Innovation of Financial Management Teaching Mode Based on Big Data

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Abstract. As we all know, the development of social innovation is inseparable from science and technology. Nowadays, the emergence of Big Data (BD) has a significant impact on society. In this data age, the traditional Teaching Mode (TM) of financial management can not meet the needs of the times, and the teaching of financial management needs to be reformed and innovated. In this context, this paper proposes the financial management professional innovation research based on BD. In order to adapt to the trend of the development of the times, this paper proposes an accurate TM of financial management based on BD. In teaching, we use BD technology to accurately mine students' learning needs and learning characteristics, and give targeted teaching plans through data analysis and decision-making. In order to verify the effectiveness of the method proposed in this paper, we conducted a control experiment. In the experiment, we selected two classes of students with little difference in financial management major in our school as the experimental objects to carry out the research. After the experiment, we investigated the performance and satisfaction of the two classes of students, and evaluated the teaching scheme and teaching effect of the two classes. The results show that after the experiment, only 40% of the students in the control class use the traditional TM, while 63.33% of the students in the class use the TM proposed in this paper, which is far higher than the control class. It can be seen that the financial management precision TM based on BD proposed in this paper is effective and has great advantages.

Key words: BD, Financial Management, Teaching Mode, Precision Teaching

1. Introduction
As we all know, financial management is a course combining theory with application. Its teaching purpose is to enable students to systematically understand the basic theory of financial management, and make simple evaluation and decision-making on the investment of enterprises, so as to maximize the value of enterprises [1-2]. It can be said that financial management is a highly practical major, and financial management, as the core of economic management, has strong applicability and professional skills [3-4]. At present, based on the influence of artificial intelligence such as BD, electronic invoice,
Internet of things and cloud computing on the financial field, the rapid development of the Internet has changed the way of enterprise investment and financing, brought financial innovation, and promoted the creation of new business models. It puts forward new requirements for the talent cultivation of financial management major in Colleges and universities. At the same time, because of the reform of education system and the rapid development of society, the requirements for the professional ability and knowledge reserve of financial management practitioners are more stringent. Generally speaking, if the teaching of financial management continues to follow the traditional TM, it will be very difficult to adapt to the needs of social development and be incompetent for today's financial management job requirements [5-6].

Nowadays, the emergence of BD in the information age has a significant impact on the society. As we know, with the development of information technology and the arrival of BD era, great changes have taken place in people's way of life and teaching philosophy. At the same time, it also makes a big step forward in the effectiveness of university education, and brings opportunities for the reform of university TM [7-8]. Today, BD has a profound impact on the innovation and development of financial management teaching, and also has an impact on the economic management of social enterprises. In the face of the change of enterprise financial management mode and the direction of talent demand, it is of great practical significance to explore how to reform and innovate the financial management TM to meet the needs of financial management in modern social enterprises [9-10].

This paper studies the innovation of financial management TM based on BD. In the research, in order to meet the needs of the development of the times, we put forward the accurate TM of financial management based on BD on the basis of BD, that is, in the teaching of financial management, we use BD technology to accurately mine students' learning needs and learning characteristics, and give targeted teaching guidance through data analysis and decision-making. In order to verify the advantages of this method, we compare this method with the traditional financial TM, compare and analyze the students' performance and satisfaction, and evaluate the teaching scheme and teaching effect of the two classes based on the accurate teaching evaluation model. The research results show that compared with the traditional financial TM, the financial management precision TM based on BD has great advantages.

2. Summary of Theories Related to Precision Teaching

2.1 Precision Teaching Based on BD

Precision teaching was put forward in the 1960s, and a large number of scholars have studied it. The research results of scholars show that precision teaching can significantly improve students' learning performance and performance.

The idea of precision teaching is to record learners' behavior frequency, response speed and other observable learning behaviors, draw standardized charts, and adjust teaching strategies according to the change rules of frequency data in the charts. For precision teaching, it is usually through the detection of students' learning behavior and process, as a basis to judge whether the teaching has reached the teaching goal, and whether the students have reached the requirements of knowledge and skills. Among them, fluency is used as an index to reflect the test results. Generally speaking, fluency includes two meanings. On the one hand, it refers to the accuracy of students' mastery of knowledge and skills, and the speed of students' use of knowledge and skills. In precision teaching, students are required to spend time on practice and measurement every day, while teachers will record the measurement results and frequency, and compare them with standard speed table, so as to judge students' knowledge and skills, and further speculate whether they need to intervene in students.

Different from the traditional precision learning, precision students based on BD analyze the data generated in the teaching process, such as students' basic information data and learning behavior data, so as to depict students' characteristics and learning behavior. Moreover, on this basis, it aims to improve the teaching effect and promote teaching and learning, so as to provide targeted services for students. In addition, it puts forward the teaching plan. In a word, precision teaching based on BD is
not to give the same teaching scheme for all students, but to mine students' data through BD technology, and customize accurate learning scheme according to students' characteristics and learning behavior, so as to improve students' learning effect.

2.2 Precision Teaching Evaluation Model
There are two keys to precision teaching based on BD, one is precision teaching, and the other is personality chemistry. Generally speaking, it is to build a model of precision teaching scheme through mathematical model to improve teaching effect and promote teaching, based on students' characteristics and behavior, and transform it into an optimization problem with the goal of optimizing teaching effect. Specifically, on the basis of BD, the data that can reflect the characteristics and behavior of students are extracted from many data. Through the establishment of a model, the relationship between these data and the teaching effect is described, so as to complete the evaluation of teaching scheme.

Considering that the teaching effect is related to the teaching plan and the corresponding students' characteristics and behavior, based on the regression model, the evaluation model of accurate teaching plan is as follows:

\[
E(Y|A,X) = \gamma^T \tilde{X} + A \cdot (\beta^T \tilde{X})
\]

Among them,

\[
\tilde{X} = (1, X^T)
\]

\[
\gamma = (\gamma_0, \gamma_1, \cdots, \gamma_p)^T
\]

\[
\beta = (\beta_0, \beta_1, \cdots, \beta_p)^T
\]

In fact:

\[
\beta^T \tilde{X} = E(Y|A = 1, X) - E(Y|A = 0, X)
\]

We know that teaching effect evaluation is based on the characteristics and behavior of students as the premise to make the teaching plan. In these processes, there are a lot of education data. BD analysis provides strong support for the processing of these data.

3. Control Experiment Design

3.1 Research objects
This paper selects two freshman classes of financial management major in our university as the research object. In the two classes, the number of students is 30, and there is little difference in the overall performance.

3.2 Experimental methods
In this paper, one class is set as the experimental class, and the other class is set as the control class. Among them, the experimental class adopts the accurate TM of financial management based on BD proposed in this paper. In the actual teaching, according to the characteristics and behavior of students, the teaching scheme is designed to teach the students. In addition, under the same conditions, the control class adopts the traditional financial TM. The experimental period of this experiment is one semester. After the end of the semester, two classes of students are tested.

3.3 Evaluation index
After the experiment, the students of the two classes were tested, and their grades were divided into four grades: A, B, C and D. the higher the grade, the better the grade. Grade B and above is good. In addition, the two classes of students conducted a questionnaire survey on the satisfaction of the TM, which is divided into three levels of satisfaction, respectively, very satisfied, satisfied, dissatisfied.

4. Analysis of Financial Management Precision TM Based on Big Data

4.1 Student Performance Analysis

In order to ensure the accuracy of the experiment, we recorded the results of the two classes before the experiment, and the results are shown in Table 1.

| Class        | A  | B  | C  | D  |
|--------------|----|----|----|----|
| Control class| 2  | 6  | 12 | 10 |
| Experimental class | 1  | 7  | 11 | 11 |

Only the students in the first two classes in the experimental grade A have little difference. Among the students with grade B, there are 6 in the control class and 7 in the experimental class. Among the students with grade C, there are 12 in the control class and 11 in the experimental class. Among the students with grade D, there are 10 in the control class and 11 in the experimental class. It can be seen that before the experiment, most of the students in the two classes were in Grade C and D, and the difference between the two classes was not big, the good rate of the two classes was 26.67%.

After the experiment, the results of the two classes are analyzed, as shown in Figure 1.

It can be seen from Figure 1 that after the experiment, the scores of the two classes have changed a lot. Among them, in the control class, there are 3 students with grade A, 9 students with grade B, 15 students with grade C and 3 students with grade D. It can be seen that after one semester, the students' grades in the control class have improved, and the good rate of students' grades has reached 40%. The number of students with grade C is the largest. In addition, in the experimental class, there are 5 students in Grade A, 14 students in Grade B, 10 students in Grade C and 1 student in grade D. the good rate of students in the experimental class reaches 63.33%, and the number of students in Grade B is the most. It can be seen that the performance of students in the experimental class is more advanced.
than that in the control class. In other words, the financial management precision TM based on BD proposed in this paper is very effective.

4.2 Satisfaction Analysis
At the end of the experiment, two classes of students satisfaction survey, the results are shown in Figure 2.

![Figure 2. Survey of students' satisfaction in two classes](image)

As can be seen from Figure 2, there are 4 students in the control class who are very satisfied with the TM, accounting for 13.33%, 15 students who are satisfied with the TM, accounting for 50%, and 11 students who are not satisfied with the TM, accounting for 36.67%. Overall, the students in the control class are 63.33% satisfied with the TM. 33% of the students were satisfied with the experimental TM, accounting for 60.33% of the total Control class.

4.3 Teaching Plan and Teaching Effect Evaluation
In order to analyze the teaching scheme and teaching effect of the financial management precision TM based on BD proposed in this paper, we score the teaching scheme and teaching effect of the two classes on the basis of the evaluation model, and the results are shown in Table 2.

| Class            | Teaching plan | Teaching effectiveness |
|------------------|---------------|------------------------|
| Control class    | 68            | 72                     |
| Experimental class| 88            | 90                     |

It can be seen from Table 2 that the teaching scheme score of the control class is 68 points and the teaching effect evaluation score is 72 points, while the teaching scheme score of the experimental class is 88 points and the teaching effect evaluation score is 90 points. It can be seen that the teaching scheme and teaching effect of the experimental class is far better than that of the control class, that is to say, the teaching scheme and teaching effect of the financial management precision TM based on BD proposed in this paper have great advantages.

5. Conclusions
With the development of science and technology and the advent of the era of BD, the TM of colleges and universities has been unable to meet the needs of the times, and its TM is facing the challenge of reform. Nowadays, the traditional financial management TM has been difficult to adapt to the changes of the times, the urgent need for reform and innovation. In this context, this paper launched a research on the innovation of financial management TM based on BD. On the basis of BD, this paper proposes an accurate TM of financial management based on BD, and compares it with the traditional TM of financial management. The effectiveness and superiority of this method are verified through the comparative experiment. This paper believes that in this information age, we should put forward a teaching plan according to the needs and characteristics of students, rather than applying a TM to all students, just like the traditional TM. The research results of this paper will provide a certain reference value for the reform and innovation of financial management in the era of BD.

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Research on blended teaching innovation in the post-pandemic era.

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