Virtual Reality for Creation of a Cultural Image for Campus: Exploring Digital Campus Culture Branding

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Abstract. This article describes a study carried out at part of the campus in China, This research investigated the Virtual Reality(VR) following through three questions based on the survey: Whether the creation of a digital cultural brand is beneficial to the dissemination of campus culture; Whether the cultural image of campus under Virtual Reality has a positive effect; Whether virtual technology can assist in the creation of a campus cultural brand and bring about good benefits. The data was collected based on a questionnaire applied to 2896 students, content analysis, and an unstructured interview. Statistically significant findings reported that the creation of a digital image of the campus culture brand is very important, and Virtual Reality technology can assist in the healthy dissemination of campus culture and form a lot of value space.

Keywords: Virtual Reality, Digital Campus, Virtual Cultural Identity (VCI)

1 Introduction

Virtual Reality (VR) can generate a few realistic images, sounds and other sensations by means of some mobile, digital devices that simulate the actual presence of the user in a virtual environment. Virtual reality encompasses auditory and visual feedback, as well as other types of sensory and force feedback that can be realized through haptic technology for a complete virtual reality experience feel. The purpose of this technology is to give people a better sensory experience in their space.

Nowadays, the development of digital technology is driving the growing maturity and realism of virtual reality. The development of many industries is integrated with virtual reality technology to produce even more marvelous effects. In the field of cultural construction, the link between the virtual and the real has brought about an era of progress in the technological dissemination of culture. Therefore, the cultural construction and development of campus is also associated with virtual reality. In the future, the construction and development of digital cultural image of campus is an important task.

This paper analyzes the propaganda role brought about by the assistance of virtual reality in the construction of cultural image in campus, and through experiential research on teachers and students in some we have learned about their attitudes and opinions on the construction of digital cultural image on campus. This paper promotes the digital dissemination of campus culture and the construction of virtual image and discusses the value it plays in the development of campus.

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2 Virtual Reality for Creation of a Cultural Image for Campus

2.1 Cultural Experiences in Virtual Reality

Virtual Reality (VR) is a technology that realizes the real experience through simulation, which uses posture tracking and 3D near-eye display technology to make users feel immersive in the experience, in feeling the reality of the virtual world.The two main concepts in the virtual reality experience are divided into Immersion and Reality–virtuality continuum. Immersive virtual reality (VR) is the perception of immersion created. This perception is created by a virtual reality system that surrounds the user with images, sounds, or other stimuli to the senses that provide an immersive overall environment. The virtuality continuum is a continuous scale between fully virtual (virtuality) and fully real (reality). Thus, the reality-virtuality continuum includes all possible states of variation and combination of real and virtual objects. It is defined as a concept in new media and computer science, but in reality it can be considered as an anthropological problem.

The rapid development of modern technology has brought about new changes in the development of different design education and careers. For example, new media, product design, graphic design, spatial design and their industries related to computer programs and technologies have expanded tremendously. Through computer-aided design more and more areas of design to achieve a variety of digital new design experience, which not only brings people a good cultural experience but also achieve greater economic value. In this paper, we will focus on the benefits that the aid of virtual reality technology brings to cultural communication and digital cultural image building in campus. Under the influence of the Internet, consumers have access to different information from all over the world; information that is timeless, critical and verifiable.

Virtual reality technology under the cultural image of colleges and universities to create is in the virtual space under the construction of a digital campus imagery, through the advantages of virtual space to break the time and space limitations more convenient, efficient and stylized dissemination of cultural content, in the process the campus can give full play to their own characteristics, in the virtual space will be their own comprehensive and comprehensive display, in order to achieve a more powerful dissemination of energy.

To summarize, this paper explores the impact of virtual-augmented reality technology as a modern technology in some of the design fields, especially in campus culture design, and how to create a valuable digital campus culture brand through virtual reality technology to achieve more value in terms of brand design. [10].

2.2 Digital Campus Cultural Development

There are many cultural image design experiences in flat spaces that give the viewer a good visual experience, but in life we still need three-dimensional, three-dimensional spaces and even further cultural experiences with a sense of atmosphere and authenticity.

There is a rigorous design process and program for designing cultural experiences, whether they are under virtual reality technology. Therefore, we also have an efficient design method in establishing digital campus culture.

Cultural Design Process with Virtual Technology:

- Researching who the identified product will be used by and the various ways in which it will be used.
- Drawings or renderings, images on paper or computer, to provide a visual design framework for subsequent design ideas.
- Use computers to produce concept drawings and virtual model drawings of different designs.
- Producing design prototypes.
- Examine design materials and production costs to determine design options.
- Communicate with industry experts and research their design concepts to rationalize costs to meet needs.
- Evaluate the utility, appearance and functionality of cultural design products to determine if the design can be feasible.
- Develop a space for the display of the cultural product design and the dissemination of the cultural experience.

From the current development of the design industry, the future of digital cultural design and the mature application of virtual experience technology has an unlimited development space. From the perspective of the experience and promotion of college culture, the use of virtual technology to develop a digital campus brand is a major development direction of innovative design, with the aid of such technology, campus culture will get more far design inspiration can also realize the broader value of the significance[6].

3 Research Method

In this study, the campus is in China was examined through content analysis. And conducted unstructured interviews with users. Subsequently, the cultural experiences in Virtual Reality by students of campus is in China was analyzed. This data was collected through the paper questionnaire based on a literature review and verified through reference interviews. This method was applied to 2896 students participating in campus culture experiences activities.

The questionnaire consists of the following parts:

Section 1 – Matching statistically different virtual reality technologies with compatible cultural experiences.

Section 2 – Analyzing attitudes, emotions, level of understanding, and impressions of value in terms of the feelings brought to participants by virtual reality cultural experiences.

Section 3 – The study examines how much attention and whether participants are interested in virtual interactive cultural experiences, ultimately predicting the future of digital culture consumption.

Then, data analysis and statistics were conducted to verify whether there was a statistically significant difference in the average importance of Virtual Reality for creation of a cultural image for campus.

4 Research Result Analysis and Discussion

4.1 Virtual Reality Technology and Campus Cultural Experience

A report from ABRP (which has manufacturing facilities in Canada, the U.S., Mexico, Finland and Austria) shows that 48 percent of consumers say they are more likely to buy products from merchants that offer AR experiences. Unfortunately, only 15% of merchants are currently using AR technology to sell products. Another 32% of merchants said they plan to include virtual reality or augmented reality apps within the next three years.[1].

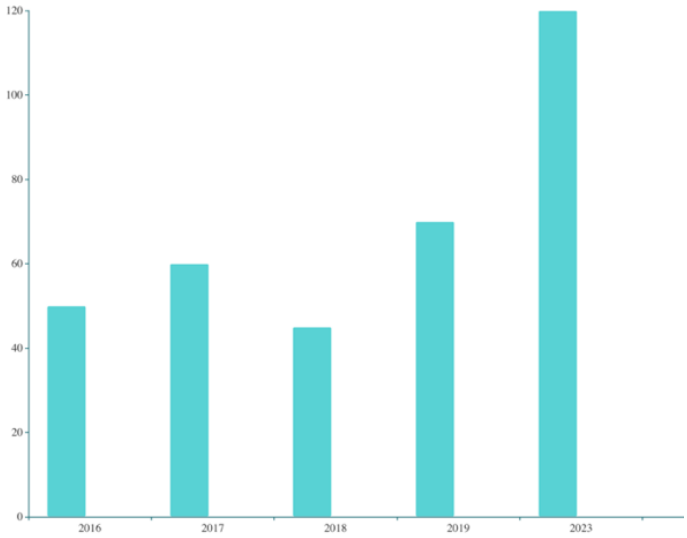

Fig. 1. Shows the use of the virtual reality (VR) market.

Data from https://www.statista.com shows that the virtual reality (VR) market is expected to reach $16.8 billion in 2019, and the numbers are expected to continue to expand dramatically in the future, topping $160 billion in 2023, as shown in Figure 1. Further values suggest that augmented reality will have great potential to boost sales, while more than 50% of users will use augmented reality in their mobile devices when shopping. In addition, 33% of them are already using VR features in stores. With the success of augmented reality app Pokémon go, the global augmented reality market is expected to reach $117.40 billion by 2022 and the global virtual reality market is expected to reach $33.90 billion by 2023. This represents the integration of virtual experiences as an assistive technology in realizing more and more of the world's cultural experiences, and the increasing refinement of virtual technology to generate more cultural value and benefits[7].

Table 1. Purposes and uses of VR applications in cultural experience design,deoending on the display

	Display	Prevalent topics	Uses	Examples
VIRTUAL REALITY	HMD (Head Mounted Display)	> Design > Sens / Cognition > Education > Representation	> Immersive sketching and design > Sensitive experience > Remote collaboration > Spatial evaluation	CAP,VR
	CAVE（Audio Visual Experience Automatic Virtual Environment）	> System > Design > Representation	> Scale 1:1 design > Spatial evaluation > Visualize simulations	VR
	Immersive screen	> Design > Sens / Cognition > Education > Representation	> Immersive sketching and design > Local and remote collaboration > Spatial evaluation	HYVE-3D,Viz Lab

The findings show that we are distinguishing between different display systems: HMDs, CAVEs, or immersive screens for VR applications; and HMDs, smart devices/screens, or any surface (SAR) for AR applications. Depending on the type of system used, the aims and objectives of the consumer's application differ, as shown in Table 1.

VR in the design domain can be used for VRAD (Virtual Reality Assisted Design). This represents an operational relationship between a digital model (CAD - Computer Aided Design) and a virtual model (model built in a VE - Virtual Environment), in this case one of the technical complexities of VRAD environment usability. Designing in virtual environments (IVE) is relatively rare in campus cultural experiences, but it is quite developed in the field of industrial design, automotive and spatial design, reducing the cost of production of 1:1 prototypes Hyve-3D offers the possibility of direct drawing in virtual environments with a 360° screen display, and the use of a mobile device can also be used as a guided interface, e.g., for presentations and for interaction with virtual environments of Various interaction designs, in this case with only one person present at a time. In this case, only one student at a time experiences the VRAD design experience activity wearing an HMD in the virtual environment. He/she was always in audio contact with the other members of the team, who were seeing the scene on the display. The results of the experiment showed that the collaboration between the students was very effective and that the immersive design enhanced their experience[4].

Therefore, there are many links between Virtual Reality technology and campus cultural experience, through the aid of virtual technology can present a more experiential cultural communication space, so that participants can experience the immersive cultural concept of the main purpose of campus cultural communication.

4.2 Participants' attitudes toward Virtual Culture

In this section, we will focus on some of the connections and results mentioned above, which were developed in conjunction with technologies designed to assist in the process of cultural

experience for the cultural communication of the campus, supporting conceptualization, simulation, or evaluation.

Table 2. Number of participants in virtual cultural experiences

Type of participant	Quantities
Teachers	819
Students	1098
Alumnus	979

In this sub-section, the usage of the cultural experience by the Participants of the campus is considered, through the analysis of the results obtained from a questionnaire applied to 2896 of them. The section was organized as the questionnaire's components, namely: teachers, students and alumnus. Table 2 shows the ratio of specific numbers. By researching different groups of people, we can see the gap between different identities in terms of how they feel about the campus cultural experience, which will make it easier for us to make more comprehensive findings.

Table 3. Participants' knowledge and experinence of the virtual cultural experience.

Technology type	Understanding	Liking
HMD (Head Mounted Display)	weak	medium
CAVE（Audio Visual Experience Automatic Virtual Environment）	medium	strong
Immersive screen	medium	medium

In the survey results, it was shown that we can distinguish between different display systems: the use of HMDs, CAVEs, or immersive screens in VR applications; and the use of HMDs, smart devices/screens, or any surface (SARs) in AR applications. Depending on the individual system types used, the purpose and goals of the application vary, as shown in Table 3.

VR in design can be used for VRAD (Virtual Reality Assisted Design). This implies interoperability between digital models (CAD - Computer Aided Design) and virtual models (models built in VE - Virtual Environments), and also points out that the usability of VRAD environments in this context is one of the challenges of technical realization. Designing in Immersive Virtual Environments (IVE) is not common in architectural design, but it is quite developed in industrial design in the automotive and aeronautical fields, reducing the cost of production of 1:1 prototypes.Fuchs, Moreau, and Guitton [5] explain that, compared to designing with CAD tools, designers working with VRAD tools have to add to the model more information. In fact, the behavior of each element must be defined in the VE. According to these authors, the advantages of VRAD are the enrichment of creativity, the contextualization of the design result or product, the change in the scale of the virtual model and the clarity of the virtual representation, which facilitates the integration of the end user into the design process.

The scope for virtual technology to assist in design is growing, and its ability to play a positive role in the design and dissemination of the cultural image of the campus is in a positive direction. The types of application of Virtual Reality technology in campus cultural experience are mainly divided into three aspects, namely: HMD (Head Mounted Display), CAVE（Audio Visual Experience Automatic Virtual Environment） and Immersive screen. Participants in the process of experience China respectively showed the degree of understanding and the degree of liking

of the three types, specifically see Table 3. At the same time, the presentation of this survey result also points out the way for the future direction of the development of Virtual Reality technology in the campus cultural propaganda, so that the participants can more clearly choose the suitable experience is an important way of cultural propaganda accuracy [3].

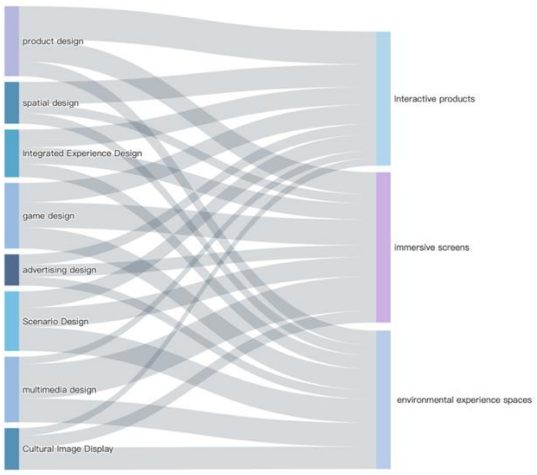

Fig. 2. Degree of match between Virtual Reality technology and cultural experience

Based on the results of these two studies, the next step will be to conduct a design study between Virtual Reality technology and cultural experience, that is, to identify suitable Virtual Reality technology for assisting in the design of the experience from the enhancement of the matching degree and the feeling, degree refer to Figure 2.

Tests were conducted based on three modes of interaction, namely, interactive products, immersive screens, and environmental experiential spaces three types of Virtual Reality technology and experience design were paired to analyze the most adaptive choices for each other. In this project, seven main design approaches were selected for matching, namely product design、spatial design、integrated experience design、game design、advertising design、scenario design、multimedia design and cultural image display. In the mutual matching of the two sets of categories there is no absolute suitability or inappropriateness of each other, but there are matching options that work better. Therefore, we should pay more attention to the comprehensive assistance when applying Virtual Reality technology in the design field, and help designers complete a richer experience through more technical aspects. In the campus cultural image design, applying different experience technologies between different cultural displays helps the campus to establish a complete cultural communication system[8].

4.3 Development benefits and prospects of virtual interactive culture

The design process involves a series of logical steps, and virtual reality technology can participate in many of them, to the point where the final design becomes a two-party interactive

process, with the designer on one side and the interactive virtual reality technology on the other, with this relationship understood as follows, refer to Figure 3 for detailed flow:

First is the stage of gathering information and analyzing competing products, in this stage augmented reality can be used to analyze the design features and specifications of the product and find out their strengths and weaknesses through various simulations.

- the design and ideation phase, where augmented reality helps to evaluate different ideas for comparison and select the best solution from them based on how they would look in a real environment, as well as providing designers with many technical drawings by Augmented Technology Drawing (ATD), converted into 3D shapes by means of barcodes and appropriate applications.

- Development of the final idea stage, selection of appropriate colors, materials and construction of a virtual model in a real environment; - Different testing phases of the designed components and between the different components, using augmented reality to analyze the characteristics and specifications of the product and identify its strengths and weaknesses.

- At the stage of designing components and different assemblies, augmented reality can be used to analyze the characteristics and specifications of the product and identify their strengths and weaknesses through relevant simulations. In the design and conceptualization phase, Augmented Reality helps in evaluating various ideas, comparing the alternatives and selecting the best from them based on their presence in the real environment and providing the designer with many technical drawings by Augmented Technology Drawing (ATD) [2]. As well as the stage of testing the design and its engineering aspects [9].

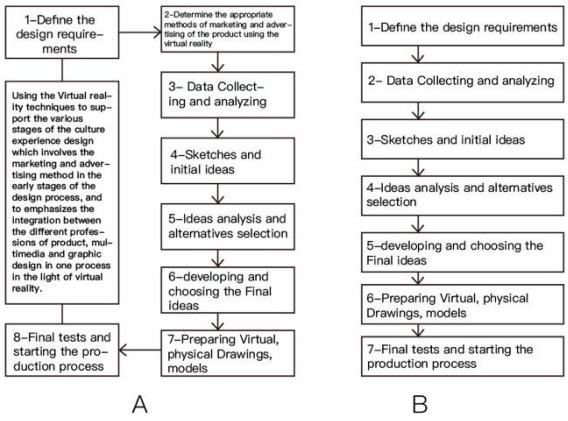

Fig. 3. Shows (A) the resulting product design stages in the light of using the Virtual Reality and (B) the classic one.

In summary, the support of virtual reality technology in the design of the overall design is a modernization of the help. Whether in the design field of any industry and digital, virtual technology combination has a certain development space, from the campus of the cultural image construction can be several kinds of design way to integrate into produce new ideas. From a comprehensive point of view, only by maintaining the combination of diversified design and

the innovative development of virtual technology can we realize new design ideas and create value space.

5 Conclusions

Based on the survey and research data, this paper affirms that the establishment of a digital cultural image is meaningful for the campus, as well as in the virtual reality technology for the development of campus culture construction up a positive role, but also for the campus culture of innovative design to provide a new direction. By analyzing the data of the design field of specialization and virtual reality matching, a more comprehensive result is seen. Overall, the campus cultural experience under virtual reality is beneficial and brings value space for campus communication development. As a research focus of virtual reality technology, combining the application needs of the campus and the characteristics of virtual reality technology with each other, discovering the economic value in the process is an important task of the research, and continuously strengthening and improving the development of campus culture is the focus of integrating the new technology and the future direction of research.

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