Analysis of design points of deep learning supported by maker space

Haoran Dai¹*, Yuanjie Gu¹

¹ Karamay Campus, China Petroleum University (Beijing), Karamay, 834000, China
² Karamay Campus, China Petroleum University (Beijing), Karamay, 834000, China
*Corresponding author’s e-mail: 2017015601@st.cupk.edu.cn

Abstract. The creator zone was a combination of practical meaning and ideas of reform and innovations. It pursued a cultural pattern of sharing, development, innovations, improvement. In the current stage of the education reform, the creator zone always supported students' deep learning and lifelong learning concept training. It constantly broadened the new territory in the students' main consciousness, and combined the classroom resources with the network resources, so that students could understand the knowledge from different angles and layers. Compared with the traditional teaching method, the creator zone education had an undeniable advantage. It could show the status of the student as the main body, stimulate the student's interest in learning, and make the student turn from a passive accepting to an active inquiring person. For this reason, based on the experience of the creator zone education, this article talked about the relationship between the creator zone and the deep learning, and provided a new teaching idea for other teachers.

1. Introduction
Creative consciousness was the goal of the current education and teaching, and also the essence of the development of the information age. For every country, creative talents were the main motivation to push forward social progress. Therefore, the Education Department of our country began to advocate the teaching reform in 2001. It removed the control of teachers' thoughts on students' learning, guided by deep learning and lifelong learning, and gradually stimulated students' inner potential, so that their comprehensive ability could be promoted quickly. Under the push of the education reform that had lasted for more than 20 years, information technology gradually began to integrate into the education industry, and many new teaching methods had been opened, and the most eye-catching teaching method was none other than the creation space teaching method. The teaching concept itself had a very strong sense of practice. When it was integrated with the teaching activity, it would gradually guide the students to enter a deep learning state.

2. Creator zone and deep learning

2.1. Creator zone
The word "creator zone" was first proposed by Chris Anderson in the United States. When he mentioned it, he just wanted to apply it to the direction of the new industrial revolution. After it was introduced to our country in 13 years, it was formally applied to the field of education, which greatly promoted the teaching reform. The teaching method of the creator was based on practice, and the
creator zone was the carrier of the teaching. With the combination of the two and the teaching reform, many unique attributes were formed [1].

One is to stimulate students' innovative consciousness. Innovation consciousness is the core idea of maker learning practice. Every student studying in maker space can boldly display his imagination in the space and verify the knowledge points in the textbook by various methods. In maker space, teachers will not measure students' learning achievements through a single test score. They will have a fair and objective teaching attitude towards each student and pay attention to each student's feasible suggestions. All of these are due to the advantages of the special teaching system of maker space [2].

Second, it is not limited to teaching tools and learning tools. In the traditional classroom, teachers will use blackboard writing as a teaching tool. For the abstract teaching knowledge points, they can only rely on the imagination of students, which greatly limits the development of students' thinking. However, in maker space, both teachers and students can use computers, 3D printers, engraving machines and even experimental equipment of other disciplines to give full play to students' hands-on ability and inquiry ability. In this way, the abstract teaching knowledge content in the textbook can be displayed vividly and vividly in front of students, reduce the difficulty of students' understanding of teaching knowledge, and accelerate the speed of students' knowledge internalization and practice knowledge [3].

Third, the deep opening of students' learning concept. In the traditional teaching activities, students' learning methods are carefully designed by teachers. Students only need to gradually accept the guidance of teachers. This kind of teaching method can not meet the learning needs of all students. In maker space, students can choose cooperative learning, personal learning, teacher assisted learning, practical inquiry learning and so on, and use all the resources in the space to solve learning problems. Students are no longer passive receivers in the learning process, but classroom leaders, knowledge observers, and promoters of teaching activities. The communication between students and students, between students and teachers is closer.

2.2. Deep learning
Deep learning is a kind of advanced learning ability, which is embodied by practical learning activities and innovation ability. Students need to connect the new knowledge with the old knowledge, and flexibly use the resources around them to explore the learning problems of new knowledge. They can gradually digest the knowledge content in the process of practice. After completing the inquiry activities, they can also summarize the relevant experience, correct their thinking ability and decision-making ability, and realize the sublimation of textbook knowledge learning. Deep learning has the following two characteristics:

First, the critical thinking mode. Critical thinking is the only way for students to practice the knowledge of teaching materials. Students must connect knowledge with practical life, rationally think about the possibility of knowledge existence, conceive practical steps with scientific thinking, and form virtual practice steps, experimental reactions and experimental summary in their minds. With the help of critical thinking, students constantly enrich their own knowledge system, summarize knowledge practice and exploration experience, and complete the perfect integration of new and old knowledge [4].

Second, actively adopt a variety of inquiry methods. Students are now exposed to the knowledge content, are predecessors through countless experiments and verification to get "truth", these knowledge "truth" in front of students is just a few numbers, behind the summary of knowledge is the students pay hard. If students want to explore the true meaning of knowledge with a single method, it is a ten difficult thing. For this reason, many students choose inquiry methods such as contrast experiment and multiple method verification to complete knowledge verification in maker space.

3. The relationship between maker space and deep learning
Maker space plays an important role in the promotion of students' innovation ability, and has been paid attention by many experts and scholars in the field of education. Many experts in the field of
education say that maker space promotes the upgrading of education reform, and students need to deeply understand the content of teaching knowledge in maker space. Students' deep understanding of knowledge content will inevitably promote the improvement of deep learning ability. Based on this, maker space can perfectly balance the relationship between deep learning and learning inquiry in teaching activities [5].

4. Deep learning based on maker space

4.1. The weakening of teachers' role
According to the survey of authoritative Education Department, only 6% of students can carry out deep learning in traditional teaching activities. Most teachers occupy a great teaching space in classroom teaching, which not only restricts students' learning direction, but also controls students' choice of knowledge inquiry, which clearly shows what is the key knowledge and what is the non key knowledge. However, when students learn key knowledge, they must have a deep understanding of the composition structure of "non key knowledge". In short, students' knowledge accumulation is like building blocks. Without the support of the underlying structure, the important knowledge content above is not reliable enough. In maker space, the interior of the space supports deep learning, and teachers are no longer the masters of all the classroom, but become the guide of teaching activities and the gatekeeper of students' practice results. They have a closer relationship with students and often appear as partners in maker space [6].

4.2. Interest based learning
As we all know, learning interest is the best teaching teacher for students. It can guide students to explore the knowledge content they need actively, so that students can always maintain an optimistic attitude towards learning. In the traditional teaching class, students' interest in learning does not come from students' heart, in a sense, it comes from teachers' teaching tasks. Therefore, some students' interest in knowledge can only last for a short period of time. After losing interest, students are difficult to make progress. This is the specific reason why most teachers say that students are "three minutes hot" in class. In the face of this problem, maker space gives the right to explore knowledge to students. For knowledge inquiry, students have the right to decide the direction, content, method and partner of inquiry. Some students not only gain knowledge and practical experience in maker space, but also cultivate deep feelings with their small partners [7].

4.3. The transformation of knowledge sources
In the traditional class, there were two sources of knowledge. One was the teacher, and the other was the teaching material. If students want to get more knowledge content, they need to rely on teachers to guide learning. Therefore, the quality of teachers' teaching will directly affect students' learning performance, even the height of students' future development. In maker space, students need to actively participate in "teaching preparation" and choose the knowledge content they need to acquire. In this process, students will encounter many difficulties, such as access to knowledge, reliability of knowledge sources, correctness of knowledge content, and so on. In the face of these problems, students still need to further verify. After a long time of verification and training, students' thinking mode and learning mode are gradually activated, and even after graduation, they will have the habit of lifelong learning [8].
5. Deep learning design supported by maker space

5.1. Connection design

Generally speaking, the connection learning design was applied to the preliminary stage of students' learning, which meant that the design of the source of students' learning resources was improved. Teachers should know that deep learning required a clear teaching goal and rich learning resources, so it was very important to ensure the information circulation in the teaching activity of the creator. The design of the connection was also reflected in the communication study between each group. For some difficult practice projects, they needed to cooperate with each other to explore. Each group was responsible for exploring a research project, communicating with each other and exchanging experience. The scattered information was gradually integrated to get the ideal study answer.

5.2. Interaction design

The interaction design not only referred to the exchange of learning opinions and inquiry experience between students, but also covered the information interaction between students and various resources. In order to strengthen the interaction between the teachers and the students, the teachers need to carefully set up the teaching environment to create the atmosphere of students' learning, so that the students can get more help through the interaction between the teachers and the students, so that they can pay attention to the importance of the interaction between the teachers and the students, and strengthen the influence of the teachers in the creation space. The interaction between students and all kinds of resources required the teachers to set up a separate "operation manual", so that every student who used such resources would know the reason, process, result and part of the experience of using resources. In this way, all the students' interaction experience with resources would be gathered together, and then the efficiency of students' learning in the creator zone would be improved.

5.3. Safety design

The safety design covered three main areas. One was the authenticity of the knowledge source, the other was the reliability of the teaching equipment, and the third was the safety of the students. The accuracy of the source of knowledge was to ensure that the students wouldn't lose the meaning of inquiry during the experiment, and that they wouldn't deviate from the direction of learning when choosing the topic; the reliability of the teaching equipment was to guarantee that the students wouldn't be disturbed during the experiment, and the inquiry results were consistent with the contents of the knowledge. Students' personal safety meant that teachers should choose some dangerous inquiry experiments to avoid unpredictable risks caused by some dangerous experiments, and prevent their lives from unnecessary threats. Safety design was the foundation of all the teaching activities. I hope the teachers will pay attention to it.

References
[1] Chen Chuancan, the deep learning characteristics of creative education and its realization in physics teaching [J]. basic education research in Fujian, 2019, 000 (007): 101-103.
[2] Tao Jihua, long Yaohua, construction and analysis of characteristic service of maker space in Library -- Taking Changsha library "new triangle maker space" as an example [J]. Journal of National Library of China, 2020, 029 (003): 31-40

[3] Chen Xin, research on the application of design thinking in Public Library -- Taking maker space of Guangzhou Library as an example [J]. Library, 2020, no.307 (04): 83-88

[4] Pei Yaxin, Zhou Suhong, Li Qian. Study on the characteristics and formation mechanism of contact network of maker space entry teams [J]. Planner, 2019, 035 (001): 63-70

[5] Nie Feixia, Luo Ruilin. Research on the development and strategy of China's Library maker space in recent five years [J]. Library construction, 2019, 000 (003): 112-116

[6] Wan Liyong. University maker space integrated with digital twin: implication, framework and function: evolution from physical space, mixed space to mapping space [J]. Journal of distance education, 2020, 038 (003): 15-24

[7] Fan Shiling, Sheng Kai, LV Fei. Research on the construction of maker space for local college students under the background of innovation and Entrepreneurship Education [J]. Journal of Shandong Agricultural Engineering University, 2018

[8] Zhang Jie, Wu Yuwei. Practice and exploration of maker space service in public libraries: a case study of maker space in Guangzhou Library [J]. Library science research, 2019, 000 (012): 17-25, 90