Creative Education, 2023, 14, 508-517
https://www.scirp.org/journal/ce
ISSN Online: 2151-4771
ISSN Print: 2151-4755

An Empirical Studying: Blended Teaching Design Based on Deep Learning

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How to cite this paper: Wang, J. (2023). An Empirical Studying: Blended Teaching Design Based on Deep Learning. *Creative Education, 14,* 508-517.
https://doi.org/10.4236/ce.2023.143035

Received: February 7, 2023
Accepted: March 18, 2023
Published: March 21, 2023

Abstract

In this paper, the studying targeted to make a practical application demonstration approach studying based on deep learning elements for the blended teaching and learning within the areas of education. The studying creates a DBTA model of the blended teaching method based on the concept of deep learning, which enhances the effective consistency of online and offline teaching activities, and improves the professional competence of students. A questionnaire is designed to verify the feasibility and science of the DBTA model, which obtained valid questionnaires 197 from the education practitioners of high education in G province of mainland China. Through research analysis, the studying gained several practical views, illustrated the applicability of DBTA approach to developing critical thinking awareness to get high-order thinking and enhance Lifelong-learning ability of students.

Keywords

Deep Learning, Blended Learning, Curriculum Development

1. Introduction

Deep learning is applied in the blended teaching and learning design, which will improve the teaching quality in curriculum, becomes a kind of teaching practice trend within high education. Deep learning emphasizes on developing the higher order-thinking awareness and lifelong learning ability within the learning process for students. Mystakidis (2021) illustrated that deep learning as meaningful learning can create the knowledge of challenging issues to enhance students' ability to learning analysis. As the application platform of deep learning, the blended teaching rebuilds the challenging elements of deep learning into knowledge practice activity in the virtual class in online. The offline class through lecturing segments the online practical activity to make a situational approach to complete knowledge

objectives of learners toward to develop the high-order thinking. Thus, self-explorational learning as a teaching design of deep learning orientation should be concerned with online instruction, and offline lecturing emphasizes the learning activity design. In this condition, it will drive learners to make a deep learning awareness looking for the knowledge issues and solving them.

From existing literature, the majority of studies only target the connotation cognitive discussion of deep learning, and lack of the practical application exploration within the field of blended teaching and learning. The existing blended teaching design is more targeted at online instructional activities, and ignores the offline teaching objectives that need to be supported by the practical heuristic guiding from online learning. In this condition, online teaching became a fragmentation learning path for learners. And the offline teaching lack of teaching flexibility lost the blended implication. However, due to the learning engagement design lacking to develop exploration awareness, which leads teaching activities cannot make profound thinking experiences, and barriers cultivation creative thinking for students. In this condition, this kind of blended teaching method leads the learning objectives disintegrated to two paths, which lost the desire participate of learning, lacks of the meaningless of blended learning to develop the critical learning for students. Therefore, the studying makes a practical application demonstration approach studying based on deep learning elements for the blended teaching and learning within the areas of education.

2. Theory Perspective

2.1. Deep Learning

Deep learning distinguished two types of learning approaches surface-learning and deep-level thinking processing to learning, which were created by Ference Marton and Roger Saljo (1976) in 1976 (Masuku, Jili, & Sabela, 2021). Surface learning is a passive approach to learning in which the students tend to learn only what has required knowledge in the classroom. This learning method is a superficial approach that simply involves scraping the surface of the material being learned and concentrating on the curriculum evaluation needs without getting into the knowledge gain details (Qi et al., 2021). At the same time, Surface learning emphases on the examinational results at the end of the curriculum in the state of the learning process (Sugden et al., 2021). Hence, this teaching guiding way does not to develop the acquisition explorational ability for learners.

In the past decade, educators find out, through knowledge transfer makes a deep thinking of learners within the learning process develop critical thinking, and attained high-order thinking ability. This is because deep learning focuses on the learning approach that highlights learners to gain the cognition of high-order thinking (McPhail, 2021). It needs to be pointed out that deep learning as meaningful learning emphasizes the students' develop the skill and ability of necessary (Tatli & Şimşek, 2022), which is applied in the teaching design. From the

respective of constructivism, applying deep learning as a kind of learning process can in teaching design achieve the valuable knowledge of skills for students, and the more important is creating the learning path of the higher-order thinking ability for students (Silalahi et al., 2022a). Therefore, the feature of deep learning is a meaningful learning through learning processing to achieve a deep-thinking awareness, build the active exploring knowledge questions for learners. It needs to be pointed out that the applicational implication of Higher-order thinking (HOTs) has a key relatedness with deep learning into the teaching design (Erman et al., 2021). Higher-order thinking (HOTs) has three skill elements, such as critical thinking skills, creative thinking and problems solving skills (Amanisa & Maftuh, 2021; Suhendro et al., 2021). Silalahi et al. (2022b) identified that critical thinking benefits learners in building the path of self-review in the learning process themselves, and this path will drive the learners to produce an awareness of creative thinking by looking for problem-solving methods.

Based upon these academic views, applying the concept of deep learning as the orientation of teaching design not only enriches blended teaching concept, but this method also is able to improve the instructional effectiveness to gain problem-solving ability in the learning processing for students. Thus, three elements of Higher-order thinking (HOTs) are the implementing guideline path of deep learning, which can be considered within the process of blended teaching design to develop self-learning and explorational ability for students.

2.2. Blended Learning and Flipped Classroom

Blended learning is the term given to the teaching practice of combining online learning implements within traditional classroom face-to-face teaching. The characteristic of the virtual classroom is that students seek understanding, knowledge development and creativity through the related online information (Syahrawati et al., 2022). In this condition, lecturer's role is a guider who provides some advice to students only. In contrast, the traditional teaching emphasizes to knowledge by lecturing face to face in the classroom during providing the learning emotion instructing toward the social ethic and career quality of development only. Thus, educational researchers take it accounted a kind of single knowledge delivering path, belongs to surface-learning ranges (Alam et al., 2022). Flipped classroom refers to the realignment of time in and out of the classroom, shifting decision-making over learning from lecturers to students (Gupta, 2022). And flipped classroom as an instructional design and strategy underlying increase student engagement (Ozdamli & Asiksoy, 2016).

It seems to be similar between the applying approach of blended learning and flipped classrooms within the teaching process. However, these are two types of disparate teaching design paths differently. And they focus on the various single knowledge under the learning objective and ignore doing to guide the acquisition ability of students. The concept of blended learning is to combine the related network source within-person teaching at online learning and face-to-face in a lesson or a curriculum, and completed instructional objective in the final

(Hrastinski, 2019). It can be seen that blended learning emphasizes to the integration of online learning and traditional teaching, throughout the teaching design processing. And this design can be used in a lesson or a course. It needs to pointed out that flipped classroom is a kind of instructional strategy in the traditional classroom (Elzainy & El Sadik, 2022). Flipped classroom emphasizes the part of learning should be completed before face-to-face teaching, so as to free up more teaching time for teachers and students to carry out more interactive learning activities to complete the part of learning objectives in the classroom. Therefore, it can be said that flipped classroom is a type of implementation path, which benefit to make deeper thinking for students in the teaching process (Algarni, 2023).

2.3. The Integrational Method of Deep Learning and Blended Teaching

Deep learning as meaningful learning applies in the design processing of blended teaching and learning, which benefits students to gain high-order thinking skills, such as logistic thinking, exploring desire and critical thinking (He & Hu, 2022). The first, deep learning can make a higher learning effectiveness than the traditional teaching approach. The Higher-order thinking (HOTs) of deep learning emphasizes to generate the learning situation to develop a learning explorational awareness for learners. This approach provides the environment with the option of a self-learning method for students, instead of being limited in the physical classroom (Farooq et al., 2022). Applying the related learning resources from the network by online teaching, which is the part of the lesson that makes a learning continuity and drives learning engagement to train students' exploring ability (Heilporn, Lakhal, & Bélisle, 2021). The second, critical thinking and creative thinking are significant elements within the concept of deep learning to enhance and improve the higher-order thinking cognition of learners. Applying these elements produces the re-processing of learning within the online and offline teaching design, which can encourage the learning explorational interesting for learners. In this context, teaching activities guide learners to find issues, and screening and integrating information regarding the learning objectives.

From the above, online teaching is a preparatory learning stage to produce a self-learning situation to build a knowledge structure to develop the problem-finding ability of students within the process of blended teaching. And offline teaching is a knowledge processing stage, which creates a knowledge understanding of the path to students by the instructor. Thus, applying the deep learning elements in the blended teaching design can enhance teaching effectiveness and drive learning proactivity to develop the exploring ability of deep thinking for learners.

3. Methodology

In order to design and evaluation scheme for a blended teaching path based on deep learning is proposed in this studying. Thus, a questionnaire survey is de-

signed from the existing blended teaching approach of practitioners within high education. And the purpose is to exploring a kind of blended teaching approach to build a critical thinking cognition, develop higher-order thinking ability (HOTs) to students within the major of e-commerce of high education. The first part aimed to the basic information to educators, such as teaching experiences, the major ranges and college attributes etc. The second part focuses on the primary research information, which is 20 questions and related to blended teaching objectives and learning surrounding as well as teaching activities design and evaluation. In order to ensure the questionnaire accuracy, and the Likert scale was adopted in this survey the scale options were divided into five grades from very consistent to very inconsistent to measures each question item (Table 1).

The Empirical Analysis

An online crowdsourcing platform collected 206 questionnaires and gained valid questionnaires 197 from the teaching practitioners of high education in G province of mainland China. The analysis adopted SPSS26.0, in which Cronbach's Alpha 0.939, indicating the reliability of questionnaires is high.

From Table 2, it can be seen that the measurement results are clearly. Despite the dispersion of the four items of results being similar, and the values of grouped medians are significantly different. First of all, the grouped median value of 1.87 of the OLM compares the other three groups ETO 1.95, 1.94 and 1.99 to close the median. It seems to be that the existing blended teaching steed up the

Table 1. Investigate contents.

Dimensionality	The related evaluation factors	Items
Effectiveness to Teaching Objective (ETO)	Deep learning applications; definition of teaching objectives; the purpose of teaching interaction; teaching progress control…	5
Online Learning Method (OLM)	The ability and application of online-course production; the connection between online task difficulty and offline-learning content; the interaction between social focus and academic knowledge; self-learning share	6
Offline Learning Guidance (OLG)	Offline professional knowledge problem, offline learning reflection design, face-to-face teaching and video tendency, learning evaluation method	5
Learning Situation Analysis (LSA)	Class size; difference in learners foundation, equipment operating ability of learners; classroom discipline	4

Table 2. Curriculum instructional design analysis scale.

Item	ETO	OLM	OLG	LSA
N	197	197	197	197
Mean	1.87	1.82	1.90	1.93
Grouped Median	1.95	1.87	1.94	1.99
S.D	0.45	0.47	0.49	0.52

deep-thinking awareness toward deep learning for students. Secondly, equally important is that the mean 1.82 of OLM is lesser than ETO1.87, OLG1.90 and LSA1.93 these three mean values. The studying takes into account that the teaching activities of OLM are toward the design of deep learning, but over-dependence on online learning cannot guide the critical thinking for students and belongs to the concept of surface learning as well. In addition, the grouped medians of the LSA factor are 1.991 and S.D 0.52, showing the dispersion degree is relatively larger than another three items of values. In this condition, it shows that the respondents driving students to create learning initiatives and tracking needs to be improved after class. It needs to be pointed out that the primary two-group data of three values have differentiation by comparing the LSA with the OLM data. Yet, LSA and OLG values are similar. This shows that respondents overemphasize on the design of online learning methods and ignore the guidance and feedback on offline learning tasks after the classroom. In this condition, the studying has one more inference point of view that respondents have a potential awareness toward deep learning application within the blended teaching approach. Yet, a comparison three groups' data showed that the respondents did not reach actual blending implication application in the process of blended teaching. Therefore, the respondent did not create the self-learning engagement actives to develop an explorational ability to students so that this way still is a surface-learning design. This is because the flexible application of information technology within the process of teaching decides the effectiveness of blended learning. As a result, blended teaching design effectively applying information recourse guides students to achieve self-learning to discover and solve learning issues, which is an essential approach toward achieving deep learning.

From the above mentioned, the studying considered that the respondents did not completely implement the deep learning concept as the teaching guideline, and the blended teaching design of respondents still stayed in the surface-learning pattern.

4. The DBTA Model

A systematic literature review and questionnaire survey is the most illustration for the purposes of this studying. As a result, an integration teaching design model (DBTA) of deep learning within to blended teaching design approach is built in this studying.

From **Figure 1** it can be seen that the model emphasizes the interactivity of three elements among learners, online/offline environment and knowledge content under three elements of deep learning. And two instructing paths are established in this model. The online teaching through three learning activities to make an explorational learning situation for students. This online teaching design of functionality as a kind of surface learning path is to drive a self-learning motivation, which produces the related learning questions to create and develop a finding issues awareness for students. The offline teaching is a pre-deep-thinking stage. The purposes of teaching design are to focus on the related teaching

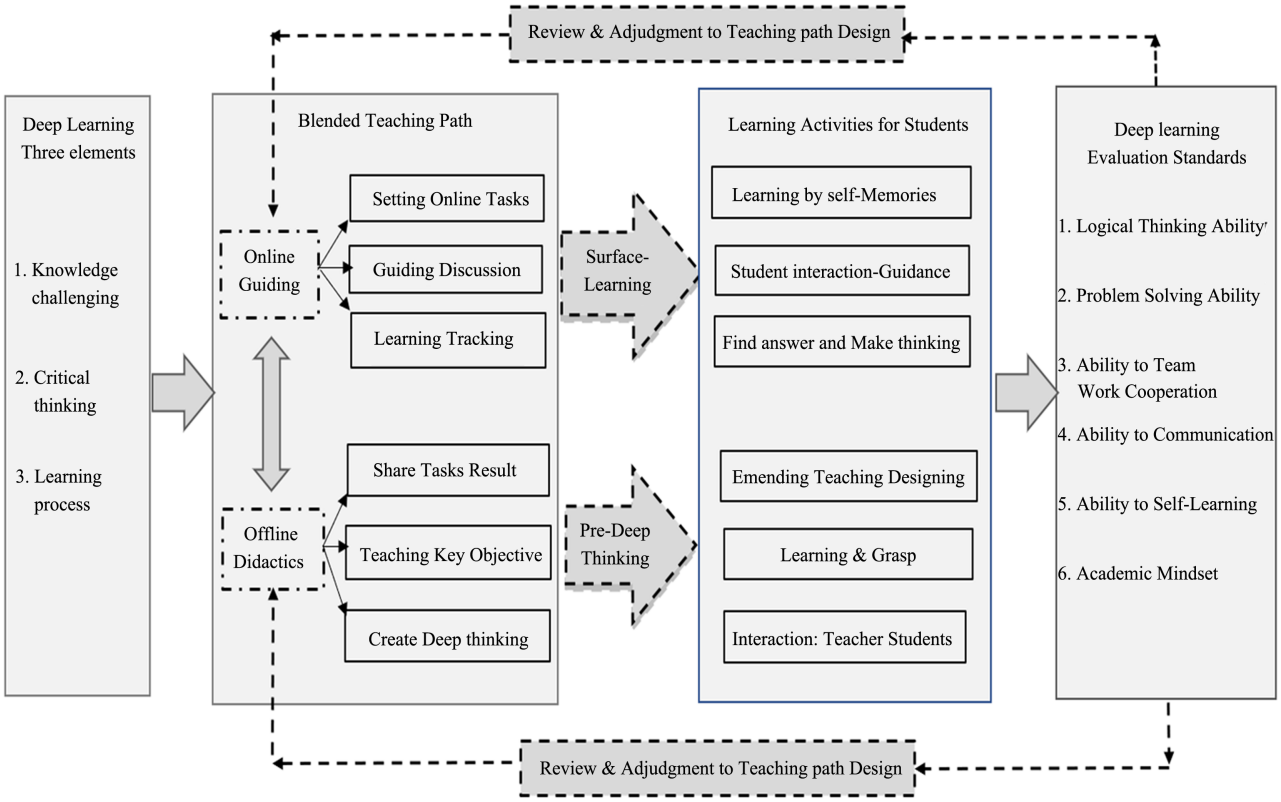

Figure 1. DBTA-Model.

interaction, which developing the cognitive structure of deep thinking from the online learning results for learners. As a result, the offline teaching applies three types of teaching activities as applying the teaching intervention driving students to do, develop and enhance manipulative ability and experiment skill.

Meanwhile, the rational interactive design between learners on knowledge content can produce effective coherence from blended learning, driving students to expand from surface to deep learning. Online interaction focuses students on thinking deeply about knowledge issues, in order to create conditions for offline teaching to guide students into higher-order thinking (HOTs). It should be noted, the related difficulty issues of learning objective sets in the offline process of teaching interaction determine whether students can be effectively guided from surface learning to deep learning. However, it must be noted that lecturers should think about the learning engagement of factors within the blended teaching. This is because the various majors of learning do have not the same attribute, which makes different deep learning ideological for students. At the same time, the correlational factors between the learning engagement of students and the effectiveness of deep learning should be thought in the process of blended teaching design. Hence, it needs to be based on the aspect of the learning situation of students as a teaching item of condition, which makes the deep learning element into the process of blended teaching designing and building the learning path from surface to deep learning for students.

5. Conclusion and Recommendation

The educational objectives of deep learning focus to a learning awareness ability of training to be independent learning, which gains solves complex issues and communicational ability, develop critical thinking in the process of learning for students.

By the above, the DBTA model systematically describes showing that the blended teaching and design approach within the concept of deep learning. The function of the DBTA model emphasizes improving and enhancing critical and creative thinking to develop lifelong learning awareness in students. Therefore, the studying gains some points of view as follows:

The first, instructors should be in accordance with the learning situation of students to create learning objective. The learning objectives surrounding the high-order thinking are to develop critic thinking in order to improve the exploring power of self-learning and creative thinking for students.

The second, based upon the center of students implements the online and offline teaching activities in accordance with the curriculum attribute during emphasizes the word of learning and thinking. The online teaching actives emphasizes on the heuristic teaching method in order to guide the thinking of learning driving the power of self-learning for students. And the offline teaching actives focus to the pattern of lecturing and practice in order to guide and make the way of deep-thinking for students.

The third, based upon the deep learning as the evaluation criterion of blended teaching, which is the significant basics condition of blended learning. The traditional teaching evaluation is a kind of singleness evaluation method that it cannot make the effective assessment including the teaching actives of lecturers and the learning of students within the process of blended teaching. Thus, the evaluation method should be the process of teaching and learning to measure the learning effectiveness to students.

The last one but it should be noted that the DBTA model application needs to be based on "practical tasks" to develop the high-order thinking in students. Although the DBTA provided a systematic teaching process within the blended teaching design, the model still has a weakness in its evaluation way. For instance, the quantitative evaluation of deep learning outcomes within this model does not show a detailed path. In addition, there were some real issues at the stage process of experimental teaching. For instance, the detailed standard of classroom performance management and evaluation toward deep learning in the DBTA model needs to be explored in the future.

Funding

This work was supported by Guangdong Higher Education Teaching Reform Project: "Research on Integrated Online and Offline Application of Blended Teaching for Applied Undergraduate E-commerce Major Courses under Deep Learning approach".

Project

Guangdong Higher Education Teaching Reform Project of Department of Education of Guangdong Province, No. 2020-646.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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