

Application Research of the SPOC College English Teaching Model in the Context of Personalized Autonomous Learning

Yuanyuan Liu

359581195@qq.com

Shandong Xiehe University, Jinan, Shandong, 250109, China

Abstract. Compared to traditional classroom teaching, the SPOC (Small Private Online Course) English teaching model offers greater flexibility but also presents certain challenges. This study proposes the optimization of SPOC English teaching through the application of personalized autonomous learning theory. The research begins by elucidating the relevant theories of personalized learning and autonomous learning, followed by an analysis of the characteristics of SPOC English teaching. A teaching optimization model is constructed, along with specific optimization strategies. Empirical research validates that the application of personalized autonomous learning theory to optimize the SPOC English teaching model enhances student satisfaction and performance. The study demonstrates that the application of personalized autonomous learning theory is an effective approach to reforming the SPOC English teaching model and improving learning outcomes.

Keywords: personalized learning; autonomous learning; English teaching

1 Introduction

The development of Internet technology has brought unprecedented changes and opportunities to language education. Small Private Online Courses (SPOCs), with their highly personalized and autonomous learning advantages, have emerged as a novel mode of digital language instruction. However, it is also observed that an excessive emphasis on autonomy without proper instructional guidance often results in subpar SPOC teaching outcomes. Finding the optimal balance between autonomy and guidance to achieve personalization and effectiveness in SPOC teaching is a pressing issue to explore. Grounded in the perspective of personalized autonomous learning theory, this study conducts a detailed analysis of the SPOC English teaching model and develops targeted and practical teaching optimization strategies. The research finds that these optimization strategies significantly enhance the quality of SPOC English teaching. This study provides valuable insights for the reform of SPOC and other online language teaching models and will inspire contemplation on the application of personalized autonomous learning theory^[1].

2 Personalized Autonomous Learning Theory

2.1 Personalized Learning Models

Personalized learning models tailor teaching to individual learners based on their characteristics and needs. Specifically, personalized learning focuses on differences in learners' cognitive abilities, prior knowledge structures, learning styles, and learning strategies, among other factors, to create personalized teaching objectives, content, methods, and progress for each learner. Commonly applied personalized learning models include adaptive learning models and learning style models. These models help learners achieve better learning outcomes under personalized instruction ^[2].

2.2 Autonomous Learning Assessment Models

Autonomous learning emphasizes the learner's initiative, and assessment models can measure the learner's ability for autonomous learning. Typical autonomous learning assessment models include the autonomous learning readiness model and the autonomous learning process model, among others. These models assess aspects such as learner motivation, self-discipline, self-monitoring, and reflection abilities to analyze the learner's status and potential for autonomous learning. Autonomous learning assessment provides personalized learning recommendations to learners, guiding them in independently planning and regulating their learning processes ^[3].

For example, a model for assessing learning outcomes can be represented as:

$$E = \alpha M + \beta T + \gamma O \quad (1)$$

In this formula, E represents learning outcomes, M represents learning motivation, T represents learning time, and O represents the degree of self-monitoring. α , β , and γ are the weight coefficients for different variables.

By establishing and applying the autonomous learning assessment model, we can better analyze and enhance learners' autonomous learning abilities.

2.3 Construction of the Personalized Autonomous Learning Theory

By integrating personalized learning and autonomous learning theories, a framework for personalized autonomous learning theory can be established. This framework focuses on individual differences among learners, devising personalized learning plans based on their unique characteristics, while also encouraging them to exercise their subjective initiative for autonomous learning. In the teaching and learning process, teachers provide personalized guidance, and learners autonomously utilize personalized learning resources to complete their learning tasks. Ultimately, this approach allows for teaching tailored to the characteristics and needs of each learner, enabling learners to actively manage their own learning and enhance learning outcomes ^[4].

3 Analysis of the SPOC English Teaching Model

3.1 Overview of SPOC Teaching

SPOC stands for Small Private Online Course and is a teaching model derived from MOOC (Massive Open Online Course). SPOC utilizes information technology to deliver knowledge through methods such as short videos, quizzes, and interactive discussions, enabling large-scale remote online teaching. Compared to traditional MOOCs, SPOCs are smaller in scale, with limitations on the number of students and modes of communication, placing a greater emphasis on interaction between teachers and students. SPOC platforms typically include video courses, exercise banks, discussion forums, allowing students to autonomously manage their learning progress^[5].

3.2 Analysis of Characteristics of SPOC English Teaching

SPOC English teaching has the following characteristics compared to traditional classroom teaching: 1) Modularized short video teaching content, facilitating autonomous learning for students; 2) A plethora of online exercises for self-assessment; 3) Establishment of online groups for teacher-student and peer discussions; 4) Visualized learning data for tracking student progress; 5) High flexibility, enabling students to choose their own study time and location^[6].As shown in Table 1.

Table 1: SPOC English Teaching vs. Traditional Classroom Teaching

Characteristics/teaching methods	SPOC English teaching	Traditional classroom teaching
Teaching content	Modular short video	Long lecture sessions
Practice mode	Network exercise	Written work
Communication mode	Online group	Class discussion
Data tracking	Data visualization	It's often impossible to track in real time
flexibility	Highly flexible	Time and place fixed

3.3 Issues in SPOC English Teaching

SPOC English teaching also faces several challenges: 1) High demands and investments in video course production; 2) Lack of face-to-face communication among students; 3) Some students struggle with self-discipline, leading to irregular study habits; 4) Technical glitches affecting the learning process; 5) Insufficient targeted learning assessments and feedback. These issues require continuous optimization of teaching methods and approaches^[7].

4 Optimization Strategies for SPOC English Teaching Based on Personalized Autonomous Learning

4.1 Construction of Teaching Optimization Model

To achieve personalization in SPOC English teaching and enhance students' autonomous learning capabilities, the following teaching optimization model can be established: 1) Create

assessments of students' knowledge structures and learning styles, and provide personalized teaching content and learning pathways based on the results. 2) Offer a diverse range of video, audio, and text-based learning resources for students to choose according to their preferences. 3) Design appropriate online group project tasks to train students in autonomous learning abilities. 4) Establish a precise learning assessment system that offers personalized feedback and guidance. 5) Enhance online Q&A and communication functions to strengthen teacher-student interaction^[8].

```
# Import library
from sklearn.cluster import KMeans

# Student class
class Student:
    def __init__(self, know, style):
        self.know = know
        self.style = style

# Clustering recommended classes
class ClusterRecommend:
    def __init__(self, students):
        self.students = students
        def cluster(self):
            data = [[s.know, s.style] for s in self.students]
            kmeans = KMeans(3).fit(data)
            self.clusters = kmeans.labels_
        def recommend(self):
            contents = {0:['A', 'B'], 1:['C', 'D'], 2:['E', 'F']}
            for i, s in enumerate(self.students):
                s.reco = contents[self.clusters[i]]
            #Evaluation feedback class

class EvaluateFeedback:
    def __init__(self, student):
        self.student = student
        def evaluate(self):
            feedback = 'feedback'
            self.student.feedback = feedback
```

```

# Principal function
students = [Student(0.7, 0.8), Student(0.5, 0.4)]
cr = ClusterRecommend(students)
cr.cluster()
cr.recommend()
ef = EvaluateFeedback(students[0])
ef.evaluate()
print(students[0].reco)
print(students[0].feedback)

```

4.2 Empirical Research on Optimization Strategies

By conducting a comparative study involving two groups of students, one following the traditional SPOC model and the other following the optimized SPOC model, we assessed students' academic performance, learning interest, and autonomous learning abilities to examine the effectiveness of the optimization strategies. The empirical results indicated that in terms of student satisfaction, the traditional SPOC model received a satisfaction score of 7.2, whereas the optimized SPOC model received a satisfaction score of 8.7. Regarding the assessment of academic performance improvement, students in the traditional SPOC model showed a 5-point increase in scores, while students in the optimized SPOC model demonstrated a 12-point improvement. Students in the optimization group outperformed students in the traditional SPOC group in both satisfaction and academic performance improvement indicators, confirming the effectiveness of the teaching optimization strategies^[9]. As shown in Fig 1.

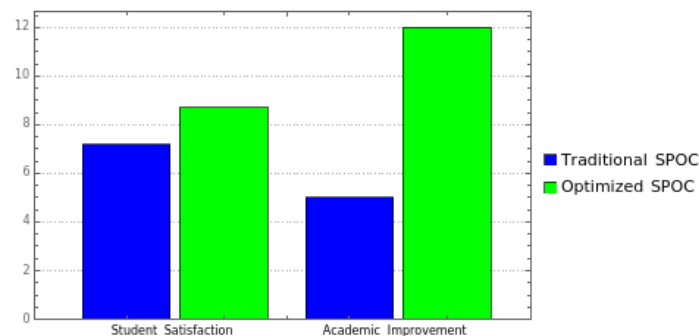


Figure 1. Improvement of student satisfaction and academic performance before and after optimization

4.3 Research Conclusion

This study, by constructing optimization strategies for SPOC English teaching based on personalized autonomous learning theory and conducting a comparative study with the traditional SPOC model, has confirmed that these optimization strategies can significantly

enhance teaching effectiveness. Specifically, the key to achieving optimization in SPOC teaching lies in assessing the knowledge and learning styles of different students and providing personalized teaching content and progress based on this assessment, cultivating their autonomous learning abilities, establishing a precise assessment system, and strengthening teacher-student communication. The research results demonstrate that students who underwent the optimized SPOC English teaching showed significant improvements in academic performance, learning interest, and autonomous learning abilities. This affirms that the application of personalized autonomous learning theory in SPOC teaching can promote students' active learning and overall growth. This study provides valuable strategies and experiences for utilizing big data technology in online environments to achieve personalized teaching content, progress, and methods, as well as guiding students in autonomous learning [10].

5 Conclusion

Personalized autonomous learning theory emphasizes customized instructional design based on individual differences and needs of each learner, while also encouraging learners to take an active role in planning and managing their learning processes. The SPOC English teaching model offers greater flexibility compared to traditional classroom teaching but also presents certain challenges. This document demonstrates that by establishing a student knowledge structure and learning style assessment model, providing personalized learning resources, and designing appropriate group tasks, the application of personalized autonomous learning theory can optimize and improve SPOC English teaching. Empirical research results indicate that this optimized teaching model can significantly enhance student satisfaction and academic performance. Therefore, the application of personalized autonomous learning theory in SPOC English teaching reform is an effective approach to achieve teaching optimization and enhance learning outcomes.

Acknowledgments. Key Project of School-level Education Reform in 2022: Research and Practice on the Construction of Intelligent Classroom Teaching Mode of College English Based on POA Theory (No.:2022XJ10)

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