0.728	0.152	2.25	2.88	1	4
	35 to 60 years old	1	1.00					1	1
	Total	27	2.56	0.751	0.145	2.26	2.85	1	4

Figure 5.Descriptives between different ages and treatments

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
What do you think of the therapeutic effect of traditional one-on-one psychotherapy	Between Groups	2.132	2	1.066	3.517	0.046
	Within Groups	7.275	24	0.303		
	Total	9.407	26			
How was your mood at the beginning of the therapy	Between Groups	5.649	2	2.824	5.008	0.015
	Within Groups	13.536	24	0.564		
	Total	19.185	26			
How much trust did you have in the effectiveness of psychotherapy before therapy begins	Between Groups	3.014	2	1.507	3.104	0.063
	Within Groups	11.652	24	0.486		
	Total	14.667	26			

Figure 6.Analysis of differences between different ages and treatments

3.3.4 The correlation analysis

The correlation coefficients between the variables "There is a special VR device through the way of playing virtual games to help psychotherapists record, collect and sort out data quickly through the performance and behavioral responses of their brain during the game. Are you willing to accept and use it" and "Do you know VR technology" is 0.580, between the variables "There is a special VR device through the way of playing virtual games to help psychotherapists record, collect and sort out data quickly through the performance and behavioral responses of their brain during the game. Are you willing to accept and use it" and "Do you think VR technology can be applied to psychotherapy" is 0.653.It indicates that there is a significant correlation.

Correlations				
		Your age	Do you know VR technology	Do you think VR technology can be applied to psychotherapy
Your age	Pearson Correlation	1	-0.025	0.088
	Sig. (2-tailed)		0.901	0.664
	N	27	27	27
Do you know VR technology	Pearson Correlation	-0.025	1	.570**
	Sig. (2-tailed)	0.901		0.002
	N	27	27	27
Do you think VR technology can be applied to psychotherapy	Pearson Correlation	0.088	.570**	1
	Sig. (2-tailed)	0.664	0.002	
	N	27	27	27
There is a special VR device through the way of playing virtual games to help psychotherapists record, collect and sort out data quickly through the performance and behavioral responses of their brain during the game. Are you willing to accept and use it	Pearson Correlation	0.120	.580**	.653**
	Sig. (2-tailed)	0.551	0.002	0.000
	N	27	27	27

** Correlation is significant at the 0.01 level (2-tailed).

Figure 7.Correlation analysis between VR awareness and acceptance of psychotherapy

3.3.5 The analysis of regression

According to the coefficient table, the corresponding significance value of the variable "Do you think VR technology can be applied to psychotherapy" is 0.013 that less than 0.05 is to indicate that this variable has a significant impact on "There is a special VR device through the way of playing virtual games to help psychotherapists record, collect and sort

out data quickly through the performance and behavioral responses of their brain during the game. Are you willing to accept and use it".

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.700 ^a	0.491	0.448	0.497

a. Predictors: (Constant), Do you think VR technology can be applied to psychotherapy, Do you know VR technology

Figure 8. Regression model of VR consciousness and VR application in psychotherapy

ANOVA ^a						
Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	5.706	2	2.853	11.558	.000b
	Residual	5.924	24	0.247		
	Total	11.630	26			

a. Dependent Variable: There is a special VR device through the way of playing virtual games to help psychotherapists record, collect and sort out data quickly through the performance and behavioral responses of their brain during the game. Are you willing to accept and use it
b. Predictors: (Constant), Do you think VR technology can be applied to psychotherapy, Do you know VR technology

Figure 9. Regression analysis of VR awareness and acceptance of VR for psychotherapy

Coefficients ^a						
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
	(Constant)	0.156	0.378		0.359	0.723
1	Do you know VR technology	0.407	0.234	0.308	1.740	0.095
	Do you think VR technology can be applied to psychotherapy	0.553	0.205	0.477	2.691	0.013

a. Dependent Variable: There is a special VR device through the way of playing virtual games to help psychotherapists record, collect and sort out data quickly through the performance and behavioral responses of their brain during the game. Are you willing to accept and use it

Figure 10. Regression analysis of understanding of VR and approval of VR in psychotherapy

3.3.6 The analysis of difference

According to the "ANOVA" table, the significance values of different ages on the three variables are more than 0.05 is to indicate that there is no significant difference.

Descriptives					
		N	Mean	Std. Deviation	Std. Error
Do you know VR technology	Under 18 years old	2	1.50	0.707	0.300
	18 to 35 years old	24	1.96	0.464	0.095
	35 to 60 years old	1	1.00		
	Total	27	1.89	0.506	0.097
Do you think VR technology can be applied to psychotherapy	Under 18 years old	2	1.00	0.000	0.000
	18 to 35 years old	24	1.50	0.590	0.120
	35 to 60 years old	1	1.00		
	Total	27	1.44	0.577	0.111
There is a special VR device through the way of playing virtual games to help psychotherapists record, collect and sort out data quickly through the performance and behavioral responses of their brain during the game. Are you willing to accept and use it	Under 18 years old	2	1.00	0.000	0.000
	18 to 35 years old	24	1.79	0.658	0.134
	35 to 60 years old	1	1.00		
	Total	27	1.70	0.689	0.129

Figure 11. Descriptives in three variables by age

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Do you know VR technology	Between Groups	1.208	2	0.604	2.656	0.091
	Within Groups	5.458	24	0.227		
	Total	6.667	26			
Do you think VR technology can be applied to psychotherapy	Between Groups	0.667	2	0.333	1.000	0.383
	Within Groups	8.000	24	0.333		
	Total	8.667	26			
There is a special VR device through the way of playing virtual games to help psychotherapists record, collect and sort out data quickly through the performance and behavioral responses of their brain during the game. Are you willing to accept and use it	Between Groups	1.671	2	0.836	2.014	0.155
	Within Groups	9.958	24	0.415		
	Total	11.630	26			

Figure 12. Analysis of differences in three variables by age

3.4 Survey results and analysis

3.4.1 The problems of doctors and patients are obvious

According to the data obtained from questionnaire distribution and collection, although 93% of the respondents have known VR technology, their understanding of VR technology was limited to a single similar situation. The public has a low understanding of the application of VR technology in psychotherapy, and 7% of the people still knew nothing about VR technology. According to the survey, 62.95% of the people thought therapeutic effect of traditional one-to-one psychotherapy was good, 25.93% of the people thought the effect was general. In the treatment process, 55.56% indicated the mood was general, 7.41% indicated the mood was bad. According to the survey, there were not a few people who distrust doctors during the treatment process (as shown in figure 5-2). The reason is that patients have too many expectations for mental health. However, due to their own lack of the understanding of the high technology and high risk of medical, they will lose trust in doctors once they find the treatment results are not up to their expectation in the treatment process. On the other hand, with the gradual improvement of people's material level, the demand for psychological medical treatment is also increasing. However, in terms of doctors, there are still a few doctors who cannot adapt to the change of modern medical mode and still use the traditional biomedical mode for psychological guidance, which indirectly leads to the deepening of distrust between doctors and patients. Another reason is that it is difficult for the patients to enter the state when they receiving treatment. As shown, in the process of psychotherapy, is difficult for patients to enter state in view of the high degree of cooperation between doctors and patients, which is the main reason for the treatment. However, in the view of the low degree of the cooperation between doctors and patients, 48% of the doctors indicated that the problem of difficult to carry out the treatment was that the patients did not trust them, and 32% of the doctors indicated that patients are difficult to enter the state during treatment. According to the survey data, 70.37% of the people indicated that restoring the scene at that time through VR could make them better enter the state and describe their psychological current situation to the consultant, and 85.19% of the people indicated that they were willing to explain psychotherapy in the form of VR immersive psychological theater.

3.4.2 Doctors have difficulty in processing psychotherapy data

According to the survey result, 44% of the people indicated that they had difficulty collecting information related to psychotherapy, 32% of the people indicated that they had difficulty recording data and 36% of the people indicated that they had difficulty sorting out the relevant data before and after psychotherapy. These are also common problems encountered by medical institutions. Due to the large case data, the high requirements for data collection, sorting, processing, and analysis, and the perfection of the patients' information can't be guaranteed, by using the construction of VR psychotherapy services projects and improving the application degree of VR technology in psychotherapy and the delicacy and authenticity of the scene felt by patients when they use this technology for psychotherapy to help them to be more open to psychotherapy, subjective behavior and thought expression. According to the survey data, 88.89% of the people indicated that they can collect, record and sort out the data through VR technology.

4. Conclusion

Through a systematic analysis of VR technology, it was found that apply this technology to psychotherapy can effectively improve the amount of data collected by medical institutions for patients' information and patients' behavior to help medical institutions provide more targeted treatment for patients. It can be found that VR technology is a technology with high feasibility and beneficial to the society. Moreover, in the process of combining this technology with psychotherapy, it also burst out more delightful effects. For example, it is of great help to reduce the patients' inner defense and improve the medical technicians' understanding of the patients' condition. This also shows that the progress of science and technology has driven the development of The Times, and the development needs of The Times and psychology itself have become the necessary needs of many people in the society. For a long time in the past, in the process of people's psychotherapy, the data collected by medical institutions about patients were relatively limited. And after applying VR technology, medical institutions can understand the needs of patients from a more comprehensive perspective and provide patients with the best treatment plan. Through the application of VR technology in medical institutions, can be found from point to surface that the technology can not only be applied to games and entertainment, but also to people's livelihood, so as to provide better services for the society, improve people's happiness index and the degree of convenience of life and form a technological development situation of technology for the benefit of the people.

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