Research on Curriculum Assessment and Evaluation Method in Blended Learning

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Abstract. In view of the shortcomings of the course assessment and evaluation methods in the traditional teaching mode, this paper carries out the reform of the assessment and evaluation methods based on the advantages of the full record of the online learning process in the blended learning mode, designs the course assessment and evaluation system under the hybrid teaching mode, and puts forward a proposal that the way of companion evaluation of subjective questions can greatly increase the participation of students in learning and promote the improvement of learning effect accordingly. Finally, the functional requirements of the online teaching platform are analyzed according to the evaluation system, which can provide some reference for the curriculum construction and implementation of the online and offline hybrid teaching mode.

Keywords: Course Assessment, Evaluation Method, Blended Learning.

1 Introduction

Course assessment and evaluation is a necessary part to form the closed loop in teaching so that teachers are able to adjust teaching strategies in real time according to the evaluation results in teaching activities, making it better oriented; meanwhile, students are able to not only further clarify learning goals and then adjust corresponding strategies, but also give full play to their subjective initiative in learning in order to better achieve the learning objectives of the course [1]. In traditional teaching, the course assessment adopts final exam results to evaluate students' learning outcomes and teachers' teaching effects, which do not play a role in the teaching process for the course has ended, thus making it actually an open-loop process. It is unavoidable that less attention is paid to the learning process of the students. On the other hand, the commonly-used formative assessment usually adopts the attendance rate, homework, answering questions, etc., making the above indicators often mere formalities due to the strict management of military cadets. The stereotyped assessment is therefore difficult to play a feedback role in the teaching process, and it is not conducive to students' learning enthusiasm and initiative as well [2].

The appearance of new educational concepts and teaching models as well as the restrictions of the epidemic has made the online and offline hybrid teaching model

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adopted during more and more courses. But the research on the course assessment and evaluation mechanism is slightly lagging behind, which makes the role of evaluation in assessment not been fully exerted, so it is urgent to promote teaching and learning by evaluation. meanwhile, the wide application of online and offline hybrid teaching makes it possible to realize the evaluation of the whole process of students' learning. Therefore, this paper takes the Principle of Automatic Control and Artificial Intelligence Principles and Their Applications as the research basis, and scientificity, objectivity, and operability as the goals to study the course assessment and evaluation mechanism under online and offline blended learning. Specifically, it includes how to construct the assessment and evaluation system of online and offline hybrid teaching and how to quantify students' performance.

2 The status quo of course assessment and evaluation in traditional offline teaching

The following problems exist in the course assessment and evaluation under the traditional teaching that is mainly based on classroom lectures:

a. The subjects of course assessment and evaluation are limited. In traditional classroom teaching, the evaluation of students' performance is often revolved around teachers, and it has no evaluations by students and other third-party groups, thus making the evaluation of learning effects limited and biased.

b. The content of the course assessment and evaluation is not comprehensive. Traditional classroom teaching pays more attention to the assessment of theoretical basic knowledge, but it gives little attention to the assessment of professional practical skills. Moreover, there is no record of the learning process of students, therefore making it difficult to obtain information on the students' learning attitudes and understand their true grasp of knowledge points.

c. The course assessment and evaluation methods are limited. The proportion of summative assessments based on final exams is too high in traditional classroom teaching, while the role of the formative assessment is weakened. Especially, there is a lack of assessment methods for students' learning attitudes and learning process. Formative assessment is often limited to class attendance, daily homework, stage examinations, etc., but it lacks more open and flexible assessment approaches, such as open-book examinations, problem discussions, research papers, critical homework, etc., thus making it difficult to effectively examine students in terms of knowledge, ability, and quality.

d. The timeliness of teaching evaluation feedback is poor. In the implementation of teaching, the commonly-used classroom questions are difficult to cover for all students. Besides, it is difficult to timely feedback students' learning effects and adjust the teaching plan in a timely manner by means of homework and tests, so it is greatly limited to form true close-loop teaching and makes the teaching efficiency low. To this end, teaching according to the needs of individuals has also become nonsense.

In considering the above reasons, it may impossible to be carried out profoundly due to the lack of school hours and other reasons even if process assessment is added, thus

making it unavoidably become a mere formality. In the end, random points are given in the evaluation, losing objectivity and fairness and becoming a burden in the teaching process.

3 Blending learning

3.1 The concept of blended learning

'Blending Learning' mainly refers to the transformation of on-campus courses based on MOOCs, exclusive online courses (SPOCs), or other online courses by using appropriate digital teaching tools while considering the actual situation of the school. Specifically, it arranges 20-50% of the teaching time and conducts flipped classroom and blended teaching by organically combining students' online self-learning and offline teaching. Professor Kekang He, a pioneer of blended learning in China, said that the so-called blended learning is to combine the advantages of traditional learning methods with those of E-Learning (i.e. digital or network learning), and it is necessary to play the leading role for teachers in guiding, inspiring, and monitoring students in the teaching process, but also to fully exert the initiative, enthusiasm, and creativity of students as the main body of the learning process, so as to obtain the best learning effect. From the perspective of teaching implementation, blended learning is not only a mixture of learning methods, but also involves a mixture of teaching methods, teaching modes, teaching resources, teaching environments, teaching media, teaching objectives, and other teaching links and elements.

3.2 How to design the blended learning process

Blended learning embodies the educational concept of 'teaching dominates while learning acts as the main body, that is, teachers play a leading role in guiding, inspiring thinking, and controlling the rhythm of teaching in the process, while students actively participate and give full play to the main role of personal creativity. Blended learning has the following characteristics: Firstly, teaching is carried out in two ways, namely online and offline, with the proportion of online teaching accounting for 20%-50%; secondly, online teaching is an important part of strengthening the foundation for different students in the teaching class and complementing the personalized learning as well; thirdly, offline teaching is not simply transplantation of traditional classroom teaching to online but a more in-depth and advanced teaching activity based on online learning results. The blended learning process can be divided into five stages according to the timeline [3]:

a. Course design. In addition to the traditional content, the blended learning curriculum design also requires teachers to choose the online or offline form for specific teaching content according to the characteristics of the course and the pre-teaching basis of the students, so as to clarify the teaching methods and objectives respectively.

b. Online teaching. It includes live teaching and students' self-study that needs to be based on the teaching content. Teachers release a preview task list in advance and provide an online resource or ask students to search it by themselves so that they can

acquire all necessary knowledge. Live teaching should make full use of information tools to mobilize student participation.

c. Classroom teaching. The classroom teaching strategy is determined according to the feedback from students' online previews and tests. Offline teaching is dedicated to creating problem scenarios, highlighting the key points of teaching, cracking knowledge difficulties, and making up for the shortcomings of knowledge fragmentation during online learning, in order to construct a complete knowledge system. Advanced teaching modes such as seminars and case studies are adopted so that students will become the protagonists in the classroom, while teachers play an auxiliary role in supplementing, summarizing, and controlling the rhythm of learning knowledge.

d. Consolidating knowledge after class. After-school homework is assigned according to the classroom teaching situation, and online teaching is used to further consolidate and strengthen relevant knowledge.

e. Feedback obtained through assessment. On the basis of traditional assessment, it needs to give full play to the role of online assessment, and adjust teaching strategies in a timely manner to form closed-loop teaching and improve the role of formative assessment.

4 Course assessment and evaluation methods in blended learning

4.1 Reform of the curriculum assessment and evaluation mechanism

4.1.1. Diversified evaluation subjects.

In addition to the teaching staff, the evaluation subjects also include self-evaluation, peer-evaluation, and automatic network evaluation of objective questions by relying on the online platform. Peer evaluation is used for assessment among different students or between different groups, which is conducive to cultivating students with critical thinking from multiple perspectives.

4.1.2. Rich evaluation content.

The evaluation content includes not only students' mastery of knowledge points, the completion of self-study tasks, and the realization of projects, but also correct learning attitudes, good study habits, and excellence in engineering literacy so as to help students grow and develop comprehensively.

4.1.3. Rich evaluation content.

The advantages of both online and offline teaching are fully utilized, and formative assessment, stage assessment, and final assessment at the end of the term are combined throughout the course. There are both quantitative assessment and qualitative assessment, in addition to organically integrating theoretical assessment and practical assessment, thus forming a variety of evaluation methods that complement and support each other.

4.1.4. Rich evaluation content.

The online test on the network can realize real-time review of objective questions, so as to instantly detect students' mastery of specific knowledge points and determine the subsequent teaching strategy. In addition, the online learning platform can also completely record the learning trajectory of each student, so that the entire process of online learning can be traced back. Teachers can grasp the learning situation of each student through data such as learning time and number of logging, and their mastery of specific knowledge points through online test scores and video replay locations as well. Timely feedback and grasping of students' learning situation makes it possible for teachers to adjust the progress and difficulty of teaching in real time, and improve teaching strategies accordingly.

4.2 Construction of curriculum teaching evaluation system in blended learning

a. Evaluation of pre-class self-study and self-study effect. The pre-teaching design enables teachers to provide students with online self-study MOOC, PPT, micro-videos, voice explanations, test questions, and other teaching resources. The duration that students watch online resources, the number of times they are played, questions and discussions in the comment area or discussion area, etc., can be used as the basis for the evaluation of the self-learning process. It is advised to add a quiz to the self-study video, or arrange test questions after the self-study video. The test scores and submission times can be used to assess the students' self-study effect. In addition, the learning behavior records such as 'video backward' or 'repeated playback' in video learning can also reflect the difficulty of specific knowledge points as far the students are concerned, which can be referred to formulate teaching strategies and implementation plans in offline classroom teaching.

b. Evaluation of students' participation in learning. For online live teaching, the functions such as barrage, posting, random roll call, and classroom red packets can achieve interesting teaching interaction, while the number and quality of students' participation in the course can be recorded as the basis for process evaluation. The learning time and frequency during the online self-study process can also be used as the basis for evaluating students' learning participation.

c. Offline classroom test. When teaching in the classroom, teachers can set up papers in advance and regularly release the test questions in the classroom by setting the answer time, answer deadline, and the limitation of whether the answers at the end of the test are available, etc. Objective questions such as multiple-choice questions, judgment questions, and fill-in-the-blank questions can be tested immediately, making it possible to realize the evaluation and diagnosis functions of the in-class test. Teachers should take students as individuals with dynamic development, strengthen the functions of monitoring, improvement, adjustment, encouragement, and promotion during assessment and test, and organically integrate teaching, learning, and examinations, so as to form a closed-loop teaching process. The results of this part of the test may not be used as a course assessment and evaluation, but only as a basis for dynamic adjustment of classroom teaching strategies.

d. Multi-question homework evaluation. Blended learning is formed by adding online self-study or teaching interaction to the original offline classroom teaching, so it supports all question types in offline teaching, and can automatically review objective questions, such as single-choice questions, multiple-choice questions, voting questions, subjective questions, and even project study reports and minor papers, and analyze test scores accordingly. Assignments can be submitted in various forms, such as inputting text to the answering area, submitting homework document attachments, pictures, voices, etc., which can fully meet the needs of different homework question types. The above homework evaluation can be used as the basis for process evaluation.

e. Subjective questions are based on mutual evaluation between groups or classmates. Mutual evaluation is helpful to promote learning between students, and it can also effectively solve the problems of plagiarism in subjective assignments such as minor papers and study reports. Besides, it can help students get rid of loneliness in learning, and increase the participation of students in the learning process to promote their study progress. In the specific implementation, the evaluation rules should be clarified in advance so that students can participate more attentively and more objective evaluation results can be achieved. For example, the grading table for each question is provided as the basis for scoring, with each student's subjective question evaluated by 6-9 students and the average score taken as the final score; the evaluated students have the right to appeal, and the teacher will give the evaluation results. This part of the score is divided into three parts, the score of subjective topics accounts for 70%, the evaluation workload of other students accounts for 20%, and the quality of the evaluation of other students accounts for 10%. Thus, more scientific and reasonable rules are established to promote the participation and thinking of students in the learning process and eventually improve the quality of learning.

f. Stage assessment and final assessment. Stage assessment and final examination are adopted for comprehensive evaluation of students' learning effect in stages during the course of study and after the course ends, respectively. This section may account for 40% of the overall course score.

The specific evaluation methods and implementation time points are shown in the table below, and the specific data may be adjusted according to the actual course.

Table 1. Evaluation method and implementation time point

Category	Quantitative evaluation index	Proportion	Evaluation method	Description
Stage evaluation	Self-study process	10%	1. Live broadcast check-in; 2. Number of videos watched or study time; 3. Number of visits to online learning platforms	Full marks are awarded to students who have watched all instructional videos and operation videos. Points will be deducted if not finished; Those who visit the website more than 100 times will get full marks. Points will be deducted if the number of visits is too few.[4]

	Self-study effect	10%	1. Test questions in the video; 2. Test questions after the video	Tests taken before and after self-study will be included in the scores.
	Learning engagement	10%	1. Barrage; 2. Forum activity	Reply to a problem in the discussion area can enable students to get 2 points, and one more point is awarded to those who get likes. The upper limit is 100 points.
	After school assignments	30%	1. Subjective homework questions; 2. Objective homework questions; 3. Project study report; 4. Minor paper; 5. Experiment report, etc.	Teacher evaluation or peer evaluation
Final evaluation	Stage test	40%	Offline written test	Score according to the grading scale
	Final exam		Offline written test	Score according to the grading scale

4.3 Analysis of the learning situation recording function of the blended teaching platform

At present, the online platforms for blended teaching include Rain Classroom, SPOC, Chinese University MOOC, Xuetang, etc. Although their principal functions are similar, each has its own characteristics [5]. According to the aforementioned design of the course evaluation system, the online teaching platform that can implement blended learning must have corresponding functions. The specific analysis is as follows:

a. Various forms of teaching resources to present functions. Generally, although all online learning platforms can upload teaching resources such as PPT, videos, exercises, etc., it is found that the presentation methods of test questions are different. For example, the widely-used Rain Classroom requires teachers to make PPT before uploading, making it slightly inconvenient to use because most of the existing test questions are in the word version. On the other hand, online teaching platforms generally have a computer terminal, and some have a mobile terminal App or WeChat public account. Obviously, the mobile terminal is more suitable for fragmented learning, making it possible to learn anytime, anywhere.

b. Community learning function. Online live check-in, sending barrage and other functions can promote students' participation in the classroom, while the community posting, replying, and like functions can prompt students to actively participate in topic discussions.

c. Convenient test function. There are two types of questions, namely objective questions and subjective questions. Objective questions can be automatically judged in real time, while subjective questions can be evaluated and appealed to by multiple people

with different roles. The test timing can be a quiz in the video, a test after self-study, an in-class test in an offline classroom, or other forms of after-school tasks.

d. Online learning process recording function. It can record common learning behaviors such as login, check-in, video views, duration, and statistics of video rewind and replay.

e. Data analysis and export function. Statistical analysis can be performed on the data and test scores of the recorded learning process, and the class average, individual outliers, etc. can be analyzed

5 Conclusions

Blended learning is a new teaching practice that has developed rapidly during the epidemic. The online learning time has been increased by 20-50% during the teaching process, making it possible for the course assessment and evaluation to make full use of the online learning process. By designing a course assessment and evaluation system in blended learning, this paper promotes the timely feedback and adjustment of classroom teaching strategies in the assessment and evaluation process, thus truly forming closed-loop teaching. Besides, it greatly improves students' participation in learning. Finally, it provides a reference for how to improve the teaching effect and the next stage of construction and implementation of the blended learning curriculum.

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