

A Research and Exploration of Blending Teaching

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Abstract—The paper investigated the research status of the blending teaching and analyzed some important problems and difficulties in its application. A practical training course of higher vocational education was chosen as the research subject to carry on the blending teaching. The research and exploration of blending teaching showed that it was an innovative teaching mode which can promote the teaching effectively.

Index Terms—blending teaching, instruction design, online learning resources, higher vocational education

I. INTRODUCTION

In recent years, information technology has developed in education field rapidly. Many relevant new things and concepts have appeared, such as MOOC, SPOC, flipped classroom, and microlecture etc. As a matter of fact, these newly emerging things have changed the traditional teacher's teaching mode and students' learning style.

Our country has attached great importance to the construction of educational informatization in the last few years. On March 13th 2012, the ministry of education issued a document, which named the ten-year development plan for teaching informatization. This document put forward clearly to accelerate information construction and share high-quality digital educational resources.

In our university, there are two kinds of education types at the same time. They are open and distance education and higher vocational education .

II. RESEARCH STATUS OF BLENDING TEACHING

As we all know, the first year of MOOC was 2012. In that year, a lot of MOOC courses appeared. And the most famous were coursera, udacity of the stanford university, and edX which was co - founded by MIT and Harvard.

Compared with the traditional teaching, online learning courses have many advantages, but they lack face to face teaching interaction. Sometimes, a MOOC course may attract tens of thousands of learners at the beginning of the study. But there are not so many people who can hold up with the learning at the end.

In June 2013, Keith Devlin of the University of Stanford, published an article on the web and took a negative attitude toward MOOC. The article believed that MOOC would die soon and MOOR would live long.

In July 30th 2013, Malcolm Brown, the head of an information institution for higher education of the United States, published an article on the website. The article was entitled that "Moving Into the Post-MOOC Era". And the article thought that the post-MOOC era has arrived.

In the MOOC era, self-discipline was the most important to achieve the effective learning. However, in the post MOOC era, learning style would transform from fully autonomous learning to the blending learning and collaborative learning.

A. Blending Learning and Blending Teaching

According to reference [1], the blending learning or blended learning combined the advantages of the traditional teaching and e-learning. Teachers played the leading role and took charge of the guiding, enlightening and monitoring in the whole teaching and learning process. Students were inspired their initiative, enthusiasm and creativity effectively. The best teaching and learning effect may be obtained in this way.

According to reference [2], colleges and universities should pay more attention to several important aspects in deepening the teaching reform with the concept of MOOCs. The education theory should better combine the traditional face-to-face teaching method which was teacher-centered and the online education which was student-centered. Teachers should play the predominate role in the teaching process. Students should play the role of cognitive subject in the course of learning.

The teaching notions should better pay equal attention to the "teacher-oriented" and the "student-oriented". Teaching method should change from traditional teacher oriented teaching to blending teaching gradually.

According to reference [3], blending learning was one of the important research directions of teaching reform in colleges and universities currently.

According to reference [4], although the online learning resources were rich, convenient and friendly, online learning could not replace the traditional classroom teaching completely.

Lack of teachers' direct participation, online learning results were not as ideal as expected. How to reflect the active participation of online learning, and how to give full play to the guiding role of teachers, and their personality influence, learning and research methods of infiltration advantages, all these questions had become the common concern. Under this background, blending learning came into being.

In the research of educational technology, blending learning was similar to blending teaching. In reference [3] and [4], it was considered that the concept of blending learning was the same as blending teaching.

However, in reference [5], blending teaching was different from blending learning. Blending teaching referred to how to help students achieve optimal learning results from teachers perspective. By means of appropriate media technology and learning environment at the right time, blending teaching could provide carefully designed resources and learning activities to students.

B. Research of Blending Teaching

Now, many education researchers and teachers around the world are becoming interesting in the exploration and practice of educational information. Blending teaching had been applied in many different levels of education, including middle school education, university education and adult education etc in the last few years,

In reference [6], the horizon report of 2016, the research institutions thought that the design of blending learning was the research emphasis of higher education, during the last year or two. The higher education community paid great importance to blending teaching.

Blending learning was not a simple combination of online and offline learning, but a perfect combination of two kinds of learning resources and learning elements.

According to reference [7], in the design of blending teaching, we should focus on the real connotation of "integration" rather than just the form of "mixing".

In reference [8], based on the SPOC platform, a blending teaching experiment of advanced mathematics was carried out. The blending teaching design included the study guidance before class, the research process in the class, and extended self-learning after class. The teaching effect was evaluated by multiple integrated assessment. The practice indicated that blending teaching can promote and cultivate students' autonomous learning, and inspire students' learning consciousness.

In reference [9], blending teaching was a product of the integration of traditional teaching and network teaching under the background of educational information. A blending teaching mode was constructed and used. The results showed that blending teaching mode not only played the leading role of teachers but also ensured the subject of cognition of students. At the same time, blending teaching provided autonomous learning, collaborative learning and research learning conditions for students.

In reference [10], blending teaching was considered as an important research direction of higher vocational education reform. Flipped classroom was introduced into the blending teaching design and practiced in a course.

C. Problem in Blending Teaching

According to reference [11], the curriculum online teaching platform should not only be used to provide learning materials, homework or notice simply. Teachers should make arrangements for online learning contents in instructional design carefully. Some ordinary universities, especially those in small cities, did not have good teaching

hardware and network environment to carry on blending teaching. Their library can only provide students with a small number of computers for free use. And the WIFI coverage on college campuses was also poor relatively, with some schools even not offering free WIFI. Although many colleges and universities had tried and explored blending teaching, there were still a large number of teachers who did not fully understand the real meaning of blending teaching. And the relevant management and evaluation mechanism was not perfect. The support of network environment needed to be updated and adjusted soon.

According to reference [12], although blending teaching was one of development trend of university teaching reform, there were few colleges and universities which began to push forward the blending teaching reform as a whole. So there were few successful experiences of blending teaching. The strategy of promoting the blending teaching mode reform in colleges and universities was an urgent problem to be solved.

In reference [13], the authors analysed the combination mode of MOOC, microlecture and flipped classroom with the blending teaching. And they pointed out that online learning model of blending teaching can select a variety of modes which including MOOC and microlecture. The evaluation of blending teaching included three aspects such as learning effect, interactive learning and the individuation degree of learning.

III. MY RESEARCH WITH BLENDING TEACHING

For a long time, higher vocational education attached more importance to practical teaching and students' skill training. However, for the students, it was not very easy to master the practical knowledge and operational skills in a short period of time.

From 2015 to 2017, I and my course team took charge of the construction of a school level high-quality specialty course. The course was a practical training course. Under the guidance of professional theory, the course emphasized the practical operation skills. The teaching duration of the course was two weeks, and the weekly hours were 28 hours. In the traditional teaching, teachers would explain the training contents and demonstrate the step carefully in the training classroom.

In the last two years, we have perfected the course instructional design and completed the construction of course online learning resources. In the autumn semester of 2017, we carried out blending teaching. Students can use the course platform and smart mobile phone APP to complete online self-learning. In the design and practice of blending teaching, we found that we must consider some important problems in advance.

A. Allocation of the Online and Offline Learning Time

The first important problem was the allocation of online and offline learning time. There were many different views on this issue.

Some people thought that in the design of blending teaching, most of the course contents should be learned

through network, and only the most important contents were taught through face-to-face teaching. So, compared to the offline teaching, the online teaching learning time should be allocated more. However, this way of learning was not suitable for everyone. Particularly, for those with learning difficulties, they preferred the traditional classroom teaching. While, if we spent more time on offline teaching, the students would not study the online learning contents with enough time.

B. Allocation of the Online and Offline Learning Content

The second important problem was the course contents selection. Some people believed that blending teaching can make up the shortage of traditional class teaching, so those unimportant contents could be put on the internet to allow students to study on their own, while the important teaching contents should be arranged in the face-to-face classroom teaching.

Online learning resources included microlecture, online work and task, small test and discussion area etc. All the learning resources were designed around the important knowledge points. Students should complete the online learning task in time. According to the data of the students' study situation provided by the course platform, teachers could analyze the students online learning situation, so as to adjust the off-line teaching contents.

For the teachers, they must pick up carefully the contents suitable for online self-learning and classroom teaching in advance. In our teaching practice, because the course was a practical training course, and many teaching contents must be learned and taught in the professional training classroom. The course contents included the use of electronic instruments, practical training kits, welding and debugging of electric circuits. All these must be completed in the training classroom. The theoretical knowledge related to the practical training project could be put on the internet with self-learning. Another purposes of online learning contents design were to prepare for the instrument and training circuit debugging to avoid damage to the instrument and equipment burn electronic circuit in the off-line training classroom teaching as far as possible.

The course undertook another important task of helping students to obtain a professional qualifications. So we designed microlecture about the method of debugging the test circuits. In this way, it was convenient for students to study online.

C. Scale of the Class in Blending Teaching

The third problem was the class size. What was the right number of the class size for blending teaching? If there were many students in a class, can the blending teaching be carried out smoothly?

According to relevant literature and previous teaching experience, we can find that students suitable for blending teaching maybe those with good learning habits and self-study ability and collaboration spirit. Teachers would check the students' online homework and experimental training reports. And teachers would participate the course online discussion whenever necessary and answer the students' questions in time. Actually, for teachers, the

blending teaching was not easy. Because of the heavy workload of the online teaching, the class size of blending teaching should not be too large.

In the autumn semester of 2017, we experimented with blending teaching in two classes. There were about twenty people in each class. Although the learning situations of students were different, the number of students in each class was very small fortunately.

D. Selection of Blending Teaching Mode

The fourth problem was that, blending teaching has not a unified teaching mode and method so far. According to the published reference, blending teaching mode was still at the stage of trial and groping.

At present, blending teaching mode included flipped classroom, microlecture, and information technology course online platform.

E. Examination and Evaluation of Blending Teaching

The last problem was the examination and evaluation of blending teaching, which included the reflection of course teaching effect and the students' learning situations.

A successful practice of blending teaching depended on the fully use of the network of course platform. The course platform can record clearly the students' online learning situation. For students, their final scores of the course included their online learning tasks completion and the offline learning situations in the training classroom and the examination of professional qualification which must also be taken into account.

We can evaluate the effect of the blending teaching from three aspects which consisted of the the teachers' teaching, students' learning, and significant improvement in teaching effect. At the end of the course, a survey software could be used to conduct a questionnaire survey on students.

The questionnaire can focus on several aspects, such as the students satisfaction of the blending teaching, online learning resources, and the use of course network platform and so on. And the result can be analyzed with the professional data analysis software.

IV. BLENDING TEACHING PRACTICE

In the autumn semester of 2016, our course teaching team uploaded the basic online learning resources to the course network platform, including the course teaching outline, the training lecture, and the teaching schedule etc. The types of the online course resources included PPT, word, image etc.

Unfortunately, for various reasons, we did not design and plan online learning time for the students in the teaching schedule. The whole teaching of the course was still completed in the training classroom as before. We just asked the students to upload their training reports to the course platform. So, a few people learned the course online learning resources actively.

At the end of 2016, we completed the microlecture script preparation. The microlecture was captured and made in the training classroom. All the contents of the

microlecture were about the professional qualification examination. In the microlecture, with the help of professional electronic instruments, the procedures of debugging and testing of the actual circuits were demonstrated step by step. In the post-production phase of the microlecture, our course teaching team communicated with the video production team many times in half of a year. And the videos were adjusted repeatedly. At last, the videos lasted thirty minutes and were divided to three episodes. Statistics on the course platform indicated that all students learned the microlecture and some students even studied the three videos several times. Obviously, these resources brought convenient for students' self-study. In this way, they can study and use the electronic instruments and debug the circuit in the training classroom by themselves without too much help.

In the autumn semester of 2017, we supplemented and perfected the course online learning resources. In order to guide the students to make full use of online learning resources, we tried to design and implement the blending teaching this time. Specifically, we allocated 24 learning hours as the online student self-study time, and the other 32 learning hours as the traditional off-line teaching and learning time in the training classroom. In view of the effective course online resources, some highly relevant online tasks were designed. Most of the answers of online learning tasks could be found in the relevant learning resources. Thus, in order to complete the online tasks, each student must read and learn the online course resources.

Each student had a smart phone. This was a beneficial factor of blending teaching. Moreover, our campus was covered with free wireless networks. And the course online learning platform had a corresponding mobile client. So students can install the mobile client APP, and then they can study anywhere in the campus conveniently. In fact, most students preferred to use their smart mobile phones to learn than to carry a laptop.

In order to provide students with a comfortable learning experience, we changed the previously dense small characters on the online course web page and adjusted the font, font size, font color, line spacing, image size and so on. And the important contents of the online learning resources were emphasized with obvious color, underline and bold.

In the online instructional design, we hoped to organize and connect various resources effectively. And we worried about that the online learning resources were put online lonely, with nobody interested in them. In the face of a pile of online learning resources, some students did not know where to look, what were the basic, what were the important, and what were the expanded resources, they can not identify and distinguish all these by themselves as a beginner. In order to help students to complete the online learning tasks, we deleted those less important resources. And at the same time, all the course online learning tasks were designed relevant to the online resources to guide students to learn.

In fact, in order to carry out a successful blending teaching, whether the teachers or the students, they must all

be familiar with the course network platform. It was only through specific using, they can understand and master the common functions of the course platform skillfully. Some students even did not know how to upload their homework and experiment reports. Also, for teachers, it was also necessary to learn more function of the course platform through regular use. Otherwise, because not familiar with the use of the platform, teachers also can not do well the online teaching.

V. THE STATISTICS OF THE BLENDING TEACHING

With practice of blending teaching in 2017 autumn semester, we can analyze the students' learning situations with the statistics by means of the course platform.

A. The Learning Situations of Microlecture

For short and clear, microlecture was convenient for students to learn and study by themselves. If they felt difficulty, then they can learn a few more times. The learning difficulties caused by different learning levels and learning bases would be solved in a certain extent.

As in Fig. 1, we chose nine students and an online microlecture learning task randomly. We can see that all students completed the online learning task. The duration of the microlecture was ten minutes and thirty-four seconds. But the study time of each students was longer than the video itself. This showed that the students learned the microlecture more than once. The ruminant ratio also showed this phenomenon.

Because students could adjusted their online learning time according to their own learning conditions, so the efficiency of the traditional offline teaching and learning would be improved remarkably.










student name	the learning situation of the video	learning time(Mins)	ruminant ratio
Zhang		13.9	131.79%
Li		19.8	187.72%
Liu		28.1	265.97%
Cai		14.8	139.76%
Cai		29.4	278.52%
Hu		12.5	118.65%
Wang		35.5	335.54%
Zhang		15.9	150.87%
Shao		15.8	149.86%

Figure 1. Statistics of students' microlecture learning on the course platform

B. The Completion of Online Learning Tasks

In the past, students' homework and experimental reports were done on paper. So they spent a lot of time to write and write. For our practical training course, the successful using of electronic instruments and skilled debugging the circuits were the main learning task of the course not those handwritten reports.

In the blending teaching practice, in order to fully use the course platform and the online learning resources, all the experimental reports and homework were asked to submitted to the course platform instead of previous paper report. All the experimental reports were simplified as online learning tasks. Some unimportant contents were

even deleted directly. The main purpose was only to lighten the burden on students and improve their online and offline learning efficiency.

As in Fig. 2, we chose the completion of an online learning task and some students. Teachers can examine the students online tasks completion time and the specific situations. And the students can check their scores and comments of their teachers conveniently. If they had any questions, by means of the course platform, they can send messages to teachers immediately. So it was very easy and convenient for teachers and students to communicate in real time. Of course, this way can promote the efficiency of the teaching and learning.

name	student ID	status	submission	student IP	correction time	teacher	teacher IP	score	check
Gao	1061304023	finished	2017-12-10 12:11	49.95.217.106	2018-01-15 09:35	Gou	112.3.246.242	70	check
Wu	1061304001	finished	2017-12-09 11:38	112.4.55.120	2018-01-15 09:37	Gou	112.3.246.242	75	check
Sha	1061304004	finished	2017-12-09 12:37	221.226.15.102	2018-01-15 09:38	Gou	112.3.246.242	74	check
Ye	1061304022	finished	2017-12-09 13:16	221.226.15.106	2018-01-15 09:47	Gou	112.3.246.242	63	check

Figure 2. The completion of an online learning task.

VI. CONCLUSION

The construction of the course online learning resources brought great convenient to the students self-learning. The students can browse and learn whenever and wherever possible, according to their own learning conditions. And our blending teaching practice showed that this innovative teaching and learning mode can guide and inspire students to use the online course resources to study independently.

It was worth pointing out that all the course online learning resources must be tested in the teaching practice and perfected and updated in time. In the future, we will study and explore the combination of information technology and teaching further.

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