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Experimental Research on the Reform of Task-Driven Blended Learning Mode Based on Work Order Platform

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Abstract: This study is guided by the Community of Inquiry (COI) model to explore a task-driven blended learning mode supported by a ticket platform. The teaching is constructed and implemented with the students as the main body, fully utilizing the leading role of teachers as classroom organizers, guides, and constructors of meaning to help students. The research objects are two classes of software majors in Inner Mongolia Vocational College of Mechanical and Electrical Technology in 2021. Using a quasi-experimental research method, the study found significant differences between the experimental group and the control group, confirming that the task-driven blended learning mode based on the ticket platform has significant effects on improving student cognitive existence, teaching existence, and social existence, promoting the innovation and improvement of teaching modes in higher vocational education.

Keywords: Process platform; Task-driven; Mixed learning mode; Reform; Experimental research

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1. Introduction

In the era of informatization, exploring effective "teaching and learning" processes has become an urgent issue to be addressed in higher vocational education. Blended learning [1-2] refers to the combination of online learning and face-to-face teaching, creating a highly engaging and personalized learning experience for students.

One well-established theory is the Community of Inquiry (COI) model proposed by Garrison et al. [3]. This model consists of three core elements: cognitive presence, social presence, and teaching presence. Based on the COI model, this study integrates learning resources and activities into three teaching stages: pre-class, in-class, and post-class, using a task-driven blended learning approach through the use of a digital platform. This teaching model places students at the center and allows teachers to serve as organizers, guides, and supporters of meaningful construction in the classroom, promoting development in cognitive presence, teaching presence, and social presence.

2. Design of a Task-Driven Blended Teaching Model Based on a Ticket-Based Platform

The ticketing platform includes three teaching stages: pre-class, in-class, and post-class. Each ticket includes sections for task preparation, task introduction, task objectives, task planning, task implementation, task evaluation, work logs, task summaries, and task extensions. The ticketing platform offers features such as asking questions, discussions, voting, assignments, tests, and supervision, facilitating teacher-student interaction and feedback.

Before class, the teacher releases task preparation on the ticketing platform. Students use learning tools and resources to preview and summarize their doubts, preparing for classroom learning. Teachers adjust teaching strategies promptly based on students' previewing situation.

During class, teachers organize and guide students to communicate and cooperate with each other, construct knowledge systems, and solve task difficulties to prepare students for autonomous exploration. There are mainly four aspects: firstly, small groups discuss, analyze and solve the key and difficult points of problems together, with the teacher guiding and summarizing. Secondly, students independently complete ticketing platform tasks, which provide micro-lecture videos and learning resource websites to support students' autonomous exploration. Thirdly, small groups display works on the podium for peer and inter-group assessment. Fourthly, teachers summarize to help students establish a more comprehensive, systematic, and in-depth learning framework, promote the integration and application of knowledge. The task log module allows students to record in detail the problems and solutions encountered during the learning process, while the task summary module allows students to organize and summarize the knowledge they have learned systematically, promoting the consolidation and application of knowledge in the brain.

After class, through the task extension section on the ticketing platform, teachers assign students some challenging or practical tasks. This not only consolidates and deepens learned knowledge, encourages students to think and solve more challenging problems, but also guides students to actively learn and participate in practical applications and research in their professional fields, broadening their horizons, understanding the latest technology trends and practical experience, and preparing for future learning and career development.

3. Based on the Work Order Platform, a Task-Driven Blended Learning Model Practice

3.1 Research Design

3.1.1 Experimental Objectives

This study selected the Software Technology Class 2101 of Inner Mongolia College of Mechanical and Electrical Vocational Technology as the experimental group and the Software Technology Class 2102 as the control group. The pre-test data showed no significant difference between the two classes.

3.1.2 Experimental Design

This study used a quasi-experimental research method to verify the effectiveness of a task-driven blended learning model based on a work order platform, using post-test data analysis of the control and experimental groups, as well as interviews, student work displays, work logs, and task summaries from the experimental group. The independent variable in this study is the task-driven blended learning model based on a work order platform, while the dependent variables are student cognitive, teaching, and social presence. Both the experimental and control groups consisted of 47 students, taught by the same teacher. The differences in the cognitive, teaching, and social presence of the two groups of students were determined to be significant through the experiment.

3.1.3 Measurement Tools

This study utilized the Chinese version of Lan Guoshuai et al.'s Exploratory Community Scale [4], which consists of 27 items that assess the factors of cognitive presence, teaching presence, and social presence. The primary fit indices of the scale are as follows: x2=809.16, df=321, x2/df=2.52, NFI=0.808, IFI=0.875, TLI=0.862, CFI=0.874, RMAES=0.082. All the indices meet the ideal standards, indicating a good fit of the model to the data and demonstrating good structural validity. The internal consistency coefficients (α) of each factor and the overall scale for the scale are as follows: 0.933, 0.834, 0.917, and 0.956, respectively. The correlation analysis between the three factors of the scale and the overall scale shows a high correlation coefficient, indicating that all factors revolve around a common trait. There is a low degree of correlation among the three factors, suggesting that each factor has its own independent effect, thus demonstrating good structural validity of the Chinese version of the Exploratory Community Scale.

3.2 Research Findings

Through quantitative comparative analysis of questionnaire data between the control group and experimental group, as well as qualitative analysis of the experimental group students' interview content, project showcases, work logs, and work summaries, this study found varying degrees of improvement in the cognitive presence, teaching presence, and social presence of the experimental group students.

3.2.1 Analysis of the survey questionnaire

An analysis was conducted on the differences between the experimental group and the control group in the questionnaire responses. The mean values of cognitive presence, teaching presence, and social presence in the experimental group were all higher than those in the control group, and the sig values were all 0.001, indicating a significant difference between the two groups as a result of the blended learning approach implemented through this course. Please refer to Table 1 for details.

Table 1: Significant Differences

Dimension		Group	
	Test	Experimental Group	Control Group
Cognitive Presence	Mean	40.00	32.10
	SD	5.15	4.14
	t	-11.60	
	sig	0.001	
Instructional Presence	Mean	59.87	48.55
	SD	6.80	5.36
	t	-12.67	
	sig	0.001	
Social Presence	Mean	22.31	14.76
	SD	3.06	1.49
	t	-21.52	
	sig	0.001	

3.2.2 Interviews and content analysis

During the post-course interviews, Student A expressed, "The discussions in the classroom have allowed me to understand different approaches to problem-solving, which has been very helpful in helping me comprehend different viewpoints and perspectives." Student B stated, "Online learning resources and tools have helped me solve some of the difficulties I encountered during the learning process." Student C believed that "The teacher has been supportive in helping me concentrate on discussing task-related questions in a way that aids my learning." After reading and analyzing the students' work journals and task summaries, it was found that 88% of students were able to express themselves clearly and accurately, record the problems encountered during the learning process, the methods used to solve them, and effectively address the learning objectives, summarizing and reflecting on their learning experiences and lessons learned. In the presentation session, the students who took the stage were able to fluently and comprehensively discuss their project's implementation ideas, as well as the technical challenges encountered and the solutions applied. According to the feedback data from the work order platform, more than 95% of the students actively participated in classroom discussions and other activities, resulting in increased student proactivity, improved knowledge construction abilities, and enhanced communication and collaboration skills. These findings are consistent with the quantified results from the questionnaire data.

4. Conclusion

The task-driven hybrid teaching model based on the work order platform provides students with a more flexible learning approach and a more personalized learning experience, which can better meet their learning needs and styles. In the hybrid teaching process, the interaction between students and teachers is strengthened. Teachers can have a more comprehensive understanding of students' learning situations and problems, thereby providing more accurate and effective guidance and assistance to students. This promotes students' abilities in cooperative communication, critical thinking, knowledge construction, and independent problem-solving, and promotes the innovation and improvement of teaching models in higher vocational education.

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