Innovative Mode of Visual Communication Design Practice Teaching Based on Big Data

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Abstract. With the advent of the era of big data, big data has affected all walks of life, and to a certain extent some questions have been raised about the logical way of teaching visual communication design courses. Therefore, there are serious problems in the teaching of visual communication design courses. This article introduces some innovations and practices in practical teaching of creative visual communication design courses, and uses these methods to conduct a series of research and discussion on creative visual communication design courses. Universities in our country must reform their teaching and training methods and cultivate talents who can meet the needs of the development society in the era of big data. Especially some undergraduate colleges that have just entered the undergraduate stage should teach in the course of visual communication design innovation. This path has undergone positive changes. In order to cultivate students' cultural, creative awareness and technology, visual communication design has a close relationship with the development of creative industries. In the education process, the integration of technology and aesthetics should be emphasized. In the era of mobile media, artistic creation results should be combined with H5, video, illustration, and virtual. Due to the comprehensive effect of reality and other factors, talent training not only possesses the cultural heritage, design power and new technology required by the creative industry. Therefore, innovation and practice of education and teaching for this course are imperative. At present, our country is establishing a dynamic scientific visual communication curriculum education and research system focusing on the development of visual communication symbols and language research. Visual communication design refers to the design of using visual symbol language to convey information. In China, the change of modern design concepts is a new vocabulary that has gradually been accepted by people in the past 10 years and has become an important part of the integration of university design education and traditional design fields. The content and direction can include all educational courses with visual information as the main content. The professional direction is gradually recognized and used in domestic design schools. Experimental research results show that in the
current era of big data, the innovative trend of practical teaching of visual communication design is inevitable, and there is an urgent need to reform and innovate teaching methods.

**Keywords:** Big Data, Visual Communication Design, Practical Teaching, Innovative Mode

1. **Introduction**

According to the definition of big data on different websites, we can make decisions by using new models and multiple processing methods, and understand big data by processing and optimizing the rapid growth and real-time changes of large-scale information resources [1]. In the era of big data, "Although it plays a role as a disruptor in many fields, the process of disruptor is tiring and long. Visual communication design is derived from graphic design [2]. With the development of technology and society, visual communication design has developed into a logo Design, packaging design, advertising design and other fields. This shape is a symbol seen by the human eye, used to express the characteristics of things, that is, the visual characteristics. Therefore, we can understand the visual communication design as follows In order to achieve the purpose of information transmission, designers use general terms of various ways of visual performance and visual sensory stimulation [3]. The research results show that in the process of visual communication design, the images that they want to convey to the public or disseminate will be with the appearance of text, the combination of images and text will have a greater impact on the public [4].

Visual communication design courses were introduced from the West to China, and the current education methods still follow the Western education model. According to the national situation, it is impossible to learn the practicality and innovative spirit suitable for the students of the country [5]. For the rapid development of China, creative design cannot imitate the development process of Western design. In order to integrate into the global digital creative industry, it needs to be combined with products according to the economic development of the new era [6]. Some universities still use the past educational model and educational concepts. Students with a foundation in art design blindly emphasize "Bausch", and students without a foundation in art blindly emphasize "PS". This is also the "feature" of technical talents who cannot meet the talent needs of the digital creative industry in the era of big data "innovative thinking and practical power of new media coexist". Design teaching reform and practice have been widely welcomed and recognized from the early stage of development due to its innovative teaching content, form and intuitive effects. The awareness of innovative education is deeply rooted in people's hearts [7]. But at the same time, this positioning also reflects the profound foundation and influence of formalist aesthetics in the design teaching of our country's colleges and universities. As time goes by, problems gradually appear [8].

First of all, this guide does not have enough understanding of the connotation of innovation ability training. It believes that practical teaching is a panacea for visual communication design education, but practical teaching cannot be done without innovation [9]. The changes in learning methods, skills, and sensory experience after conceptual transformation are regarded as innovation itself. Although this situation is new, its core is still traditional formalist aesthetics: the obsession with form and emotion
has become its important goal and direction [10]. We know that modern visual communication design is not only the pursuit of the fun and novelty of visual forms, but also an innovative expression of the connotative meaning attached to the external form. The changes in ideas and methods caused by changes in ideas are the result of creativity, but once applied to the mature stage, this is only the principle of the method, not the creativity itself. Because people are unclear about the concept of "creative" cultural creation and dissemination, it is immersed in the novelty and surprise of the form and meaning. The deep understanding of the cultural and language characteristics of visual language is vague, and the value and status of design in the market are mixed with communication applications, and the rich cultural meaning and meaning of visual language cannot be effectively used to express through art. Targeted communication, creative learning and research are often powerless, even unintentional, full of creative mistakes.

2. Method

2.1. Big Data K-Means Algorithm

For category U, the calculation formula for the j-th dimension of the center point is:

$$U_j = \frac{1}{n} \sum_{i=1}^{n} X_{ij}$$  \hspace{1cm} (1)

N is the number of data of class U, and $X_{ij}$ is the j-th dimension data of $X_i$. The calculation formula of Euclidean distance is:

$$Dist(X_i, X_j) = \sqrt{\sum_{k=1}^{m} (X_{ik} - X_{jk})^2}$$  \hspace{1cm} (2)

Among them, $X_i$, $X_j$ represent the m-dimensional data object in the data set, and k represents the dimension.

For the value of i, the calculation formula of the scatter matrix $S_i$ is:

$$S_i = \sum_{X \in C_i} (X-U_i)(X-U_i)^T$$  \hspace{1cm} (3)

For the overall data, the calculation formula of the scatter matrix $S_S$ is:

$$S_S = \sum_{X \in S} (X-U_S)(X-U_S)^T$$  \hspace{1cm} (4)

In the traditional K-means algorithm, the loss function is the error sum of squares function, and the calculation method is as follows:

$$J_c = \sum_{i=1}^{k} \sum_{X \in C_i} ||X-U_i||^2$$  \hspace{1cm} (5)

2.2. Change Concepts and Advocate Science and Rationality

Advocate rationality and scientific research spirit, and strive to create a scientific and rigorous academic environment and atmosphere. Creating a rigorous and scientific academic environment
should also be the concept of entering the 21st century. The teaching and research of visual communication design is still facing the problem of conceptual change and ideological emancipation. If this problem is not resolved, design teaching in our country will have to detour. Our experience, strength, sensibility and professional training are not missing. What we lack is rationality and scientific spirit, an important basis for professional architecture. This is also the most precious thing in Chinese art education for decades. From the point of view of scientific spirit and reasonable spirit, the long-term misunderstanding of Western culture and the deep-rooted conceptual prejudice in the Chinese art world have formed an environment of blind contempt and rejection. Just mentioning science and reason is enough to kill the intuitiveness of art. She admitted her role, but the inspiration was mainly limited to the technical category. This is obviously not true. In fact, the mainstream ideas and creations of Western art are developed with rationality and scientific spirit as their soul. Various artistic studies and experiments conducted on this basis, including artistic propositions emphasizing the sensibility and emotional expression of the soul, are in contrast to the pursuit of people’s awakening and soul liberation rather than restricting people’s thinking on art. Art is at a deeper level. Such introspection, change and progress are the scientific rationality of Western cultural traditions. Therefore, in design education, a comprehensive high-quality culture and high-quality education must be created. Actively support rationality and scientific research spirit to penetrate into the field of modern design, and strive to create a strict and scientific academic environment and atmosphere.

2.3. Increase the Construction of Off-Campus Practice Bases for Visual Communication Design

The establishment of visual communication majors should maintain close cooperation between schools and enterprises, provide students with off-campus training bases, and enable students to accumulate work experience conducive to early employment. In order to train visual communication design talents, colleges and universities must not only let students master solid theoretical knowledge, but also focus on cultivating students' application skills. In actual teaching, the school must establish a talent training base, encourage students to participate in corporate training activities, and truly apply classroom knowledge to practice, in order to truly feel the needs of visual communication professionals in the development. In the case of insufficient ability, improve the overall quality of students, and make full preparations for students to enter the society after graduation. For example, in Pioneer Park, students can jointly research and develop projects under the guidance of teachers. Insufficiency, give advice and help.

3. Experiment

3.1. Subject

This article can be known through a series of investigations and studies. This article uses a question-and-answer survey with teachers and students majoring in visual communication design in a university as the research object. Then, some data obtained by summarizing are transformed into graphs and tables. Secondly, some questionnaires are distributed to students and teachers to explore the views on the innovative mode of visual communication design practice teaching.

3.2. Experimental Method
3.2.1. Literature research method. First, use the literature research method to clarify the concept, type, and characteristics of big data, and learn from the theories of pedagogy and educational psychology. Use a multidisciplinary approach to generalize and summarize the theoretical resources of visual communication design education.

3.2.2. Qualitative research method. The organic combination of qualitative research and quantitative research is adopted. It focuses on analyzing how to apply data-related technologies to the visual communication design education work, and how it affects the subject, object, and influence of education.

3.3.3. Investigation and research method. Through design-related questionnaires, the visual communication design students' views on the changes in the practical teaching innovation mode of visual communication design are investigated, and the overall situation of the visual communication students' views is obtained, and then the obtained data is integrated and analyzed to obtain a theoretical basis. Perform scientific analysis on the basis of practice in order to obtain scientific conclusions.

4. Results

Through the teachers and students majoring in visual communication design in a certain university, we can know how in the classroom, if the teacher does not provide the model, the students will complain if they don’t know how to start, but if the model is provided, the students’ works I will follow the teacher’s model and draw in the same way. There are too few creative paintings. Of course, this is a phenomenon often seen in the visual communication design classroom, and then summarize these problems as shown in Table 1:

| The problem                              | Student number |
|-----------------------------------------|----------------|
| Too much focus on technology            | 35             |
| Single teaching process                 | 45             |
| Good case analysis is missing           | 28             |
| Ignore the subjective feelings of students | 26             |
| Lack of practical exercise              | 36             |

From the data in Table 1, we can see that there are various problems in traditional visual communication innovation model, we should pay attention to the transformation of students' strengthening thinking. Third, students should be encouraged to become familiar with and explore creative thinking in this way, and they can also use various information and cases in the era of big data to expand students' thinking through the cultivation of innovative methods.
Figure 1. Average grades of students in each grade using two teaching methods

Summarizing the results of the students in each grade using the two teaching methods, we can know from Figure 1 that from the freshman to the senior year, the students of the visual communication design major in the innovative teaching generally have higher performance than the traditional teaching. Traditional teaching methods should be changed.

We design questions based on our views on the practical teaching methods of visual communication design, conduct a questionnaire survey of students and teachers, and then obtain data through Figure 2 to know:

Figure 2. Views on teaching after innovation

It can be seen from Figure 2 that most teachers and students majoring in visual communication design recognize creative teaching methods, and only a few people have doubts about this. Therefore, in the era of big data with many information resources and convenient access, we should make full use of the advantages in the teaching process to cultivate professional talents in visual communication. Then through the use of class time, to stimulate and develop students' unlimited creativity. This teaching method of brainstorming and teamwork can not only make students' design creativity deeper and more effective, but also greatly stimulate their creativity and vision in classroom logic.
5. Conclusion

With the increasingly fierce competition for talents in the visual communication design industry, the importance of innovation has become increasingly prominent. With the rapid development of various technologies, more and more people are involved in the practical teaching of visual communication design. In the era of big data, the ability to clarify the relationship between teaching logic and correctly use various digital technologies can make visual communication design practical teaching more exciting. Experiments have proved that through innovations in the teaching methods of visual communication design courses, students with low artistic level and poor aesthetic ability can be motivated to learn and integrate teaching content. By improving teaching methods, it can be ensured that students master the design principles they should master. In short, the school should strengthen the training and educational reform of students majoring in visual communication design, and give full play to the characteristics and advantages of the "big data" era. Use modern methods to stimulate students' sense of innovation and strengthen the cultivation of students. Combine the theoretical teaching and practical teaching of the visual communication design major with design practical skills to cultivate outstanding design professionals with development potential.

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