

Research on the Influence of the Use of VR Technology in Dance Creation on the Willingness of Dance Directors to Use: Focusing on the Ease of Cognition and the Mediating Effect of Usefulness

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Abstract

In the field of dance creation, the use of film and television skills, cyberspace, action sets, computer graphics and other technology and media technology have made the creative environment for dance art that it rapidly improves and presents a new situation. Especially in the dance creation part, VR technology can show many possibilities and can be used as a tool to fully satisfy the choreographer's intention and imagination. Therefore, this study analyzes the acceptance model of virtual reality technology in dance creative education, and we will examine the effect of social influence, shared trust, innovation, interest, and self-efficacy on perceived usefulness and perceived ease. Second, we will examine the effect of perceived usefulness and perceived ease on intention to use. The study is targeted at ordinary dance creators who currently reside in Hebei Province, China. The survey was conducted for approximately 30 days from March 16th to April 17th. The total number of valid samples collected was 377.

The results of the identification of the hypotheses between variables based on the questionnaire data are as follows: Firstly, social influence, shared trust, innovation, interest, and self-efficacy have a positive impact on perceived usefulness, perceived ease. Secondly, perceived usefulness, perceived ease has a positive effect on the intention to use. In view of the above research results, the theoretical significance and limitations of this research and the future research directions are discussed in depth.

► Keyword: Creative Dance, VR Technology, Technology Acceptance Model, Perceived Usefulness, Perceived Ease, Intention to Use

I. Introduction

The development of information and communications technology is dramatically changing our life. Computer technology enables us to live an extremely convenient and efficient life. With the accelerating development and gradually expanding fields of these technologies, not only new changes have emerged in the fields of industry, economy and culture, but also the proportion of

information and communications technology has been gradually increasing in the field of art.

With the accelerating development of digital technology, the application of digital technology expands continuously, and the application of new media that utilizes digital technology is also increasing in the field of dance. Technology and media can be used as tools of

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new forms and new field of dance in the creation of dance works, and it is of great artistic significance to expand dancing knowledge through these processes to provide unprecedented aesthetic experience. In dance creation, the environment for dance creation has made rapid progress and taken on a new look through the application of film and television technology, network, computer graphics and media technology.

Among these new technologies and media, the latest "fourth industrial revolution" enables the new generation of information and communications technology to integrate into industry, with Virtual Reality (VR) being the hot topic of the entire industrial circle. Virtual Reality (VR) refers to IT technology which enables the public to experience "virtual reality that does not exist". Recently, with the development of intelligent media and image technology, representative VR devices have come into use.. "Virtual Reality (VR) has a wide range of applications in games, sports, movies, entertainment, education and other fields, and it is expected to have an enormous impact on the entire field." In particular, virtual reality technology, as a technology to enhance users' sense of involvement and presence, has aroused tremendous attention. Consequently, it has been applied in many fields. Moreover, a variety of attempts have been made to break through difficulties in combining virtual reality technology with education..

The value of dance creation education based on this virtual reality may well break away from the previous secondary three-dimensional creation education, and present itself as a new four-dimensional stimulus. The experience of virtual reality (VR) can generate creative stimulation and free thinking, thereby delivering a large number of new creations. Especially in dance creation, the application of virtual reality (VR) technology displays various possibilities through the expansion of performance, and thus VR will serve as a tool to fully meet the intention and imagination of choreographers. Therefore, it is essential to explore the possibilities of new dance techniques using VR technology to break the previous perception of dance and initiate new dance creation.

However, based on the previous research on dance creation education, it can be found that dance creation education is emerging, for instance, "scanning" and compromise dance education, education based on thinking, dialogue and discussion, stimulation, and so on. The reality

is that, in spite of the development of media and digital technology, the two-dimensional approach remains in use in education currently. In addition, although the latest digital technology has been actively applied in dance assignments and academic concerns, it is mainly based on research related to technical examples, conceptual characteristics and media aesthetic views. In spite that it has its own meaning, it is specifically VR technical medium.

Therefore, considering the possibility of new dance creation brought by new technologies and media utilizing VR technology, it is essential to provide influencing factors and understanding of the decision-making process of VR technology acceptance with the aim of accepting new VR technology in dance creation education. Consequently, this study aims to analyze the acceptance model of virtual reality technology in dance creation education and verify the influences and factors in the acceptance process on this basis.

II. Theoretical literature

1. Dance Creation

Creativity in dance means to fuse and form relevant elements appropriate for dance. It is an artistic process and an outcome that draws the ideal of life and nature from the body as an original activity expressing artistic inspiration as ability to move appropriately in various environments as a dance work. In order to accomplish this goal, it is necessary to continuously study motion using elements of all basic movements. Developing kinesthetic sense is also an important factor in creative dance.

2. Virtual Reality

VR(Virtual Reality) means 'virtual reality' if you translate it into a combination of two words, virtual and reality. The origin of virtual reality is the use of 'virtual reality' in the book by Antonini Artaud, a French playwright, poet, actor and director.

This virtual reality is generally defined as "human being feels realistic in cyberspace created by computer." Virtual reality technology for realizing this is "to make the user feel very similar to real world, A three-dimensional virtual environment is created, and a user can freely manipulate various input / output devices in the virtual environment and provide a corresponding means.

3. Technology Acceptance Model

The Technology Acceptance Model (TAM) was first designed and presented by Davis FD in 1986, and it is the theory to explain the acceptance process of innovation technology. It is followed by Warsaw, (TAM) and the planned behavior theory (TRA), which are the theoretical bases of the technology acceptance model (TAM), have been studied together with various scholars such as Prof. Dr. Bagozzi and Venerates Theory of Reasoned Action (TRA) is designed to "substantiate the behavior of any human being." The Theory of Planned Behavior (TPB), Subjective norms, and perceived behavioral control influence behavioral intentions.

4. The Main Variables of the Technology Acceptance Model (TAM)

4.1 perceived usefulness

Perceived usefulness is the subjective belief that the productivity and efficiency of work will be increased by introducing new technologies or systems. Davis (1989) The use of the system is defined as the degree of helping to improve the work, and it can be understood as an evaluation of the result that the information technology users will select and use the specific technology related to the productivity and efficiency of the work, have. The perceived usefulness used in the study listed the perception that the new VR technology does not require much effort and can be easily performed.

4.2 Perceived ease

Perceived ease of use is a subjective belief that using a new system will not require much emotional and physical effort. Davis (1989) defined that the perceived ease of use in the initial technology acceptance model is the degree to which an individual believes that the use of a particular system is not difficult, and that the less physical and mental endeavor required to learn and use the new information technology, It can be understood as an evaluation of the process of being. In this study, The results showed that the perceived ease of use influenced the intention to use VR.

4.3 Intent to use

The intention to use is the ultimate dependent variable of the technology acceptance model, which means that the existing user intends to continue to use the innovative product, or the intention that the potential user intends to

use for the innovative product. In the present study, the intention to use VR was defined as a degree of intention to use VR technology and was used as a dependent variable of the study.

External variables influencing the perceived usefulness and perceived ease of use of the exogenous variable technology acceptance model for the extension of the technology acceptance model (TAM) Based on the previous studies on the successful acceptance of computer or web-based media Interest, and self-efficacy.

(1) social influence

Social influence is perceived pressure received by an individual to perform a specific action. In most of the previous studies, social influence is limited to subjective norms, and many scholars believe that subjective norms. This social influence is the perception of what a colleague or friend thinks is valuable. In the end, the influence of actors around actors and how important people think influences behavior or perception of actors.

(2) shared trust

Shared trust has been shown to have a positive effect on the actual use of information technology as a concept of individual confidence in the effect of using new VR technology.

(3) Innovation

Individual informativeness represents the degree to which an individual is relatively receptive to innovation. The degree to which a recipient can easily and quickly accept a new one has an important impact on whether a consumer accepts a new product. Therefore. In this paper, we propose a new methodology for the analysis of information systems.

(4) Interestingness

Interestingness represents a degree of joyful thought or amusing immersion while using new media technologies. Interest in the acceptance of information technology has been confirmed as an important factor. Koufaris(2002) classifies the concept of flow into intrinsic fun and perceived control and attention. Among them, the intrinsic fun could have a significant effect on the use of technology. In the state of flow, humans have sincerely fallen into action, narrowing the focus of perception and have developed it. Therefore, interest is the degree of enjoyment that can be felt when using VR.

(5) Self-efficacy

Self-efficacy has been analyzed as an important variable that directly affects the use of information technology, meaning confidence in the user's own ability and efficiency in new dance media and technology. Self-efficacy is a theoretical basis of Bandura's social cognitive theory. It is the individual's belief and confidence that he or she can succeed when doing something with a certain purpose. The results of this study are as follows. This new media and technology self-efficacy will have a significant impact on VR usage.

III. research method

1. Research Model

The research model based on hypotheses used to achieve these research goals is shown in Figure 1 below.

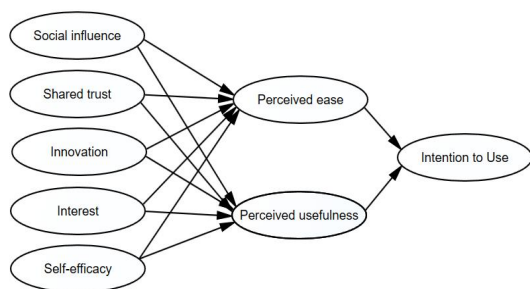


Fig. 1. Research model

2. Research Hypothesis

H1: Social influence will have a positive effect on perceived ease.

H2: Shared trust will have a positive effect on perceived ease.

H3: Innovation will have a positive effect on perceived ease.

H4: Interestingness will have a positive effect on perceived ease.

H5: Self-efficacy will have a positive effect on perceived ease.

H6: Social influence will have a positive effect on perceived usefulness.

H7: Shared trust will have a positive effect on perceived usefulness.

H8: Innovation will have a positive effect on perceived usefulness.

H9: Interestingness will have a positive effect on perceived usefulness.

H10: Self-efficacy will have a positive effect on perceived usefulness.

H11: Perceived ease will have a positive effect on Intent to use.

H12: Perceived usefulness will have a positive effect on Intent to use.

3. Data Sources

The subject of this study is a general dance creator who resides in. Therefore, we conducted a survey through off - line to investigate the attitude of accepting VR technology in creative dance education. The questionnaire was collected for about 30 days from March 16, 2019 to April 17, 2019. A total of 377 samples were collected.

4. Operable Instructions of Variables

In this study, questionnaire was used as a measurement tool to examine the attitude analysis of VR technology acceptance of dance creators. The results of this study are as follows. First, the questionnaire consisted of the following items: social influence, shared trust, innovation, interest, self-efficacy, perceived Usefulness, perceived ease of use, and use. Table 1 summarizes the variables measured.

Table 1. Operable Instructions of Variables

variable	Justice
Social influence	Perceptions of the influence of reference groups such as colleagues, friends, and professors in relation to the use of new VR technology
Shared trust	The degree of confidence in the effectiveness of the new VR technology
Innovation	The extent to which we accept new VR technologies and accept them
Interest	The user's interest in using the new VR technology
Self-efficacy	Confidence in ability to use VR technology in creative dance with a good understanding of information technology and use
Perceived ease	The recognition that there is no need for much effort in using the new VR technology and that it can be done easily
Perceived usefulness	The user's perception that using the new VR technology will increase educational and learning outcomes
Intention to Use	Intent to actively embrace new VR technology

IV. Analysis Result

1. Demographic Characteristics of the Specimens

As for the general characteristics of the study subjects, the demographic characteristics of the respondents were male 52 (13.8%) and 325 (86.2%) of the total 377 respondents. The proportion of women was higher than that of men. In addition, the highest age group was 140 (37.1%) aged 40 to 49. Followed by 114 (30.2%) respondents aged 20 to 29 years. Followed by 78 respondents (20.7%) aged between 30 and 39 years. Four (1.1%) of the respondents with the lowest response rate were younger than 20 years old. 178 respondents (47.2%) answered that they were the college graduates. Followed by 79 college graduates (21.0%) and 66 high school graduates (17.5%). 54 respondents (14.3%) answered that they had the lowest response rate. The results of the occupational survey were the highest (148 persons, 39.3%). Followed by 77 of respondents (20.4%). Followed by 59 respondents (15.6%). 38 respondents (10.1%) responded that they had the lowest response rate. The survey results showed that the respondents with 300 ~ 4 million won were the highest with 128 (34.0%). Followed by 81.5% (21.5%) of respondents between 4 and 5 million. Followed by 77 respondents (20.4%) with more than 5 million won. The respondents with the lowest response rate ranged from 200 to 3 million, with 39 respondents (10.3%).

2. Data Quality Inspection

2.1 Exploratory Factor Analysis and Reliability Analysis

First, exploratory factor analysis was conducted to examine whether each measurement tool used in this study was the same as the intention of this study. Principal component analysis was performed to minimize the loss of information while minimizing the number of factors and to prevent the validity of the measurement. In order to clarify the factor classification of the variables, the orthogonal rotation method(varimax) was used. Factor extraction criteria were eigenvalue of 1 or more, factor load of 0.5 or more, and eigenvalue of 1 or more as a whole. The Cronbach's Alpha coefficient, which is a measure of internal consistency, was measured to ensure the reliability of the measured variables. If the value is more than 0.6, it is judged to be relatively reliable. If the value is more than 0.7, it is considered to be high.

Table 2. Exploratory Factor Analysis and Reliability Analysis of Exogenous Variants

Configuration concept	Survey question	Factor load value	α
Shared Money Trust	Shared Money Trust 4	0.77	0.94
	Share money trust 1	0.76	
	Shared Money Trust 3	0.75	
	Shared Money Trust 2	0.69	
	Share money trust 5	0.66	
Interest	Interest 4	0.77	0.91
	Interesting 3	0.76	
	Interesting 5	0.74	
	Interesting 1	0.63	
	Interesting 2	0.62	
Self-efficacy	Self-efficacy 2	0.77	0.93
	Self-efficacy 4	0.76	
	Self-efficacy 3	0.74	
	Self-efficacy 5	0.63	
	Self-efficacy 1	0.62	
Innovation	Innovation 1	0.73	0.93
	Innovation 2	0.71	
	Innovation 5	0.67	
	Innovation 3	0.66	
	Innovation 4	0.65	
Social influence	Social impact 3	0.72	0.91
	Social Impact 4	0.72	
	Social impact 5	0.68	
	Social impact 2	0.61	
	Social Impact 1	0.56	

As shown in Table 2, all factors are more than 0.5, and the shared money trust is 17.56%, interest is 16.03%, self-efficacy is 15.25%, innovation is 15.10%, and social influence is 13.54% . As a result, Cronbach's Alpha coefficient was 0.9 or more, which is a general tolerance, as shown in Table 3. As a result, the reliability of the measured variables was secured.

Table 3. Exploratory Factor Analysis of Measured Variable

Configuration concept	Survey question	Factor load value	α
Intention to Use	Intention to Use2	0.81	0.90
	Intention to Use1	0.80	
	Intention to Use3	0.76	
Perceived ease	Perceived ease2	0.78	0.88
	Perceived ease3	0.77	
	Perceived ease1	0.74	
Perceived usefulness	Perceived usefulness1	0.82	0.91
	Perceived usefulness2	0.82	
	Perceived usefulness3	0.66	

As shown in Table 3. all factors were more than 0.5, 28.69%, 27.61%, and 26.72%, respectively, indicating a useful explanatory power of 83.02%. As a result, Cronbach's Alpha coefficient was 0.8 or more, which is a general tolerance value as shown in Table 4, and the reliability of the measured variables was secured.

2.2 Confirmatory Factor Analysis

Confirmatory factor analysis was conducted to verify

convergence validity and discriminant validity of measured variables. As can be seen in Table 4, the fit of the measurement model is GFI = .872, AGFI = .847, NFI = .928, IFI = .966, CFI = .966, RMR = .029. The fit of a measurement model can be evaluated as a relatively satisfactory fit. In the mean time, χ^2 (df) = 916.978 (499) and χ^2 / df is 1.838 (when the number of samples is large, the maximum is 5.0 or less, usually 2 to 3 or less is recommended), it is confirmed that the measurement model used in this study is superior.

In addition, factor loadings of confirmatory factor analysis showed statistically significant t-values and convergence validity was confirmed. At the same time, the combined reliability was evaluated through Amos. In all items, the result was more reliable than the general allowance of 0.6. On the other hand, another measure of convergent validity is the average variance extraction (AVE) value, which is known to be valid only if the magnitude of variance is 0.5 or greater. In this study, we found that the convergence validity was obtained because the mean variance extraction (AVE) value of all factors was over 0.5.

Table 4. Analysis of Certainty Factor

Configuration concept	Standard factor load	T value	Complex reliability	AVE
Social influence	0.845			
	0.836	20.420		
	0.798	18.508		
	0.799	18.515		
	0.789	18.163	.953	.811
Shared trust	0.864			
	0.897	24.483		
	0.888	23.821		
	0.835	21.225		
	0.859	22.354	.905	.743
Innovation	0.817			
	0.819	18.935		
	0.831	19.246		
	0.920	22.631		
	0.887	21.321	.927	.772
Interest	0.810			
	0.858	19.683		
	0.860	19.628		
	0.785	17.163		
	0.813	18.097	.930	.726
Self-efficacy	0.828			
	0.875	21.336		
	0.882	21.218		
	0.873	21.047		
	0.794	18.296	.938	.786
Perceived ease	0.900			
	0.885	25.768		
	0.866	23.721	.905	.743
Perceived usefulness	0.809			
	0.861	19.327		
	0.852	18.878	.927	.772
Intention to Use	0.856			
	0.896	23.243		
	0.842	20.377	.930	.726
$\chi^2=916.978$, $P=.000$, $DF=499$ $CMIN/DF =1.838$, $GFI=.872$ $AGFI=.847$ $NFI=.928$ $IFI=.966$, $CFI=.966$ $RMR=.029$				

3. Research hypothesis verification

A structural model was used to verify the hypothesis. The path coefficient of the structural model to verify the hypothesis can be found in Table 5. The fit index for the structural model used in this study is $\chi^2 = 546.950$, $P = .000$, $DF = 182$, $CMIN/DF = 3.005$, $GFI = .870$, $AGFI = .835$, $NFI = .911$, $IFI = .939$, $CFI = .938$ and $RMR = .091$ respectively. The fit of the structural model in this study has no major problems and can be evaluated to an acceptable level.

As can be seen in Table 5, social influence has an effect on perceived ease of use of -0.013. These results were not statistically significant at the 0.05 level ($C.R. = -0.125$, $p > 0.05$). Hypothesis 1 was therefore rejected. Shared trust has a 0.204 effect on perceived ease of use. These results are statistically significant at the 0.05 level ($C. R = 2.333$, $p < 0.05$). Therefore, Hypothesis 2 was verified as expected. Innovation has an effect on perceived ease of use of 0.192. These results were statistically significant at the 0.05 level ($C. R = 1.99$, $p < 0.05$). Therefore, Hypothesis 3 was verified as expected. Interest has an effect on perceived ease of use of 0.485.

These results are statistically significant at the 0.05 level ($C. R = 4.912$, $p < 0.05$). Therefore, Hypothesis 4 was verified as expected. Self-efficacy has an effect on perceived ease of use of 0.311. These results are statistically significant at the 0.05 level ($C. R = 3.257$, $p < 0.05$). Therefore, Hypothesis 5 was verified as expected. Social influence has an effect on perceived usefulness of 0.001. These results are not statistically significant at the 0.05 level ($C. R = 0.008$, $p > 0.05$). Hypothesis 6 was therefore rejected. Shared trust has a 0.011 effect on perceived usefulness. These results were not statistically significant at the 0.05 level ($C = 0.159$, $p > 0.05$). Therefore, Hypothesis 7 was rejected. Innovation has an effect on perceived usefulness of 0.225. These results were statistically significant at the 0.05 level ($C = 2.976$, $p < 0.05$). Therefore, Hypothesis 8 was verified as expected. Interest has an effect on perceived usefulness of 0.274. These results are statistically significant at the 0.05 level ($C.R = 3.603$, $p < 0.05$). Therefore Hypothesis 9 was verified as expected. Self-efficacy has an impact on perceived usefulness of 0.395. These results are statistically significant at the 0.05 level ($C. R = 5.191$, $p < 0.05$). Therefore, Hypothesis 10 was verified as expected. Perceived ease has an effect on intention to use of 0.312. These results are statistically significant at the 0.05 level ($C.R = 4.627$, $p < 0.05$). Therefore, Hypothesis 11 was verified as expected. Perceived usefulness has an effect on the intention to use 0.611. These results

Table 5. Structural model analysis result

Route	Path coefficient	Standardized path coefficient	C.R.	P
Social influence → Perceived ease	-0.013	-0.011	-0.125	0.9
Shared Trust → Perceived ease of use	0.204	0.192	2.333	0.02
Innovation → Perceived ease	0.192	0.159	1.99	0.047
Interest → Perceived ease	0.485	0.392	4.912	***
Self-efficacy → perceived ease	0.311	0.241	3.257	0.001
Social influence → Perceived Usability	0.001	0.001	0.008	0.994
Shared Trust → Perceived Usability	0.011	0.013	0.159	0.874
Innovation → Perceived usefulness	0.225	0.249	2.976	0.003
Interest → perceived usefulness	0.274	0.296	3.603	***
Self-efficacy → perceived usefulness	0.395	0.408	5.191	***
Perceived ease → Intention to Use	0.312	0.379	4.627	***
Perceived usefulness → Intention to Use	0.611	0.556	6.478	***
X ² =991.423, P=.000, DF=505 CMIN/DF =1.963, GFI=.862 AGFI=.837 NFI=.922 IFI=.96, CFI=.96 RMR=.034				

*P<0.05

are statistically significant at the 0.05 level (C.R = 6.478, p <0.05). Therefore Hypothesis 12 was verified as expected.

V. Conclusions

In this study, based on the technology acceptance model of VR technology and system acceptance in creative dance education, we set up a theoretical model of factors and decision process affecting decision of acceptance of new dance technology and media using VR technology. Based on the surveyed data, the research goal is to analyze the relationship between variables using path analysis.

The hypothesis of the hypothesis among the variables based on the questionnaire data is as follows. First, hypothesis of the study that external variables on technology acceptance will have a significant effect on perceived ease of use, social influence, shared trust, interest, innovation, Have a significant (+) effect on perceived ease of use.

Second, social influences, shared trust, innovation, interest, and self-efficacy have a significant (+) influence on the hypothesis that external variables on technology acceptance will have a significant effect on perceived usefulness.

Third, it was found that the perceived ease of use had a significant effect on the hypothesis of the study that it had a significant effect on the intention to use.

Fourth, the hypothesis that the perceived usefulness will have a significant effect on the intention to use has been concluded to be significant.

Based on these conclusions, this study suggested the following.

First, in this study, only dance students' acceptance attitude toward VR technology was analyzed. In order to

utilize the new VR technology and media acceptance more actively in the curriculum of creative dance, it is necessary to study how to use VR technology in specific creative dance education based on this research.

Second, the perceived ease and perceived usefulness of the new VR technology, which has a decisive influence on the intention to use, is strongly influenced by the psychological attitudes of users such as reliability, innovation, and interest in VR technology. The teacher should be aware of this point in class.

Third, in the follow-up research, it is necessary to provide a variety of practical programs and learning materials so that students have an interest in VR technology acceptance in the curriculum of creative dance, and research will be carried out in order to increase confidence in the ability to use VR technology. There is a need.

Fourth, the market size is not large enough for the dance students to understand the characteristics of VR. There is a high possibility that the questionnaire was conducted through expectation without accurate recognition of VR technology. When the VR market expands, the fields are segmented, and users have an accurate perception of VR, empirical research on new technologies should be done.

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