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Constructivist Perspective on Developing a Multidimensional Blended Teaching Model Fostering Deep Learning

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Abstract

To promote high-quality development of higher education, it is imperative to facilitate students' transition from surface learning to deep learning. Compared with surface learning that focuses on rote memorization, deep learning emphasizes meaningful learning based on understanding and transfer. It involves three progressively advanced cognitive stages of knowing: "learning for understanding," "learning for application," and "learning for innovation," which ultimately enable the internalization, transfer, and creative application of knowledge. How to foster deep learning in students has been an urgent issue of higher education. This study, grounded in constructivist learning theory, explores a multidimensional blended teaching model fostering deep learning. It also develops an evaluation system assessing learning outcomes from the perspectives of ideological, political and moral education, knowledge, and competencies. We conducted an empirical study to test the effectiveness of this multidimensional blended teaching model. Findings will provide theoretical and practical implications for teaching reforms of similar courses.

***Keywords*— constructivism, blended teaching model, deep learning, higher education.**

I. INTRODUCTION

To advance high-quality development in higher education, it is necessary to facilitate students' transition from surface learning to deep learning. In contrast to surface learning, which emphasizes rote memorization of disjointed facts without true understanding, deep learning refers to meaningful learning aimed at understanding concepts and transferring knowledge to new contexts. Deep learning encompasses three progressively advanced cognitive states of knowing: "learning for understanding," "learning for application," and "learning for innovation," which ultimately enable the internalization, transfer, and creative application of knowledge. This promotes high-quality learning in students. The question of how to foster deep learning in students to achieve high-quality development of higher education has thus become an urgent issue in current pedagogical reforms in colleges and universities.

This study, grounded in constructivist learning theory, will explore a multidimensional blended teaching model fostering deep learning for a Principles of Marketing course, based on the course content and characteristics. It aims to empirically test its effectiveness in enhancing student learning outcomes, providing theoretical foundations and practical implications for high-quality reforms in higher education.

II. PROCEDURE

Adopting the Deep Learning Cycle (DELC) approach, this reform encompasses seven steps: aligning course and learning objectives, pre-assessing students, fostering a positive learning culture, preparing and activating prior knowledge, acquiring new knowledge, processing knowledge deeply, and evaluating student learning. Drawing from teaching resources, learning spaces, instructional strategies, assessment methods, and other dimensions, a multidimensional blended teaching model is constructed to foster deep learning, as shown in Fig.1.

1. Blending teaching resources to build knowledge foundations for deep learning

In the digital age, textbooks alone cannot satisfy students' needs for knowledge and information. To accommodate changes in student learning habits, this course adopts blended teaching resources to build students' knowledge foundations for deep learning: 1) Print and digital textbooks that systematically present knowledge frameworks; 2) SPOCs (Small Private Online Courses) that satisfy fragmented online learning needs; 3) MOOCs (Massive Open Online Courses) that deliver quality online courses. Based on the flipped classroom approach, pre-class learning materials including digital courseware, micro-lectures, and MOOC videos are recommended to introduce marketing concepts and activate prior knowledge.

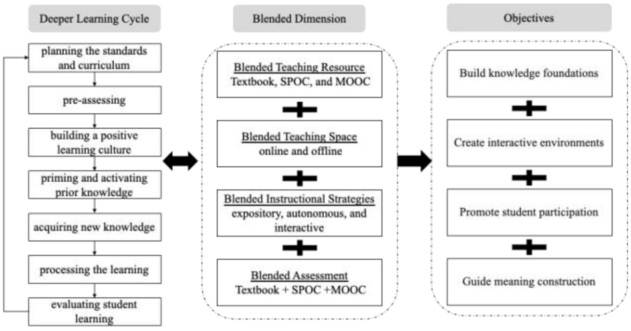

Fig.1 A multidimensional blended teaching model fostering deep learning

2. Blending learning spaces to create interactive environments for deep learning

Creating communication environments facilitates collaboration and discourse. Blending online and face-to-face instruction expands online learning opportunities, overcoming time and interactivity constraints in traditional classrooms. Multimedia, WeChat, and online learning platforms are integrated to engage students, promote comprehension and exchanges. In face-to-face classes, students are encouraged to participate anonymously or visibly. Online, social learning software creates course communities for collaborative inquiry, viewpoint sharing, aggregation, and reporting. Blended spaces shape a positive culture and atmosphere for acquiring new knowledge and processing it deeply into higher-order cognition.

3. Blending instructional strategies to promote student participation for deep learning

Students construct knowledge meaning, guided by teachers. Traditional lecture-based teaching propagates knowledge unidirectionally, often leading to superficial memorization rather than deep meaning construction. To enhance student participation for deeper processing, this course blends expository, autonomous, and interactive strategies. Students study basic concepts autonomously pre-class. Lectures focus on real-world applications and difficulties. Current issues are introduced through questioning to stimulate active discussions, exchanges, and meaning-making, enabling knowledge internalization, transfer, and innovation.

4. Blending assessments to guide meaning construction for deep learning

When students can actively construct meaning, deep learning occurs. Traditional evaluation relies solely on test scores. Deep learning assessment evaluates higher-order cognition, skills, and thinking holistically beyond scores. This course employs self, peer, and teacher assessments of learning, participation, and competency gains to gauge meaning construction, guiding students towards deep learning.

Besides tests and presentations, participation in academic competitions and concept maps are evaluated, signaling knowledge transfer and application abilities. Students constructing meaning can interrelate, internalize, and transfer knowledge into mental schemas for marketing problem solving, the ultimate goal of deep learning.

III. METHODOLOGY AND RESULTS

1. Methodology

A controlled experiment was conducted comparing a course section before (control group) and after (treatment group) implementing the multidimensional blended teaching model for Principles of Marketing at Hubei University of Economics. To ensure cross-semester comparability, class sizes were similar, all sophomore non-marketing majors. Details are shown in Table 1.

Table 1 Pre- and Post-Reform Class Details

	Pre-Reform (Control Group)	Post-Reform (Treatment Group)
Time (Semester)	2021-2022 (Sem 1)	2022-2023 (Sem 1)
Class (student amount)	Accounting 2046 (44) ACCA Accounting 2041 (28)	New Media Advertising 2141 (42) AI Accounting 2141 (28)

The control group included 72 students from Accounting 2046 and ACCA Accounting 2041 in 2021-2022 Sem 1. The reform was implemented in 70 students from New Media Advertising 2141 and AI Accounting 2141 in 2022-2023 Sem 1.

Learning outcomes were evaluated from knowledge mastery and transfer/innovation abilities. Knowledge mastery was compared between groups using exam scores. Transfer/innovation abilities were gauged through academic competition participation, summaries, and reflections.

2.Effectiveness of the reform

2.1 Test Scores Significantly Improved

2.1.1 Comparing Pre- and Post-Reform Exam Scores

Fig.2 shows the final exam score distribution for the control group. There were 7 students fail the exam (scored lower than 60), 17 students scored 60-69, 16 students scored 70-79, 20 students scored 80-89, and 12 students scored above 90. In the treatment group, no student failed, 1 scored 60-69, 12 scored 70-79, 31 scored 80-89, and 26 scored above 90, as seen in Fig.3. The treatment group showed noticeable improvement.

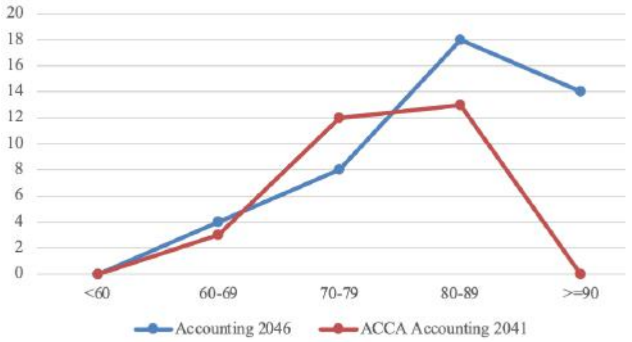

Fig.2 Score distribution before the reform

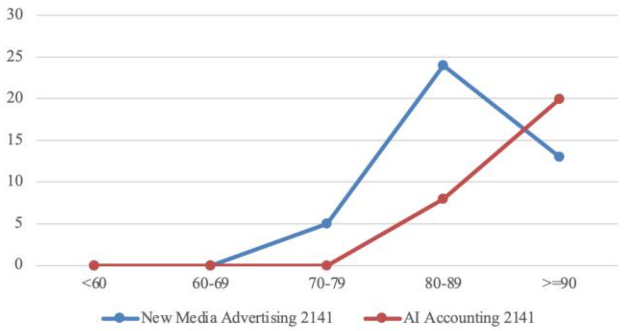

Fig.3 Score distribution after the reform

We used SPSS 24.0 to analyze group differences via correlation and regression, validating the reform's effectiveness.

The reform was coded as a 0-1 variable, 0 for control and 1 for treatment. The final course grade was the dependent variable. Table 3 shows descriptive statistics. The control group's mean exam score was 76.99 (*SD = 11.905*). The treatment group scored higher on average (*M = 85.66, SD = 6.850*) with less dispersion.

Correlation analysis in Table 2 shows a significant relationship between the reform and exam scores.

Table 2. Descriptive Statistics

	Cases	Mean	Std. Deviation	Std. Error	95% CI lower	95% CI upper	Min	Max
Control group	72	76.99	11.905	1.403	74.19	79.78	45	97
Treatment Group	70	85.66	6.850	.819	84.02	87.29	65	96
Total	142	81.26	10.642	.893	79.50	83.03	45	97

The ANOVA results in Table 3 indicate significant score differences between the control and treatment groups (p=.000, <0.01).

Table 3. Reform-Score Correlation Analysis

		teachingreform	performance
teachingreform	Pearson	1	.409**
	Sig.		.000
	count	142	142
performance	Pearson	.409**	1
	Sig.	.000	
	count	142	142

***p*<0.01

The ANOVA results in Table 4 indicate significant score differences between the control and treatment groups (*p=.000, <0.01*).

Table 4. ANOVA of Pre-Post Reform Exam Scores

	SS	df	MS	F	Sig.
Between Groups	2668.602	1	2668.602	28.089	.000***
Within Groups	13300.758	140	95.005		
Total	15969.359	141			

****p*<0.001

Regression analysis in Table 5 shows the reform had a significant positive impact on scores (β=0.409, *p*=.000, <.001).

Table 5. Regression Analysis of Pre-Post Reform Exam Scores

Model	B	Std. Error	Beta	t	Sig.	95.0% CI lower	95.0% CI upper
1 (constant)	76.986	1.149		67.020	.000	74.715	79.257
teachingreform	8.671	1.636	.409	5.300	.000	5.436	11.906

2) Students' Transfer/Innovation Abilities Improved

Academic competitions and practical activities were encouraged in the treatment group to assess social evaluation and transfer/innovation abilities. Many students actively participated in the Yusu Cup “Playing in the New Media World, Sailing in the Metaverse to Forge Dreams” Marketing Compete hosted by Hubei University of Economics and partners. Some students reflected on and summarized their experiences.

The participation and summaries demonstrated that competitions and practices effectively promoted knowledge internalization, transfer, and innovation. In their reflections, students integrated deep marketing understandings to build practical foundations for future careers, the ultimate goal of deep learning.

IV. CONCLUSIONS AND DISCUSSIONS

Constructivism views learning as learners actively constructing meaning. "Situatedness," "collaboration and discourse," and "meaning construction" are key elements. To foster deep learning, learning environments facilitating meaning construction through collaboration and discourse should be created.

This study empirically tested the effectiveness of reforms in improving test scores and transfer/innovation abilities. Further robustness testing is needed across multiple semesters to refine and optimize the multidimensional blended teaching model fostering deep learning based on findings.

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