Investigating Methods of Importing Ideological and Political Education into Advanced Programming Language Courses

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Abstract

Ideological and political education is an important means to promote the three aspects of education. Taking advanced programming language course as an example, this paper discusses the methods of importing ideological and political education into such courses, including the training of teachers, the exploration of ideological and political elements, the design of ideological and political teaching in experimental courses, the construction of ideological and political resources, and the evaluation of the effects of ideological and political education, so as to improve students’ professional ability and to enhance their comprehensive quality, as well as to cultivate their talents with comprehensive development of morality, intelligence, physique, beauty and labor.

Keywords

Ideological and political education; Advanced programming language; Ideological and political element.

1. Introduction

In 2016, General Secretary of the CPC Central Committee Xi Jinping stressed the need to make a synergy effect between various courses and ideological and political education [1], which has been widely recognized by educators from various backgrounds. Many universities have launched the practice of integrating ideological and political education within basic courses and specialized courses [2, 3]. Since China has made the development of artificial intelligence and big data technology a national strategy, enhancing the development of computer-related disciplines and majors is undoubtedly the core of cultivating talents in those areas. As a typical kind of professional basic course, advanced programming language course that teaching C++, Python or other languages is one of the required core courses for computer majors and many other engineering majors. Advanced programming language courses focus on the cultivation of students’ practical ability, and aim to guide students to solve practical problems and make innovation through programming. It not only requires students to have a serious, rigorous and practical learning attitude, but also requires them to be team workers and hard-working. Most importantly, as information technology is developing so rapidly nowadays, talent advantage is particularly critical for seizing the technological highland and realizing our national strategy. Therefore, it is particularly necessary to cultivate high-end technical talents’ devotion to family and country, guide them to establish a positive outlook on life and values, and be outstanding successors of socialism with Chinese characteristics. Based on this, it is of great significance to explore the program of integrating ideological and political education in advanced programming language curriculum [4].

2. Background

Programming language courses are usually opened for Engineering Freshmen, teaching the use of classic advanced programming languages such as C++, Java, python, etc. One of the important
characteristics of this kind of courses is their strong practicality, which emphasizes the cultivation of students' practical ability. The programming language course is often divided into two parts: the theory course and the experiment course. When teaching such courses, teachers spend a lot of time in case writing, code explanation and grammar correction. Compared with other typical computer technology courses, the ideological and political education of programming language courses mainly presents the following two characteristics:

(1) Programming language is in fact a tool, and the goal of the course is clear: to make students master the use of the language and be able to use it to solve practical problems. The content of the course is mainly technical, and is rarely related to humanities and social sciences. Therefore, it is relatively difficult to excavate the ideological and political elements in the course.

(2) The experiment part of the programming language course is generally letting students practice programming on computers. Teachers are mainly responsible for answering questions, but not lecturing. Therefore, they cannot directly carry out the ideological and political education in the process of knowledge lecturing, nor can they set up the ideological and political elements in advance in the preparation for the course. Therefore, teachers need to investigate other aspects and find the ideological and political education points in an all-round way.

3. Methods

Based on the characteristics of programming language courses, to achieve the goal of conducting ideological and political education in these courses, we should make it clear that ideological and political education does not only happen on the lecturing platform, but is also closely related to teachers’ mental outlook, moral spirit, teaching methods and other comprehensive factors. Therefore, we need to start from the following aspects.

3.1. The Construction of the Curriculum Ideological and Political Education Team

Teachers are the main personnel of ideological and political education. First of all, it is necessary to strengthen the construction of teachers' ethics, cultivate morality, and let students really respect teachers' knowledge and virtue. Through their own words and deeds, teachers can affect students in a positive way. Secondly, teachers of engineering courses often mistakenly think that the teaching of professional knowledge has nothing to do with ideological and political education. Even if they conduct ideological and political education, it often results in the "two skins" phenomenon [5]. Therefore, an important task of ideological and political education in advanced programming language course is to strengthen teachers' awareness of the importance of ideological and political education in the course. The teaching team needs to discuss regularly and exchange ideas on ideological and political education, so as to constantly improve their understanding of ideological and political education in the course and make it clear that the purpose is to better educate people and improve students' comprehensive ability. Finally, it is necessary to improve teachers' ideological and political education skills, encourage them to participate in relative training programs, carry out teaching and research activities frequently, and explore the ideological and political education methods and means in advanced programming language courses. As a result, teachers will be willing to and good at ideological and political education. In a word, only by the construction of the teaching team can we grasp the core of the curriculum ideological and political education.

3.2. The Exploration of Ideological and Political Elements in the Curriculum

Advanced programming language courses mainly teach students the basic knowledge and methods of programming, students will learn about array, tree, linked list and other basic data structures, as well as the use of loops, functions and other program modules, as well as the
implementation of simple algorithms. The traditional theory teaching only pays attention to the grammar: as long as the program runs correctly, it is considered to be successful. The shaping of students' values was ignored. Therefore, we need to integrate ideological and political education with professional knowledge, fully investigate the ideological and political elements in the curriculum, and carry out ideological and political education silently. For example, when introducing the history of mainstream programming languages, we can introduce the learning and struggling experiences of computer scientists to encourage students to study and work hard; in the meantime, we can let students understand that the development of technology is endless, and so is the road of life, so that we should strive for perfection and search with unbending will; through the explanation of functions and modules, we can let students understand the importance of teamwork; by introducing the inheritance and polymorphism features of object-oriented classes, we can introduce the inheritance and innovation of Chinese traditional culture. Through continuous discussion and exploration, teachers can fully uncover the ideological and political elements associated with the knowledge points of programming language, so as to organically integrate the two and achieve the purpose of promoting each other.

3.3. The Design of Ideological and Political Education in Experiment Course

Experiment course is an important part of advanced programming language course. Students need to complete multiple programming exercises assigned by teachers independently or in groups. The experiment process is mainly based on students' independent programming, supplemented by teachers' guidance. Compared with the theory course, conducting ideological and political education in the experiment course is more difficult, which requires teachers to spend more time on teaching design. In order to integrate the ideological and political education in the experiment class, firstly, we can start from the design of the exercises. Although the programming problems will eventually be implemented into codes, the background of the problems can be rich and diverse. Teachers can creatively design diversified practical tasks by using celebrity deeds and traditional virtues as the backgrounds. Secondly, students can be divided into various project teams and scored according to the overall performance of the team, so as to let them learn the importance of teamwork and responsibility. Finally, we should encourage and actively guide students to be indomitable and bold in the process of solving problems, so that they can get satisfied by achieving their goals and realize the positive significance of hard work. In a word, although the experiment courses of programming languages are not mainly lectured by teachers, there still exist many entry points that can be used to import ideological and political elements, which need to be carefully designed.

3.4. Curriculum Ideological and Political Education Resources Construction

First of all, we should focus on students and analyze their psychological characteristics and interests. Nowadays, college students are mainly born after 2000 and exposed to plenty of various information. Their views are different from those of the past. In order to achieve good educational effect, we should follow the law of students' growth, analyze their characteristics, and teach them in accordance with their individual aptitude; secondly, we should integrate the knowledge points of programming language with ideological and political elements, regularly organize course team meetings to discuss teaching methods, further optimize the syllabus, revise the curriculum plan, and improve the effect of teaching. Finally, teachers of computer science are familiar with modern information technology, of which they can take advantage and accelerate the construction of micro-lectures, online lectures, mixed online and offline lectures and other teaching resources about advanced programming language. Teachers also need to get familiar with students, understand them, innovate teaching styles that students will enjoy, and provide the best learning resources to them. As such, students will feel rewarded in the learning process, which will further motivate them to learn harder.
3.5. **Evaluation of the Effect of Curriculum Ideological and Political Education**

Tracking and evaluating the effect of ideological and political education in advanced programming language courses is an important means to promote the sustainable development of curriculum ideological and political education. The main principles are “student-centered,” “output-oriented” and “continuous improvement.” We should make evaluation and feedback rules based on the output effect. Firstly, through questionnaires, interviews and other methods, we invite students to evaluate the effectiveness and make suggestions about classroom teaching. Secondly, the performances of our students in technical contests such as ACM, Challenge Cup, and Internet plus, as well as their performances in all aspects of virtue, intelligence and physical education, can all be used as reference standards to evaluate the effect of ideological and political education in programming language courses. Finally, incentive mechanisms in the year-end evaluation, funding support and others should be established to award teachers that did well in curriculum ideological and political education and to improve the enthusiasm of them. In a word, the combination of diagnostic evaluation and summative evaluation needs to be adopted to improve the evaluation cycle of “implementation->feedback->improvement.” Through iterative verification, we can continuously improve the effect of ideological and political education in programming language courses.

4. **Conclusion**

Curriculum ideological and political research has developed rapidly in the past few years. It has been paid attention to by educators from all areas and has achieved some gratifying results, but it is still in the primary stage. Taking the advanced programming language course as an example, this study discusses the ideological and political education in such courses from the following aspects: education team construction, ideological and political element mining, ideological and political education for experiment course, resource construction, and evaluation. Through implementation of the above aspects, we aim to improve the education team’s awareness of the importance of ideological and political education, and improve the teaching skills of them. Also, we expect to fully explore the ideological and political elements related to advanced programming languages, expand the methods and ways of curriculum ideological and political construction, and educate students subtly by integrating value guidance and knowledge education together.

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