

Teaching Reform and Practice Based on the Concept of Learning Output OBE Education —Take the Course “Data Structure” as an Example

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ABSTRACT

In order to implement the educational concept of learning output OBE, according to the course nature and teaching objectives of data structure, a teaching reform practice based on the educational concept of learning output OBE is proposed. The formation is guided by the educational concept of learning and producing OBE, and takes the improvement of students' data structure course knowledge and ability as the main line. Through course reform and teaching practice optimization design, iteratively optimize and improve the teaching process, and make real-time corrections according to the teaching implementation. Meet the requirements of curriculum teaching reform. Use the educational concept of learning output (OBE) to organically integrate online and offline teaching, give full play to the advantages of online teaching, and make it promote the reform and innovation of data structure teaching methods.

Keywords: *OBE education concept, Teaching reform, Online and offline.*

1. THE EDUCATIONAL CONCEPT OF LEARNING OUTPUT OBE

OBE (Outcome Based Education) stands for Outcome Based Education [2]. That is to say, instructional design and instructional implementation should take the final learning outcomes of students through education as the main goal, and the curriculum teaching should take the students' expected learning output as the center to organize, implement and evaluate the structural model of instructional activities. Therefore, corresponding specific teaching plans and classroom teaching content should be formulated, and effective teaching methods should be used to ensure the successful completion of teaching objectives, so as to maximize the learning results obtained by students, and finally use students' learning results as the test standard of teaching effect.

With the gradual improvement of the epidemic situation at home and abroad, how to make better use of online teaching in the context of normalized epidemic prevention and control has become a new test for college teaching. In this context, in order to meet the quality requirements of modern society for talent training in colleges and universities, the OBE education concept of learning output is organically integrated with

online and offline teaching to give full play to the advantages of online teaching.

2. PROBLEMS EXISTING IN CURRENT COURSE TEACHING

As the core basic course of computer major, data structure has strong theoretical and practical nature. Due to the particularity of data structure content, most theories are abstract and difficult to describe and describe, and the algorithms are numerous and boring. Therefore, there are some deficiencies in the traditional teaching mode:

2.1. Disconnection between theory and practice

The data structure has a strong practicality. In the original classroom teaching, teachers mainly lectured on theory, interspersed with relevant experimental content, and the curriculum arrangement lacked systematicness, which was not conducive to students' digestion and absorption. Strengthening the experimental teaching link can not only consolidate students' understanding and mastery of the basic concepts and related algorithms in the data structure theory course, but also help students better complete the preview and review of knowledge points.

2.2. Poor self-learning awareness

The data structure has many knowledge points. In the original classroom teaching, it was found that students were afraid of difficulties in their acceptance, and individual students were less willing to do it. Therefore, it is very important to guide students' interest in teaching. Students can be guided to pay attention to the content of the public account and interact in real time to improve their interest in learning through the habit of students who like to watch short videos. Students should be taught in accordance with their aptitude and reasonable guidance. Encourage students to use fragments Time to improve hands-on ability, overcome fear of difficulties, and achieve the expected teaching effect.

2.3. Outdated teaching mode

The traditional teaching method aims at imparting course knowledge, adopts the indoctrination teaching method, takes teachers' "teaching" as the main teaching activity, and does not pay attention to external incentives for students. Unable to mobilize students' enthusiasm for active learning. To change to a "student-centered" teaching model. Stimulate the internal motivation of students to learn and exert their creativity. Course knowledge points can be integrated into the project, and the effect of data structure experiment teaching can be realized by practicing with competition, so that students can "learn by doing" and use abstract knowledge to solve practical problems.

2.4. The teaching evaluation standard is single, and the course assessment is not challenging

Traditional teaching assessment generally focuses on the evaluation of teachers' teaching quality, teaching resource construction, teaching link design, etc., while the assessment and evaluation of students' learning is relatively simple. Therefore, in the teaching reform, we should strengthen the supervision of the usual learning effect, pay attention to the process assessment, grasp the acceptance and mastery of the students' classroom knowledge points in real time, adjust the course progress and the difficulty of the knowledge points in time, reflect the differentiated teaching of teaching students according to their aptitude, and make the assessment purpose It is not a reflection of scores, but a reflection of students' mastery of knowledge.

Aiming at the problems existing in the current "Data Structure" course, this paper proposes the OBE education concept based on learning output and the online and offline hybrid teaching reform and innovation model, so as to cultivate innovative, exploratory and personalized talents that meet the needs of social development.

3. CLASSROOM TEACHING GOALS BASED ON LEARNING OUTPUT OBE EDUCATION CONCEPT

Cultivate students' abstract thinking, computational thinking and innovative thinking ability, explore new ideas for curriculum reform, and realize the OBE education concept based on learning output and the online and offline hybrid teaching reform and innovation model. As a highly theoretical course, data structure focuses on understanding the relationship between data expressed by various abstract data structures and the flexible application of various data structures. The difficulty is how to select appropriate data for practical application problems. Structure, design and implement efficient algorithms. The data structure course includes classroom teaching, experimental teaching and extracurricular teaching. Classroom teaching mainly adopts teaching modes such as theoretical teaching, problem explanation and analysis, and in-class communication and discussion; the experimental teaching mainly adopts the method of arranging experimental questions, past competition test questions, etc. to complete computer-based experiments. Through abundant example materials, reasonable scientific experiments are used. , improve the education plan and fully stimulate the interest of students; make full use of teaching resources outside the classroom, and provide teaching resources for students to learn by themselves through the development of public accounts, online course websites, and course resource sharing websites, so that students can achieve course goals.

4. CURRICULUM INSTRUCTIONAL DESIGN

To clarify the key points, difficulties and solutions of the course, the reform and innovation based on the OBE education concept of learning output and online and offline hybrid teaching can be realized through the following points [3].

4.1. To formulate a syllabus, it is necessary to clarify the key points and difficulties of the course, and highlight the requirements of the OBE education concept.

The courseware, review points, example analysis, exercises and thinking that are matched with the course are compiled and provided to students in a combined way, so that students can exert their learning autonomy, inspiration and research, and guide students to think and research deeply.

4.2. Give full play to the advantages of classroom teaching, and focus on the key and difficult points.

In teaching, the theoretical teaching and practical teaching are integrated, case teaching, and practice while learning, so as to improve students' participation and practical operation ability. For the explanation of basic knowledge points, this link is mainly set in the early stage of course teaching. For key and difficult knowledge points, the teacher will focus on analysis based on previous teaching experience, students' completion of online quizzes and homework; for classroom interactive knowledge points, the teacher will focus on the problems that students make mistakes, understand difficulties and ask more questions in the past. Discussions are carried out in the classroom to achieve the effect of enlivening the classroom atmosphere and promoting thinking; according to the content of the classroom exercises, they are sent to the students for on-site exercises in the classroom, and the teacher gives on-site guidance in the form of experimental classes in the computer room; classroom teaching can also be based on cases. The time allocation ratio of explanation and practice can be adjusted according to the complexity of the teaching method, so that teachers can have more opportunities to understand the problems encountered by each student, and use strategies such as guidance and feedback to guide students to improve computational thinking and engineering skills. Practical ability.

4.3. The "ideological and political" elements of the course are interspersed in the course teaching to correctly guide students' sense of mission and responsibility.

Offline teaching is a form of face-to-face teaching in which teachers and students gather in a classroom or laboratory [5]. Compared with online teaching, offline teaching pays more attention to face-to-face real-time communication and interaction between teachers and students. Teachers can give targeted explanations to relevant knowledge points in a timely manner according to students' classroom responses, which can motivate students in the process of classroom interaction. Of knowledge extension. The interaction between teachers and students through expressions, language and actions is also conducive to emotional communication, making cold knowledge points more dynamic, less obscure and abstract and easy to understand. The advantages of offline teaching allow the organic integration of knowledge, ability and quality, and better cultivate students' comprehensive ability and abstract thinking in solving complex problems. The "ideological and political" content of the course is introduced into the

course to fully adjust students' sense of responsibility and mission. .

4.4. Construct online course teaching resources in a targeted manner, and use online interaction as an effective supplement to classroom teaching.

In the teaching process, the basic knowledge is mainly used to understand the connotation of the logical structure of various algorithms. Make full use of the resource advantages of online teaching and enrich the content of the classroom to achieve an organic integration of online and offline: teachers pre-recorded micro-lectures and copied lecture videos to students, including course handouts, explanations of key and difficult points, a complete test question bank, homework and Supplementary reading materials are all released in the form of public accounts, which can facilitate online learning and online testing for students; make reasonable use of relevant teaching materials on the Internet to enrich teaching resources, and adopt a variety of modern information technologies: for teachers, online The teaching form can be more diversified, making the teaching content more vivid, and it is easy to grasp whether the online teaching students really complete the learning of the corresponding content according to the required course progress, and timely interactively grasp the learning effect of the students. You can use the main functions of the WeChat public account to carry out effective secondary development and design [8], and use a small workload to achieve platform teaching functions such as: registration, data download, exercises, online learning, teaching interaction and other functions, and students can use WeChat. The enthusiasm makes it a learning tool for students and enhances students' interest in learning

4.5. Construct a "competition"-oriented online experiment and training platform:

Pay attention to and strengthen the practical teaching link of computer, strengthen students' mastery of storage representation and operation of various data structures through programming practice, and help students to further understand the relationship between logical structure, storage structure and operation structure. Using project as the carrier, task-driven, and new technology as the guide, let students "learn by doing", and stimulate students' learning interest and learning potential. The online experiment and training platform mainly includes: teaching public account, ACM competition, "Blue Bridge Cup", computer design competition, "Internet +" and other real questions over the years, practical training, practice question bank, project case database, etc. [6] to achieve data sharing, Improve students' interest and enthusiasm for independent learning, improve academic challenges,

increase the difficulty of courses, expand the depth of courses, effectively improve the quality of course teaching, and achieve the teaching goal of organic integration of knowledge, ability, and quality training.

5. APPRAISAL METHOD AND IMPLEMENTATION

The curriculum reform and innovative assessment method designed based on the OBE concept is a whole-process assessment method. It is mainly composed of classroom attendance, classroom interaction, project report, knowledge point test, and classroom experiment acceptance. Diversity and flexibility of assessment. The main assessment in the class mainly examines students' attendance, classroom interaction, online code test, completion of video knowledge points, and practice with competitions, etc. [7] The content of the project process assessment includes: completeness of project functions, standardization of documents, teamwork, and defense. The final assessment is based on the quality of the submitted papers or the written test scores. In addition to the process assessment, this course also establishes a student-centered feedback mechanism for classroom learning effects. Specifically, through the interactive link of the official account platform, the mastery of the learning content after each class is recorded.

6. CONCLUSIONS

Based on the data structure course, blended teaching reform and innovation of the learning output OBE education concept, the formulation of the syllabus should clarify the key points and difficulties of the course, and highlight the requirements of the OBE education concept; give full play to the advantages of classroom teaching, and focus on the key points and difficulties. The "ideological and political" element of the course is introduced into the teaching; the course is deeply reformed by making full use of the resource advantages of online teaching, online and offline organic integration, training by competition, and reform of assessment methods and other practical and theoretical methods. Through the research on the teaching based on the OBE education concept of learning output, the students are organized using new media such as official accounts to form an intra- and extra-curricular community. By pushing messages and publishing key points, it helps students to transfer knowledge and record the learning process. The integration of in-class and extra-curricular integration breaks through the limitation of teaching space, integrating the advantages of traditional teaching and online teaching to achieve the reform requirements of the OBE education concept of learning output.

Although teachers felt the convenience of online teaching during the epidemic prevention and control period, they also found that online teaching required more energy and time than offline teaching, but through

the strong interactive ability of online and offline hybrid teaching, It enhances the exchange of knowledge between students and teachers, and between students and students. Therefore, the educational concept reform of learning output OBE is very effective[4]. Through the data structure teaching practice, the learning output OBE education concept model has a positive effect on improving students' performance and enhancing students' interest in learning. Through the investigation of the actual learning situation of the last three students, the effect is very satisfactory.

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