Research on the Visual Media Design System of Brands Integrating New Media Technology in the Attention Economy

Ying Yu [1, a*], Dantong Yu [2, b]
* Corresponding author Email: 89743860@qq.com, Email: 937867000@qq.com

Shenyang Jianzhu university Institute of Design and Art, Hunnan, Shenyang, Liaoning, China

Abstract—In the age of attention economy, it becomes increasingly important what unique experiences brands can bring to consumers. In this paper, we analyze what kind of brand visual media design system can lead to brand sales by studying people's visual needs from the perspective of attracting audience's attention. With the arrival of new media technology, virtual reality (VR) technology is applied to the construction of visual media design systems to address the problem of slow scene switching time in traditional visual media design systems. Based on the analysis of the characteristics of brand visual media design under the attention economy, the hardware required for the system is designed. In the software part, two ports were designed to integrate the hardware and software design to complete the design of the visual media design system based on 3D VR technology. The experimental comparison results show that the VR-based visual media design system is faster than the traditional scene switching system and can complete the scene switching in the system in a short time, which has great advantages and proves the effectiveness of the system.

Keywords-Attention Economy; Visual Media; Branding; New Media Technology

1 INTRODUCTION

1.1 Research Background

By December 2021, the number of Internet users in China was 1.032 billion, and the Internet penetration rate reached 73% [1]. The rapid development of mobile communication technology and the popularity of smart phones have created a new era for brand communication, and the focus of brand communication has shifted from traditional mass media to new network media. Nowadays, media emerge in endlessly and change with each passing day, and different consumer groups have formed different media preferences and media usage habits. At the same time, as Marshall McLuhan said, media is information [2]. Media is not only the carrier of symbols and other information, but the information contained in media itself has an important influence on the understanding of brand symbols and brand personality.

Due to the development of society and technology, visual media design is emerging in China, and with the development and improvement of the economic system, new media technologies such as 5G represented by artificial intelligence will start a new systemic reconstruction of media technology from the perspective of information content, media channels, terminals, big data, marketing, etc.

1.2 Purpose of the study

In the era of attention economy, to stimulate consumers' desire to buy, first of all, we need to attract consumers' attention, and through continuous conscious management, consumers can keep this attention and form attention, so as to win profits for enterprises. Nowadays, brands do not give priority to consumers' emotional and visual needs in their visual media design, and are unable to gain consumer recognition. The purpose of this paper is to study how brands can base on consumers' visual needs in visual media design to make consumers more impressed with the brand, so that the brand can achieve better communication and promotion effects.

2   ATTENTION ECONOMY

What is attention market economy? Attention market economy refers to an economic form in the process of manufacturing, producing, using, communicating and consuming scarce resources through attention. The media acts as a "bank" in the attention market, occupying the core position. In such a market environment, the richer the known information, the fiercer the unknown competition, and the more precious the attention resources are. If you want to gain the initiative in the fierce competition, you need to win the attention of consumers first, which is of great help to the formation of product brands and the sales of products. The resources of visual attention are the key to the development and cultivation of an organization, especially in the new market economy and development atmosphere. If brands get visual attention, they can gain advantages in the competition among companies.

According to the research data of Harvard Business School in the United States, visual perception is the most important in people's five senses acceptance, accounting for 83% of information acceptance, while other proportions are: taste accounts for 1%, touch accounts for 1.5%, smell accounts for 3.5%, and hearing accounts for 11% (as shown in Figure 1). Therefore, in the era of attention economy, people's daily life is full of various brands, so how a brand can attract consumers' attention in the shortest time and make them make purchases is an important guarantee for the long-term development of brands.
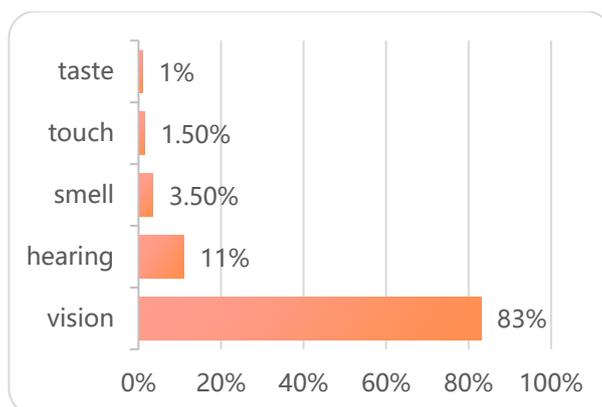
Figure 1.   The proportion of information received by the five senses of human beings (Data source: Guolian Securities Research Report)

3   VISUAL MEDIA DESIGN

The meaning of "media" refers to the communication media, media, that is, the carrier of information dissemination [5]. The so-called visual media design refers to the active visual expression in order to spread specific content, which generally includes two-dimensional images such as logo, layout, plane, product design and illustration.
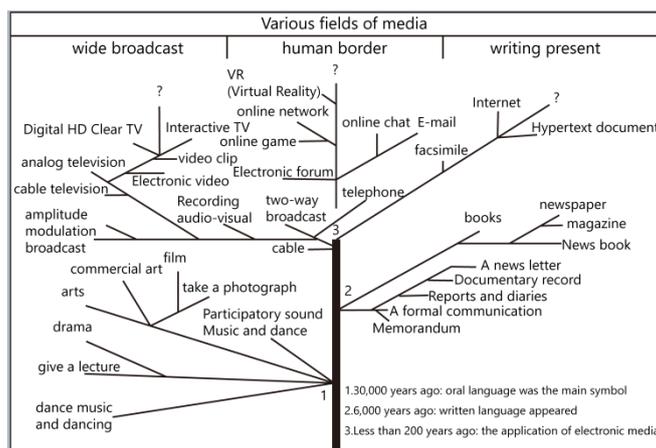

Figure 2.   The field of media (Photo credit: Self-drawn by the author)

Generally, visual media design appears in the form of two-dimensional space. With the development of economy and the progress of science and technology, visual media design has begun to expand towards electronic technology. The static advertising has become dynamic, and the two-dimensional space has become multidimensional. The original advertisements printed only on paper have gradually become diversified, and paper advertisements are no longer the only ones.

4   NEW MEDIA TECHNOLOGY

4.1 New Media Technology

New media is a media model that has flourished out of traditional media forms such as newspapers, TV programs, and internet broadcasting, and it presents new business forms that are more entertaining to users systematically by integrating multiple terminals such as computers and cell phones, and through new forms of expression such as one-to-one, many-to-one, and many-to-many [8].

VR technology in new media technology, also known as Spirit Crystal Technology, is a high technology involving multiple disciplines developed at the end of the 20th century [10]. It integrates computer technology, sensor technology, simulation technology, and microelectronics. The ideal VR is the use of these technologies to create a virtual environment by computer, which makes the user feel the same effect as in reality through the action of vision, hearing, touch, taste and smell, thus making the user immersive. It allows direct interaction

between the user and the environment. VR is a combination of several technologies, including 3D VR. 3D VR is essentially the use of computer models to create a three-dimensional virtual world that provides a sense of immersion for the user to view things in a three-dimensional space without permission [11].

4.2 Communication vehicles under new media technology

What brand advertising pursues is to implant the brand into consumers' hearts, and it is also better to carry more information about brand image through brand advertising and reach a deeper interactive relationship with consumers. However, brand advertising needs advertising forms with visual impact and display effect, such as outdoor digital screen, OTT screen (smart TV/network TV screen), PC (personal computer) screen and cell phone screen, all of which have the ability to become high-quality brand These screens have the ability to become carriers of quality brand advertising.

4.2.1 Outdoor digital screen

Outdoor digital screen is now pointed out in the public environment of digital media, outdoor digital screen covers a wide range of content, modern city life can be seen everywhere, from the roadside digital screen to the cinema screen can be called outdoor digital screen media, outdoor digital screen can be said to be a form of media into the circle of consumer life.

4.2.2 OTT screen

OTT screen is the network TV screen, refers to the public Internet to provide users with video, games, shopping and other services in the form of media, unlike traditional cable TV can only watch live TV stations, OTT TV can do on-demand movies / TV shows and other program content at any time, and can be networked to achieve the TV screen to browse the web, play games and other functions, but also as a screen and other electronic devices interconnection, to cast the way to use, it can be said that OTT screen is an Internet upgrade of the traditional TV screen.

4.2.3 PC Screen

PC devices are currently the two most mainstream applications are as a productivity tool for work and study and as a carrier of leisure and entertainment, and in the use of the state of the PC screen is mostly for the user's immersive exposure to one person, to achieve the advertising to the user's desk.

4.2.4 Mobile Phone Screen

Cell phone integrates social communication, audio-visual entertainment, life services and other aspects into one, through the cell phone can complete the whole chain of behavior from browsing advertising to order purchase, is undoubtedly a high-quality advertising carrier, but also the most effective form of media to reach users.

Table 1 Changing trends of different screen carriers

	Interaction Capability	*Scenario-based*	*Refinement*
Outdoor digital screen	Body tracking, naked eye 3D and other technology applications, giving the screen more interactive possibilities	More suitable for advertising brands in shopping and travel scenarios to place	With the support of big data capabilities, it will refer to geospatial, personnel flow and other data to achieve more refined placement
OTT screen	Cross-screen linkage with cell phones, linkage with smart homes and other forms to provide more interactive possibilities	More suitable for advertising brands in home scenarios for placement	Targeted and accurate placement can be combined with users' movie viewing data and shopping browsing data
PC Screen	Continuously develop new forms of interaction, such as PC pop-ups, cell phone opening screen jump infomercial	Better fit for advertising brands in workplace scenarios for placement	Combined with rich user data tags, with the continuous improvement of data processing capability and rich data assets deposited, the level of placement refinement is driven to enhance
Mobile Phone Screen		Fragmented usage habits to meet multiple scenarios advertising brands for placement	

4.3 Research and analysis of consumers' impressions of PC screen advertising

4.3.1 Research questionnaire and analysis results

#### 4.3.1.1 Questionnaire setting

PC screen as a productivity tool carrying office demand and game entertainment demand, and cell phone screen as an essential communication tool in modern life, both perform better than outdoor digital screen and OTT screen in terms of absolute time of use and daily frequency of reaching users, so the questionnaire survey will mainly focus on this, making the questionnaire more meaningful.

4.3.1.2 Research process

The questionnaire survey focused on school students, office and community PC users. The questionnaire was mainly designed in the form of single-choice questions, and the questions mainly included whether consumers were impressed by the PC screen form of advertising, consumers' acceptance of PC advertising and analysis of the reasons why consumers were more impressed by PC advertising.

4.1.3.3 Research Results

37.33% of users have a certain impression of PC screen ads, and 12.74% have a deeper impression of such ads. PC screen ads leave a slightly lower impression than outdoor digital screens and OTT screens, but overall users have a higher acceptance of PC ads, with 48.68% of users saying they can accept PC ads as long as they do not interfere with normal computer use.
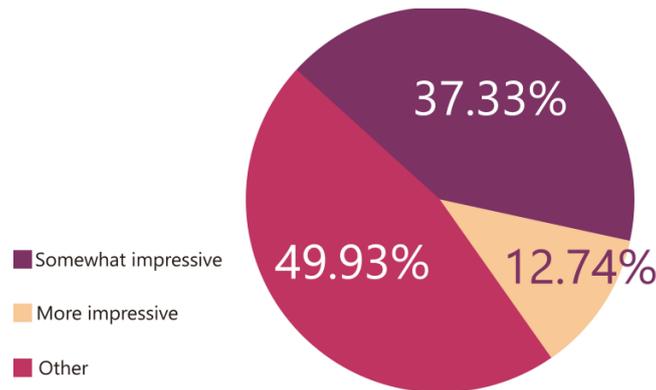
Figure 3. Analysis of PC users' impressions of advertising (Photo credit: Self-drawn by the author)

The results of the reasons why PC users are more impressed by advertisements in the research questionnaire show that 72.3% of PC users can directly click on the products they are interested in; 66.3% of PC users think they are more focused on the scenes of using PC when they are working or studying; 61.4% of PC users think the visual impact of advertisements is strong; 61.4% of users think PC advertisements are in a richer and more diversified form; and 59.4% of users think that PC ads are recommended according to the content they are interested in, etc. (see Figure 3).
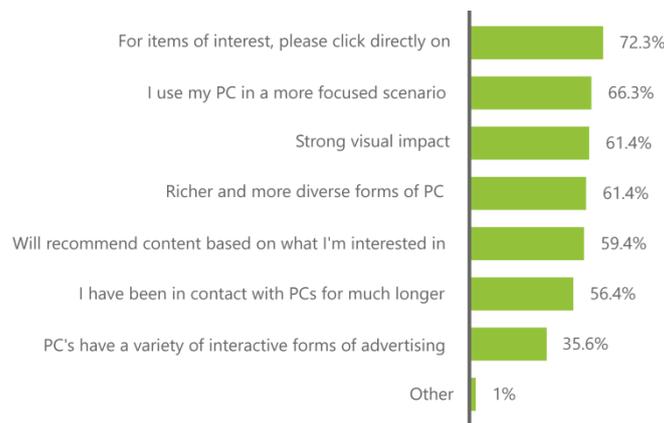
Figure 4. Reasons why PC users are more impressed by ads (Photo credit: Self-drawn by the author)

PC screen as an advertising carrier, with clickable and interactive, when users browse to the products of interest, they can directly click on the products to further understand or directly order conversion, after a smoother link is an important reason why users will be impressed by

PC screen advertising. In addition, whether users are using PC for work or entertainment, they are relatively more focused when facing PC screen; and PC screen is closer to users in the use of scenarios, and the larger screen size brings a stronger visual impact.

4.2 Research Summary

It follows that visual media design should meet people's functional use and visual aesthetic needs. Visual media design is influenced by many factors. If there are some problems in visual media design, the design effect will not reach the expectation. Meanwhile, the poor performance of traditional system can lead to deviation of design art concept and wrong design direction. Therefore, a VR-based visual media design system is constructed to solve the current problems.

The visual media design system is a platform for brand presentation. The visual media design system that introduces 3D virtual reality technology can integrate the things to be designed into 3D space, make the whole design more three-dimensional and realistic, simplify the tedious design process, promote the diversification of visual media design technology, and provide a new design method for visual media design. Traditionally, the medium is described by two-dimensional graphics, and the information obtained lacks intuitiveness and interactivity. Therefore, how to stereotype two-dimensional electronic images, integrate VR into three-dimensional images, and complete the three-dimensional virtual reproduction of the medium is the focus of analysis [13]. By analyzing the basic requirements of current visual media design, VR is applied to the visual media design system. The hardware of the system includes the environment module and the global control module, and the software mainly implements the data processing and storage of the system [14]. The experimental comparison results show that the response time of this designed system is shorter than that of the traditional system for scene switching. The use of VR technology in visual media design can create a good 3D virtual medium to make consumers know more about the brand and accelerate the development of the visual media industry.

5 VISUAL MEDIA DESIGN SYSTEM INCORPORATING NEW MEDIA TECHNOLOGY

5.1 Generation of three-dimensional environment

Creator modeling software is used for modeling solid models and terrain models in the environment. The software uses the modeling module Terrain to model *.ded files of the corresponding format independently, to process the textures and colors of the model, to build the environmental feature model, and to obtain the environmental terrain model data in DFD format by the GeoFeature module.

The elevation data of 2D e-environmental map is confusing, so the initial map data needs to be corrected to get the grid data of the same area. The data supplement method is adopted as distance-weighted interpolation method to predict the values of uncertain points, and the values of uncertain points are calculated by weighting the known values of adjacent points, and the given weights are obtained according to the distance of.

$$f(x, y) = \left[\sum_{i=1}^{n} W(d_i)z_i \right] / \sum_{i=1}^{n} W(d_i)$$

(1)

Where: $W(d_i)$ is the weight function. z_i represents the number of the i-th known point. d_i is the distance between the point i and the uncertain point. The distribution between adjacent discrete points and uncertain points is different, which has different interference effects on f(x,y). $W(d_i) = 1/d_i^2$ is the best result, and the inverse ratio of the square of d_i determines the $W(d_i)$ value.

5.2 System design

5.2.1 Design of hardware system and software system

The system hardware uses a microcontroller as the main controller to control and process some special environmental calculation processes. An input environment indication unit and an output unit are designed, which carry the input and output of VR. The overall hardware design circuit framework is shown in Figure 5.
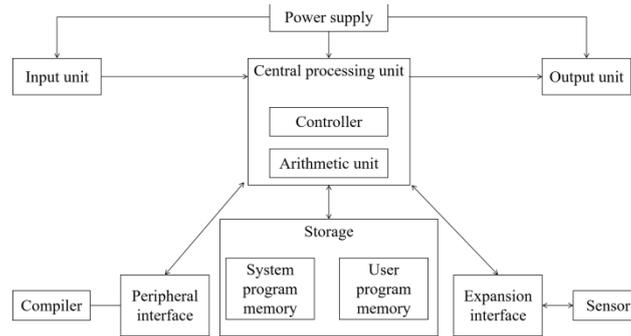

Figure 5.   Hardware composition diagram

According to Figure 2, the hardware of the design system mainly includes central processing unit, memory, input/output interface, design equipment, communication interface and power supply. The controller adopts microcontroller based on single chip microcomputer, which has simple structure and powerful programming function, and can bear changing environmental design data. To ensure the safety and reliability of the processing, the sensor adopts SP12 multifunctional sensor, designs the internal clock of the sensor, places two oscillators inside the sensor, places the low-power oscillator with an oscillation frequency of 2.5kHz in the internal clock, and uses the oscillator with an oscillation frequency of 2MHz in the data function module. The specific sensor structure is shown in Figure 6.
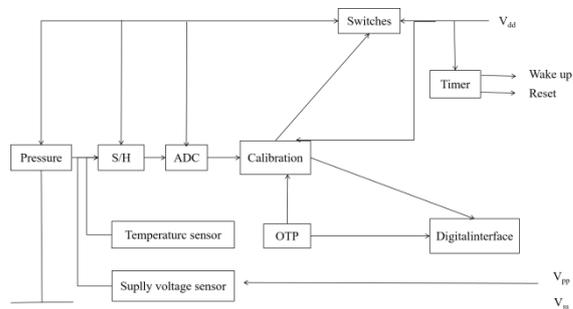
Figure 6. Sensor structure diagram

The data function module is designed as a terrain data module, a building module and a plant position module. The three modules collect data respectively, and then perform digital-to-analog conversion. The memory design is divided into two modules, the system program memory and the user program memory. The system software design is divided into two parts, namely the server side and the client side. The two ports are connected through the Internet. The server port provides designers with necessary design data and other resources. The client can communicate with the server port according to the designer's needs. The overall structure diagram is shown in Figure 7.
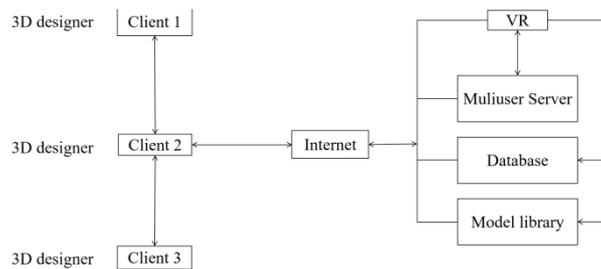
Figure 7. Overall architecture diagram of system software

As shown in Figure 4, the server side of the Virtual Reality Environment Art Design System (VREAD) integrates a 3D VR, a SQL Server database, a Virtools Multiuser Server server, and an Environment Model Library.3D VR enables data communication by querying, modifying, adding, deleting data in the database requested by the designer. In order to improve the extensibility and flexibility of the system, the two-dimensional graphic information in the environment design is geometrically transformed to present the three-dimensional virtual reality effect. The process of dimension transformation is regarded as the change of environmental graphics in the coordinate system, and the two-dimensional graphics are represented by homogeneous coordinates, and the coordinates are constantly changed to achieve the effect of three-dimensional virtual reality. At this time, it is assumed that the coordinates before dimension change are [x, y, 1] and the coordinates after transformation are $[x^*, y^*, 1]$, and the two-dimensional transformation matrix at this time can be expressed as:

$$T_{2D}\begin{bmatrix} a & d & g \\ b & e & h \\ c & f & i \end{bmatrix}$$

(2)

In the formula, a, d, g, b, e, h, c, f, i all represent the coordinate points of the two-dimensional image. When performing the transformation, formula (2) is divided into 4 sub-matrices $\begin{bmatrix} a & d \\ b & e \end{bmatrix}, [c,f], \begin{bmatrix} g \\ h \end{bmatrix}$ and [i]. The sub-matrix $\begin{bmatrix} a & d \\ b & e \end{bmatrix}$ is scaled, rotated, and symmetrical transformation. $[c,f]$ is translation transformation. $\begin{bmatrix} g \\ h \end{bmatrix}$ is a projection transformation, g can produce a vanishing point at 1/g on the x-axis, and h can produce a vanishing point at 1/h on the y-axis. [i] The entire two-dimensional graphic can be scaled. Thus, $\begin{bmatrix} 1 & 0 & 0 \end{bmatrix}$ can be expressed as an infinite point on the x-axis, and $\begin{bmatrix} 0 & 1 & 0 \end{bmatrix}$ as an infinite point on the y-axis, $\begin{bmatrix} 0 & 0 & 1 \end{bmatrix}$ as the origin. In this case, the dimension transformation can be achieved by:

$$[x^*, y^*, 1] = [x, y, 1]\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ T_x & T_y & 1 \end{bmatrix}$$

(3)

In the formula, T_x, T_y represents the dimensional change in the coordinate axis. The dimensional conversion process is recorded in the computer, and the design of the 3D VR environmental art design system is completed.

5.2.2 Experiments and results

3D VR and modern visual media design are in a transitional stage. From the application environment of 3D VR, the development of its overall technology application has gradually realized visualization and scientific, which can rely on new media design technology to complete the 3D design, thus ensuring the intelligence of the whole visual media.

Using the perceptive ability of virtual environment can inspire designers' thinking and bring them an immersive feeling. In the process of feeling, there is a deeper appreciation of the fun of human-computer interaction, giving full play to the substantial role of 3D VR. In the process of visual media design, these features of 3D VR are given full play. Designers can use computer technology to complete their designs, and can also use this technology to simulate real objects. Before implementing the plan, the builder can communicate with the designer. The designer can use 3D VR to show the builder the design plan and model, identify the deficiencies in the plan, and make suggestions accordingly. This implementation scheme is very intuitive and easy to use.

6   CONCLUSIONS

With the development of science and technology, visual media design has gotten rid of the situation that design implementation can only be done with paper and pen. Computer-aided design has become the main design tool for designers, shortening the design cycle and improving design quality to a certain extent. Among them, the most prominent one is the environment design system supported by 3D VR, which reflects the pending design elements in media more realistically and provides new ideas for visual media design. In order to improve the overall level of visual media design, the combination of 3D VR and visual media design strengthens the practicality, operability and visibility of modern visual media design, and provides more favorable conditions for scientific adjustment of visual media design.

Through this system, a more realistic and vivid virtual environment can be created to enable users to experience the sense of touch, vision and hearing, deepen their memory and enhance the sense of picture in the virtual environment. Therefore, it is of great theoretical and practical importance to explore and study the practical application of visual media design systems for brands incorporating new media technologies in the attention economy.

REFERENCES

[1]   Guo, J. 2021. After putting on new apps, 360 browsers and 360 searches, 360 is eager to return to   C-end-ZAKER   News. https://view.inews.qq.com/k/20211213A05S2300?web_channel=wap&openApp=false&pgv_ref=baidutw

[2]   J. Jiang, H.H. Practical Exploration of Inheriting Traditional Culture and Higher Education Institutions in the context of the Internet era [J]. Zhi Ku Times, 2018(39):3.

[3]   D. Guan, J. On Visual Consumption Guided by Print Commercial Posters [D]. Shenyang Normal University, 2015.

[4]   J. Du, P. The role of visual media design for TV commercials [J]. News Front, 2015(12X):2.

[5]   J. Zhang, H.M. On the influence of network media [J]. Northern Literature Xunkan, 2013, 000(005):224-224.

[6]   J. Wang, W.R. Research on the Multiple Development path of Visual Communication Design in the 5G era[J]. Industrial Design, 2020(10):2.

[7]   J. Zhu, Y. Research on Visual Media Design [J]. China Science and Technology Information, 2008(19):159.

[8]   J. Xu, R. A Preliminary Study on the Qualities of Self-Media and its Impact [J]. Cultural and Educational Materials, 2015(11):3.

[9]   J. Du, P. The role of visual media design for TV commercials [J]. News Front, 2015(12X):2.

[10]   Chen, Y.F. Ship indoor environment design system based on 3D virtual reality technology. Ship Science and Technology, vol. 42, no. 20, pp. 17-19, 2020.

[11]   Hu, M. Wang, D. Industrial product design CAD 3D modeling system based on virtual reality technology. Modern electronic technology, vol. 42, no. 9, pp. 150-152, 2019.

[12]   Zhou, F.Y. Analysis of the application of 3D virtual VR technology in environmental art design. Journal of Jiangxi Institute of Education, vol. 40, no. 6, pp. 52-54, 2019.

[13]   Wang, M.M. Application of Virtual Reality Technology in Environmental Art Design. Heilongjiang Science, vol. 10, no. 22, pp. 134-135, 2019.

[14]   Wang, F. Duan, J.C. Research and Analysis of Virtual Reality Technology in Virtual Design Environment System. Management and Technology of Small and Medium-sized Enterprises (Mid-day Issue), vol. 563, no. 1, pp. 182-183, 2019.

[15]   Chang, Y.X. Discussion on the Application of Virtual Reality Technology in Environmental Art Design. Art and Design (Theory), vol. 2, no. 8, pp. 55-56, 2019.

[16]   He, F.Y. The impact of VR technology on modern environmental art design. Beauty and Times (Urban Edition), vol. 687, no. 1, pp. 69-70, 2017.

[17]   Wang, L. Application of Virtual Reality Technology in Environmental Design Teaching. Journal of Hubei Second Normal University, vol. 35, no. 9, pp. 82-85, 2018.

[18]   Zhang, C. Application of VR technology in interior design renderings of environmental art. Mang Chong, no. 3, pp. 121-122, 2018.