Construction of Maker Competencies-Oriented Smart Classroom Model in College English Listening and Speaking Teaching

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Abstract. Smart classroom, as a new kind of teaching model, has triggered a revolution in China's educational field. This paper clarifies the teaching model of smart classroom established on the maker competency-oriented learning activities, which generates learners' English productive ability, innovative thinking, and highlights the self-directed, personalized and creative teaching design in classroom teaching.

Keywords: Smart Classroom, Maker Competency, Model Construction, Teaching Design

1. Introduction
In 2019, the Chinese State Council issued The Implementation Program for Speeding up the Modernization of Education (2018-2022) [1], which emphasizes the need to promote the deep integration of information technology and education. The Modernization of Education in China 2035 also points out that it is necessary to strengthen the cultivation of practical ability, cooperative ability and innovative ability in classroom teaching [2].

However, at the present stage, the application of information teaching models such as MOOC, SPOC, Micro-Course, Flipped Classroom are still at the stage of simply replicating foreign experience, and there are many problems:(1) the ignorance of the main role of the students in the teaching process (2) excessive reliance on the extracurricular learning (3) all kinds of visualization resources need to be integrated urgently.

This paper proposes to construct the teaching mode of "maker competencies-oriented teaching design + smart classroom " based on the concept of maker education, that is, to provide students with exploratory learning equipment under the Wi-Fi environment, and strengthen learners' awareness of action, sharing, cooperation and innovation through the design of creative and practical teaching activities of "learning by doing" and "creating in learning."

2. Current Situations of College English Listening and Speaking Teaching
With the transformation of the training scheme of English talents to the "applied and interdisciplinary", the instructional objective has changed from emphasizing knowledge imparting to cultivating the
specialized ability with the emphasis on students' capacity for language application, problem solving and innovation. Language itself is the most creative activity and a tool for social and cultural communication. In this context, the teaching method of college English listening and speaking should not be limited to the linguistic skills. Instead, we should pay attention to the cultivation of students' intercultural and communicative competence, including international vision, innovative spirit and critical thinking. However, the existing teaching model has its obvious shortcomings.

2.1. Teaching Content
Classroom teaching has not yet got rid of the mechanical practice of vocabulary and sentence patterns, as well as the "routine" imitation of social scenes. Learners are used to repeatedly listening, viewing, judging, and retelling the video and audio materials, but it is difficult for them to express unique and in-depth thoughts and viewpoints in the specific fields such as politics, economy, culture and commerce.

2.2. Teaching Organizing
Owing to the lack of systematic data analysis, teachers cannot keep track of students' individual ability, needs and habits during the process of learning, only relying on the subjective experience and judgment, stipulating student grouping and releasing tasks. It is arbitrary for teachers to organize and implement the teaching activities.

2.3. Teaching Evaluation
The examining mode of this course is simplified and non-scientific, leading to a poor effect. The assessment is mostly based on the proposed methods and operations in order to get the satisfactory results. It is difficult to distinguish between students' practical ability and their classroom performance. The teaching reform of this course should give full play to the main role of students in classroom, effectively improve students' English communicative competence, and promote students' ability to find, explore and solve problems independently, so that every learner can contribute and share knowledge and wisdom through practice and inquiry, and promote the cultivation of students' autonomous learning and innovative ability.

3. The Application of Maker Competencies-oriented Smart Classroom Model in College English Listening and Speaking Teaching

3.1. The Origin and Connotation of Smart Classroom
The term "Wisdom Education" has a long history, and both eastern and western civilizations give it a very high status. In 1929, the British scholar Alfred North Whitehead pointed out in The Aims of Education and Other Essay that the whole purpose of education was to make people have active wisdom [3]. The exact origin of smart classroom dates back to Professor Warren Simmons at Brown University in 2006. Warren pointed out that wisdom education should be flexible, efficient and adaptive in the forms of "wisdom", "education" and "system"[4]. In November 2008, IBM CEO Peng Mingsheng presented the Smart Earth (Smart Planet) strategy in Smart Earth: The Next Leadership Agenda. Since then, the practice of smart classroom has been regarded as an important strategy for the development of education in the future, such as the iN2015 program led by the Singapore government, the National Educational Technology Plan 2010 issued by the US Department of Education. American scholar Matt Ratto believed that wireless smart devices could be used to improve students' participation in the classroom [5]. Professor Rania believed that interactive platforms based on mobile terminals could help children develop learning and social skills [6]. James Dooley believed that intelligent learning, as an innovative learning paradigm, provided students with ubiquitous and individualized learning resources through situational perception environment [7]. Thus, it can be seen that the smart classroom, which takes the acquisition of knowledge, the sharing of knowledge and the cultivation of innovation as the core to promote the generation of wisdom, has become a new realm and demand of educational informatization.
3.2. The Maker Competencies Created in Smart Classroom

The cultivation of wisdom needs to be combined with practice, and the ultimate goal of wisdom education is to cultivate people with innovative ability and innovative thinking. Maker, translated from the English word "Mak-er", originated from an experimental project in the Micro Assembly Laboratory of MIT in the United States. Makers are people who have the courage to innovate and strive to turn their ideas into reality. Chris Anderson, a former editor of Wired magazine in the United States, illustrated makers would create, share, and lead the value proposition and the industry trends in the third industrial revolution through innovation and cooperation in *Makers: The New Industrial Revolution* [8]. Against this background, maker education came into existence, which emphasized the construction of a platform to update knowledge and improve students' abilities in inquiry and application. In China, maker education is linked to "Mass Entrepreneurship, Mass Innovation" put forward by Premier Li Keqiang in 2015, which provides powerful theoretical support and methodology for the reform of teaching methods.

Classroom is the core component of the environment and conditions on which wisdom is generated. The ultimate goal of smart classroom is to cultivate people with maker competencies. Different from the traditional classroom, which takes passive listening as the way of knowledge acquisition, maker competencies include the cultivation of innovative thinking, practical skills and sense of sharing. The introduction of maker competencies into the smart classroom aims at emphasizing the change of the fixation, stillness, and disorder of classroom management through the intelligent teaching system and creative teaching design. It is also hoped that students can promote the generation of wisdom and cultivate their applied ability through active exploration, innovative practice and cooperative sharing in the process of discovering and perceiving the cognitive activities.

3.3. The Advantages of Maker Competencies-oriented Smart Classroom Model

The nature of maker competencies is in line with the attribute of cultivating students' critical thinking by adopting diversified and innovative learning methods in smart classroom. Maker competency is the core of smart classroom, where the accumulation and mutual stimulation of innovative elements are needed, providing it with intelligent, universal and personalized learning system. As a new teaching form, the smart classroom model guided by the concept of maker competencies has the following characteristics and advantages:

- The creative teaching design with students as the main body. Wisdom comes from innovation. Creative teaching design is not only the practical carrier of its application in subject teaching, but also the necessary condition for the generation of wisdom. Maker competencies-oriented smart classroom model breaks the classroom structure of "teaching first and learning second." Through the design of creative teaching activities of "learning by doing" and "creating in learning", it emphasizes individualized, autonomous and creative learning practice, so that students can construct knowledge by cooperation, sharing, and cultivate innovative practical ability.

- Breaking the spacial barrier in class and after class and constructing smart teaching environment. Through the construction of smart classroom environment, this model brings the task of autonomous exploration and learning, which originally needs to be completed after class, into classroom teaching, and realizes effective management and real-time recording of learners' independent practical activities and data in classroom teaching.

- Advancing the orderly interconnection of teaching resources. On the basis of collecting, integrating and optimizing the existing teaching models, such as MOOC, SPOC, and Flipped Class, the model of maker competencies-oriented smart classroom forms an intensive overall planning pattern by controlling excessive construction and repeated construction.

4. Construction of Maker Competencies-oriented Smart Classroom Model in College English Listening and Speaking Teaching
4.1. Three-Dimensional Teaching Content

The teaching content of college English listening and speaking tries to embody the characteristics of general knowledge, creativity, practicality, and multi-culture in the aspects of overall design, material selection and structure arrangement, and construct the three-dimensional teaching resources of listening, speaking and viewing, which focuses on novel and diverse topics (covering politics, economy, culture, education and other modules) and real contexts (such as court debate, TED speech, product release and propaganda, cultural salon and communication, etc.) It helps students to explore, practice, and innovate their own language, emphasizing the high-quality communicative competence with international vision and critical thinking.

4.2. Blended and Smart Learning Space

This model breaks the space-time limit of geographical position of the podium, blackboard, and seats in class, and develops the mixed teaching design based on the mobile platform online, which includes the exploration of the interactive data from students' learning behavior, deepening the analysis of their learning situation and optimizing the teaching design before class; real-time data recording, and accurate feedback in class; data evaluation, personalized tutoring resources and intelligent learning support after class. The blended and smart learning space make the classroom teaching more intelligent, scientific and sustainable (in Figure 1).

![Figure 1. The blended and smart learning space](image)

4.3. Implementation of Maker Competencies-oriented Smart Classroom Model

As a practical course, the teaching form of college English listening and speaking course adopts the teaching method of maker competencies-oriented smart classroom. Before class, the teacher creates the situation and presupposes the project task to stimulate the students' curiosity and thirst for knowledge. In the class, the individualized and autonomous discourse system is constructed through group cooperation, itemized exploration and repeated practice, so as to promote the generation of their creative language and complete the language output based on mutual assistance and cooperation. After class, through the mechanism of project display, self-evaluation, peer response, it urges learners to actively summarize, judge and reflect on their learning effectiveness in practical activities, and further cultivate learners' critical thinking.
To be specific, in the pre-class part, teachers release learning resources to prepare for students' autonomous learning and creation. In the classroom, teachers organize the classroom by situational projects, so that students can further complete activities (such as dubbing, debate, drama performance, interactive question and answer, etc.) While the students complete the practical activities, the smart platform collects the teachers' evaluation and the students' mutual evaluation to record and judge the students' learning. The electronic platform would deliver individualized teaching and learning resources to students after class (in Figure 2).

4.4. Creative and Situational Class Activities
Through the creative and situational class activities of "learning by doing " and "creating in learning", this model adopts group consultation and cooperative inquiry, taking problem-oriented situation as the driving goal, helping students to carry out in-depth English interactive communication by language points, creating visual and listening stimulations, and providing powerful conditions for students' thinking innovation and generating wisdom. For example, through thematic speeches, debates, commodity sales, tour guides of scenic spot, English teaching and other simulated scenes, students can really participate in classroom teaching, get substantive skills training in the classroom, consolidate professional knowledge, and improve their comprehensive quality while carrying out the diversified tasks.

5. Designing and Implementing of the Teaching Case

5.1. Instructional Objectives
Smart classroom is not the simple grafting and transplantation of technology and education, but the process of "people-oriented" comprehensive interaction. The teaching case is based on the innovative nature and attribute of smart classroom, taking the course of " College English listening and speaking " in applied undergraduate colleges and universities as an example, which presents the overall structure of the maker competencies-oriented smart classroom: through the construction of information-based classroom teaching management model as well as innovative classroom ecological system, every learner can acquire the maker competencies of innovative thinking , practical skills and sense of sharing, and realize the intelligent learning path of collective creation, so as to promote the cultivation of students' autonomous learning and innovation ability and the prosperity of wisdom.

5.2. Target Students
In this teaching project, the 117 undergraduate students are selected as the experimental subjects, divided into experimental classes and reference classes (2 experimental classes, 1 reference class, a total of 117 students), and the teaching model of maker competencies-oriented smart classroom is carried out in the experimental class, and the students in the experimental class and the reference class are comprehensively evaluated every semester, and the evaluation results are compared and studied horizontally and vertically.

5.3. Teaching Case
The first unit "Friendship" of Learning English: Viewing, Listening, Speaking published by Shanghai foreign language education press is selected as the teaching content, and the target students are 34 sophomores majoring in English. The teaching process lasts for 90 minutes. Step one: in the pre-class stage, the teacher pre-published the pre-arranged statistical questionnaire and preview questions to the students through the online school-based curriculum platform to understand the students' cognition of the topic, the relevant interest points and the level of their language ability. After the students completed the questionnaire, the teacher divided 34 students into three maker groups according to the learning information collected by the platform. The teacher sent different teaching resources to the three maker groups, so that students can carry out personalized and differentiated learning tasks. Second, in the stage of making, the teacher arranged the first group to complete the maker task: "Sino-foreign famous friendship story " , makers need to collect the report on "The Legend of High Mountains and Flowing Water," "The Friendship between Marx and Engels", "Peach Garden Sworn Brothers", and summarize the way to get along with each other according to the standard of making friends. The task for second maker group is to watch the movie clip Friends, on the basis of mastering the relevant language knowledge points, and use the dubbing software to complete the video dubbing imitation of selected films; the task for the third maker group is to deeply read the relevant materials of online resources, and complete the online dating advantages and disadvantages, draw the mind mapping and illustrate the tips for online dating.

In the process of making and creating, the students explore independently through group discussion, digesting and absorbing the practical skills of language points related with the topic, the information difference and task difference formed between different groups would inspire students to maximize their ability in self-exploration for topic-related information from different angles within a specified time, and complete the task of innovative thinking and sense of sharing. The evaluation system of this teaching activity is composed of three parts: peer assessment, teacher evaluation and students' self-reflection, which are comprehensively evaluated from the aspects of language quality, content theme, innovation and enthusiasm. According to the comprehensive evaluation records, teachers sent the resources after class to the students of the three groups so as to facilitate the students' consolidation what they have learned.

6. Conclusion
The smart classroom is the prerequisite for the educational informationalization. The educational reform in the age of information should take the cultivation of students' all-round development as its orientation. The construction of maker competencies-oriented smart classroom makes great efforts to build an information-based classroom teaching and management model, and realize the ecological system of intelligent teaching environment, digitization of teaching resources, innovative and sharing learning mode. The model aims at changing the solidness, stillness and dogmatism of the traditional teaching method, changing the singleness of teaching behavior, rigid students' seats, and uniformity of teaching resources and disorder of classroom management. At the same time, it enriches teaching activities, and combine teaching with autonomous learning, interactive communication, scientific inquiry, innovative thinking, practical skills and sense of sharing, so that the classroom is truly intelligent, digital, ecological, students-oriented, fully reflecting the characteristics of humanism, ecology, intelligence, mixing, openness, interaction and dynamics.
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