

# Research on Information Art Design Theory in Online Open Course Education

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**Abstract:** In recent years, China's rapid development has played an important role on the international stage, which also indicates that China's talent strategy has played a positive role. Today's developing society has a huge demand for the popularization and sharing of knowledge resources. The progress and development of information network technology enable people to acquire knowledge in a form that is no longer limited to traditional teaching methods. More and more people participate in online learning through the Internet platform. At present, cloud based online learning models dominated by MOOC platforms have been well received by the public in Chinese universities, and universities and enterprises are also participating in further optimizing and promoting the development of a learning society. Many factors, such as backend programs, frontend interface design, and content timeliness, can affect the efficiency and effectiveness of learners. Therefore, it is necessary to study information art design theory in open online course education, which is conducive to further optimizing open online courses. This research carries on the investigation from many aspects and so on network open class platform, user feedback, social approval degree, in-depth understanding information design transmission influence factor, and proposes the corresponding solution, to promote the visual development of open online course information.

**Keywords:** Public Courses; Information; Art and Design; Visualization; Graphic Design

## 1. Research Background

With the acceleration of the pace of life, the rapid development of Internet technology and

its wide coverage, people's diversified learning content and personalized needs cannot be met by the traditional education model. The combination of education and information technology produces online learning methods that provide convenient conditions for people and are widely used in various disciplines in education and teaching, not only laying the foundation for the sharing and popularization of knowledge resources, but also promoting the development and progress of education. In addition, when people are satisfied with their material lives, their pursuit of spiritual life is becoming increasingly strong. Art based online open courses are popular among the public, and graphic design based online open courses have emerged. For example, NetEase officially launched the principle of knowledge without borders on November 1, 2010, bringing together courses from world-renowned schools with Chinese subtitles to provide a free learning platform for netizens. For example, the Ma Weidu Collection launched by CCTV, taught by the director of the Beijing Guanfu Museum, is easy to understand and concise in language, allowing netizens to experience the vastness and profoundness of Chinese culture. From this, it can be seen that the application of information design in such courses is not only beneficial for people to acquire knowledge, improve and enrich human cultural level, but also enhances China's cultural soft power in international cultural competition.

## 2. Current Situation Analysis

At present, the application of information design in online public courses has begun to take shape. How to use information design to improve the dissemination of rich culture is a new issue faced by information technology workers and cultural communicators. To meet people's needs for acquiring and learning cultural knowledge, we should make full use of advanced information technology to

promote the dissemination of culture. When designing rapidly developing countries such as the United States, Japan, France, and the United Kingdom to use culture as a breakthrough point to improve economic development, China realizes that cultural soft power is conducive to improving the country's competitiveness and promoting economic development. For example, in 2012, the Creative Expo was successfully held in Shanghai, with the theme of "Creative Products, Interpreting a Better Life"[1]. Key categories of creative and cultural industries from various industries in Shanghai actively participated in this expo. To promote investment and transactions, the second floor of the expo was arranged as the China Cultural and Creative Industry Trading Center. Based on international standards in positioning and scale, this expo combined with the development strategies of creative industries in China and Asia to study the development direction of the creative industry worldwide, with the aim of presenting a representative industrial development trend for participants from all over the country.

Creativity is the soul of graphic design, and creativity comes from rich culture. Information technology has changed our limitations on factors such as time and space. In today's social, cultural, and economic context, it is worth considering how we can combine culture and creativity. Therefore, establishing an online learning platform that integrates with information technology has become the main way for social groups to carry out cultural dissemination, achieving an "efficient and low consumption" interactive cultural dissemination method, and providing new opportunities for the development of the cultural and creative industry [2].

To this end, based on one's own professional direction, the significance of providing theoretical basis and practical guidance is to conduct case analysis of graphic design courses in online open courses, systematically organize and summarize relevant theoretical knowledge.

### 3. Graphic Information Design

Design is a creative activity carried out by humans to achieve a certain goal, and it is a planning activity. Graphic design is the use of visual elements to spread design ideas and

plans in different forms or in different directions. Communicate to the audience through easily acceptable elements such as text and graphics. In terms of visual presentation, it is easy for others to generate excitement, excitement, and other emotions, conveying the main information nurtured therein. Graphic design works are generated by the interaction between products, designers, and customers. All visual elements in the design work serve both the product and the user. The creative organization of various elements is a purposeful art form that moves the user's emotional expression.

Graphic designers play multiple roles, with graphic design works representing products and creative ideas representing emotions that move customers. Graphic design is a purposeful form of art.

### 4. Online Open Course

The rise of online open course water has accompanied technological progress and the emergence of mobile networks, and currently there is no clear definition. Due to its innovative teaching form, rich content, good environment, and different teaching objectives, it is very different from traditional preaching teaching methods, and it is difficult to provide an accurate overview.

### 5. Research on the Intervention of Information Design Theory

In real life, information is constantly updated and multiplied, filling our daily lives. With the vast network coverage, we can easily obtain information while engaging in any type of online activity. The cumbersome information not only affects the lifestyle and thinking of the audience, but also has a significant impact on their information acceptance and selection. Therefore, information design has emerged. Information is essentially intangible but becomes tangible through platforms such as websites and print media. Through design, information gradually transforms from data to more recognizable images. This requires visual designers to recreate information in a concise, easy to understand, and accurate form. Information is mainly disseminated through visual elements such as text, images, audio and video, and colors.

#### 5.1 Definition of Information

Rich and complex information exists in a very broad, diverse, and multi-level manner. However, the increasing amount of information and the variety of information types are due to the diversity and complexity of the relationships between information, and the ways in which this information is disseminated and stored are not entirely the same.

#### 5.1.1 Concept of information

In Chinese, "information" comes from "audio" and "news". In real life, we are exposed to, receiving, and disseminating information every day. Information design is an interdisciplinary field that involves different disciplines and professional fields with different interpretations.

In 1922, Hartley of the United Kingdom first distinguished "information" from "message" in "Information Transmission" and proposed the concept of "numerical measurement information". By analyzing the information of the American flag, he concluded that the number or logarithm of messages represents the amount of information they contain. As shown in Figure (4), the representative figure of British empiricism and philosophical psychologist David Hartley (1705.08.30-1757.08.28) analyzed the design concept and evolution process of the American flag. The flag is a rectangle with a length to width ratio of 19:10, which is the Star-Spangled Banner. The 13 red and white stripes on the flag represent the 13 colonies in North America at the time of the founding of the United States. The upper left corner of the flag is a blue star area, where the number of stars represents the number of states owned by the United States. The number of stars will increase with the number of states, which explains the idea of information theory. American mathematician Shannon outlined the definition of information based on David Hartley's research. Broadcasting theory suggests that information refers to communication with the audience through written language, visual language, body language, and other means. In addition, some famous scientists such as Ains clearly believe that information from nature is objective information, but natural information is processed by human subjective consciousness and becomes subjective information [3].

#### 5.1.2 Types of information

The classification of information from the perspectives of linguistics, prominent features of information, and information media and functions is a form of information expression based on technical support. Simply put, it refers to the part of information that the receiver can access through touch, hearing, and vision. This part is further divided into a visual part mainly based on text, symbols, and colors, and a perceptual part based on the texture of information carriers.

Semantic information is a design method used by designers using information technology as a medium, using copywriting to name and design themes. Through annotations or design instructions, the design ideas are further clarified to ensure that information can be correctly interpreted, conveying emotions and meanings to the audience.

Aesthetic information includes the designer's aesthetic level and philosophy, the formal beauty and style of the design work, and the differences expressed by the information receiver in interpreting semantic information. Design works themselves have practical humanistic and social value, and only information that is accepted and praised by the public is considered valuable.

## 5.2 Information Design

Design is a creative activity carried out by people to achieve a certain goal, and it is the design result formed through the processing of certain forms, requirements, and concepts. For example, in poster design, the first step is to understand the product's functions and the main content that needs to be conveyed through legal means. Based on this, designers understand the brand culture and various factors, and based on their own interpretation, design promotional works with clear themes that are easily accepted by the public. However, with the progress of society, more and more information is flooding us, and designers pay more attention to design elements, leading to the emergence of a new concept of information design [4]. For the general public, when it comes to information, they will think of a large amount of digital content such as data, charts, and computer code. When it comes to design, they will think of various fields such as posters, web design, and layout design in shopping malls or subway entrances,

And information design is the combination of

two separate concepts, using design methods to organize information through elements such as images, text, and color, and more effectively disseminate information.

Through the rational dissemination of data and information through visualization, information design has evolved from the initial computer field to various disciplines with the progress of the times. In the field of graphic design, it has expanded from a single copy to computer technology such as images, audio, and video. Information design provides a clear and targeted understanding of abstract and tedious specialized knowledge, making it easy to receive information.

The information design address can be divided into three parts, namely data visualization, scientific visualization, and knowledge visualization.

First, data visualization is composed of a large amount of data, with data as the unit element to form an image. The data is expressed in different forms with its different dimensions and attributes. After analyzing and observing the data, a complex and massive data model is developed. In the process of expanding the scope of visualization applications, it involves the field of user interaction experience.

Second, scientific visualization is essentially the visual expression of data, but it is mainly applied in some fields of science and engineering, such as natural sciences and engineering. Scientific visualization involves the visual presentation of website development, computer imaging of online open courses, or the design of audio and video.

Third, knowledge visualization refers to the use of information technology for knowledge dissemination, constructing, conveying, and representing complex knowledge connotations through graphics or images. However, it not only conveys factual information, but also conveys opinions, insights, viewpoints, values, etc. In order to assist the public in applying knowledge on the basis of correct cognitive understanding and memory, it is presented in a graphical form, with many disciplinary theories involved as strong theoretical support in a graphical way.

Although there are visual and auditory forms of expression, the main focus is on visual information. Information designers filter and summarize data through logical thinking to transform it into reality. This is the biggest

difficulty and necessary condition faced by information design. Of course, in addition to relying on designers to make designs based on their understanding of information, there are also related software in the computer field that can directly generate charts. From this perspective, there is a certain degree of correlation between information design and information automation. This type of information graphic that uses visualization to express data and information is a branch of information design, such as illustrations, logos, etc. in online courses. Information design has added a visual approach to text-based reading, which presents complex and cumbersome issues with visualizing data. The main basis for information design is its universality, sharing, timeliness, objectivity, and other characteristics [5].

### **5.3 Information Design and Design Information**

Information design is an independent discipline with interdisciplinary characteristics based on the collection of information. The diversified design elements of information design mainly consist of forms such as identification, charts, and network interaction. Information design has become a profession that appears in various educational institutions with specific learning methods. The development of information design is almost synchronous with the development of visual language, and the new media generated by computer network technology are more concise and clearer in expressing information. At the same time, people's demand for information fun is constantly increasing. In the field of design, information design can be limited to visual information design. This paper mainly focuses on information design based on online open courses.

## **6. Research on Information Visualization Design Concept**

### **6.1 Information Visualization**

The 21st century is an age of information. Getting content from information can no longer meet people's needs. They prefer interesting forms of information expression.

The more powerful vitality of information visualization comes from interactive technology, which runs through the whole

process of information expression, processing, retrieval, recognition and transmission. In the view of psychologists, human cognition consists of procedural and declarative two parts, procedural cognition is to let people understand the mechanical operation method, this operation method is difficult to describe in detail with words, if only use the brain to remember, it will bring a heavy burden to the brain. This knowledge is easy to describe in words. Information visualization solves the problem of procedural cognition, using the regular common sense formed in the brain memory by visualization, so that users can understand the attributes of products and their use through graphics. As more and more interactive products enter people's lives, information visualization plays an important role in human-computer interaction.

FFunction team2 (a Montreal-based professional information visualization and user interface company) has explained its understanding of information visualization through an infographic. They believe that the intersection of different fields covered by information visualization, such as visual communication, informatics, computer user interface design, news graphics, etc., results in the realization of readability and usability of information visualization and the content elements closely related to design.

Through the display and observation of the meaning and attributes of information in the process of data and information processing in the visual space, the hidden relationship between objects is clearly and intuitively displayed, the interaction between people and information is realized, and the public consciousness is influenced through information transmission, so as to guide or generate public behaviors.

## 6.2 Design Types of Information Visualization

Information visualization, which may sound extremely high-end to the uninitiated, involves many fields, such as cartography, graphic design, data collection and extraction, statistics, and so on.

At present, information visualization mainly consists of two design types: data presentation and viewpoint presentation.

### 6.2.1 Present data

Designers summarize and refine a large

amount of data, and present it visually using aesthetic principles, so that the public can naturally appreciate some of the meanings contained in it, just like watching artworks.

### 6.2.2 State your opinion

The viewpoint statement about visualization is that the designer appeals the main content and theme ideas to the public on the basis of interpreting and analyzing the data. The most common are infographics and graphic videos: Compared with infographics, the presentation techniques of videos are more acceptable to the public and easier to attract readers [6]. The fun requires a designer's creativity and planning, and here is a Pinterest visualization video: Pinterest Statistics Facts.

Video reflects data visualization, and designers are required to have very professional skills in design, including the dynamic design of the image and the overall tone design, which are presented in vivid charts. The graphic design of the ratio of men to women in the video directly enlarges the image of girls, and the bar chart made of the candles of the birthday cake is used to reflect the age group, etc. The loving details are intriguing.

Compared with information ICONS, the advantage of video ICONS is that on the basis of dynamic camouflage, dubbing is added, and the dubbing explanation increases the effect of information transmission. As a typical case of video charts, "5 minutes to let you know what taxes you have paid", the views are close to the public, highlighting the key points, extremely sharp, and ordinary visual design techniques can also make everyone resonate.

## 6.3 Technical Classification of Information Visualization

Although visualization involves a wide range of fields, it is rarely mentioned in the overall classification, whether in textbooks or the Internet. From the emergence and development of visualization technology, the earliest information visualization classification card was collected and sorted in 1995, and research institutes in different fields conducted comprehensive and systematic classification research on the basis of collecting and sorting out a large amount of data [2].

From the perspective of objective application, electronic communication technology, aerospace technology, network video, multimedia production, etc. [3], among which

network distance education and open courses launched by universities are particularly prominent. In the information application industry, library document management, medical human data statistics, smart city digitalization and other fields are involved.

Technically, Plate Herman. Miller studied and summarized the visualization data structure through charts, navigation and interaction. In addition, Leung and Apperley further studied multiple visualizations on this basis and came to a conclusion: Part of the classification is based on the tasks to be completed by the users of the visualization system, such as observation details, filtering, etc., and part of the classification is the display mode of the dark war system itself, such as column charts and news infographics.

#### **6.4 Functional Advantages and Application Fields of Information Visualization Design**

With the overload of information in today's society, the complex and cumbersome huge amount of information is designed into clear and intuitive image expression and dissemination by information visualization methods, and dynamic video effects are used to reflect the problem. In this case, people will achieve remarkable results when solving problems.

In life, its specific functions and advantages are manifested in many aspects, information visual design helps to cultivate potential consumers. Secondly, it can provide more convenient and fast services to the public. For example, medical professional charts such as the human body structure in hospitals can only be transformed into information acceptable to the public through the analysis of doctors and then the design of designers. At present, there are many representative information visualization design works, which are not only immature designs for professionals but also from the perspective of the public [7]. Let's look at a few typical examples.

##### **6.4.1 Graphic art**

The basic data information of the Malaysia Airlines incident chart (14) reflects the scientific and technological diagram of the multinational joint search for the missing, which comes from the Chinese state news report. It is the information organization of the chart: the location is the first-level clue, the disaster and casualty events correspond to the

incident location; the geographical environment is a secondary clue, and the longitude and latitude of the flight path and the location of the lost contact are as well as clues. According to the definition of disaster area and damage degree, the division map of search area is drawn, and the specific situation is described, including geographical characteristics, location, route and so on. From another perspective, this case also reflects the active participation of visual designers. In the face of complicated news data, visual design is carried out by means of graphics and patterning, so that people can see at a glance. Designers not only express the functionality of news data, but also inject aesthetic characteristics [7].

##### **6.4.2 Aesthetic information**

The participation of artists and designers in the visual field adds vitality to information design [6]. The Trafalgar stamp series is a typical case that demonstrates the incisive use of information design in the application of aesthetic information. It is precisely because designers and artists through a large number of experimental works, for the later information design in the form of expression to provide more selectivity.

##### **6.4.3 Report animation**

The report animation is more vivid in the form of images and animations, and the report animation "Did You Know?" Is a typical case, in this animation, to add vitality to the report, close the distance between the data and the audience.

America's Did You Know? It is a report animation to educate people to keep pace with The Times, which has a positive public service advertisement for students, the 21st century is full of opportunities, and the slogan of not changing or falling behind.

The first version, which appeared in August 2006, was created as an instructional PowerPoint presentation for a Colorado high school staff member at a school of 150 students, with the main purpose of discussing and motivating students to succeed in the more competitive 21st century environment, using a simple and sober blue background. It's filled with all kinds of data and text, and the only embellishment and contrast in the short film is to highlight the key words,

The second version was completed in June 2007, on the basis of learning from the first

version, the performance effect has been greatly improved, the use of bar charts, pie charts and other ways of expression, so that the reader's perception of the data is clearer. However, there are also weaknesses, such as the color, the contrast in the ICONS is not high, and the slow rhythm of the background music creates a lazy atmosphere, which does not fully achieve the understanding of the data.

The third version was produced in 2008 and has made an extraordinary progress compared with the second version. Visually, black, red and white form a strong visual experience, background music has a strong sense of urging, and the design of the icon has also made some progress, showing numbers in the form of a diagram of an array of things, expressing time with warrior-level time, and its huge size. The intensity of contrast and the speed of development are no longer generalities, but more real performance. The content of the introduction of China's large population is arranged in the first version and the second half of the third version, and the more effective presentation method makes the data information more prominent. The second version does not reflect this part but does have a comparison of the number of births.

To give an example of public welfare assistance, a well-known person once held a special public welfare activity for the Chinese farmer brothers of pneumoconiosis, which is an occupational disease. The patients are mostly engaged in rock processing, jewelry processing and other related work for a long time, and most of the patients are the main labor force in their families.

The video recording of the event captured the entire promotional video of workers suffering from systemic diseases caused by diffuse fibrosis of lung and lung tissue, leading to death due to breathing difficulties without timely treatment. There were also related articles published in the newspaper, hoping that social awareness could lend a helping hand, but most people were moved by the video. This reflects people's numbness to simple text information, on the contrary, reflects the public's recognition of visual works, which also shows that information visualization, a new art form, is a field worth exploring.

With the progress of science and technology and the development of network technology,

graphics with diversified elements appear and the amount of information presented increases, making it easier for people to find, process and analyze information. People improve the ability of information analysis and processing through dynamic information. Through operation, people consciously screen information, find rules in appropriate ways, and find ways to solve problems.

Information visualization is mainly reflected in the interaction between teachers and students in open online courses, which will affect the effect of information transmission and the experience of both parties. Interaction design consists of two parts: digital interaction and human-computer interaction. Digital interaction is an experience that brings comfort to users. The two stages of interaction of open online courses are divided into usability goals and user experience goals [8].

## 7. Information Design in Open Online Courses of Graphic Design

The professional field of graphic design involves binding, advertising design, poster design, book covers, CD covers, typography and other drawings seen on the plane. In addition to the comprehensive application of graphic design elements in the design of open online courses, more emphasis is placed on the functional realization of interactive activities in user experience. This requires the designer to re-arrange and design the information so that the course content can be effectively disseminated.

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