Research on Design of Blended Teaching Mode Based on Smart Classroom

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Abstract

With the arrival of the information society, Chinese educational informatization has entered a new stage of development, the educational ideas and teaching mode are changing constantly. The blended teaching mode is the only way to information-based teaching, which combines the network teaching mode with the traditional classroom teaching mode. In recent years, with the development of campus information construction, the traditional classroom as a classroom form is becoming more and more unsuitable for the needs of the current teaching work. More and more schools begin to use more intelligentized, interactive smart classroom. The blended teaching mode based on smart classroom gets rid of the disadvantages of traditional classroom teaching and simple online teaching, which is not only conductive to teachers' monitoring of the whole teaching process and the systematic teaching of scientific knowledge, but also to the cultivation of students' spirit of inquiry and innovation. By organically integrating offline and online teaching resources, it builds a two-way interaction platform between teachers and students for the course of the whole school, and a smart classroom for teachers' teaching behavior and students' learning activities. This paper briefly expounds the connotation of smart classroom and blended teaching mode, analyzes the characteristics of the learners, discusses the design principles of blended teaching mode based on the smart classroom, and on this basis, the instructional design is made, which is excepted to promote the deepening of teaching reform and the continuous innovation of teaching mode while improving teaching quality.

Keywords

Smart Classroom, Blended Teaching, Instructional Design.

1. Introduction

With the arrival of the information society, information technology has brought an unprecedented change to higher education. The educational ideas and teaching mode are constantly updating and changing. The blended teaching mode is the only way to information-based teaching, which combines the network teaching mode with the traditional classroom teaching mode, it is also an important direction of the current education and teaching reform in colleges and universities. In teaching activities, optimize the combination of traditional teaching and network teaching, which breaks the boundary of traditional teaching mode, and teachers skillfully use various teaching methods, teaching strategies and teaching media technology to optimize the combination and improve the teaching effect. In recent years, with the development of campus information construction, the traditional classroom as a classroom form is becoming more and more unsuitable for the needs of the current teaching work. More and more schools begin to use multimedia equipment to carry out daily teaching, solve the problem of single method and lack of means in normal teaching work, and gradually evolve into the construction of more intelligent and interactive smart classroom. Smart classroom is based on the Internet of things technology, it is mainly from the smart management, smart environment, smart resources and smart service to better support teaching, which is a new form of modern education. The emergence of smart classroom is to assist classroom teaching and provide intelligent environment for teachers and students, and make full use of the intelligence and interactivity of smart classroom to implement blended teaching, give full play to the value of smart classroom. It breaks the imprisonment of original teaching methods, optimizes teaching strategies, and improve the level of education and teaching[1]. In the intelligent, personalized and interactive classroom teaching

environment, the implementation of blended teaching enables teachers to play a leading role in guiding, inspiring and monitoring the teaching process, which can be brought into full play. As the main subject of the learning process, students' initiative, enthusiasm and creativity can be fully cultivated and stimulated. The blended teaching based on the smart classroom is the general direction of the development of education modernization, which plays a role in promoting the development of education.

2. Smart Classroom and Blended Teaching Mode

2.1 Smart classroom

The smart classroom is usually translated into Smart Classroom、Classroom of Future and so on. The earliest foreign study of the smart classroom is proposed by Ronald Reicinho— "Smart Classroom"[2]. The research on smart classroom in foreign countries is earlier, it can be divided into two stages. The first stage is mainly from the basic hardware design of the smart classroom, it includes the configuration of the smart classroom and its effect; In the second stage, foreign researchers mainly focus on analyzing the design and practical application of the smart classroom from the perspective of teaching and learning. MIT's "Technology Enabled Active Learning"plans to integrate classrooms and laboratories, emphasizing hands-on practice, cooperation and high interaction. They integrate online teaching system, 3D visual simulation graphics, experimental dynamic simulation, and personal real-time feedback system into the teaching environment. The SCALE-UP program at North Carolina State University helps students reflect and share by creating a learning environment that encourages collaboration between students, partners and teachers[3].

The domestic experts and scholars' discussion on smart classroom is mainly aimed at the definition and understanding of the concept of smart classroom. They analyze the characteristics of the smart classroom and implement technology at the same time. Ronghuai Huang believes that the "smart" of smart classroom can be reflected in five aspects, which includes Showing, Manageable, Accessible, Real-time Interactive, Testing, forming a SMART model[4]. Weixin Hu believes that the smart classroom is a new learning environment, which is based on advanced technologies such as the ubiquitous web environment, on the premise of appropriate digital courses and resources, the interaction is at the core. Therefore, integrate the above aspects to realize the new learning environment and space of teaching and learning process optimization[5]. Nie Fenhua and others from Tsinghua University believe that smart classroom is the sum of the teacher's space and its hardware and software equipment that provide intelligent application services for teaching activities. It is also the latest form of classroom information construction driven by emerging information technologies such as the Internet of things, cloud computing and big data[6].

2.2 Blended teaching model

Both "Blended Learning" or "Blending Learning" can be used. Blended teaching originated in the United States, and western countries used to call "blended teaching" as "blended learning" from the perspective of learners. Antoine and Bertrand of foreign researchers[7] consider that blended teaching is the combination of face-to-face teaching between teachers and students and Computer Aided Instruction. This combination of traditional teaching and Computer Aided Instruction has got rid of the drawbacks of the original two separate learning methods, which makes the blended teaching mode show great advantages in the field of education. On the basis of retaining the flip type and flexible type, Johande Jager[8] starts from different driving forces and constructs six blended teaching modes including face-to-face driving mode, online driving mode and so on. Maria Avram[9]et al believe that in determining the appropriate blended teaching model, the following aspects should be considered: on-site encouragement of students willing to learn, active learning, cooperative inquiry, evaluation of estimates and learning materials provided to support students.

The study of blended teaching by domestic scholars is obviously later than that by foreign countries. Zhu Zhiting is the first scholar to introduce the concept of "blended learning" into the field of education in China. "Blended Learning" is a new type of vocabulary, Chinese scholars have different

understanding and translation of it. Li Jiahou translated it into "integrated learning", and most researchers translated it into "blended learning ". In a series of researches on blended teaching, many scholars equate "blended teaching" and "blended learning" with the same expression, such as Yu Shengquan, Zhang Qiliang and other scholars in the use of Blended Learning , "blended learning" and "blended teaching" concept is not treated differently. Ho Kekang, Beijing Normal University[10], based on the recent research on the blended learning model, the professor proposed that blended learning is a combination of online learning, distance learning and traditional face-to-face teaching learning, it aimed at how to better promote students' blended learning improve teachers' blended teaching, and how to improve students' blended learning effect. Xie Fei[11]pointed out that the introduction of information technology into the subject teaching has become more and more profound with increasing effects and some problems. Therefore, he put forward the necessity of implementing blended learning teaching mode in middle school. Scholar Tian Shisheng[12]discusses the basic situation of blended teaching, the mode method of designing blended teaching and the changes it brings to the field of education.

3. The Theoretical Basis of Blended Teaching Model Based on Smart Classroom

3.1 Blended Learning Theory

The blended teaching mode combines the advantages of traditional classroom teaching and online learning, which not only plays the leading role of teachers but also plays the main role of students in learning, it optimizes the selection and combination of teaching elements to a certain extent. All kinds of teaching methods, models, strategies, media, technology and so on are skillfully used according to the needs of teaching. It provides different ways for learners with different learning levels, allows learners to choose their own learning content, and enables learners to achieve their own needs to better implement individualized teaching.

It provides students with intelligent and individualized learning environment, intelligent recording and broadcasting autonomous learning resources, the pre-class learning supported by cloud platform and individualized resource acquisition. It combines face-to-face in-depth discussion with teachers to provide new ways for students to learn, which makes learning more personalized, makes teaching means and resources more diversified, teaching effect more obvious. It also increases the interaction between students and students, students and teachers, so as to achieve better teaching results.

3.2 Constructivism Learning Theory

Constructivism theory was first put forward by Swiss psychologist Piaget. Constructivism learning theory emphasizes the main role of learners and the initiative, sociality and situational of learning. In the constructivism learning theory, learning is the process in which learners construct their own knowledge, which means that learners do not passively accept stimuli, but actively choose and process external information to construct the meaning of information. It emphasizes student-centered to provide students with learning resources and focus on problem to drive learning, while focusing more on collaborative capabilities. It encourages students to independently complete the meaning construction of new knowledge and make continuous improvement.

The design of blended teaching mode based on smart classroom should be based on constructivism theory, which pay full attention to the individual needs of learners and respect the main position of learners, comprehensively use various techniques to realize individualized teaching and promote the construction of learners' knowledge. And strengthening the interaction between the internalization process and the external environment.

3.3 Ubiquitous Learning Theory

Ubiquitous learning is the information that anyone can obtain through a mobile terminal device at any time and anywhere. It needs the support of many resources, such as digital technology environment, learning resources, compound teaching mode and so on. From the learning model level, uviquitous learning includes three models: formal course learning (professional course learning), informal resource learning (such as picture, audio, video, animation, courseware or other types of

available resources) and quasi-formal subject learning (between formal and informal, based on learning resources and teachers)[13].

The video recorded in the smart classroom is the normal course content of school, and it is a formal course study. Meanwhile, it is also a shared learning resource, which can be viewed by students in need, and it is an informal resource learning, so the research includes both formal curriculum learning and informal resource learning.

4. Design of Blended Teaching Mode Based on Smart Classroom

4.1 Analysis of Learner's Characteristics

A teacher-led and student-centered blended teaching model based on smart classroom is based on which learners are participants of teaching. In the design of teaching mode, we must take into account the commonness and difference of learners in order to teach students in accordance with their aptitude. The blended teaching mode based on the smart classroom is for all the students in our school. They have high information literacy ability, and more likely to form a team in the network environment and more likely to stimulate the interest of learning. Their thinking has higher abstraction and theory, and gradually from the abstract logical thinking to dialectical logical thinking development. Their observation of things is further enhanced in terms of purpose and systematicity. Their thinking is further developed in terms of organization, profundity and critical ness. Their independence is stronger and attention is more stable.

4.1.1 learner′s original knowledge and skill level

In the process of cognition, we finally form schemata through assimilation, naturalization and balance, which involves the old knowledge. In the process of learning, the learner's original knowledge and skill level affect the acceptance and processing of new knowledge. In the design of blended teaching mode based on smart classroom, it is necessary for teachers to take into account the students' original knowledge and experience in order to accurately position the teaching starting point.

4.1.2 learner′s study time after class

In the blended teaching mode based on smart classroom environment, students are required to learn online teaching videos after class, and the completion of each subgoal is based on online teaching video learning. The time of watching teaching videos online is one of the factors that determine whether the blended teaching mode is successful or not, and it can also be understood whether the students have certain self-study ability. This plays a certain role in paving the way for the practice in the follow-up class.

4.1.3 learners′ information technology capabilities

In the blended teaching mode based on the smart classroom environment, supported by information technology, both online and offline stages involve the reception, retrieval and integration of information, so high requirements are placed on students' information literacy ability. The students' ability of information literacy includes the ability of PPT production, PS operation, information editing, database operation and computer operation.

4.2 Design Principles of Blended Teaching Mode Based on Smart Classroom Environment

The design principle of blended teaching based on smart classroom environment is based on constructivism learning theory. The main principles of instruction design are as follows:

4.2.1 subjective principle

There are differences in learners' knowledge level and cognitive characteristics, and the blended teaching design based on smart classroom environment should fully consider the learners' original knowledge level to determine the starting point of teaching. Taking learners as the center, students are the main body of learning activities, all activities should be carried out around students, which means to make students' learning more active, so that students can arrange learning activities according to their own characteristics. Teachers guide students to think and explore actively in

teaching activities, and improve their sense of ownership, and enhance students' self-confidence and enthusiasm.

4.2.2 system principle

In order to realize the training goal of students' knowledge, skills and emotion, we should consider the relevant elements in the teaching process from a systematic point of view, learn from each other's weaknesses, and reasonably match.

4.2.3 operational principle

Instruction design should recognize the difference of students' information literacy, and choose the appropriate blending way to make students easy to accept, understand and operate.

4.2.4 interactive principle

The blended teaching design based on smart classroom environment should pay attention to the communication between teachers and students or students and students. Students are more willing to acquire knowledge and make progress in learning. This kind of communication makes students also closer to teachers, which arousing students' interest in learning.

4.2.5 openness principle

Smart classroom is an open learning environment, and the blended teaching activities based on smart classroom environment need to follow the principle of openness. On the one hand, the development of teaching activities can not be limited to fixed learning resources, should support learning resources can be constantly generated and updated. On the other hand, teachers need to encourage learners to actively communicate and interact with the external environment, constantly explore a broader learning space. Try to meet the individual learning needs while expanding their learning horizons and knowledge and skills.

4.2.6 collaboration principle

Modern society is not a closed society, but a cooperative society. In order to cultivate students' cooperative spirit, instruction design should have a choice to design students' cooperation, so that students not only learn knowledge in cooperation, but also cultivate students' communication ability and team cooperation spirit.

4.3 Design of Blended Teaching Mode Based on Smart Classroom

The blended teaching mode design based on smart classroom should pay full attention to the individual needs of learners and respect the main position of learners. The idea of teaching design is shown in figure 1, which mainly includes six parts: pre-analysis, instruction resource design, pre-class design, in-class design, after-class design and evaluation design.

4.3.1 Preliminary analysis

pre-analysis is mainly learner analysis, learning content analysis and learning environment analysis. Learner analysis is mainly to analyze the learner's basis of professional knowledge, curriculum professional characteristics, learning ability, interest, hobby and so on. Learning content analysis is mainly to analyze the curriculum syllabus, curriculum teaching objectives and curriculum teaching resources; Learning environment analysis is mainly to analyze the facilities of classroom teaching equipment and the functional structure of intelligent classroom teaching platform.

4.3.2 Instruction Resources Design

Instruction resource design can be divided into two parts: online resource and offline resource. Online resources include micro video, courseware, text, pictures and other learning materials corresponding to the knowledge points before class; offline resources include the key points, difficulties, discussion questions, application of knowledge points and individualized guidance for students.

4.3.3 Pre-class Design

Teachers log on to the cloud platform, upload the pre-designed teaching resources to the cloud platform, and release the task list, asking students to watch the video and complete the corresponding tasks before class, and feedback to the network teaching platform in time when they encounter

problems; Teachers collect and summarize students watching video and completing exercises through the network teaching platform before class, and designs the in-class teaching accordingly.

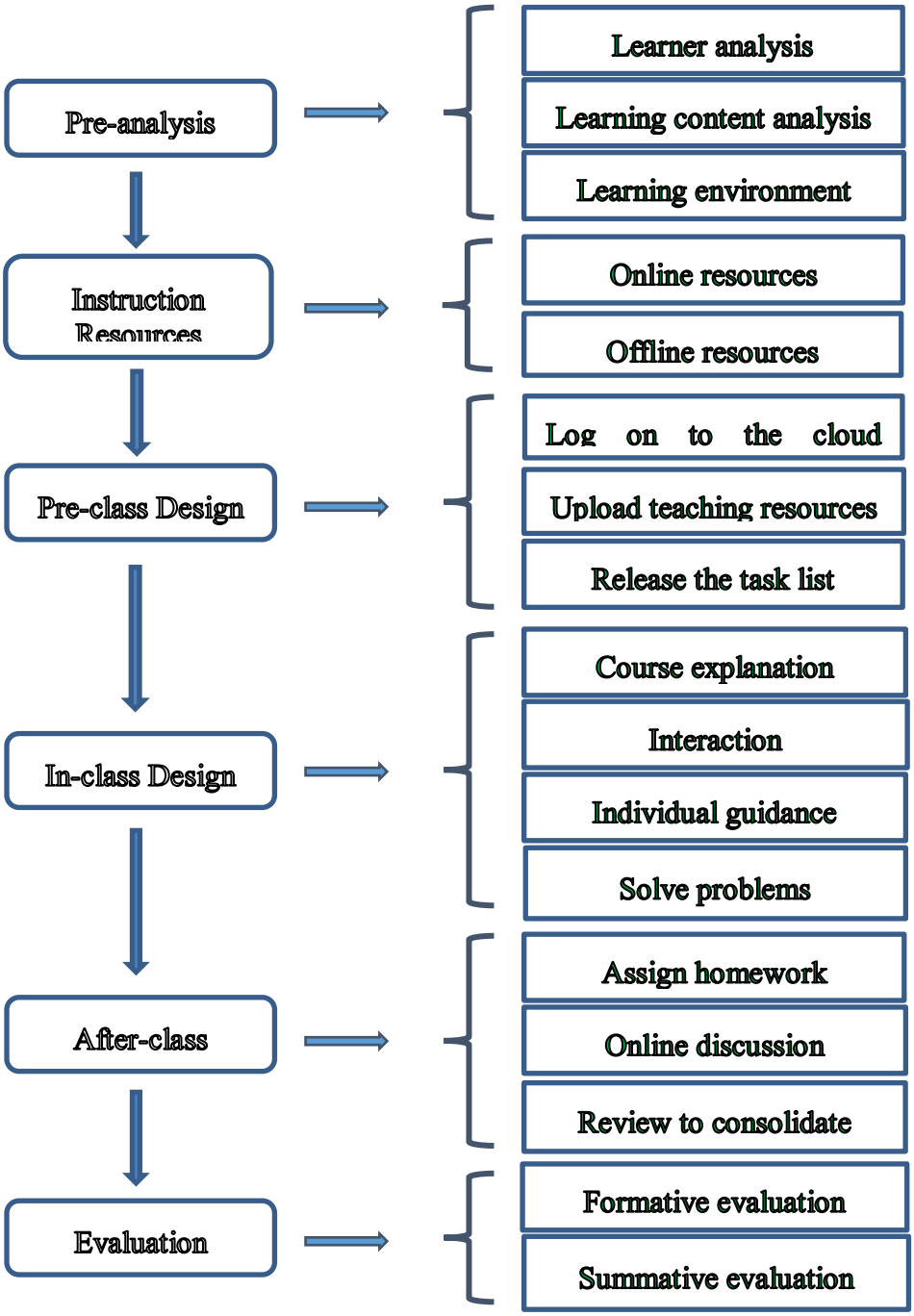

Figure .1 Design of Blended Teaching Mode Based on Smart Classroom

4.3.4 in-class design

The middle stage of class is the core part of blended teaching and the stage of knowledge transmission and internalization. The main forms of course explanation includes the explanation of key points and difficult points, and the explanation of common knowledge encountered by middle school students before class. Set up the corresponding teaching interaction link, let the students participate fully, strengthen the communication and communication ability, let the students better understand the teaching content and improve the students' interest. Students can transmit the problems or doubts that

can not be solved to the teachers in real time, so that teachers can carry out individualized guidance and communication, which solves the practical problems encountered in the course at the same time.

4.3.5 after-class design

After-class stage is the stage of students' knowledge remediation. After class, students review and consolidate their knowledge by watching class videos and learning materials pushed by teachers. Teachers assign homework reasonably according to the teaching objectives and teaching contents, students should complete in time. If students encounter problems, they can ask questions and discuss them through online communication.

4.3.6 evaluation design

Teaching effect evaluation can help teaching implementers understand the practical effect of teaching activities and find out the deficiencies in teaching. In traditional teaching, a single final exam score is generally used to evaluate the teaching effect of the teaching model, which cannot fully reflect the knowledge construction and ability generation of students, and is also not conducive to teachers' discovering problems existing in teaching activities. The blended teaching model emphasizes students' learning experience of full participation, deep experience and complete comprehension, comprehensively assesses students' mastery and application of knowledge, and encourages students to learn actively, so the evaluation is carried out by formative evaluation and summarize evaluation. Formative evaluation runs through the whole teaching process and can provide modification and improvement at any stage of instruction design. Formative evaluation is composed of some feedback, which are the completion of each subgoal and the learner's response, including homework completion, classroom performance, discussion participation, etc. Summative evaluation generally supports the judgment of learners' achievement and teaching effectiveness, it refers to the established standards to judge whether students'final learning results have reached a satisfactory level. Summative evaluation mainly includes practice assessment and final assessment.

5. Conclusions

The blended teaching mode based on smart classroom enables teachers and students to communicate deeply, and promotes students' cognitive style to change. Students can also study anytime and anywhere. Based on the blended teaching mode of smart classroom, the higher education teaching reform is promoted, so that teachers can truly participate in students' learning, and teachers' teaching mode, teaching strategy and teaching method are changed. Getting rid of the disadvantages of traditional classroom teaching and simple online teaching will not only help teachers to monitor the whole teaching process and systematically impart scientific knowledge, but also help to cultivate students' spirit of inquiry and innovation. The offline and online teaching resources are organically integrated to build a two-way interaction platform for the whole school curriculum and a smart classroom for teachers' teaching behavior and students' learning activities. So that the whole school level of curriculum teaching can not only according to the traditional teaching rules to arrange teaching and learning, but also breakthrough the limitation of time and space. It is not limited to the classroom and teaching materials, and will learn better into life, attach great importance to students' learning experience. For they become a lifelong learner, it is not only to master professional knowledge and skills, but also cultivate students' information literacy. At the same time, improve teachers' professional accomplishment and level, master the teaching means and tools of information, guide teachers to innovate constantly in the classroom, and promote the deepening of teaching reform while improving the quality of teaching.

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