

The Influence of Digital Multimedia Communication Forms on Graphic Design

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Today, highly sophisticated technology has changed the lives of most individuals worldwide. In the field of graphic design, the emergence and development of digital multimedia communication forms have had a crucial impact on the creative process of graphic design and even the process of communication, offering more opportunities and more exciting challenges to this domain. And with the continuous improvement of people's material culture and spiritual culture, the digital age has enriched people's production and life. Especially in the application of digital multimedia in graphic design, the changes caused by the emergence of digital multimedia focus mainly on the visual expression. With the continuous application of digital multimedia communication forms, the graphic design closely related to it has been affected to some extent. In order to meet the changing data needs of people, graphic design has also begun to adjust accordingly. Therefore, this paper analyzes the relationship between digital multimedia and graphic design from the perspective of art design, systematically determines the relationship between multimedia and graphic design specific design subjects, and studies the influence of digital multimedia technology on graphic design. Email of corresponding author: huangshenghong@mail.zixu.edu.cn

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1. INTRODUCTION

Throughout the ages, people have been looking for ways to express ideas and communicate feelings via visual symbols, to better store their memories and knowledge, and to make information more convenient [1–2]. The creation of words and the invention of printing are the results of such efforts. Human exploration has always been ongoing, and has now reached the stage of digital multimedia technology. In the last century, the rapid development of multimedia attracted worldwide attention, and has broad applications in industry where it continues to flourish [3]. According to statistics, for 10 million users, broadcasting has been used for 30 years, TV has been 13 years, cable TV has spent 10 years, and multimedia has only been used for 5 years [4–6]. Although the history of multimedia

development is relatively short. Digital design art is a new skill, experience and knowledge system made possible by computer technology, and is constantly developing with the changes of the language rules of science, economy, art, design and other knowledge categories [7, 8].

The development of digital multimedia technology has made traditional visual symbols more challenging than ever before; hence, graphic design needs to continuously seek a broader development space in the field of modern science and technology [9]. In the new media era, graphic design has not only changed in scope, but has also extended from two-dimensional plane to a three-dimensional one. At the same time, this domain has abandoned the flat and static visual communication effect, and begun to pay attention to the application of new media technology, allowing it to incorporate sound and colour. The fusion of basic elements such as light and animated images produces a dynamic and integrated visual

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communication effect, allows the communication of virtual information images [10–14]. It can be said that under the impetus of digital technology, the traditional graphic design approach has undergone a radical transformation [15]. Modern graphic design focuses on designing the media environment it is based on, which will enrich and complement its diversity [16]. The emergence of digital multimedia has changed people's traditional ideas and concepts, and allowed artistic creation to adopt a variety of expressions [17–18]. Digital art design is a new form of expression. Current progress and development have changed the traditional expressions used in graphic design and realized the dynamic development of ways to convey information. It not only reflects the authenticity of the virtual world design, but also ensures the continuous progress of Chinese culture in this technological era.

Tracing back to history, the transformation from arts and crafts to design concepts was a complicated and chaotic process in the 20th century. Design had been developing in the West for a hundred years, while in China, the history of modern design spans less than 20 years [19]. Graphic design involves not only the use of multiple elements, but also the application of different expression techniques [20]. Graphic design uses a variety of design elements to carry out an organic art combination, forming a work with creative graphics, color and taste, and material texture that is impressive. The foundations of design, such as the arts and humanities, society and commerce, are developing and changing, and the creation of new technologies and media significantly influences design. The development of graphic design can be seen in the change of design work mode and structure and the change of design performance and shape [21–22]. In China, although a large number of talented people have been supported and encouraged, most of them engage only in low-end art design projects, and are not given the opportunity to produce more classic works. Our art design does not depend on the strength of people, but on the elites of industry, but unfortunately, the outstanding design talents in industry are very rare. This has caused many of our works that could be influential to be only drawings and nothing more. Without enough contemporary artistic flair and content, the designs are a failure [23–24]. In addition, the artistic accomplishments of many famous designers in the world are spectacular. The styles of various theories and works have deeply influenced our environmental art design work. With many of our works, careful observation shows what has inspired them [25]. This requires us to actively learn from them, rather than learning, to truly understand their actual connotations. What is least acceptable is the one-sided imitation which does not reflect cultural authenticity. Moreover, such imitations do not convey the rich ethnic character of a country [26–27]. The frequent occurrence of such phenomena is cause for vigilance and reflection. We all know that environmental art as a manifestation of art has a strong attribution.

Therefore, this paper uses the system analysis method to explain the relationship between digital multimedia and graphic design, and systematically explains the concepts and features of graphic design and digital multimedia respectively. A detailed analysis will be conducted of the performance of graphic design in the digital multimedia era and the influence of new media on graphic design.

2. RESEARCH ON THE RELATIONSHIP BETWEEN DIGITAL MULTIMEDIA AND GRAPHIC DESIGN

2.1 Multimedia Technology

Although the idea of “multimedia” has been around for a long time, the concept of multimedia in terms of digital technology appeared in the early 2000s. The concept is also gradually changing with the development of technology and people's understanding. Broadly, multimedia means the integration of multiple media for the purpose of communication, emphasizing that multimedia itself is a property of the media. As the name suggests, multimedia is about using a variety of media. Negroponte, the author of *The Digital Revolution*, and other stakeholders at the Massachusetts Institute of Technology Media Laboratory believe that multimedia, also known as composite media, is usually defined as being two or more modes of communication aggregated into a single media. Multimedia also relates to “performance media” as it can integrate various methods of presentation media such as text, graphics, images, sound, animation, video, etc. to achieve a rich presentation of information. It also suggests the interaction between the media and the users. Strictly speaking, today, multimedia refers to digital multimedia, that is, multimedia that utilizes digital devices such as computers.

Multimedia is often narrowly considered as being the use of a variety of media for the one purpose. Multimedia technology is an information processing technology that integrates various ways of conveying information such as sound, video, image, animation, etc. It can receive external images, sounds, videos and various other media information. Through computer processing, pictures, texts and sounds are applied. Multi-mode outputs such as animation, etc., is achieved by means of a variety of input and output methods. The well-known computer magazine “Personal Computer” in the United States explained: “Multimedia computers are a set of hardware and software devices that combine various visual and auditory media to produce unforgettable audiovisual effects ...In the medium, including language, stereo and music, users can access a variety of colorful media sources from multimedia computers”. Put simply, “multimedia” mainly refers to art design using computer technology and any combination of carrier, text, image, computer graphics, animation, sound, video, etc. Hence, it is a technical means that assists with design; its design process depends on the computer carrier; and the design effect is often inseparable from network transmission [28].

2.2 Graphic Design Technology

“Graphic design” was first introduced into the Chinese mainland by design books published in Hong Kong and Taiwan in the 1960s. At that time, graphic design was defined as a work that expressed the content by means of patterns, fonts, illustrations and photography. These features are widely used in commercial design to influence public attitudes and opinions. Promotional and advertising purposes can be achieved through professional visual design and beautiful printing in the logo, leaflets, etc.

Graphic designs are used in packaging, catalogues, newspapers, magazines, calendars, posters, etc., conveying instant messages intended to influence consumers and promote sales.

Modern graphic design has gone through more than a century of development, and graphic design involves a lot of content. Every major step in this evolution redefines the concept of “graphic design”. As the design master, Ryan Han, said, the 50-year design life has seen him and other designers being transformed from “business artists” to “graphic designers” to “visual communicators”. From this, it can be seen that the design has undergone change according to the times. Nowadays, it has experienced the baptism of the digital information revolution. The scope of design is constantly expanding as is the designer’s content. Both the design tools and the design concepts are changing. The only constant quality of graphic design is the wisdom derived from the mind, intended to give new insights into a particular aspect of society or the environment.

2.3 Overview of the Relationship between Digital Multimedia and Graphic Design

The introduction of computers into the design field gave rise to much controversy. Some people think that computer technology is not adequate and cannot achieve the same effect as manual design. Today, as computer technology matures, more and more graphic designers use computers for graphic design. With the maturity of digital multimedia communication, digital graphic design has become more recognized and accepted by designers. The graphic design of digital multimedia communication, whether it is color, font or layout, is better than manual processing. The graphic design achieved by digital means consists of a variety of characteristics. With the development of computer technology, graphic design software has emerged, such as Photoshop, Painter and CorelDRAW, in addition to a wealth of 3D design software, such as 3d Max, Maya and so on. The use of graphic design software enriches the color of images and the design effects. The three-dimensional graphic design software is designed to be comprehensive, allowing the graphic designer to add new ideas to the original design, and at the same time create a more vivid work [29]. The emergence of digital multimedia has enriched graphic design and promoted its development.

Multimedia technology mainly involves the presentation of information that incorporates, for example, sound and video images. The characteristics of multimedia are also diverse, and they are more prominent in terms of comprehensiveness and interactivity, virtual reality, and all-round display. There is also a close relationship between digital multimedia and graphic design. Multimedia has developed rapidly, due to its unique characteristics. The interactive fusion of computer technology is a phenomenon of graphic design. Different media communication characteristics will also have different effects depending on individuals’ psychology and perception of the information being conveyed. In regard to continuation and inclusiveness, multimedia and traditional graphic design have continuity. Multimedia as a medium for visual communication has both graphic design principles and design elements [30]. Moreover, new technologies have made multimedia more

dynamic and sophisticated. Digital media as a form of communication is very powerful, particularly since the graphics made possible by computers and comprehensive technology are more effective than traditional graphic design.

Multimedia has a comprehensive feature, which can expand the processing range of images and realize the humanized creative mode by means of computer technology. Simple changes and adjustments can be made in a variety of media resources such as images, texts, sounds, videos, etc., to achieve a complete architecture. It also has the characteristics of mutuality. Through the design and application of the software, it can examine the information/or and message being conveyed and judge its effectiveness. This interactive generation art design facilitates effective communication with people. It also has virtual reality features. In addition to offering various visual elements, it also has a certain perception function, which enables users to experience real effects in a virtual environment. It also has a full range of expressions, because digital design is not just a single visual factor, but a collection of comprehensive, multimedia forms. It is possible to edit and process each image, and it can also create according to people’s changing ideas, thus enriching the components of art design and realizing the expression of art. This new expression technique has been applied to various fields. During the period of development and utilization, the positive effects on visual communication have been changed, and the main forms of expression have been improved, thus creating art that represents a new form of communication.

3. THE IMPACT OF DIGITAL MULTIMEDIA COMMUNICATION ON GRAPHIC DESIGN

3.1 Characteristics of Digital Multimedia Communication Form to Graphic Design

The digital multimedia format is a new media technology based on computers and the Internet [31]. Its purpose is to provide a new design platform for each traditional design form by establishing a digital network device. Thus, graphic design has the following characteristics:

(1) Faster propagation speed

The final purpose of any piece of graphic design work is to convey information, but there is a great variety of ways by which the information is conveyed. The creation of traditional graphic designs takes longer and they are generally highly regional. Even the works of famous designers can only be distributed in the local area. In order to let people in other regions understand this work, it must be realized through the transportation and exhibition of works. On the other hand, graphic design works created by digital multimedia can be distributed and communicated electronically by means of the Internet, the speed of which cannot be matched.

(2) Technology implementation is simpler

In the traditional graphic design process, the main medium of production is paper. No matter what the designer has, it can only be designed and produced on a two-dimensional plane such as paper. Therefore, in most cases, traditional graphic design requires some designers to have solid foundations and strong drawing skills to produce good designs. On the contrary, for those who have ideas, innovative ability and no solid drawing skills, it is very difficult to produce a good graphic design. With the new digital multimedia media, design has become simpler. Designers can produce a beautiful graphic design simply by having their own ideas and mastering some basic computer design software. This type of work, which is a very good thing for the development of print advertising design, enriches the types of advertising design works to a certain extent.

- (3) Traditional graphic design requires the designer to have certain technical skills and appropriate tools and materials such as various brushes, pens, etc. Other tools, although they can be used, are very big challenges for designers. The digital multimedia era has greatly improved the design tools, and people can easily achieve the desired effects through multimedia technology. For example, with Photoshop software, designers can easily implement various art forms through various filter effects, which can meet people's different needs and enrich the image's impact, so it is a very effective design method. By designing in this way, the visual effect of the work is strengthened.

3.2 The Influence of Digital Multimedia Communication Forms on the Form of Graphic Design Communication

In terms of performance, digital multimedia communication has several impacts discussed below:

- (1) Cross-media communication

At present, different media are increasingly being integrated so that traditional online media and print media are gradually being combined to produce a new form of media. Hence, graphic design can be spread through a variety of media platforms, thereby achieving depth and breadth of communication. First of all, the characteristics of different media platforms will also be different, and will produce different graphic design effects for the purposes of publicity and advertising. Secondly, according to the different characteristics, coverage and audience scope of the media platform, an appropriate media platform is selected to further enhance its publicity effect. Finally, although the media platforms are different, there are still intersecting areas in the scope of communication, and special attention should be paid to them to enhance their influence by using multiple presentations of graphic design works.

- (2) Diversified communication

Traditional media has the disadvantage that as a means of communication it is usually time- and space-dependent, both of which factors can significantly influence the

effectiveness of the communication. The lack of direct communication between the audience and the graphic design designer also has had an adverse effect on the communication effect of the work. Digital multimedia integrates many different communication elements such as printing and network, in this case, video materials, images and data that need to be processed during the creation process, and digital technology can accelerate the creation of the work, thereby improving the designer's creative efficiency. The graphic design work can be disseminated to the audience through a variety of media such as electronic display screens and car TVs. This process of propagation is not constrained by time and space. Hence, the application of diversified modes of communication has made the dissemination of graphic design works more effective.

Traditional media advertisements are obviously inadequate as channels of expressions and communication, and the communication is only one-way from the media to the audience. Traditional advertising media mainly include broadcasting, outdoor media, paper media, television, etc., which are constrained by time and space, and can convey only limited design information to the audience. In the era of digital advertising, visual communication is more diverse. Digital multimedia integrates communication elements such as network, printing, computer, television, and electronic publishing, and processes data, sound, text, video and other content more quickly and effectively, providing a full range of three-dimensional services. For example, a computer network can make the advertisement more vivid and more attractive to the audience; the car TV can make the advertisement appear on the subway; the electronic display can show the advertisement outdoors in airports, shopping malls, stations, etc. and other venues where there is a large flow of people. These communication media are not only fashionable and novel, but also have their own distinct advantages and characteristics, which greatly enrich the communication offered by the advertisement's design and enhance the visual communication effect of the works.

- (3) Humanized communication

Visual communication design is mainly intended to create a psychological interaction with the audience through visual perception. The digital graphic design pays more attention to the interaction with the audience. The audience's experience and evaluation of the design product will lead to continual improvement to achieve perfection, maintaining the sustainability of graphic design. Interaction with the audience is a key feature of graphic design. The designer hopes that the products he designs can attract the attention of consumers. The products he creates can resonate with the consumers. The advertising works he produces can stimulate the interest of consumers in related products as well. In short, the interaction between the designer and the audience can be reflected in all aspects of the design. Through various levels of interactive communication, designers can adjust their creative goals, change their creative styles, and improve their creative standards based on feedback from the audience.

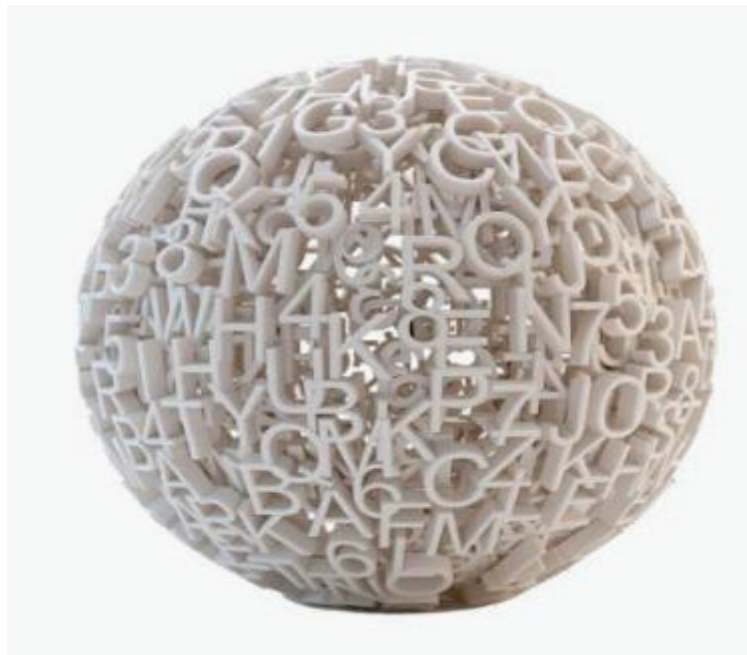


Figure 1 Multimedia graphic design - text stereo ball.

Essentially, graphic design works are created to satisfy the aesthetic needs of the audience at the psychological and visual levels. The advent of digital multimedia has led to the innovative digital graphic design method. Compared to the traditional design process of graphic design, this design approach pays more attention to the integration of the audience into the design process. As the creative process of graphic design works continues, the audience will make corresponding comments and impressions based on the current design situation and characteristics.

4. APPLICATION ANALYSIS OF DIGITAL MULTIMEDIA COMMUNICATION FORM TO GRAPHIC DESIGN

4.1 New Technology for Font Design

The development of computers and computer software that automatically generate fonts, makes it possible for people to make more complex and abstract designs of fonts to reflect the way the information age is communicated. A large number of unique font design techniques have been produced, such as design methods that can be used to create stereoscopic effects using different plate-making and process methods; or a combination of text and graphics, grouping Chinese characters to form graphics; that is morphological text fonts are used to create a particular textural effect and so on. As shown in Figure 1 (image from the network), this is a three-dimensional ball consisting of English characters. These techniques and methods can be used in design so that the fonts can give a sense of “space”, “industry” and “metal”, for example. Special visual effects include “super modernity”. Digital multimedia technology offers endless opportunities for creative font design.

4.2 The Beauty of Digital Text Layout

The design of text in the sports domain is a great challenge. However, animation and hypertext have brought breakthrough changes to text design. Animation adds dimension to motion and time for text design. It means viewing and using text in a moving, time-space concept. Hypertext levels and non-linear reading provide a space beyond the edge for dynamic text. The elements in digital media are sometimes dominated by words, sometimes based on images. In addition to the attractiveness of form and movement itself, the rhythm formed by the arrangement of visual elements conveys a sense of rhythm to the audience, and the movement of the elements attracts people. The eyes focus on the direction of movement, interpret the changing pattern, and thus convey the content to the audience. Figure 2 (picture from the network) shows the online hot-rolling time roulette. It is a circle of numbers, from inside to outside, in hours, minutes, and seconds.

4.3 Innovative Communication of Interactive Advertising

The visual communication conveyed by modern advertising has gradually expanded its dynamic nature and rhythm from the past, in the form of flattening, static and singularization, and has evolved into the integration of three-dimensional, spatial and advertising media. The rise of interactive advertising is a direct manifestation of this trend. Interactive advertising is a form of advertising that uses interactive media to promote products online and offline and to influence consumers’ purchasing decisions. Users can download the software to the desktop to learn about the company’s products, just like sending an email. Or, a simple text message can be sent intended to bring more customers to the site through these services. Interactive



Figure 2 Time roulette.



Figure 3 Formula product creative advertising.

advertising implies an interaction between users, advertisers and digital multimedia. Advertising in the digital multimedia environment should be based on planning and creativity as the core of production and management, making full use of the convenience and creativity offered by digital multimedia technology. However, it should also be clear that the design of advertisements and creative posters is more of a process of creative thinking, not just a matter of technical issues. It requires specific planning and investigation of the audience and the market according to the expected goals of the design. This process will ensure that the theme of the design will be conveyed to the audience more clearly and accurately. Advertising will be more effective if the relationship between digital multimedia technology and artistic beauty is fully understood and reflected appropriately in the design (see Figure 3 and Figure 4).

4.4 Market Satisfaction of Graphic Design Based on Digital Multimedia Technology

This article considers four levels of satisfaction: very satisfied, satisfied, general, and dissatisfied. The questionnaire was investigated by 200 people, and the results obtained are shown in Table 1. It can be seen that most people are satisfied with the graphic design based on multimedia technology.

5. CONCLUSION

- (1) The emergence and development of various forms of digital multimedia communication have had a crucial impact on the creative process of graphic design and even the process of communication, offering more opportunities and more exciting challenges to the graphic design domain.



Figure 4 Creative advertising of a drink.

Table 1 Market Satisfaction Statistics.

Attitude rating	Number of people	ratio
Very satisfied	74	37%
satisfaction	69	34.5%
general	37	18.5%
Not satisfied	20	10%

- (2) The arrival of the digital multimedia era has injected new vitality into graphic design. Both in terms of expression and mode of communication, there has been tremendous progress compared to that of the past, which has led to graphic design works. The efficiency of information transmission continues to increase. However, even so, the designer's focus should still be on the word "creative", using digital multimedia communication as a solid platform for creativity.
- (3) This paper addresses various understandings of "graphic design" and "new media" from the theoretical perspective, and comprehensively analyzes and summarizes these two important concepts. It can be concluded that graphic design is not a single subject. It usually interacts with other disciplines such as the arts and humanities. The creators of graphic design require not only a strong artistic background, but also need to have some knowledge of humanities; an excellent design work is a platform for communication between audiences and creators. It combines social information with visual beauty and enriches people's lives.

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