Innovation Mode of Art Education in Colleges and Universities Based on Big Data

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Abstract. In this paper, firstly, the author expounds the current situation and development of modern art education in China in the digital information age, and points out the shortcomings of the current art education. Then a new interactive data teaching method is proposed, which is analyzed from three parts: the reason of the new interactive data teaching design, the curriculum design and the innovation of the curriculum design. Finally, from the perspective of practical teaching cooperation with enterprises, this paper puts forward scientific innovation education strategies.

Keywords: Big Data, Art Teaching, Domestic Colleges and Universities, Wisdom Education

1. Introduction
Contemporary data applications have greatly changed people's living and working habits, making networking an important way of development[1]. For the development of art education, how to create a mobile education resource platform suitable for education subjects, especially students, with the help of Internet, big data and other technologies, so that the art education network and mobile gradually become the focus of art education in the digital information age[2]. It has become an urgent task to apply it to our education and teaching process.

With the advent of the Internet economy, a huge amount of art education resources can be spread and collected through the network. [3] It is necessary to effectively integrate and classify them according to big data technologies and methods, and present them in the form of art education resource platform, so as to facilitate sharing, understanding and use. In the digital information age, it provides a wider and better teaching resources for art college students[4]. We need to take technology as the support, establish a new network exchange and learning platform, integrate and then show effective art knowledge resources to more teachers and students on the university network platform. In this way, when teachers communicate with students and what academic problems students are facing, they can communicate with teachers through this platform, or consult the teacher through the platform message, and then the teacher can answer in time. Through this diversified way of communication, can better help the composition of the harmonious relationship between teachers and students, improve the quality of Teaching[5].

After a deep understanding of the practical significance of art education and training management based on intelligence and information, the industry has clearly put forward the core concept of
"enhancing the intelligence of art education and training", which is quite different from traditional art. Education and training. How to use the characteristics of electronic information and the core concepts of data and information technology to serve students is a problem that teachers should seriously consider. At the same time, they should also consider how to adopt new forms of interactive digital information teaching strategies. The author elaborated on art teaching innovation mode, and tests the innovative teaching mode platform, and analyzes its advantages and disadvantages in contemporary education through practice test results.

2. Related Concepts of Art Teaching Innovation Mode

2.1. Big Data Algorithm
In the 1990s, the concept of big data has been put forward by some scholars, and the arrival of the digital information age development has also been predicted. At the same time, data has become one of the key factors that affect various industries and fields, and data has also become an important part of productivity. Big data emerges with the rapid development of computer and Internet technology. It can realize close contact with other industries through Internet and related technologies, so as to promote the optimization and upgrading of the industry. Since the arrogant data was put forward, other industries have been looking for the combination point with big data and exploring the points that can be optimized and upgraded. In general, big data is the continuous integration of the Internet and various industries. Through the integration, our life becomes more convenient. The basic algorithm of big data:

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\text{Mean square error} \quad \text{RMSE} = \sqrt{\frac{\sum_{(u,i) \in T} (r_{ui} - \hat{r}_{ui})^2}{|T|}}
\]

\[
\text{Mean absolute error} \quad \text{MAE} = \frac{\sum_{(u,i) \in T} |r_{ui} - \hat{r}_{ui}|}{|T|}
\]

\[
\text{Accuracy} \quad \text{Precision} = \frac{\sum_{u \in U} |R(u) \cap T(u)|}{\sum_{u \in U} |R(u)|}
\]

2.2. Pain Points of Art Education
(1) Delay teaching system
The informatization teaching of Fine Arts in Colleges and universities in China is still in the early stage of development, and has not started from the construction of closed disciplines. However, it has not yet formulated a development plan in line with the characteristics of private colleges and universities and personalized specialty construction, and has not achieved "delayed" innovation in the development goals, teaching system, management system, etc. [7] The specialty is not based on the characteristics of the discipline, students' cultural background and social requirements. There is a "mechanical duplication" phenomenon in the professional teaching reform system [8].

(2) Administrative management mode
At present, the art major in Chinese universities has not completely separated from the administrative teaching management mode, and the importance of user experience is often ignored. Therefore, in terms of "management service" and "business data", it is difficult to form an effective governance scheme and promote the development of teaching from "management" to "governance" [9].

(3) Closed development decision
Comprehensive decision-making of specialty plays an important role in discipline construction and
development. According to statistics, many private art colleges in China generally lack market survey and industry information data when making relevant decision-making strategies, and lack professional development prediction and comprehensive decision-making evaluation indicators.

In terms of discipline construction, enrollment plan, teaching staff, teaching management and personnel training, "building a car behind closed doors" is very common. In addition, many private colleges and universities still have some problems, such as imperfect infrastructure, slow data information update and imperfect data service system, which makes the construction of art major always in a "closed" state [10].

### 2.3. Teaching Mode Based on Big Data

Big data + education refers to introducing digital technology thinking into education and gradually changing the form of education with digital technology as the carrier. Digital technology is also produced under the rapid development of science and technology, such as mobile TV, network, etc., they are different from traditional data, the form of digital technology is more novel, more in line with the development trend of this era, its data collection is more convenient, the range of data recording is larger, and it has a broader development prospect. Therefore, in the process of contemporary college students' education, there is a broader demand for digital technology. The education industry has high requirements for information collection. By using digital technology + education, graduate students are a kind of resource integration. Only when the sharing and timeliness of resources are achieved can they really be called effective integration of resources [8].

In today's education process, the use of digital technology is becoming more and more extensive and in-depth. From the initial use of digital technology to record some information, now we can make in-depth use of digital technology to exchange and discuss some educational issues, conduct opinion questionnaire survey, intention research selection and so on. The role of digital technology in education is no longer a simple third-party medium, but also an important tool of education. Educational experts have published their own views on education in the internet background under the "Internet plus education" teaching wisdom research. She believes that the biggest advantage of digital technology in education is the low cost of information recording, which does not require huge cost of paper, printing, transportation and so on. Relying on digital technology, it can provide the educational resources needed in a short time. Information is widely transmitted. In the process of education, schools should firmly grasp this advantage, use digital technology to record and analyze the majority of students' information, and process the education information that needs to be transmitted, so as to provide students with more abundant educational resources, so as to promote the improvement of modern education level.

### 3. Practice of Art Innovation Teaching Mode

#### 3.1. Experimental Objects and Methods

The subjects of this study are two classes, class A and class B (40 students in each class). Class A is the experimental class and class B is the control class. Through the digital technology platform designed by Hadoop, spark, HBase, flume and other technologies, the data collection and processing of class A students are completed. Class B is taught by the teacher through the previous teaching experience. The course teaching time is maintained for one month. The corresponding assessment results of the two classes after one month are analyzed for reference.

#### 3.2. Practice Content

The research mainly uses questionnaire to investigate the basic situation of students, and analyzes three aspects: (1) students' understanding and use of online learning, the understanding and use of online teaching platform; (2) students' learning attitude or recognition degree for the hybrid teaching mode of Online + offline combination; (3) under this teaching mode, the specific situation is analyzed Which part of teaching resources or links can attract students' attention. After the teaching experiment,
the teaching effect will be evaluated through three aspects: (1) students' experience; (2) teachers' interview; (3) statistical information of the platform. Through the above three aspects to evaluate the overall learning effect of students, in order to analyze the application effect of hybrid teaching mode.

4. Analysis of the Practice Results of the Innovation Mode of Art Education in Colleges and Universities

4.1. Students' understanding of Innovative Teaching Mode

The students in class a of the experimental group did not have a good understanding of the digital technology teaching platform. Only 13% of the students in the class knew it better, 23% of the students did not know much about the digital technology teaching platform, and the remaining 64% of the students did not know the relevant information of the digital technology teaching platform. The students in this class knew little about the digital technology teaching platform, and naturally they were more unfamiliar with the online education platform. On the one hand, this situation requires teachers to give students a simple training when using the platform for hybrid teaching, introduce relevant concept knowledge, and improve their understanding of this online learning, which is conducive to the smooth implementation of hybrid teaching. On the other hand, students in class a of experimental group have less knowledge of digital technology teaching platform, which is more conducive to comparative analysis of learning situation and attitude towards such education mode after mixed education. Just entered the university gate, for all things full of curiosity students, this is a new teaching method. Therefore, mixed teaching is more likely to attract students' attention and stimulate their interest in learning, which is its advantage.

4.2. Performance Statistics of Each Period

![Figure 1. Students' understanding of Big Data](image.png)
According to figure 2, the broken lines in the figure are the fifth, fifteenth, 25th day and the final examination scores. The blue and gray lines are the theoretical average scores and practical average scores of the students in class a of the experimental group. It can be seen from the figure that the average scores of the students in class a of the experimental group maintain a large increase in the two examinations; the yellow and orange lines are the average scores of the students in class B of the control group. The theoretical scores of students in class B kept rising, but the rising range was not large, the average practical scores were not ideal, the results fluctuated obviously during the experiment, and the final examination scores did not significantly improve.

Table 1. Average Scores of Students in Two Classes in Different Periods

|                  | Theoretical achievements of class A students | Theoretical achievements of class B students | Practical achievements of class A students | Practical achievements of class B students |
|------------------|--------------------------------------------|--------------------------------------------|------------------------------------------|------------------------------------------|
| Check out        | 75                                         | 74                                         | 78                                       | 77                                       |
| Day 5            | 80                                         | 74                                         | 83                                       | 83                                       |
| Day 15           | 87                                         | 76                                         | 88                                       | 84                                       |
| Day 25           | 94                                         | 79                                         | 93                                       | 83                                       |
| Final assessment | 98                                         | 81                                         | 97                                       | 85                                       |

According to table 1, before the course training, the average scores of the two classes of students in the bottom examination are almost the same, the average score of class A is higher than that of class B by 1 point. After a period of courses, the average theoretical scores of class a students in the experimental group increased by about 5 points every day, compared with that of class B by 2 points every day. Finally, the average score of class A in the experimental group was 17 points higher than that of class B in the control group, and the average practical achievement of class A was 12 points higher than that of class B.

According to the relevant data in Figure 2 and table 1, under the traditional mode of education, the knowledge absorption efficiency of students in the curriculum is not high, and after one month's course, the results have not improved basically, which shows that most students have not seriously completed the task of classroom practice; in the education mode with digital technology, students can improve their scores by 12 points compared with the bottom examination within one month Right, it shows that the corresponding learning tasks have been actively completed in the course teaching. Under the monitoring of digital technology platform, it is impossible to know whether students are
forced to take classes seriously or to improve their interest. However, it is an objective fact that their final scores are improved.

4.3. Statistics of Satisfaction Degree of Assessment Results

| Table 2. The Satisfaction Degree of the Students in the Two Classes to the Examination Results |
|-----------------------------------------------|-----------------|-----------------|-----------------|-----------------|
|                                               | Very satisfied  | Quite satisfied | Not satisfied   | Dissatisfied    |
| Class A students                              | 21              | 5               | 4               | 0               |
| Class B students                              | 11              | 20              | 7               | 2               |

According to table 2, students in class A are more satisfied with their assessment results after the one month new teaching mode, and there is no dissatisfaction, among which 4 students are not very satisfied; in the control group, only less than half of the students in class B are completely satisfied with their assessment results, and less than half of them are satisfied with their assessment results, and 9 students do not choose much Satisfaction and dissatisfaction indicate that the course has not achieved the desired results.

5. Conclusion

With the continuous development of science and technology in China, education also needs to progress with the development of science and technology. The integration of digital technology platform and education is the trend of the times. The future teaching mode will inevitably develop towards diversification, digitization and informatization. According to the analysis of the above data statistics, digital technology platform plays an important role in the reform of art teaching mode At the same time, it can also achieve the effect of improving students' art and physical performance, so it can play an auxiliary role in teaching to a certain extent. The promotion of wisdom education also puts forward higher requirements for art teachers. They not only need to innovate professional teaching ideas, but also need to improve teaching ability and information technology application ability, so as to become educators from disseminator of single knowledge to cultivating intelligent talents.

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