

Research on the Reform of Higher Vocational Computer Teaching Based on the Background of Big Data

Ying Liu

Xiamen Institute of Software Technology, Xiamen, China

Abstract

With the continuous progress of Internet technology, big data has brought new challenges to the teaching of higher vocational computer majors. The traditional teaching method focuses on teachers explaining in the classroom while students master the knowledge points independently, but this model has limitations in cultivating high-end composite talents and may lead to problems such as poor teacher-student communication and lack of interaction. Therefore, this paper explores the strategies to promote the efficient development of higher vocational computer technology courses from a practical point of view, aiming to promote teaching reform.

Keywords

Big Data Background; Higher Education Institutions; Computer Science Program; Educational Reforms.

1. Introduction

In the context of the era of big data, computer technology is gradually developing in the direction of automation and hierarchical centralized control, developed information technology is gradually living and popular, the types of network equipment are more and more advanced and intelligent, and people are gradually aware of the power of computers.

“Big Data” is not only a product of the development of the times, but also the crystallization of human wisdom. It is no longer a simple computer calculation, but in the structural and non-structural, or even semi-structural types of data processing, with 5V characteristics, namely volume (volume), variety (change), velocity (speed), value (value), veracity (accuracy). The “big” of big data is not simply to describe the size of the data volume, but to change people's previous knowledge of the data, and to discover the new world hidden behind the data through rapid access to information [1].

The application of big data abroad has been more developed, such as medical protection, disease treatment, public health and other fields. The United States, for example, has gained no less than one hundred billion dollars in the utilization of big data, and the means of processing big data have also been developed to varying degrees, such as cloud computing and other technical means, which are both safe and bring a lot of gains in terms of energy saving. China's research and application of big data began late, and is currently only used in transportation, energy development and other fields. With the development of the times, big data has brought people a more convenient life. Relevant information shows that China's colleges and universities have gradually opened up big data-related majors, such as the Beijing University of Aeronautics and Astronautics opened a big data program in 2012, aiming to seize the data market and cultivate skilled mastery of big data collection, storage, analysis and other technology-based talents.

2. The Necessity of Higher Vocational Computer Teaching Reform in The Context of Big Data

The rise of the knowledge economy has affected the traditional economic model to a certain extent [2]. Under this background, different industries coincidentally choose industrial innovation for the sake of sustainable development. Industrial innovation needs talent support. Only by adjusting the focus of teaching and reforming the education method can we cultivate compound talents who meet the needs of industrial innovation. The computer course in higher vocational colleges is a public foundation course, with the nurturing function of cultivating students' computational thinking and enhancing students' informatization innovation ability. However, the existing teaching technology can't integrate more computer course nurturing resources into the teaching process, which is still insufficient to meet students' individual development needs. Big data technology is an informatization teaching technology, characterized by rich teaching resources and diverse teaching forms. Big data technology is used in the process of computer teaching reform in higher vocational colleges and universities, which can not only remove the traditional teaching model of teaching, but also meet the personalized learning and development needs of higher vocational students in terms of depth and breadth learning, and has a positive significance for further enhancing the value of computer courses in higher vocational colleges and universities for educating people. In terms of teaching reform, the application of big data technology meets the strategic requirements of the "Outline of the National Medium- and Long-Term Education Reform and Development Plan (2010-2020)", and is also in line with the teaching development concept of the "Education Informatization 2.0 Action Plan". In terms of talent cultivation, the application of big data technology makes teaching resources richer, teaching channels broader and the teaching process more detailed, meeting the learning needs of students' cognitive development, ability formation and literacy enhancement.

3. The Status Quo and Problems of Higher Vocational Computer Professional Education Under The Background of Big Data

3.1. Disconnect in the cultivation of higher vocational talents

The times are constantly developing, and the social demand for all types of talents is also increasing, especially in the context of the big data era, the demand for talents in all walks of life is even more urgent, but the talent training program of higher vocational education is not perfect enough, which makes the cultivation of high-quality talents appear disconnected.

3.2. Insufficient support for experimental conditions

Big data relies on cloud computing, the Internet and other platforms to analyze and calculate. However, some of China's colleges and universities are not sufficiently prepared for teaching conditions such as cloud computing and other teaching experiments, and the experimental projects are not scientific enough, resulting in some teachers can only teach the relevant basic concepts, and are unable to implement practical teaching such as data analysis, which ultimately makes the content of higher education and the development of the times seriously out of step with the development of colleges and universities.

3.3. Big data teaching and traditional teaching are fundamentally different

Big data teaching should cultivate students' innovative thinking for the purpose. At present, China's traditional teaching mode is relatively single, most teachers take a single teaching method for knowledge inculcation, students are rote memorization. This teaching mode only allows students to learn the current or previous technical means that have already appeared, and can not bring effective innovation to the future development of technology, resulting in a

narrow vision of students, lack of innovation ability, seriously hindering the development of big data teaching.

4. Reform Strategies for Higher Vocational Computer Specialization Education Facing Big Data

4.1. Utilize big data to integrate teaching information and set precise teaching objectives

Teaching goal is the precise expectation of teaching effectiveness [3]. Doing a good job of setting teaching objectives has a positive significance for the orderly development of teaching. Under the big data environment, senior computer teachers can only give full play to the nurturing value of big data technology and promote the smooth progress of teaching reform by clarifying the teaching reform objectives. On the one hand, teachers can use big data technology to integrate teaching information, including the current computer teaching methods in higher vocational colleges and universities, teaching content, teaching activity arrangements, teaching results and so on. Based on the integrated teaching information, the current situation of computer teaching is analyzed to determine the entry point of teaching reform, and the teaching reform goal is determined based on the content of the information analysis, which indicates the general direction of the development of computer teaching reform in higher vocational colleges and universities under the big data environment. However, such a reform goal is too general and still lacks guidance for the teaching reform of individual courses. For this reason, teachers also need to focus on the other side, using big data technology to integrate student information, including students' basic learning level, students' learning behavior, students' learning preferences, and students' development potential. The integrated information collected on students' development classifies students and sets differentiated teaching objectives according to the basic characteristics of different types of students to further promote the personalized reform of computer course teaching. In this way, integrating the application of big data technology to integrate teaching information from two perspectives, namely, macro perspective and micro perspective, provides reference information for the design of teaching reform objectives of computer courses in higher vocational colleges and universities, so as to improve the accuracy of the teaching reform objectives.

Provide teaching reference for the orderly promotion of teaching reform.

4.2. Analyzing classroom data with big data and choosing suitable teaching programs

Selecting the right teaching methods is of key significance for improving teaching efficiency [4]. The reform of computer teaching in higher vocational colleges under the environment of big data can only ensure that the effect of teaching reform meets the expectations by paying attention to the methods and methods. To this end, teachers can apply big data technology to integrate the classroom teaching data before and after the teaching reform, and analyze the differences in student learning performance before and after the teaching reform. In this way, teachers can further clarify the role of teaching reform, and at the same time adjust the teaching program according to the data of students' classroom performance to further strengthen the effect of teaching reform. It should be noted that there are differences in students' learning interests, learning energies, and learning abilities at different stages of teaching. If teachers fail to recognize the differences in student learning, they will not be able to meet the learning and development needs of some students, which will then affect the effect of teaching reform. For this reason, teachers should also use big data technology to collect and organize students' learning data under different teaching stages, including students' pre-study learning data, theoretical learning data, methodological learning data, experience (skills) summary learning

data and so on. After analyzing the obtained data and clarifying the developmental differences of students, teachers continue to choose differentiated teaching strategies according to the differentiated learning needs of students, such as contextual teaching, problem teaching, task teaching, project teaching, application teaching strategies, etc., and apply different teaching strategies to further strengthen the learning experience of students in computer courses, and to promote students' independent learning and deep learning.

4.3. Utilizing big data to integrate teaching resources and enrich diversified teaching content

The reform of computer teaching in higher vocational colleges and universities under the environment of big data is mainly manifested in the reform of teaching form, teaching method, teaching process and teaching content. To a certain extent, the effectiveness of teaching reform is constrained by teaching resources. Teaching resources are rich, higher vocational colleges and universities computer teachers can take more diversified means of teaching reform, the content of teaching reform that can be utilized is richer, and the teaching classroom after the teaching reform is more wonderful, and vice versa. In order to further enhance the effect of computer teaching reform in higher vocational colleges and universities, it is necessary for teachers to apply big data technology to integrate multiple teaching resources and provide content support for teaching reform work. On the one hand, teachers can use big data technology to integrate the content of textbooks of computer courses in higher vocational colleges and universities, integrate the application cases of teaching content, and other offline teaching resources, so that students can study the course from the theoretical and practical perspectives during offline learning. At the same time, teachers can also use big data technology to integrate the knowledge of the wrong application cases, in the form of “negative teaching materials” for students to face the errors, and cultivate students' critical thinking in the offline teaching process. On the other hand, teachers can apply big data technology to integrate digital teaching resources (such as teaching courseware, teaching video, teaching audio, etc.), data-based teaching software (such as Super Star Learning Channel, Nail, Blue Ink Cloud Class, etc.), online education websites (such as the official website of higher vocational colleges and universities), and other online teaching resources, to further broaden the channels of higher vocational computer teaching and broaden the horizons of students' computer learning.

4.4. Utilizing big data to monitor the teaching process and promote effective teaching interventions

(1) Intervene in the learning process to enhance the cognitive level. The reform of higher vocational computer courses under big data should be based on student development, and should focus on cultivating students' information awareness and computational thinking [5]. Among them, information awareness refers to the ability to perceive information, judge information, and analyze information; computational thinking refers to the ability to apply data-based approach to define problems, abstract modeling, and organize data to solve problems. To cultivate students' information awareness and computational thinking in the reformed computer teaching process, it is necessary to fundamentally improve students' cognitive level. To improve students' cognitive level, it is necessary to ensure the students' learning subject position, so that students can discover knowledge, clarify theories, summarize methods and improve cognition in the process of independent learning. To this end, teachers can apply big data technology to intervene in the learning process of students in the process of teaching reform of computer courses, and guide students to recognize new knowledge, discover new problems, and summarize new theories from a scientific point of view through teaching interventions, so as to develop students' cognitive thinking such as logical thinking and abstract thinking. It is important to note that the “intervention” here is not a clear command to require students to do what they must do or must not do what they must do, but rather in the form of

“data” to give students learning tips to drive students based on their own development independently to explore new knowledge in the case of Ensure that the students' learning subjectivity, and gradually improve the cognitive level of the students.

(2) Intervene in the process of practicing to cultivate application ability. Exercise teaching is part of course teaching. The use of big data technology in the process of practice teaching is conducive to teachers summarizing students' practice learning data, constructing students' course learning “portrait”, and adjusting the content of practice teaching according to students' learning “portrait” to further enhance the effect of practice teaching. Big data technology has a wide range of applications. In the reform of higher vocational computer course teaching, teachers can use big data technology in the integration of practice teaching resources, the organization of practice activities, and the adjustment of practice programs to ensure that students form a good transfer and application ability in the process of practice learning. For the integration of practice resources, teachers can apply big data technology to analyze the students' learning situation, and then integrate the corresponding practice resources according to the basic learning situation of the students, such as basic theoretical exercises, operational exercises with a certain degree of difficulty, and case studies with strong expansion, etc., in order to satisfy the practice learning needs of students with different academic backgrounds. For the organization of practice activities, teachers can apply big data technology to integrate students' practice learning data, and build a “portrait” of students' application ability development based on the data. After that, teachers can determine students' practice development characteristics according to the content of the “portrait”, and organize various practice teaching activities such as contextual practice, interactive practice, practical practice, etc. to meet different students' practice development needs. In order to adjust the practice program, teachers can apply big data technology to integrate the data on the implementation effect of practice teaching, make clear the deficiencies of practice teaching through data analysis, further adjust the practice teaching program, and promote the sustainable development of the practice teaching reform of higher vocational computer courses.

(3) Intervene in the review process to promote knowledge construction. Ensuring that students really master the teaching content of computer courses is the pursuit of the teaching reform of higher vocational computer courses in the new era. To achieve this goal, teachers need to focus on the review teaching reform work. Under the big data environment, teachers can use big data technology in the review teaching process, through technological intervention, constantly optimize the review teaching process, so as to maintain the activity of students' knowledge construction thinking, and strengthen the students' knowledge construction review effect. For example, teachers can apply big data technology to collect the time of students' memorization of theoretical knowledge and operation methods, and analyze the results of students' memorization, and determine students' tendency to memorize and learn through analysis. After that, the teacher adjusts the revision teaching program according to the analysis results, such as organizing interactive games to strengthen the fun of revision content and the students' memory learning effect; organizing concept map drawing activities to strengthen the students' knowledge construction thinking and so on. In this way, the application of big data technology to timely collect students' revision information, diagnose students' revision problems and timely adjust the revision teaching program can continuously enhance the effect of revision teaching and ensure the quality of students' knowledge system construction.

4.5. Utilizing big data to improve teaching evaluation and promote students' reflection and enhancement

Teaching evaluation is a kind of teaching activity, with the role of judging the value of teaching and serving the role of teaching decision-making. The reform of computer teaching in higher vocational colleges and universities under the big data environment should also take into

account the reform of teaching evaluation, so as to ensure that students' learning behavior is compatible with the reformed teaching behavior, thus strengthening the effect of teaching reform. In the teaching reform work, teachers should start to improve the teaching evaluation system, and further strengthen the instrumental attribute of teaching evaluation in the teaching reform work. On the one hand, teachers can apply big data technology to improve teaching evaluation standards, which will guide students to standardize their learning and development behaviors and promote their sustainable development. When improving the evaluation standards, teachers can apply big data standards to collect the existing teaching evaluation standards of computer courses in higher vocational colleges and universities, and use them as the blueprint for teaching evaluation reform. Teachers can also integrate the Education Informatization 2.0 Action Plan, the Information Technology Curriculum Standards for Specialized Higher Vocational Education (2021 Edition), and other policy documents related to the teaching reform of higher vocational computer courses, and distill the relevant information on cultivating students' competence from the policy documents, and use the relevant information as a reference for formulating the teaching evaluation standards. In this way, the application of big data technology broadens the perspective of teaching evaluation, enriches the level of teaching evaluation, and further improves the teaching evaluation standard. On the other hand, teachers can apply big data technology to update the means of teaching evaluation, such as online teaching system automatically, offline teachers' comments, and online students' mutual evaluation. By updating the evaluation means to give students objective and real-time teaching evaluation, students can reflect on themselves with the evaluation content in different learning stages, thus promoting their continuous improvement.

5. Conclusions

Big data has become an indispensable part of people's life and work. With the constant updating and upgrading of Internet technology and the increasing level of information services, the education of higher vocational computer majors should conform to the trend of the times, improve the mastery of students' knowledge and skills in information technology courses, promote the smooth implementation of information technology construction work, and lay a solid foundation for the high-speed and stable growth of China's social and economic development.

6. Conflicts of Interest

The authors declare that they have no conflict of interest.

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