

# Discussion on the Reform of Teaching Methods for Specialized Courses under the Background of Big Data

## -Taking Animal Food Technology as an Example

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**Abstract**—In order to further improve the teaching effect of specialized courses in the era of big data, this paper introduces the limitations of traditional teaching methods under the background of big data era, and summarizes the new situation brought by the application of new teaching methods such as Mooc to the teaching of professional courses, taking the experience of Animal Food Technology teaching practice and the achieved results as an example. This article presents the reform strategies of teaching methods for specialized courses under the background of big data: optimizing the teaching system, course setting and teaching contents, changing teaching ideas and improving teaching methods, creating personalized education environment for students by the support of big data, to achieve the goal of teaching students in accordance of their aptitude.

**Keywords**—Big data; Animal food technology; Massive Open Online Course (Mooc)

### I. INTRODUCTION

The Fifth Plenary Session of the 18th CPC Central Committee proposed to implement the national big data strategy, which marks that the big data strategy has officially risen to the national strategy, and big data construction has opened a new chapter. After the Internet of things, cloud computing, big data has begun to penetrate into all areas as a major technological change in the IT industry, and education is no exception. In this context, how to better use big data to make our teaching design more reasonable, teaching methods more personalized and teaching effect more objective, how to adapt to the needs of the times, make full use of resources in big data era to improve the teaching methods of specialized courses, to improve teaching effect stressfully and improve the quality of personnel training, are new problems to discuss in the current field of higher education.

### II. CHARACTERISTICS OF BIG DATA AND BIG DATA ERA

As a new concept, there is no precise unified concept about big data. The US Internet Data Center defines big data as a new technology architecture [1], which obtains value from large volumes of data by capturing at high speed, discovering, and / or analyzing. It then is generalized to four features: greater volume, more obvious variety, faster generating velocity, and higher value.

The big data era is the information era, which is based on a wide range of data resources collected on the Internet, Internet of things and other network channels. It can store data, refine value, intelligently process and display. In the era of big data, people can almost get valuable information from any data. This era has the following basic features: sociality, extensiveness, openness and dynamism. In the era of big data, data can be produced any time and any where, not only the collection of data is dynamic, but also the data storage technology and data processing technology are updated at any time, that is to say, the tools for processing data are also dynamic [2].

### III. CHALLENGES FOR TRADITIONAL TEACHING METHODS UNDER THE BACKGROUND OF BIG DATA

Online normalizing and networking of high quality education resources in the era of big data become more and more popular, and future high quality courses of world-class universities will be open free online, so that high-quality education resources will be provided to any people from all over the world who are willing to accept and learn at a low cost way, and then, the large-scale data generated in the process of learning can be collected, sorted, analyzed and summarized, so as to repeatedly test and improve course resources further, improve the quality of online teaching resources. This university education and teaching development idea based on big data will have a huge impact and far-reaching influence on traditional education. Specifically speaking:

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#### A. *Limitations of the existing teaching contents and teaching system under the background of big data*

In the era of big data, the multi-sources, availability and optionality of information resources have changed the social distribution pattern of knowledge and the people's ownership relations for it. Classroom learning is only one way for students to acquire knowledge. The globalization of online education makes it possible to provide high-quality educational resources of world-class universities for students in any region. Online learning can provide students with more learning space and selection space. Comparatively speaking, the traditional course setting is difficult to meet the needs of systematization and diversification well, and it is also difficult to fully meet the personalized design and individualized teaching requirements of professional knowledge structure [3].

#### B. *Limitations of existing teaching methods in the era of big data*

In the context of big data, teaching resources are greatly enriched, subjectivity, participation and enthusiasm of students in the teaching process have been greatly improved, and the traditional teaching methods are difficult to meet the teaching needs. The existing class teaching system mostly adopts the traditional "indoctrination" teaching method with teacher centered, and each teacher carries out teaching activities in a fixed teaching time and teaching space while facing a class or several classes of students. Teaching resources mainly come from teaching materials, teaching reference books and all kinds of case data collected by teachers. It is difficult for teachers to get a detailed understanding of the students' specific situations in the learning process, and it is difficult to truly teach students in accordance with their aptitude.

#### C. *Limitations of existing teaching evaluation methods under the background of big data*

Big data comes from process, instant behavior and phenomenon record, and students' microscopic, personalized learning situation can be analyzed through the big data, only needing a certain technology and equipment to assist, which completely does not affect the students' learning and life. In contrast, the traditional teaching evaluation comes from periodic, phased assessment, mainly carried out through the examination or scale survey and other forms, with a strong purpose, and these evaluation methods itself will bring great pressure to students [4].

#### IV. THE APPLICATION OF NEW TEACHING METHODS, SUCH AS MASSIVE OPEN ONLINE COURSE (MOOC), BRINGS A NEW SITUATION TO THE TEACHING OF SPECIALIZED COURSES.

Our College of Food Science and Biotechnology is a member of the "Mooc" teaching alliance of animal food technology. In recent years, our college *Animal Food Technology* has achieved good teaching effect by adopting the way of classroom teaching combined with online courses. Now, we take the experience of *Animal Food Technology* teaching practice and the achieved results as an example, and sum up the new situation brought to the specialized courses by the reform of teaching methods of specialized courses under the background of big data.

#### A. *Sharing and co-construction of teaching resources have greatly enriched the course teaching materials*

*Animal Food Technology* includes three parts: *Meat Product Technology*, *Dairy Product Technology* and *Egg Product Technology*, with more contents but limited class hours. The construction of Mooc has given full play to the advantages of network course which is not limited by class hours, and the establishment of rich teaching resources database is an effective extension of classroom teaching. The construction of *Animal Food Technology* Mooc is organized and led by South China Agricultural University, and teachers of relevant courses from many universities nationwide participate in the course construction, and participate in the production of a large number of videos, pictures, graphics, animation and other multimedia network courseware, greatly enriching the teaching materials of the course, showing the original boring and abstract Animal processing knowledge to students in a perceptual, intuitive, real, vivid way, enhancing the students' learning intuition, interest and interactivity, so that students can be clear at a glance. Try to reach the goal of simplification from complexity and difficulty. For such a huge workload, if it uses the organization form that the construction of teaching resources is independently completed by a small number of teachers in the teaching team usually in the course of the construction of traditional specialized courses, it is almost impossible to realize. As an online teaching form, Mooc can share the course resources in all classes taught by the teachers participating in the course in the whole country, and all the teachers participating in the course are also involved in the construction and supply of teaching resources. This sharing and co-construction organization form is easy to implement under the background of big data, and it is precisely because of this organization form that the construction of course resources of *Animal Food Technology* has great personnel advantages, realizing the visualization, rationalization and simplification of complex learning contents, increasing the teaching information, greatly enriching the teaching content and form, and expanding the teaching space and improving teaching efficiency through networking.

*B. Give full play to the academic expertise of the teachers, and greatly improve the level of course construction*

The organization form of sharing and co-construction in the construction of *Animal Food Technology* Mooc makes a number of well-known intra-industry professors throughout the country participate in the course construction, and everyone can concentrate their energies, play their respective academic expertise, and focus on preparing their best part. The overall level of course construction completed under such conditions of large-scale personnel, high academic level, strong teaching ability is obviously increased compared with the traditional course construction level of specialized course completed only by several teaches of some teaching team. Course resources are shared, and the promotion of course construction level is beneficial to all learners. The scope of the audience is large and the scope of benefit is wide.

*C. New learning methods help students make full use of debris time, and classroom teaching has been effectively extended*

*Animal Food Technology* Mooc is learnt through the software named as "Chaoxing Xuexitong". This is the first knowledge dissemination and management sharing platform based on the principle of neural system in China. It integrates knowledge management, course learning and special creation, providing one-stop learning and working environment for readers.

Each student will get an account and password set according to the student number from the teachers at the beginning of the learning the course, and after downloading the software "Xuexitong" on the mobile phone, the student can use his own account and password to log on the platform and enter into the *Animal Food Technology* course for online learning. As the mobile phone and wifi environment are so popular today, this learning form is convenient and flexible, advancing with the times, which can help students to use debris time to learn. Students' learning places are no longer confined to the classroom, and online course learning is an effective supplement to classroom learning.

*D. Increase the interaction and communication between teachers and students*

On the "Xuexitong" software *Animal Food Technology* Mooc platform, there are settings of groups of chat and discussion, and students can exchange learning feelings in it and ask the teacher questions. Teachers can see the students' questions from their clients, reply them in time, and publish their notices to their students on their own clients. Such communication can be carried out anytime and anywhere, convenient and quick, and it promotes the interaction between teachers and students, and promotes the communication

between teachers and students. It is a useful supplement to classroom teaching.

*E. Make full use of big data, help better feedback students' learning situation, and establish more effective evaluation mechanism.*

It can get timely and comprehensive feedback for the leaning situation of students using "Xuexitong" on the *Animal Food Technology* Mooc. It has detailed records about the percentage of watching the course video, test completion, scoring rate, course platform visits, assignments and average grade of exams and other specific details, and the students can see these records, quantitatively understand their own learning state, and teachers can check students' learning record at any time, and export all supervision objects through the development of supervision conditions, and timely supervise. Such detailed, specific and comprehensive feedback cannot be realized in traditional teaching methods. We often say that teaching evaluation should be procedural rather than summative. These detailed and specific data to be obtained, on the one hand, can help the teachers to supervise students' learning, and on the other hand, can also help teachers to make more comprehensive, objective and correct evaluation for the students' learning interest, learning attitude, learning achievement, and more effective examination and evaluation mechanism can be established on the basis of these data.

*F. The application of advanced technology makes the time needed for signing in, assignment correcting and examination paper preparing and other links saved effectively*

One of the functions of "Xuexitong" software is "sign in"; Teachers can use it to investigate the attendance of students in the link of classroom teaching: within the specified one or two minutes, students login platform, and complete the sign in according to the instructions of teachers. Teachers can see the list of absent students directly on their clients, avoiding the tediousness and time consuming of traditional roll call according to roll book. The teaching resources database also includes the question database, which is established by all teachers participating in the course construction according to the sections, chapters and the question types. The question database covers a wide range of contents and involves all knowledge points. The establishment of such question database makes the teachers directly extract in the process of assignment arrangement and test paper proposition, and the workload is reduced greatly. And release of assignment and examination can be directly carried out online, and students can directly complete on the course platform, and the platform can directly correct according to the answers of the question database, and give the results, reducing the workload of teachers in the correction of assignment and examination papers.

## V. REFORM STRATEGIES OF TEACHING METHODS FOR SPECIALIZED COURSES UNDER THE BACKGROUND OF BIG DATA

### A. Optimize the teaching system, course setting and teaching contents

As the unit producing and using big data, colleges and universities can strengthen the construction and integration of big data, and integrate the data of talent training data with government department and enterprise group in the vertical integration, cooperate according to division of labor, get mutual benefit, combine talent supply chain to the industrial chain, and obtain the industry demand information and talent unit feedback information through big data, thus adjusting the training strategy of college talents. In the horizontal joint, it should establish close cooperation relationship with the counterparts at home and abroad on the basis of consultation, and form a dynamic alliance, so as to realize the optimization, dynamic combination and sharing of educational resources.

In the era of big data, to extract valuable information from massive data, it should master the corresponding information technology, statistical technology, computer technology, which is of great significance to improve the innovative and creative ability of training objects and the integrity of knowledge structure. Therefore, it is very important to add big data related courses in the course system, such as mathematics, statistics, computer programming language, database, data mining, data visualization tools, etc., which can provide tools for students' self-learning.

### B. Change teaching ideas and improve teaching methods

In the era of big data, the way of students getting access to knowledge will no longer be limited to the classroom. Online learning has gradually become the main way for students to acquire knowledge. Teacher should not only have the traditional lecturer identity, but play as a guide, pointing out the direction of learning for students, constantly improving and integrating course resources sharing platform, actively pushing the right learning resources for students, and providing high-quality, personalized educational resources. In the process of learning, encourage students to express their views, exchange views, cultivate the atmosphere of joint learning and mutual learning, and actively study and enhance their abilities in the process of discussion. Teachers should master and learn data analysis methods, and can use tools to collect and analyze learners' data, so as to guide teaching. Teachers should combine the traditional classroom collective teaching mode with the large-scale open network courses and other new teaching modes, and give full play to the advantages of the two teaching modes, so that students' learning efficiency and teachers' teaching efficiency can be improved simultaneously.

### C. Create personalized education environment for students by the support of big data, to achieve the goal of teaching students in accordance of their aptitude.

Personalized education requires teachers to understand the students' existing knowledge reserves, learning ability and interest, expertise, etc., and the era of big data provides convenience for teachers to understand the students. When students learn through online learning platform, their learning behavior data will be constantly recorded. In the face of the same teaching content, the performance of each student and feedback content are sent to the background, and teachers can use the system through the reasonable setting, and assess students based on the large-scale, constantly updated learning behavior data, and give the learning mode most suitable for the students. For example, in the course of practice, when a student completes several subjects in the same types correctly, it jumps to another type of subject automatically, which not only improves the learning efficiency, but also reduces the students' learning burden. In addition, under the support of big data, teachers can also remind students at the right time to review and consolidate the previous contents, and promote students to learn more efficiently [2]. Through the induction and analysis of a large number of teaching data, truly realize the goal of teaching students in accordance of their aptitude, and personalized teaching.

## VI. CONCLUSIONS

The advent of the era of big data has led to significant changes in higher education teaching. Under the background of this era, teachers should keep pace with the times, let big data better serve the university teaching, improve teaching methods, raise the teaching level of specialized courses, improve the quality of talent training, and promote the development of higher education in China.

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