Research on Building an Open Assessment and Evaluation System for Smart Classroom Teaching Based on Computer Aided Technology

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Abstract: With the advent of the Internet+era, the deep integration of network technology and education will inevitably bring about significant changes in the field of education. In recent years, many scholars at home and abroad have conducted research on smart classrooms, but these studies mostly focus on teaching practice and model construction, lacking systematic methods and standards for evaluating the quality of smart classrooms. Therefore, based on the theory of learning evaluation, the article constructs a quality evaluation system for smart classrooms, proposing six primary evaluation indicators: intelligent learning environment, personalized self-learning, professional teachers, high-quality micro courses, driven classroom project-based learning, and exploratory flipped classroom teaching. Corresponding evaluation levels are also established to provide detailed reference standards for the evaluation of smart classrooms.

Keywords: learning evaluation; Smart classroom; evaluating indicator

1 Introduction

The development of the times has led to new challenges in China's current education work. The traditional "teaching" and "learning" models are too outdated and single for modern society, and the teaching quality is low. This has prompted the education industry to start researching the integration of advanced scientific and technological elements in teaching work, in order to develop new education models. Computer technology has been applied in various industries in China and has achieved good results in each industry[1]. Therefore, the education industry has gradually realized the importance of computer-aided teaching. By integrating computer technology into teaching work, learning time is effectively shortened, teaching quality and efficiency are greatly improved, and optimal teaching objectives can be achieved.

2 Building a Computer Aided Smart Classroom

With the rapid development and widespread application of big data, cloud computing, and mobile internet, the development of smart education has been promoted, and research on smart teaching has been promoted. Smart classrooms have emerged as the times require. The smart classroom is based on constructivism and emphasizes the creation of "situations". Before class, it emphasizes that teachers create various learning situations to promote students' active learning,

NMDME 2023, October 13-15, Xi'an, People's Republic of China

DOI 10.4108/eai.13-10-2023.2341337

actively participate in learning discussions, complete learning tasks, and use the platform's big data to grasp students' learning situation analysis[2]; In the class, emphasis is placed on students' "collaboration" and "conversation", and collaborative exploration is carried out among groups. Teachers use situations to carry out emotional and intellectual conversations between teachers and students, emphasizing the acquisition of students' learning experience and the improvement of learning wisdom; Pay attention to students' "knowledge construction" and "meaning construction" after class, assimilate new knowledge into students' existing knowledge system, and achieve the goal of "knowledge internalization" and ability improvement.

The construction of a smart classroom based on SPOC is divided into three stages: pre class, in class, and post class. Before class, teachers use the SPOC platform to push learning resources, allowing students to learn independently and complete the process of knowledge transmission and absorption. They can count the areas they don't understand and analyze the learning situation through the platform's big data, in order to determine the teaching method; In class, teachers can create collaborative exploration scenarios and resources, break the traditional cramming style of classroom teaching, and carry out targeted problem-solving[3]. Students can internalize knowledge in collaborative and exploratory learning contexts; After class, it is a process of application, consolidation, and improvement. Teachers provide targeted guidance to students and promote learning resources to different students, such as more comprehensive, innovative, and designed programming competitions. Students can use practical programming exercises to enhance their engineering development abilities and achieve the improvement of their abilities. The details are shown in Figure 1.

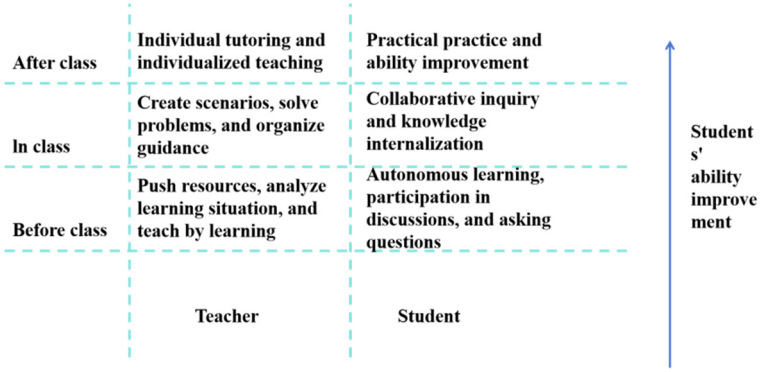

Fig. 1 Construction of Smart Classroom Based on SPOC

The construction of smart classrooms based on SPOC has the following characteristics: first, personalized and autonomous learning. Before class, students can use the teacher push resources on the SPOC platform to independently choose time periods for repeated learning, fill in problem statistics for difficult problems, and submit them to the teacher through the online platform; second,classroom teaching is more targeted. According to the online platform, teachers can analyze the learning situation, and classroom teaching can focus on solving students' difficult problems, spending more time on collaborative inquiry learning and on-site learning tests, guiding students to actively participate in learning; Third, after class exercises are more capable and practical. Teachers can assign competition questions and practical application questions that highlight the cultivation of abilities, allowing students to apply their knowledge

to the process of solving practical problems, and better achieve the internalization of knowledge; fourth, scientific and procedural learning and assessment. By utilizing SPOC platform big data, students' video learning situations, discussion participation, homework completion, quizzes, and other situations can be clearly and accurately seen, and their learning behavior and ability can be scientifically evaluated[4].

3 Quality evaluation indicators for smart classrooms

To construct a smart classroom evaluation system, it is necessary to clarify the evaluation indicators of the smart classroom, and develop an evaluation plan based on the evaluation indicators. Through evaluation feedback, classroom teaching and online and offline learning can be improved. The success of a smart classroom cannot be achieved without an intelligent learning environment, personalized self-learning, professional teachers, high-quality micro courses, driven classroom project-based learning, and exploratory flipped classroom teaching. The specific evaluation indicators are detailed in Table 1.

In order to implement the entire process dynamic accompanying learning evaluation and assessment system in place, it is necessary to specifically determine each assessment item and quantify each assessment item[5]. The following is the assessment situation table of the entire process dynamic accompanying learning evaluation and assessment system, which provides detailed assessment items, weights, and requirements, as shown in Table 2.

Table 1 Evaluation Index of Smart Classroom Quality

Grade 1	Grade 2	Grade 3	ranking				
			5	4	3	2	1
learning environment	Learning platform	Stability and convenience of network platform operation; Multimedia computer configuration, number of computers, wireless network environment					
	Learning resources	Micro-courses, courseware, lesson plans, exercises and test questions are all available.					
	Learning atmosphere	Enthusiasm, initiative and interactivity					
Students' autonomous learning ability	Online record	Online time, sign-in record, filling in the study list, and playing times of micro-lessons.					
	Online test	High completion rate and correct rate					
	practise	High completion rate and correct rate					
	online exchange	Frequent interaction with teachers and students.					
Professional teacher	Academic level	Rich knowledge reserves; Strong academic ability, scientific research ability and innovation ability.					
	Information literacy	Understand and use new educational information technology					

	teaching level	Clear teaching objectives, strong organizational ability, good interaction between teachers and students, can cultivate students' critical thinking ability, communication and cooperation ability and innovation ability.					
	Assess literacy	Analyze and interpret data and improve teaching.					
High-quality micro courses	Content selection	Novel, interesting, accurate and appropriate, focusing on a knowledge point.					
	Teaching objectives	Clear and definite, with strong achievement.					
	Teaching design	Creative conception, clear main line, complete structure, step by step, strong logic and student-centered.					
	teaching method	Novel, simple, vivid, flexible and effective, promoting autonomous learning and personalized learning.					
	Teaching language	The voice is clear, the pronunciation is standard, the speech speed is appropriate and infectious.					
Classroom project learning	Driving problem	An interesting, challenging and urgent problem to understand.					
	investigation and research	Carry out interdisciplinary sustainable exploration and produce high-quality works.					
	cooperate with due division of labour	Clear division of labor, mutual respect, active participation, and timely completion of tasks.					
	Reflection and improvement	Learn to give and receive constructive feedback from peers.					
Flip classroom teaching	Teaching objectives	Reasonable and clear, which can promote the flexible use and internalization of knowledge.					
	content of courses	Proper selection, prominent focus, and organic combination of pre-class and class.					
	teaching process	Clear, activity design is based on micro-lessons, closely organized, effective in evaluation and full in interaction.					
	teaching method	It is novel and effective, and can stimulate students' interest.					

Table 2 Assessment of the Whole Process Dynamic Adjoint Learning Assessment System

Serial number	Assessment item	Weight	Specific requirements
1	Course video	30%	The average score of all videos is out of 100, and the course videos are all scored out of100.
2	register one's attendance	6%	The sign-in activities released by teachers in class are accumulated according to thenumber of times, and each sign-in time is increased by 1, and 30 times is the full mark (2classes a week, excluding holidays, a total of 15 weeks, 2*15=30 times, and the maximum score does not exceed the upper limit.

3	Classroom interaction	10%	A series of activities released by teachers in class (such as voting/questionnaire, rushing to answer, selection, discussion, etc.) to get the corresponding score set by the teacher. When the score reaches 300, it is a perfect score, and the maximum score does not exceed the upper limit.
4	Chapter test	15%	The average score of all the test tasks received by students is 0 if they don't take the test.
5	Homework/ task	20%	The average score of all assignments/tasks received by students is 0.
6	PBL weight	2%	The scores obtained by students in each PBL group are summed up and averaged.
7	Page View	5%	Students' visits to websites through computers or mobile terminals.According to the number of times, every time you visit, add 1. If the number of times you visit reaches 300,you will get full marks,and the maximum score will not exceed the upper limit.
8	Discussion quantity	10%	Publishing or replying to a discussion gets 2 points, and getting a praise gets 1 point, out of 100 points.
9	Reading volume	2%	The total reading time in the data module is as long as 180 minutes or the number of data downloads reaches 100 times,and the maximum score does not exceed the upper limit.

The smart classroom aims to use information technology to cultivate comprehensively developed smart talents and promote the development of students' core skills. According to the theory of learning evaluation, smart classroom evaluation is divided into three levels: learning evaluation, teaching evaluation, and learning environment evaluation[6].

3.1 Learning Evaluation

Learning evaluation includes two levels: progressive evaluation and developmental evaluation. Progressive evaluation focuses on the impact of smart classrooms on students in terms of learning achievement, motivation, participation, and interaction. Academic achievement is an important indicator for evaluating smart classrooms. Through the practice of smart classrooms, whether students' learning status, academic performance, and hands-on ability have been improved, whether teacher feedback can help students with lower academic levels make progress, and whether feedback can promote thinking must be included in the learning evaluation plan. Any criteria for evaluating academic achievement must be open and transparent, allowing students to have a clear understanding of their academic goals and the significance of successfully achieving them. Therefore, learning motivation is particularly important. To promote students' learning motivation, it depends on whether smart classrooms can improve the self-efficacy of independent learning, cultivate students' internal motivation for deep learning, and meet students' needs for improving abilities and autonomy. At the same time, learning opportunities promote learning participation. Smart classrooms provide students with the opportunity to participate in active learning. Whether it is blended learning, flipped classroom, or project-based learning, students must prepare for classroom activities by learning online learning materials before class. Therefore, whether students actively participate in classroom activities, discuss with peers, exchange opinions, and solve problems, as well as whether their confidence has improved, are important indicators for evaluating student participation[7]. The improvement of learning participation is bound to promote an increase in learning interaction. The interaction between students in a smart learning environment is significantly higher than

that in traditional classrooms, because the application of educational technology not only extends the interaction space from in class to outside class, but also expands the interaction objects from teachers and students, students, and students to the interaction between teachers and students and learning content. Learning interaction promotes peer cooperation, enhances individual responsibility, cultivates awareness of self-monitoring, and enhances the ability to self-evaluate and peer evaluate. Progressive evaluation should focus on individual growth and mastery of knowledge, emphasizing the efforts made by students in the learning process. Teachers should help students establish self reference goals in advance, so that students can continuously bridge the gap between their current level and target level during peer evaluation and self-evaluation.

In the past, summative evaluations focused on information memory and exam taking abilities, while current learning evaluations focus on evaluating students' ability to ask questions, solve problems, apply, reason, innovate, and create, emphasizing goal orientation and self-awareness, all of which are the contents of developmental evaluations. The focus of teachers is on the progress and development of students. Progress not only refers to the improvement of academic performance, but also includes mental growth, skills in communication and cooperation with others, self-management, awareness of self-supervision, authentic evaluation skills, and so on. Therefore, teachers should provide timely and specific feedback on students' learning behavior, learning abilities, learning preferences, etc. based on the learning data of students in the smart teaching system. Feedback should not only be reflected in scores, but should form a written evaluation and propose corresponding improvement measures. In this way, students can objectively reflect and re understand their learning based on the feedback from teachers, correctly understand learning goals and know what needs to be done to achieve them, thereby optimizing learning methods and improving academic achievement. This process of self-awareness is also a process of self-evaluation[8]. In addition to self-evaluation based on teacher feedback, peer evaluation can also be used to apply the skills learned in the classroom and gain a correct understanding of one's strengths and weaknesses. Compared to teacher feedback, there is no sense of distance between peers, so peer evaluation is more likely to trigger in-depth discussions and facilitate communication.

3.2 Teaching Evaluation

Teaching evaluation is actually a consideration of teachers' professional knowledge, skills, and qualities. Smart classrooms are the re scene of teachers' information literacy. In the new era, teachers should learn to use information technology tools to create micro courses, learn big data analysis, learn how to navigate flipped classrooms, and learn how to use interaction to test students' mastery and application of knowledge. The success of flipped classrooms depends on whether micro classes can stimulate students' learning enthusiasm, enhance their motivation for learning, and improve their academic performance. Therefore, teachers need to understand students' learning needs and psychological characteristics, plan their learning abilities in advance, understand their learning processes and outcomes, and continuously improve teaching design to promote students' learning progress and achievement of learning goals[9].

3.3 Evaluation of learning environment

The evaluation of smart classroom learning environment includes whether the learning platform interface has affinity, whether the network is smooth, whether the classroom culture is positive,

and the information technology level of teachers in managing smart classrooms. Students in smart classrooms are a learning community with common goals. It is necessary to create a harmonious, fair, comfortable, united, and positive smart learning atmosphere, and gradually form a learning atmosphere of mutual respect and support through interaction, cooperation, and reflection. Teachers should use intelligent teaching methods to cultivate students' qualities of independent thinking, active exploration, and unity and cooperation, reset the learning space, teach students to independently research and solve problems, provide certain help and guidance when necessary, and propose improvement suggestions[10].

4 Conclusion

With the continuous development of educational informatization, teaching models such as MOOCs and micro courses have had a profound impact on modern education. The changes in teaching models have forced teachers to change their educational and teaching concepts and evaluation models. The connection and integration of online teaching and offline flipped classroom teaching make teaching methods more focused on students' learning styles and creative activities, teaching objectives more focused on meeting students' personalized needs, and evaluation methods more focused on process and matching. While implementing smart classrooms, teachers must construct an efficient and appropriate evaluation index system for smart classrooms in a timely and appropriate manner. With these specific evaluation indicators, students' high cognitive engagement can be increased, and intentional learning and mastery of learning can be further promoted, thus achieving innovation education and smart education.

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