Exploration of Computer-Based Course Teaching in Data Thinking

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Abstract. The research results of this paper are as follows: put forward suggestions and Countermeasures to improve the construction of university computer basic teaching system and deepen the reform of computer basic teaching: combine the cultivation of "computational thinking ability" with the cultivation of "compound high-quality innovative talents"; promote the integration of computer basic teaching and professional teaching. At present, there are some problems in the teaching of computer basic course in our country, such as "special tool theory", disconnection with high school information technology teaching, "learning" goal, etc. Starting from the same level, improve the specific program of teaching reform of basic computer course.

Keywords: Basic computer course · Teaching exploration · Computational thinking · Teaching model

1 Introduction

Computational thinking is an important topic concerned by the international and domestic computer science, philosophy and education circles. The research and development of CT is of great significance to China's computer education. Academician sun Jiaguang, Dean of the school of software, Tsinghua University, also put forward in "the revolution of computer science" that "Computational Thinking" is the most long-term and basic thought in the field of computer science. In addition, China's computer education sector has also accelerated the pace of research and Discussion on Computational Thinking. In July 2010, the Ministry of education's College Computer Foundation Course Teaching Steering Committee issued the joint statement on the development strategy of nine University Alliance (C9) computer foundation teaching, which clearly requires all colleges and universities in China to carry out the reform of computer foundation teaching with computational thinking as the core. At present, some colleges and universities in China have taken the lead in carrying out the reform and practice of basic computer courses with "computational thinking as the core". For example, Shanghai Jiaotong University and Southern University of science and technology have opened a new basic computer course - "Introduction to Computational Thinking" for 2010 freshmen.

At present, Although scholars at home and abroad have carried out some research on Computational Thinking and achieved certain results, there is no consensus on some basic theories of computational thinking, such as the concept, characteristics and principles of computational thinking. In addition, some research fields, such as the basic computer curriculum system, teaching mode and teaching mode with "Computational Thinking Ability Training" as the core, have not yet reached a consensus Methods and teaching evaluation system have not attracted the attention of the majority of scholars [1].

Nowadays, the development of Internet provides more convenient conditions for acquiring knowledge resources and information resources, and also provides better learning tools and broader learning space for lifelong learning. The popularity of computer brings us not only convenience in study and work, but also great improvement in life. Therefore, it is essential to master computer technology. As colleges and universities to cultivate modern talents, the opening of basic computer courses is particularly important.

2 Basic Requirements of Computing in English Vocabulary Query System Based on Struts

Generally speaking, computational thinking refers to the thinking method that well-trained computer science workers are used to in the face of problems. It is embodied in some typical means and ways of analyzing and solving problems in the brilliant development of computer and information technology in the past half century. Computational thinking is recursive thinking and parallel processing, which can translate code into data and data into code. It is a type checking method promoted by multidimensional analysis. Computational thinking is a method that uses abstraction and decomposition to control complex tasks or design huge complex systems. Computational thinking is a way of thinking to choose an appropriate way to state a problem, or to model the related aspects of a problem, making it easy to deal with. Computational thinking is a way of thinking to prevent, protect and recover the system from the worst through redundancy, fault tolerance and error correction. Computational thinking is a way of thinking that uses heuristic reasoning to seek solutions, that is, planning, learning and scheduling in uncertain situations. Computational thinking is a way of thinking that uses massive data to speed up computing, and makes tradeoffs between practice and space, processing capacity and storage capacity. Through in-depth analysis, it can be seen that there is a certain correlation between higher-order ability and computational thinking. The cultivation of Computational Thinking as the core represents the generation of a series of higher-order ability. The corresponding relationship between computational thinking and higher-order ability is shown in Table 1.

Table 1. Advanced capabilities

Ability	Definition	Corresponding points with computational thinking
Innovate	The ability to produce novel, original and socially significant products	a b c f
Problem solving	It refers to any goal oriented cognitive operation procedure	a d
Policy decision	Faced with multiple options. The ability to make judgments through a careful process of thinking	f g
Critical thinking	Have independent, comprehensive and constructive thinking ability to a certain phenomenon/thing	e
Information maintenance	The ability of problem solving and innovation by using various information tools/resources	a b d

The purpose of university computer basic course is to cultivate students' basic quality. Therefore [2], in the process of university education, the goals of quality education, the cultivation of computational thinking ability, and the teaching of university computer basic course are consistent. The relationship between the three is shown in Fig. 1.
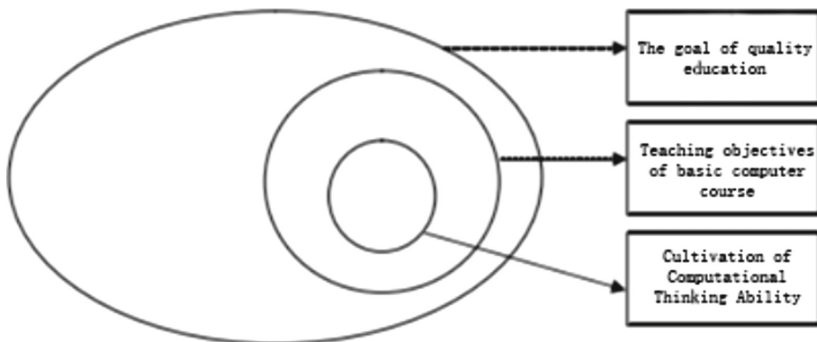
Fig. 1. The relationship between "quality education basic computer course Computational Thinking"

For a long time, our country has been carrying out the reform of quality education, and has achieved fruitful results. Therefore, in the process of teaching reform of College Computer Basic Course Based on Computational Thinking, it is necessary to actively learn from the experience, methods, means and achievements of quality education reform

to change the teaching concept of teachers and the learning concept of students in the teaching of college computer basic course.

3   The Design of Teaching Mode of Computing Thinking

With the deepening of the teaching reform of the new curriculum, the teaching reform goal based on the cultivation of CT ability as the core of Cultivating University Learners' scientific thinking and scientific methods has been recognized and concerned by the majority of scholars, experts and teachers. The construction of "CT" teaching and learning mode as the core ability has also become the focus of the realization of this core ability. The reason why the "CT" method is used as a direct means to construct the reform means to cultivate the "CT" ability is to make a more intuitive and complete description of the abstract "CT", so as to help researchers and computing enthusiasts understand and analyze. The construction of a series of teaching mode and learning mode based on "CT" is based on relevant theories and methods. Through the analysis of relevant theories and the summary of practical experience of course teaching, the teaching process based on CT is explained and analyzed. The discussion on the teaching and learning mode of CT series helps to promote the understanding of the process of creating teaching and learning mode for the majority of scholars, and apply the series of modes to the course teaching activities, so as to promote the learners' mastery of CT methods and the improvement of CT ability [3].

As modern educators, especially those who have been fighting in the front line of education for a long time, each of them actually has a set of teaching methods belonging to their own style, which can be said to be their own personal "teaching mode". Once they produce good teaching results in their teaching, they can promote their teaching methods. Generally speaking, the formation of a "teaching mode" must have corresponding links, such as the guiding ideology of teaching theory and learning theory, teaching objectives, teaching process plan, implementation conditions, teaching organization strategy, teaching effect evaluation, etc.

As mentioned above, the theoretical basis and practical operation of inquiry teaching need further research. Exploring the inquiry teaching mode with thinking as the core is of great significance for the development of inquiry teaching theory and CT. The research of inquiry teaching mode based on CT should be constructed from the three variables of Inquiry Teaching: problem posing, problem inquiry and problem solving method, as shown in Fig. 2.
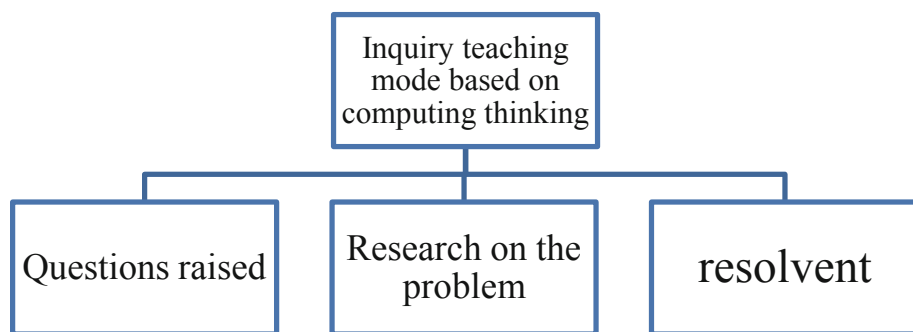
In the teaching of computer course, all kinds of scientific knowledge can be used, and inquiry teaching is gradually developed. In order to fully express the whole teaching activity, it is established as the following mathematical function expression [4].

$$Q = F(A_T, A_S, P) \tag{1}$$

In general, A_T and A_S has the following action set:

$$A_T = \{q, i, r, h, c\} \tag{2}$$

$$A_S = \{l, t, a, d, m\} \tag{3}$$

Fig. 2. The construction basis of inquiry teaching mode

In the process of implementing inquiry teaching based on CT, learners are required to use a series of methods of CT to explore and discover the essence of the problem, and to cultivate learners' independent ability to think and answer questions like scientists under the guidance of scientific inquiry methods. To achieve this goal, the scientific CT into the inquiry teaching process, can greatly improve the ability of teachers and learners to quickly find and solve problems.

4 Application of Computational Thinking Ability in Basic Computer Course Teaching

The rise of MOOC curriculum platform is inseparable from the support of learning support technology. Learning support refers to the learning support provided to meet the reasonable needs of individual or group learners in the learning process under the learner centered modern distance education environment, including learning conditions, learning environment, learning materials and other learning resources and comprehensive, high-quality and efficient help and services. Creating environment for learners' learning needs, improving learners' learning efficiency, and promoting learners' interactive learning are the three levels to gradually improve learning support, and the technical support of hardware, software, communication and other aspects provided for these three levels is learning support technology [5].

Teachers will upload the recorded course video resources to MOOC course platform, and learners can watch them freely after landing on MOOC course platform. Learners not only need to watch learning videos, but also need to share and interact videos. When learners discuss in the forum of MOOC course platform or finish practical homework, they can give up monotonous text or picture content and use mobile terminal to record a certain length of micro video. The learners upload the recorded micro video to the homework area, and the teachers make comments and corrections on the video, and then conduct quantitative assessment on the students. This kind of video interaction mode has changed the present situation of one-way presentation of teaching resources, and enriched the interaction between learners and teachers, and between learning peers. This two-way video interactive learning mode needs three aspects of technical support: video recording equipment support, network bandwidth support and platform function support.

At present, the vast majority of mobile terminals support video recording function, and device support is easy to achieve; with the popularity of WFI and 4G communication technology, bandwidth is easy to meet the needs of learners; therefore, the support of MOOC course platform for video technology is the most critical link. Figure 3 shows a method to include videos through the <video> tag.

```
</video>   <video width="320" height="240" controls="controls">
<source src="movie.ogg" type="video/Ogg">
<source src="movie.mp4" type="video/MPEG4">
Your browser does not support the video tag.   </video>
```

Fig. 3. Video standard method

5 Conclusion

At present, in order to meet the needs of the development of the times, colleges and universities need to reform the basic computer courses. Of course, in our modern information technology environment, if we want to face the change correctly, our teachers' teaching methods are bound to change. In the process of teaching, no matter what kind of teaching method we use, the final task is the same, that is, in the teaching of basic computer course, in addition to cultivating students' computational thinking ability, we should also improve their innovation ability. In learning, through learning, they can really become the main body of learning.

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