Research on the Blended Teaching Mode in the Course "Principle and Application of Linux" based on OBE-BOPPPS

Liyu Zhu[a], Yueyue Zheng[b]

Guangdong University of Science and Technology, Dongguan 523000, China

[a]zhuliyu6@foxmail.com, [b]zhengyy829@163.com

Abstract

"Principle and Application of Linux" is a core course for software engineering majors. This course leads students into the world of Linux OS and plays a role in the subsequent development of embedded programs. In view of the problems such as students' lack of practical training, low online participation, and switching between online and offline teaching modes in the course teaching during the epidemic period of COVID-19, the research team, based on the Superstar Learning Platform, integrated OBE teaching concepts into the BOPPPS teaching mode, improved the connection scheme of online and offline teaching modes, and made further reform and exploration on the blended teaching mode. The results show that the blended teaching mode based on OBE-BOPPPS can adjust teaching strategies according to teaching effects and improve teaching practice according to learning outcomes, thus forming a virtuous circle process of sustainable improvement. The new teaching model has stimulated students' enthusiasm for learning, enhanced students' ability to integrate theory with practice, and achieved remarkable teaching results.

Keywords

OBE; BOPPPS; Blended Teaching; Teaching Reform; Linux.

1. Introduction

"Principle and Application of Linux" is an important professional compulsory course for students majoring in software engineering in Guangdong University of Science and Technology, and is a school level high-quality resource sharing course. This course leads students into the world of Linux OS and plays a role in the subsequent development of embedded programs. Closely connected with Linux system engineer, Linux operation and maintenance engineer and other professional posts, it has a practical guiding role in the cultivation of students' professional quality and professional ability. Course content [1] includes the concept and characteristics of Linux OS, common commands and tools of Linux, user and user group management, Shell programming, Linux file system management, disk file and directory management, process management, etc. There are many courses and knowledge points are relatively scattered, so it is difficult for students to establish a knowledge system.

At present, the following main problems still exist in the teaching of this course:

(1) Students lack of targeted practical training.

"Principle and Application of Linux" is a course that emphasizes both theoretical learning and practical operation. However, in the traditional teaching process, teachers focus on the explanation of principles and technical knowledge, while students stay in the memorization of knowledge, emphasizing theory over practice. The students are lack of targeted practical training, and their ability to analyze and solve comprehensive problems should be strengthened.

(2) The online participation of students is low, and it is difficult for teachers to monitor students' learning.

Compared with other theoretical courses, "Principle and Application of Linux" not only focuses on the study of theoretical knowledge, but also on the application of theoretical knowledge to practice. In online teaching, teachers generally give priority to theoretical knowledge, supplemented by practical operation. Online classroom often lacks teacher-student interaction, which is difficult to improve students' participation and enthusiasm in the classroom, and easy to lead to students' insufficient understanding of theoretical knowledge. At the same time, it is difficult for teachers to monitor students' learning and resolve doubts in time, especially in the process of practical operation. In general, students' online participation is not high, and it is difficult for teachers to make diagnostic and formative evaluations of students' learning.

(3) Online and offline teaching modes need to be switched at any time.

At present, the prevention and control of the COVID-19 situation in China is still severe. Colleges and universities need to strictly implement various measures for epidemic prevention and control, adjust teaching plans in time according to different situations, improve the connection plan, and make preparations for changing online and offline teaching at any time in a safe and orderly manner. The current teaching methods can no longer adapt the education and teaching requirements of the course "Principle and Application of Linux" during the epidemic period of COVID-19, and teaching reform is urgently needed to solve these problems.

Outcome based education (OBE) was first proposed by Spady in 1981. Its core is student-centered, result-oriented and continuous improvement. The OBE concept emphasizes the goal of learning outcomes achieved by students, and all teaching design, teaching content and teaching implementation must focus on this goal and serve it. The BOPPPS teaching mode takes constructivism as the theoretical basis and active learning as the focus to reform the traditional spoon feeding teaching. It has built a teaching closed loop that includes six stages: Bridge-in, Objective, Pre-assessment, Participatory-Learning, Post-assessment and Summary, with more emphasis on student participation and feedback evaluation. Both OBE teaching concept and BOPPPS teaching mode are new teaching methods that emphasize student-centered, result-oriented and active exploration. OBE concept has been widely concerned and discussed in China's education session, which has formed a relatively complete theoretical system and implementation mode, and has been proved to be the right direction of higher engineering education reform [2-4].

Guided by the curriculum objectives and students' learning outcomes, we combines online theoretical knowledge with offline practical skills application to achieve close coordination between theoretical teaching and practical teaching. Through the introduction of ideological and political curriculum and the adjustment of teaching strategies, we can continue to improve teaching, establish a new teaching model that pays equal attention to theory and practice, and cultivate high-quality comprehensive talents required by society.

2. Teaching Reform Measures

2.1. Reform Target

The overall concept and goal of this project is "To focus on student development, take market application as guidance, and witness the power of knowledge landing with students! " Under the guidance of OBE-BOPPPS teaching concept, explore a new way of blended teaching mode reform. We design teaching strategies based on the objectives of curriculum setting and students' learning outcomes, achieve close coordination between theoretical teaching and practical teaching, increase the interest of the curriculum, and then stimulate students' interest in learning. This paper actively promotes teaching reform and strives to realize three

conversions, namely, conversion from subject-oriented to target-oriented; from teacher-centered to student-centered and from quality supervision to continuous improvement [5].

2.2.   Reform Content

(1) Integrate OBE teaching concept into BOPPPS teaching mode.

This topic takes "Principle and Application of Linux" as the course carrier, and integrates OBE teaching concept into the teaching mode of BOPPPS, that is, to answer the four questions emphasized by OBE in the six teaching stages of BOPPPS. On the one hand, we should fully respect the students' dominant position in the teaching process, encourage students to actively participate in the classroom; On the other hand, we should design teaching strategies based on the objectives of curriculum setting and students' learning outcomes, achieve close coordination between theoretical teaching and practical teaching. Under the dual attention of teaching process and teaching results, adjust teaching strategies according to teaching effects, and improve teaching practice according to learning outcomes.

(2) Disassemble teaching goals and measure teaching outcomes.

In view of the problem that the course has many teaching contents and students' level is uneven, teachers teach students in accordance with their aptitude. Disassemble the curriculum goals , and each teaching unit, module or topic has a clear goal of theoretical knowledge and practical skills. Most importantly, the degree of completion of teaching goals can be measured and evaluated. Before class, teachers should clarify the context and relationship between learning contents. In class, teachers pay attention to the connection and integration of knowledge points, and guide students to actively build their own knowledge system. In the "Pre-assessment" stage of the classroom, we should timely understand the students' mastery of the previous teaching content, and then adjust the depth and progress of the subsequent teaching content according to the students' actual situation.

(3) Construction of practical training system.

The practical training of the "Principle and Application of Linux" course is divided into two forms: In-class training and whole-week training, and the corresponding instructions are configured. The in-class training instructions and the whole-week training instructions are closely combined with the curriculum outline, echo each other, develop a number of training projects and corresponding assessment standards, and form a systematic training system. In the teaching process, implement in-class training, disassemble the curriculum goals , and each teaching unit, module or topic has a clear goal of theoretical knowledge and practical skills, and focus on strengthening the training of current knowledge points. The whole-week training will be carried out in the later stage of teaching, focusing on the connection and integration of various knowledge points, and strengthening the ability of students to analyze and solve problems.

(4) Provide learning support services.

In view of the low participation of students in online teaching and the difficulty for teachers to monitor students' learning, we have set up various learning support services such as guidance, supervision, promotion and assistance in the teaching process. For example, we have developed and implemented a class performance bonus mechanism, designed a "rush to answer" link, effectively encouraged students to follow teachers' teaching ideas, and improved students' interest in participation and acquisition. The "practical operation sharing" link is designed to focus on the consolidation and improvement of knowledge, help teachers more accurately master the actual learning situation of students, and optimize and adjust the follow-up teaching content and strategies.

(5) Integration of ideological and political elements.

We adhere to the principle of moral education, integrate the ideological and political education into the curriculum content, and promote the core socialist values. We seek the elements of ideological and political education contained in the "Principle and Application of Linux"course, construct the situation, and integrate them into the teaching link. For example, the phenomenon of Linux OS spreading all corners of human life is introduced into the development history and characteristics of Linux. Teachers guide students to think that the apparent reason why Linux has been widely developed is to join the GUN and follow POSIX standards, while the essential reason is to share resources and unify norms. Let each student remember the concept of resource sharing and win-win cooperation, and understand the importance of unified norms in the process of cooperation, so as to cultivate the students' dedication and noble moral sentiment.

3. Course Assessment

This course adopts the assessment method of combination of process and individuality, and combination of formative assessment and outcome assessment. The course score is composed of process assessment (40%) and final assessment (60%). Among them, the process assessment score is obtained by the teacher through the superstar learning platform to record students performance in attendance, homework, mid-term assessment, discussion, chapter test, course interaction and other links during the whole semester's teaching process, see Fig. 1.
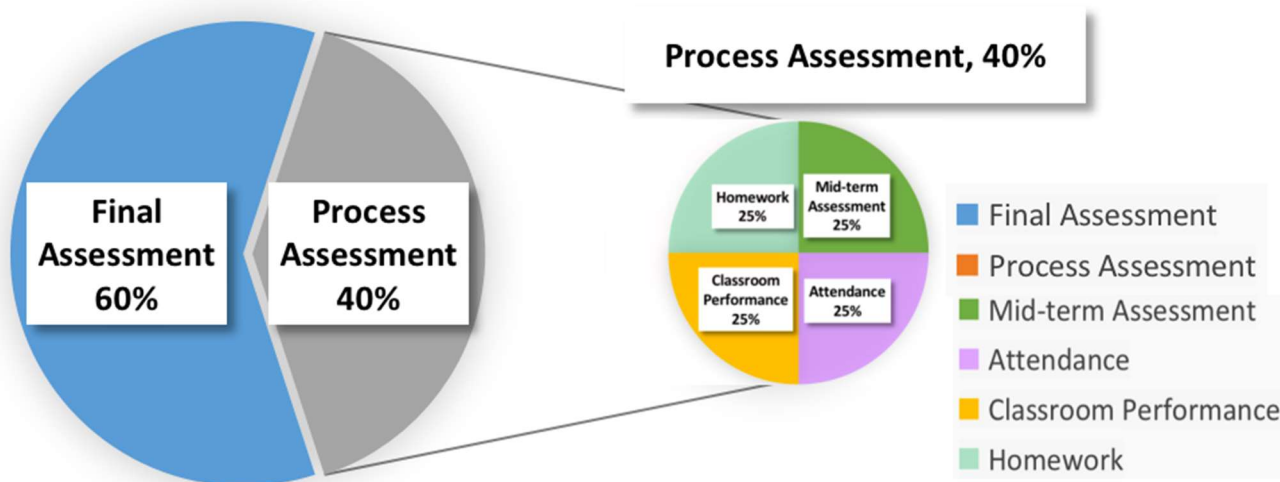

Fig. 1 Percentage of course assessment

4. Teaching Effectiveness

We gives full play to the advantages of online teaching. Teachers use the Superstar Learning Platform to independently build courses and share teaching resources. The number and type of teaching resources are far more than traditional teaching. There are rich and diverse teaching resources for students to preview, review and self-study. Superstar Learning Platform provides teachers and students with convenient class management, online homework correction, score summary and analysis, courseware sharing, online discussion and other services, which are popular with teachers and students. At present, the curriculum team has skillfully used the information platform to carry out teaching activities, and the new teaching mode is effective in stimulating students' interest in learning and improving the teaching effect.

5. Conclusion

The teaching mode of universities needs to be switched online and offline at any time during the epidemic period of COVID-19. We integrated OBE teaching concepts into the BOPPPS teaching mode, improved the connection scheme of online and offline teaching modes, and made further reform and exploration on the blended teaching mode. We can adjust the teaching plan in time according to different situations of the epidemic situation. In any online or offline mode, we can double observe the teaching process and teaching results. The blended teaching mode based on OBE-BOPPPS can adjust teaching strategies according to teaching effects and improve teaching practice according to learning outcomes, thus forming a virtuous circle process of sustainable improvement. The new teaching mode has stimulated students' enthusiasm for learning, enhanced their logical thinking ability and practical comprehensive ability, and laid a solid foundation for future work as Linux system engineers, Linux operation and maintenance engineers, etc.

Acknowledgments

References

[1] itheima. Fundamentals of Linux Programming[M]. Beijing: Tsinghua University Press, 2017.

[2] Yao Li, Ni Bo. Research on Teaching Reform of Embedded Linux System Development Course Based on OBE[J]. Journal of Educational Technology, 2017, 16(12): 7-9.

[3] Kan Yuan, Guo Qiang, Wang Jianyu, Liu Zhanmin. Research on Teaching Reform of Fundamentals of College Computer Based on OBE-BOPPPS[J]. Software Guide, 2020, 19(2): 210-213.

[4] Dai Jiashu, Yan Nan, Li Jun, Liu Tao. Exploration on the Construction of Linux Operating System Curriculum Group under OBE Concept[J]. Computer Knowledge and Technology, 2022, 18(13): 175-177.

[5] Li Zhiyi, Zhu Hong, Liu Zhijun, Xia Yuanjing. Guiding the Reform of Higher Engineering Education with Result-oriented Educational Ideas[J]. Research in Higher Education of Engineering, 2014(2): 29-34.