

# Exploration on the Cultivation of Curriculum Ideological and Political and Computational Thinking Ability in The Application Teaching of Big Data Technology

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**Abstract:** Based on the current situation of the application teaching of big data technology in the major of computer application technology in the School of Electronic Information Technology of Zhejiang Polytechnic of Industry and Commerce, this paper introduces the teaching method of combining the heuristic teaching based on the thought map and the enterprise practical teaching, combining with the visualization cases in big data, to enhance the students' awareness of learning innovation, pursue the excellent craftsman spirit, and improve the core literacy of computer science; Big data visualization is applied to practice, guiding students to design and innovate visualization methods, and improving students' computational thinking ability; On this basis, guide students to deeply understand the close combination of theoretical knowledge and social practice needs, and enhance their sense of social responsibility.

**Keywords:** Computational thinking; Curriculum ideological and political; Mind mapping; Heuristic teaching; Practical teaching of enterprises.

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## 1. Computational Thinking and Curriculum Ideology

Professor Jeannette M. Wing, Department of Computer Science, Carnegie Mellon University (CMU), put forward the concept of "Computational Thinking" and made a detailed definition on the authoritative journal Communications of the ACM. The article points out that "Computer thinking is a basic skill of everyone, not just for computer scientists. It uses the basic concepts of computer science to solve problems, design systems and understand human behavior. Computer thinking is not programming, it requires us to think from multiple abstract levels. The purpose is to hope that everyone can think like scientists, so as to find the solution to problems and achieve innovation. May 28, 2020 The Ministry of Education issued the Guiding Outline of Ideological and Political Construction of Curriculum in Colleges and Universities. Improve the quality of talent training in colleges and universities.

A large number of studies have shown that the integration of computing thinking and curriculum thinking and politics is more suitable for the needs of the times and the needs of innovation in the information society; Scientific research needs the ideological and political curriculum as the basis, correctly guide the calculation thinking, cultivate the innovative talents needed by the society, let scholars use efficient thinking to think, and use scientific thinking to guide the development of new teaching models.

## 2. Big Data Technology Application Course

### 2.1. Introduction to Big Data Technology Application Course

The application of big data technology is a technology born to solve the problem that the increasing data in the current

society cannot be processed efficiently. Among the current mainstream technology applications, Baidu, Alibaba, Tencent and other famous enterprises are leading the way. The government also began to prepare to build a national data center cluster in 2022. Among them, 25 new projects, "East and West Computing", will bring digital development opportunities to the industry.

At present, the demand for computing power in the whole society is very urgent. According to the "2021-2022 China Computing Power Construction Network Communication Analysis Report" released by the Ministry of Industry and Information Technology, during the "Fourteenth Five-Year Plan" period, the investment in big data centers is expected to increase by more than 20% annually. For the application of big data technology, it has strong practicality and operability, rich content and wide application, and is widely used in all walks of life. Moreover, with the application of network and electronic products in various industries, the application of big data technology has been involved in various industries, such as television, film, animation, photography, advertising, art, games, military and so on. Today, the application of big data technology has become a professional basic course in most colleges and universities.

### 2.2. Teaching status

In the daily teaching process, teachers have little combination with enterprise projects in the teaching of big data technology application, and have not reached 100% popularization of the program, and students can only get limited knowledge in theory. In this way, the curriculum ideology and politics cannot be truly implemented. Only when it is truly integrated into specific socialization projects can it be implemented to enhance students' awareness of learning and innovation and pursue excellent craftsmanship spirit in curriculum ideological and political education. First of all, with the rapid development of the network era, the market demands more and more talents for the application of

big data technology. They need not only superb technical skills, but also unique innovation capabilities; Secondly, with the rapid upgrading of the application of big data technology, it is obviously unable to meet the requirements of curriculum ideology and politics just by learning the corresponding knowledge points at school. So the current teaching of big data technology application only teaches students to simulate the corresponding technology in real combat, so that students can independently carry out some basic processing work on big data, such as data collection, data cleaning, data visualization, etc., but this is far from enough, even can be said to be too far from the training goal of curriculum ideological and political education, which is also extremely unfavorable for students' future work. At present, the disadvantages of teaching the application of big data technology are mainly reflected in the following aspects.

(1) Although the course is project-based teaching, it is divorced from specific practice and enterprise application

The application of big data technology in the processing of massive data is quite powerful, and there are many corresponding knowledge points. Before the start of the project, a certain amount of theoretical knowledge is needed to support it. Due to the arrangement of teaching tasks, teachers need to explain these knowledge points through lectures. This lack of flexible and vivid class mode makes students feel dull and unwilling to study again.

(2) In teaching, we pay attention to the teaching of knowledge and skills, and neglect the refining of thinking

At present, in the classroom, teachers mainly use direct explanation of knowledge points, so that after the theoretical support required by the project is completed, the corresponding project cases can be operated. Then these cases are directly extracted from enterprise projects, and lack of corresponding background. In the teaching process, the refining of thinking in the process of imparting knowledge will be ignored. When students operate, they will mechanically imitate the cases that the teacher said, Thus, students lose the ability of active thinking and have a strong dependence on teachers. Even when finishing homework after class, they have no enthusiasm. They just finish homework mechanically as a task and do not form the habit of active thinking. In the long run, students are unable to start and solve problems when facing the reality.

### **2.3. Students lack innovation ability**

In the teaching of the course of big data technology application, the following methods are mainly adopted: students listen to the teacher in the class to explain the commands, the use of the library package, and the steps of the case, and then carry out the computer operation in some cases; The assessment mainly adopts the combination of written examination and computer operation. These methods are very effective for learning, but there is a disadvantage that students' actual abilities cannot be comprehensively examined. Students often deal with the exam through direct recitation and rapid memory. In the long run, it is difficult to cultivate excellent talents required by the society due to lack of imagination and thinking power.

## **3. Under the Guidance of Ideological and Political Courses and In Combination with Computational Thinking**

When learning the course of big data technology application, we should avoid falling into the misunderstanding of "putting more emphasis on operation and less emphasis on thinking". We must combine the visual case in the course of thinking and politics with big data to enhance students' awareness of learning innovation, pursue excellent craftsmanship spirit, and improve the core literacy of computer science. The course of big data technology application is not only about learning the writing of fixed code, but also about the usage and realization of some effects of corresponding module libraries and packages. What we need to learn is innovation, such as visualization, to enhance the user's experience. Reduce the time complexity of the corresponding algorithm in the application of big data technology, optimize the corresponding data structure, and improve the robustness of the code. In particular, how to deal with data or design algorithms, so that we can use big data technology more flexibly and easily solve problems in real life, so as not to be eliminated by the rapid development of big data technology.

According to the characteristics of the big data technology application course, the requirements of the course ideological and political, and the understanding of the training of computer thinking, teachers can use the method of combining the heuristic teaching with the thinking map as the core and the enterprise practical teaching to carry out teaching, with the purpose of cultivating students' thinking ability and developing their thinking mode.

### **3.1. Heuristic teaching based on mind map**

Mind mapping is a thinking method put forward by Tony Bazan, a famous British psychologist and education expert. It starts from the central knowledge point and spreads to the surrounding knowledge. It follows a set of simple, basic, natural and easy to be accepted by the brain. It roughly means that starting from a central or important knowledge point, other sub-knowledge points are recursively extended until all knowledge points show a thinking structure. The whole mind map is composed of lines, graphics, colors, words, symbols and other elements. It is represented by a tree structure, showing a thinking process, which is conducive to divergent thinking. In short, mind mapping is a scientific and efficient way of thinking, which can continuously stimulate people's potential, improve people's memory and creativity, and help people find inspiration and methods in learning, work and creation. Therefore, it is applied in many fields

Heuristic teaching is a kind of teaching method that teachers purposefully guide students to think, tap students' potential and improve students' quality according to what they teach. It is contrary to the boring injection teaching in most colleges and universities at present. It is not a mechanical classroom teaching mode, but a teaching thinking mode. The whole teaching activity is composed of students' main activities and teachers' guiding activities as auxiliary lines. In short, heuristic teaching pays more attention to communicating with students, stimulating students to think, helping them integrate what they have learned, and developing their thinking ability.

Therefore, by combining mind mapping with heuristic

teaching, the author proposes to add mind mapping to heuristic teaching to learn the application of big data technology, so that students can first have an overall understanding of the actual projects of enterprises. In this way, when teaching the course of big data technology application, teachers can use the mind map to present the knowledge points of this lesson in the form of a tree, highlight valuable information, plan the overall project, and facilitate students to clarify the overall idea of the project, know what they will learn, rather than blindly cramming memory. When the teacher talks about a specific knowledge point, he can use the mind map to make a more detailed knowledge tree of this knowledge point. Then by teaching in this way, students can be organized and clear, and there will be no situation where the teacher has been talking for a long time without knowing what to say. At the same time, when teaching in class, teachers should encourage students to think, ask questions to students through some examples, and encourage students to actively ask questions, and then guide students to solve problems by themselves, improve their ability to solve problems and analyze problems, and encourage them to seek the best solution through the development and inspiration of teachers to students' ideas, Translate the application knowledge of big data technology learned by students in the classroom into the ability to solve problems.

When explaining the data cleaning module in the big data technology application project, we can extend the various operations of data cleaning through the addition, deletion, modification and query of data, and visualize it, and make it easy for students to understand. The teacher can inspire students to imagine the entire data to be cleaned as a solution waiting to be extracted. When performing various operations in the solution, it can be imagined that different solutions will be extracted and separated. Each time a solution is extracted, it can be imagined that the data will be cleaned in one step, and finally the required data will be obtained. Heuristic teaching based on mind mapping like this is believed to be of great help in teaching and students' learning.

### 3.2. Practical teaching of enterprises

Enterprise practical teaching is that teachers hide knowledge points in one or more specific tasks, and let students realize, understand, think and apply the proposed tasks to complete a specific task to achieve teaching objectives. Adopt the method that the enterprise master is responsible for the operation and the course lecturer is responsible for the theory. In view of the fact that students are easy to forget what they have learned in class, the practical teaching of enterprises can help students master knowledge and clarify what they have learned. On the other hand, students' self-consciousness is generally not very high. The enterprise practical teaching method allows students to learn with tasks, giving students a learning motivation and sense of urgency to complete tasks, thus promoting students to work hard to complete the knowledge they need to learn within the limited learning time. In short, its core purpose is to let students learn how to learn and how to solve the problems they encounter, so as to transfer and apply knowledge.

At the beginning of teaching this course, the enterprise master packaged a copy of the enterprise project, and first proposed a total task based on the outsourcing project and a subtask based on the knowledge points of each lesson to the students. The total task is based on the application of big data technology to all the knowledge points, and the subtask is designed based on the knowledge points learned in each lesson. We stipulate that there is no standard answer for each task, They fully rely on the imagination of each student. When encountering problems in the process of completing tasks, teachers can inspire students to use computational thinking to think and learn, and let students use efficient computational thinking to solve practical problems and explore new knowledge.

In short, the practical teaching of enterprises has fully played the practical ability and creativity of students in the process of learning, allowing students to turn the empty theories in books into live applications through specific operations.

## 4. The Significance of Exploring the Cultivation of Computing Thinking Ability in The Teaching of Big Data Technology Application Course

In combination with the ideological and political objectives of the new era curriculum, enhance students' awareness of learning innovation, pursue excellent craftsmanship, and cultivate students' ability of computing thinking in the teaching of big data technology application curriculum, which can imperceptibly enable students to form scientific computing thinking to understand and solve problems. Cultivating students' innovation ability and improving students' overall quality is a development of teaching methods of big data technology application in the new state. It is a good teaching method for teaching the application of big data technology in higher vocational education.

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