



Mining and Practice of Ideology and Politics Elements in Course of High Performance Computing

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Abstract. It is the mission and responsibility of our universities to train students with all-round development. Curriculum ideology and politics is the key to realize the simultaneous development of “five educations” and “three complete education”. As a computer course, high performance computing focuses on technology and logic. Therefore, it is difficult to dig out and effectively integrate ideological and political elements. In this paper, from the three dimensions of perfecting the theoretical system, carrying out curriculum practice and establishing innovative thinking, the feasible direction of carrying out curriculum ideological and political education in high performance computing is discussed.

Keywords: high performance computing · curriculum ideology and politics · Huawei · educating people

1 Introduction

Who to train, how to train and for whom is the fundamental problem of education. In 2020, the Ministry of Education issued the Guidelines for Ideological and Political Construction of Courses in Colleges and Universities, pointing out that universities should deepen the reform of education and teaching, fully tap the ideological and political resources of various courses, give full play to the educational role of each course, and comprehensively improve the quality of personnel training.

High performance computing (HPC) is the science and technology which uses super-computer to realize the theory, method, and application of parallel computing. Its development has become an important symbol to measure a country's comprehensive strength. Meanwhile, HPC has become an important professional course in the computer subject construction system of universities [1]. In this paper, we explore the ideological and political education resources contained in HPC courses.

HPC is an important branch of computer science. The research content includes parallel algorithms and related software foundation, etc. The main application fields include: large-scale scientific problems, storing and processing massive data, data mining, image processing and gene sequencing. Parallel processing system with high response efficiency is provided. HPC is a system in which software and hardware work together, and its corresponding course content covers a wide range, which can be mainly divided into two aspects, software and hardware.

2 Key Problems in Curriculum Ideological and Political Education of HPC

Carrying out curriculum ideological and political is conducive to giving full play to the unique advantages of the higher education system with Chinese characteristics, improving the quality and level of China's higher education, and promoting the construction of world-class universities with Chinese characteristics [2]. Clarifying curriculum characteristics can help us better understand what curriculum ideological and political thinking is, so as to promote the construction of curriculum ideological and political thinking more effectively in practice.

Content of HPC Course Updates Very Fast. Since the appearance of high performance computer in the 1980s, HPC has played an important role in climate simulation, industrial design, material research and development, experimental research and other fields. The processing demand of massive data in the era of big data also makes high performance computing play an irreplaceable role. While HPC is becoming more and more important, its parallel programming paradigm, parallel algorithm and other research continue to make new progress. The hardware performance keeps growing, leads to constantly update in HPC architecture and course teaching content. Consequently, the difficulty of curriculum ideological and political elements mining is high.

HPC Courses are Professional. HPC focuses on the core issue of using constantly developing parallel processing units and parallel architectures to achieve high performance parallel computing. The research scope includes parallel computing model, parallel execution model, parallel architecture and parallel algorithm design, etc. The course content mainly focuses on theories, formulas and algorithms. The teaching of professional knowledge gives the "truth" of knowledge, while the ideological and political education requires the unity of the "truth" of knowledge and the "goodness and beauty" of ideology. In fact, it is difficult to integrate the two things.

High Performance Computing Has Obvious Internationalization Characteristics. High performance computing plays a decisive role in breaking the bottleneck of scientific and technological innovation, rapidly realizing scientific and technological innovation, and realizing leapfrog development in the industrial field. Therefore, developed countries such as Europe and the United States attach great importance to the development of high performance computing, and set up special institutions at the national level to study and formulate high performance computing development strategies. Thus, the developed countries play an exemplary and leading role. Therefore, a large number of foreign advanced technologies are quoted in the course teaching. Thus, students are easy to immerse themselves in the study of advanced technologies. Consequently, the original intention of study may be forgotten.

3 Dimensions in Curriculum Ideological and Political Education of HPC

The effective development of curriculum ideological and political education needs continuous exploration and practice based on characteristics of the subject. Therefore, organic integration of ideological and political work, teaching results, students' growth characteristics and other aspects can be realized. In brief, curriculum ideology and politics need to be carried out around specific subject contents. Teachers of specialized courses need to accurately grasp the characteristics of the curriculum in the teaching process, dig deep into the elements of education, broaden the ways of education, enrich the connotation of education, and finally complete the ideological guidance during the course of imparting knowledge.

The Theoretical System Needs to be Completed, While Elements of Education Needs to be Dug. The ideological and political construction of curriculum can be regarded as the development and continuation of the educational idea. The construction of ideological and political construction of curriculum can make the professional curriculum and the ideological and political theory course to go in the same direction. Thus, the function of ideological and political education performs well, while a new educational pattern of "educating people through the whole curriculum" is obtained. However, the ideological and political education elements of natural science courses are relatively few, at occasions, even hard to find. HPC focuses on technology and logic. Course content of HPC mainly involves the hardware knowledge and programming knowledge. Therefore, it is the top priority to explore the ideological and political elements closely related to the course content. For ideological and political education, it is necessary to revise course chapters, improve the theoretical system, and set the corresponding emphasis and objectives. Only in this way, the ideological and political education elements contained in the course be deeply explored, organically integrated into the course teaching by us. At the same time, it is necessary to master the basic methods of integrating ideological and political elements in the teaching process, such as integrating with examples of pictures and texts, integrating with discussion and interaction, and integrating with stories, so as to better inspire and cultivate students' learning attitude, scientific literacy and value emotion.

Curriculum Practice Needs to Executed, While the Way of Education Needs to be Broadened. Talent cultivation system, which run through the system of ideological and political work, involves the teaching module, teaching material module, subject module, etc.. Education can deepen the course objectives, content, structure, mode of reform, the political identity, national consciousness. Based on education, cultural confidence and personality cultivation, ideological and political education guide with all kinds of course the inherent knowledge, skills, teaching organic integration, realize the combination of explicit and implicit education, promote students' free all-round development [3]. As an engineering subject, HPC course contains necessary knowledge and skills. Curriculum ideological and political education can invisible guide students to set up home countries affection, healthy personality, synthetic. The organic unity of ideological and political education and knowledge education may be achieved. At the same time, to carry out the teaching practice, widen the teaching theoretical knowledge learning, as the main

way of educating, it is beneficial to integration of society, enterprises, alumni resources, make the ideological and political education into the education teaching of the various elements. Then, “the last kilometer” of school ideological and political education can be get through. As a result, comprehensive cooperative education can be obtained.

Innovative Thinking Needs to be Established, While the Effectiveness of Education Needs to be Deepened. In the new era with great social changes and cultural prosperity, when carrying out curriculum ideological and political thinking, we should not only adhere to scientific thinking, but also set up innovative thinking. Development direction of history and time requires to be mastered. Mainstream or tributary and phenomenon or essence need be distinguished. Historical thinking, dialectical thinking, systematic thinking and innovative thinking need to be cultivated. Due to the introduction of a large number of foreign advanced technologies, the course of HPC has obvious international characteristics. Under the background of the fierce confrontation of various social ideological concepts, we need to resist the erosion and further strengthen the ideological and political education in our course, build a firm ideological defense line for students, and resist the harm of various wrong ideological trends or wrong remarks. Therefore, in the concrete process of curriculum ideological and political construction, we need to set up more innovative thinking, with new thinking to generate new ideas, new ideas to improve new methods, with new methods to solve new problems, to achieve innovative development of curriculum ideological and political, and finally to implement the fundamental task of cultivating moral and human.

4 Practice Approach of Curriculum Ideological and Political Education for HPC

To further promote curriculum ideology and politics, we should firmly focus on the trinity teaching objectives of “curriculum knowledge imparted, professional ability cultivation, and value system shaping”. Meanwhile, the fundamental question of higher education of “what kind of person to train, how to train people, and for whom to train people” need to answered. In the ideological and political education of engineering courses in higher education, professional teachers should take good care of the main force, advance into the main battlefield. Furthermore, the values of moral cultivation in the collision of innovation, discussion and practice require to be given.

Patriotism Should be Deeply Rooted in Knowledge. By integrating industry development, school style, discipline construction and other resource elements into “curriculum ideological and political education” as important teaching resources, the ideological and political education elements contained in the curriculum can be explored scientifically, reasonably and realistically. To some extent, HPC, which is worthy of being an important instrument of great power, directly reflects a country’s scientific and technological ability and innovation ability. In this context, the development history of HPC in China is a very good ideological and political entry point. Computer related technologies and industries are basically originated from the United States. Since the 1970s, China began to research and development of high-performance computers. In the state of poverty, we overcame technical blockade, lack of talent, and other difficulties, to

develop high-performance computers. With the growth of national strength, China has produced a number of achievements in high performance computing technology research and infrastructure construction through the implementation of the High-tech Research and Development Program (“863” program) and the key basic research and development program (“973” program). Up to now, China’s high performance computing has been in the international leading level. Through teaching the development history of the industry, the patriotic tradition of the Chinese nation is fully integrated into the ideological and political course teaching, which not only improves the quality of classroom teaching, but also enriches the teaching content, cultivates the patriotic feelings of college students, guides the contemporary students to connect their own interests and losses with the rise and fall of the country, links their own destiny and future with the destiny and future of the country, and cultivates the patriotic feelings [4].

Consciousness of Serving Our Country by Science and Technology Should be Aroused Based on Curriculum Practice. Course practice is an effective supplement to improve the professional training system. In practice, students not only improve their professional ability through professional practice, but also have a chance to close understand industry development and social trends. By this means, the extension of the course from inside to outside the classroom is realized. Moreover, the characteristics and unique advantages of the first class and the second class are integrated. In addition, resources and platforms for the deep integration of ideological and political theory courses and professional courses are provided. The course practice of HPC involves various kinds of hardware. We chose to take the research and production of various kinds of hardware made by Huawei as an example. As we know, Huawei itself is very suitable material for ideological and political education. Teachers participated in the course training of HPC held by Huawei. Thus, teachers know Huawei’s progress in HPC hardware. Moreover, Huawei has cooperated with the school to provide some hardware facilities through “intelligent base”. So far, Huawei seems to have everything in place, from infrastructure, including high-speed network cables, to chips. Although Huawei has encountered some difficulties and obstacles in the development process, Huawei is firmly moving forward on the road of becoming an all-around hardware manufacturer, which is a remarkable feat for the country and even the world. Self-reliance and self-improvement of high-level science and technology is of great strategic significance for safeguarding national security and interests. Only by constantly creating new scientific and technological advantages can we take the initiative of development in our own hands. In our plan, curriculum ideological and political through curriculum practice is a deep combination of professional courses and ideological and political elements, which not only comprehensively introduces the hardware knowledge of high-performance computing, but also imparts ideological and political content silently into the material. Students are inspired enthusiasm of serving the national strategic with science and technology.

The Shaping of Value System is Based on Thought Guidance. Case is the natural carrier to carry on the ideological and political elements of the curriculum. Case teaching is also the advantageous weapon of the ideological and political construction of the curriculum [5]. Wuxi National Supercomputing Center has a “supercomputer Doctor publicity group”. Taking the great changes in the new era as the most vivid educational materials, we should explain clearly the internal mechanism and practical logic of the

“Four self-confidence”, which will not only enhance simple emotion, but also enhance rational identification. In the teaching practice of HPC, it is necessary to dig the combination of cases from the aspects of talent training and curriculum ideological and political thinking: start from the opportunities and challenges in the era of big data, use the gap between massive data and systematic data processing ability to solve the problem, and guide students to correctly understand the development trend of the world and China.

5 Conclusion

For “Ideology and politics education in course”, teachers need to keep good a canal, have their own responsibility farmland. As a result, all kinds of courses and education course are equipped with synthetic counterparts for training high quality talents, building three whole education. It is an effective practice to train new people in the new journey to assume the great responsibility of national rejuvenation.

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