Teaching Design and Practice of a Project-Based Blended Learning Model

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ABSTRACT

Project-based learning (PBL) and Blended Learning (BL) have been widely used in universities. There are some empirical teaching researches on PBL in the BL environment for some specific courses, but for the combination of PBL and BL, there is as yet no universal teaching model. This article puts forward a new universal teaching mode: Project-Based Blended Learning (PBBL) and describes a teaching experiment in applying PBBL. Firstly, the design idea of PBBL is discussed. Secondly, taking a course on Single Chip Microcomputers (SCM) as an example, the strategies of selecting, designing and controlling the core teaching elements are given, and the complete implementation plan and concrete methods are described. The teaching case shows that the PBBL gives full play to the advantages of BL and PBL, and can effectively improve students’ abilities of self-learning, practical application and innovation.

KEYWORDS
Application Ability, Flipped Classroom, Innovative Spirit, Instruction Design, Micro Lesson, Network Teaching Platform, Project-Based Learning, SCM Course, Task-Driven

INTRODUCTION

With the emergence and rise of MOOCs and Micro-Lessons, the application of blended learning (BL) in higher education is becoming more and more popular, and its scope and depth are also expanding. BL takes full advantage of the rich network resources and combines face-to-face learning with online learning. It allows students to learn flexibly without the constraints of space and time, and can provide a learning experience that is more involved than a single teaching format (Garrison & Vaughan, 2008; Porter et al., 2014). At present, many universities around the world implement BL. According to the survey data published in the American Science and Technology Campus in 2016, 71% of American college teachers adopt the mixed teaching mode of online learning and face-to-face teaching (Schaffhauser & Kelly, 2016).

Project-Based Learning (PBL) is also a widely used teaching model in the world. In this model the real task is designed, and the learning content is set to the complex and meaningful project situation. Through self-inquiry and cooperation, students solve the problem to learn the implicit knowledge. Then the ability of problem-solving and self-directed learning is formed (Solomon, 2003).

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However, there are also some problems in the implementations of BL and PBL. For example, when implementing BL, many teachers only take online learning as a supplement to traditional teaching, and fail to change the traditional classroom teaching in essence (Zheng, 2018). Moreover, learners cannot get timely feedback and guidance from teachers in the process of autonomous learning, and lack effective collaboration and supervision management (Zhao et al., 2017). In the implementation of PBL, there are also problems such as less communication and cooperation between teachers and students, and the difficulty in evaluating students’ learning processes (Bilgin et al., 2015; Zhou et al., 2016).

From the above, it can be seen that BL and PBL have their own advantages and disadvantages. Therefore, some teachers have studied whether BL and PBL can complement each other in order to improve the teaching effect. Chen and others put forward the implementation of PBL in the network environment, focusing on the analysis of the impact of network technology on the implementation of PBL, but did not explicitly put forward the concept of BL and PBL integration, and it had the shortcoming that the students often paid too much attention to practical operation and neglected the formation of curriculum knowledge (Chen & Deng, 2014; Guo et al., 2017; Zhu, 2018). Zhou and others combined PBL with Micro-Lessons, applied it in Electronic Design Technology Course teaching, and promoted the implementation of PBL by using flipped classroom. However, it had the problem that the process evaluation was difficult to implement (Zhou et al., 2016). Ahern (2010) applied PBL and BL together in a Transportation Course, focusing on the impact on students’ performance, but did not specifically analyze the strategies and methods of combining the two. Munezero (2016) applied a blended project-based approach to students’ extracurricular activities, improving the participating students’ technology, interdisciplinary and interpersonal skills.

The combination of PBL and BL is a logical outcome of the development of educational technology and network technology. However, the existing research has not given a generalizability of the combination of the two learning models. Therefore, this study is committed to building a better universal teaching model - PBBL. Elements of the teaching model mainly include teaching contents, teaching resources, teaching strategies and teaching evaluation. Therefore, to establish a new teaching model is to study how to construct these teaching elements organically. So, the research questions are how to construct the four teaching elements and how to study the new teaching model empirically. To achieve this goal, firstly the characteristics of PBL and BL are theoretically studied, and then the new teaching model is designed systematically. Finally, the teaching model is verified and improved by a specific course teaching, and a PBBL implementation scheme with good generalizability is given.

BACKGROUND

This section mainly analyzes the definition, characteristics, advantages and disadvantages of PBL and BL, as well as the possibility and necessity of combining them.

Project-Based Learning

PBL is a learning process where teachers and students choose and utilize optimal learning resources around a specific learning project, acquire more complete and specific knowledge in practice experience, internalization absorption and exploration innovation, and to form specialized skills and get fully developed learning (Solomon, 2003). PBL is a set of principles based on the constructivist view of learning that puts forward that people actively construct knowledge rather than receive and store it (Greening, 2000).

PBL has its own elements and main links. Some scholars believe that PBL is mainly composed of four elements: content, activity, situation and result (Hou & Hu, 2016; Zhang et al., 2016). Other scholars believe that the implementation of PBL is generally divided into six steps, such as project background, project task, activity exploration, making production, achievement exchange and project evaluation (Jiang & Sun, 2012; Munezero, 2016).
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