Research on the Construction of "Golden Course" of Data Warehouse and Data Mining in Local Colleges and Universities Based on OBE Concept

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Abstract: Combined with the reality of local colleges and universities, and based on the concept of OBE, this paper discusses the construction of the first-class course of data warehouse and data mining. The reform and practice of the curriculum are carried out from four aspects: curriculum objectives, teaching contents, teaching strategies and teaching assessment. Practice shows that the reform improves the quality of curriculum teaching, and provides a reference for the research and practice of online and offline hybrid "golden courses" in local colleges and universities.

1. Introduction

In the era of big data, the social demand for data mining talents is growing rapidly. In this context, the talent demand put forward new requirements and challenges to the undergraduate teaching of data mining course. Data warehouse and data mining is a professional core course of information management, information resources, big data management and application in our college. The course has the characteristics of novelty, complexity and intersection. The concepts of the course are abstract, involving relatively more mathematical knowledge, many algorithms and teaching difficulty. The teaching content is boring, and there are difficulties in learning, which affects the teaching effect of the course. The search found that there are no achievements about the construction of "golden course" of data mining at present. There are seven literatures on the construction of "golden course" based on OBE concept, and only one literature on the reform of data mining course based on OBE concept. Therefore, based on the concept of OBE, taking the course of data warehouse and data mining as an example, this paper discusses the ideas and schemes on the construction of "golden course" in local colleges and universities, which has important reference value for improving the course teaching quality in local colleges and universities, and optimizing quality of applied talents in local colleges and universities.

2. OBE Concept

The curriculum construction of colleges and universities has been paid more and more attention by the state. In 2018, the Ministry of education put forward the concept of "golden course" for the first time at the National Conference on undergraduate education in colleges and universities in the new era. In November of the same year, at the "China University Teaching Forum", director Wu Yan proposed the "golden class" standard. In October 2019, the Ministry of Education printed the implementation opinions on the construction of first-class undergraduate courses, which proposed that the courses should improve the high-level, highlight the innovation and increase the challenge. The requirement in the curriculum reflects the problems of simple curriculum system, outdated curriculum content, traditional teaching design and lack of ability training based on the concept of OBE.

OBE concept pays attention to the actual needs of the society for talents, and emphasizes the rational arrangement of teaching time and the design of key teaching resources around learning. Proposed by American scholar Spady in 1981, the Washington Agreement, namely, an international mutual recognition agreement certified by the undergraduate of engineering education, has been fully accepted. At present, it has become the mainstream concept of world education reform. In 2016, China officially joined the Washington Agreement, which objectively requires the implementation of OBE concept into education and teaching reform and curriculum construction. The talent training of local colleges and universities is guided by the needs of economy and society, and aims to cultivate senior specialized application-oriented talents. Therefore, it is of practical significance to use OBE concept to guide the "golden course" construction of local colleges and universities.

3. Construction of "Golden Course"

Taking the "golden course" construction of data warehouse and data mining in local colleges and universities as the research object. Learning from the four steps of implementing OBE proposed by Acharya, that is, define learning output - realize learning output - evaluate learning output - use learning output, and realize four changes, that is, change the teaching concept into students' learning, change the curriculum goal into ability improvement, change the teaching form into students' Center, and change the result evaluation into process assessment. Taking students' learning achievements as the guidance of "golden course", this paper puts forward the ideas and schemes for the construction of "golden course" in local colleges and universities. Next, we will focus on four aspects to carry out the construction of the "golden course" of data warehouse and data mining.

3.1. Refine Course Objectives

The learning achievement emphasized by OBE concept is the ability that students should have when they graduate. As the specific carrier of students' professional learning, the curriculum learning achievement is also an integral part of the ability that students should have when they graduate. Therefore, the determination of curriculum learning results should establish a clear mapping relationship with students' professional training objectives and graduation requirements, so as to ensure that the learning results can meet the professional graduation requirements and support the training objectives.

The course "data warehouse and data mining" is arranged after learning "Introduction to database system". Combined with the practical application of the course, the learning objectives of data

warehouse and data mining are determined as follows: (1) master the basic concepts, principles and key technologies of data warehouse and data mining. (2) Understand the architecture and design method of data warehouse, and have the ability to use data mining platform to analyze and mine data and assist decision-making.

According to the professional training objectives and graduation requirements supported by the course, combined with the practical application of the course, the support of the course teaching objectives to the professional graduation requirements is determined, as shown in Table 1.

Table 1: The support of curriculum objectives to graduation requirements

Graduation requirement	Graduation requirement index point	curriculum
4 Use scientific methods based on scientific principles Research on complex information management issues, including establishment, analysis, modeling, demonstration and countermeasures, and get reasonable and effective conclusions through synthesis.	4-2 Master the basic methods of data acquisition and processing	objective 1
5 Use appropriate technologies and methods of information organization, information retrieval and information analysis for complex information management problems; Complete the countermeasures to solve the problems, and understand the scope of application of the technologies and methods used.	5-3 Master different intelligent decision analysis methods	objective 12

3.2. Optimize Teaching Content

The teaching content of the course is to make comprehensive use of various teaching methods according to the teaching objectives and the teaching requirements of different knowledge points in chapters or units, so that students can understand and master knowledge through stage learning. The design of teaching content under the concept of OBE should not only pay attention to how students master a single knowledge point, but also pay attention to the logical connection between each knowledge point, help students establish a relatively complete knowledge system, and decompose and design students' learning objectives.

Table 2: Experimental items and hour allocation

name	hours	contents and requirements	target
DW implementation	four	Learn and master the establishment of data warehouse and multidimensional analysis operation, and deepen the understanding of some concepts involved in data warehouse, such as cube, fact table, dimension table, star model, snowflake model, online analytical processing, etc.	1,2
Classification prediction	four	Master the use of data mining platform. Comprehensive use of data preprocessing, classification and prediction algorithm, result interpretation and other knowledge for data mining. So as to deepen the understanding of relevant knowledge points in the course.	2
Association clustering	four	Master the use of data mining platform. Comprehensively use the knowledge of data preprocessing, association rules and clustering mining algorithm, result interpretation and so on. So as to deepen the understanding of relevant knowledge points in the course.	2
Algorithm implementation	four	Using data mining, programming and other related knowledge, select a common algorithm of data mining for programming. Deepen the understanding of the basic principle, detailed execution process and specific application of data mining algorithm.	1,2

According to the position of data warehouse and data mining in the professional curriculum

system, referring to relevant materials, combined with the actual situation of the enterprise, adjust the course content and class hour arrangement according to the construction of data warehouse and the process of data mining. The setting of experimental projects and class hour allocation are shown in Table 2:

3.3. Enrich Teaching Strategies

Teaching strategy is a teaching implementation plan formulated to achieve teaching objectives, including teaching process arrangement, teaching methods, teaching interaction and so on. The teaching strategy under the concept of OBE is student-centered and guided by the expected learning results. According to the determined learning objectives of data warehouse and data mining, combined with the characteristics of the course, the teaching strategy based on blended learning is determined.

Blended learning requires grasping the three teaching aspects before, during and after class. In these three aspects, as the leader of course teaching, teachers need to integrate pre class preparation, in class learning and after-class review into the blende learning process. For example, in the pre class preparation, students mainly learn through online excellent courses on data warehouse and data mining. In the actual teaching process, teachers designate the related resources in Chinese University MOOC as the pre class preview, set guidance questions related to the teaching content in the class, stimulate students' interest in learning, and lay the foundation for efficient classroom learning. Learning in class is the key aspect of curriculum teaching, teachers are required to show and impart curriculum knowledge to students, and emphasize guiding students to actively study and practice, so as to transform knowledge into application ability. In the actual teaching process, the discussion questions set on the learning platform will be exchanged. After class review is to let students practice experiments, solve an application problem around the course homework, and guide students to transform their knowledge into problem-solving ability. At the same time, the learning platform provides articles related to the course content for students to understand the hot spots and trends in the field.

3.4. Improve Teaching Assessment

Under the concept of OBE, the curriculum assessment system is the core to ensure learning results. The OBE concept guided by students' expected results is student-centered, focuses on the improvement of students' knowledge, ability and quality, reversely designs the curriculum assessment system, and the assessment runs through the processes of teaching. For the course of data warehouse and data mining, the teaching assessment is improved after reforming. The course assessment methods are as follows: the combination of process assessment and final assessment is adopted. The process assessment includes classroom performance, answers discussion questions, experimental operation and final defense. The final assessment includes experimental report and final report. Total evaluation score = 10% of classroom performance + 10% of answers discussion questions + 20% of experimental operation + 20% of final defense + 20% of experimental report + 20% of final report. Researchers pay attention to the process assessment, and give excellent, good, medium, pass and fail respectively according to the completed materials standards.

4. Conclusion

After reform and practice, the members of the research group have completed the predetermined

objectives and research contents of the project. The teachers of the course group have obtained training certificates such as big data analysis, guided the students to obtain two excellent bachelor's theses of Hubei province, four awards in competitions, and the teaching evaluation is excellent.

Combined with the reality of local colleges and universities, taking the construction and practice of the first-class course of data warehouse and data mining as an example, and based on the engineering education concept of "student-centered, achievement oriented and continuous improvement", we transform and reshape the course objectives, teaching contents, teaching design, and assessment, so as to realize four transformations. Strengthening the foundation and emphasizing practice, comprehensively improving the gold content of the curriculum, providing reference for the research and practice of online and offline hybrid curriculum construction of local colleges and universities, solving the contradiction between talent supply and social demand, and improving the quality of talent of local colleges and universities.

Acknowledgements

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