

# Ideological and Political Teaching Design in Computer Programming

## -- Taking Python as an Example

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### ABSTRACT

First of all, the paper defines the teaching thought -- ideological and political teaching design in the course *Python Programming*. Then according to the educational objectives, the corresponding ideological and political elements are explored from the knowledge points of the course. Next we integrate the appropriate ideological and political materials into course content to start teaching design. Finally, under the guidance of this thought, the teaching design could guide students to learn actively, and achieve the perfect combination of classroom knowledge learning and morality education.

**Keywords:** *Python Programming, Course Teaching with Ideological and Political Education, Course Design.*

### 1. INTRODUCTION

It is the essential requirement and prerequisite for high quality talents to have good ideological and political characters, and integrating relevant education into the curriculum is an effective means to improve this level. General Secretary Xi Jinping stressed that ideological and political education should permeate the entire education process to realize the all-round education [1]. Ideological and political teaching is the basic measure of moral education in colleges. Every teacher need to think deeply to properly combine ideological and political elements with various courses to reach the target of educating people naturally. College teachers should establish the thoughts of ideological political education, adhere to the correct teaching direction, and cultivate morality in the teaching process [2]. Many studies have shown that putting into effect ideological political education of professional courses is the important and difficult problem, especially in science courses [3]. Therefore, the paper focuses on how to integrate the excellent Chinese culture and socialist values into the knowledge system of Python Programming Course, to realize the perfect integration ideological political education into knowledge education, enhance students' four

confidences, and make them qualified as national builders and successors of national rejuvenation.

### 2. RELATED WORKS

To actively respond to General Secretary Xi Jinping's call for putting curriculum ideological political education and professional courses teaching at equally important status, universities had successively carried out the relevant construction of professional courses. Li et al. [4] combined the spirit of traditional Chinese culture and new era with teaching courses, they also integrated ideological political education with object-oriented programming (C++). Yu et al. [5] embedded ideological and political materials into "C Language Programming" and demonstrated the beauty of Chinese elements through programming cases, thus strengthening students' cultural and national confidences, which provided new ideas for the reform of science and engineering courses. Shi et al. [6] discussed the means of strengthening ideological political education of engineering courses, and introduced the implementation process by taking basic computer courses as an example. Wu et al. [7] deeply explored the ideological and political intension of "C Language Programming", and elaborated on the process of ideological political education in each knowledge point

with examples. Huang et al. [8] explored the teaching model of computer courses by analysing the connotation of ideological political education of “C Language Programming” Course.

Drawing on the previous research results, we analysed the ideological and political materials included in Python Language Programming, and integrated them appropriately into teaching plan, curriculum design, curriculum cases, and homework, so as to affect students imperceptibly and foster virtue through education.

### **3. TEACHING DESIGN WITH IDEOLOGICAL AND POLITICAL**

#### **3.1. Design Ideas**

The idea and thinking of the ideological political teaching design in Python Programming Course are as follows: to clarify the educational goal → to select the knowledge points in the course → to mine the ideological and political elements → to collect the relevant materials → to design the corresponding teaching mode → to implement course teaching with ideological political education → to evaluate the effect of the education.

It is the first step to clarify the educational goal for the overall course teaching and carry out teaching work. According to the education goal, we select the appropriate course knowledge points, then analyze the related ideological and political elements, and compile a comparison chart of knowledge points with the elements. Then we select the elements and integrate them with teaching content and design the teaching mode according to the characteristics of Python knowledge points.

During teaching design, we analyse each knowledge point, and reform the teaching content from the knowledge itself and the design of teaching cases. During teaching implementation, ideological and political elements permeate the students’ spiritual world through various means, relying on curriculum knowledge points. The evaluation of teaching effect can be made by observing students’ classroom performance, questionnaire survey, and result comparison, etc.

In order to enhance the effect of ideological political education, and get the goal of professional knowledge and skills learning as well as ideological political education, we should not only follow the learning characteristics in programming courses, but also give consideration to the principles and methods of ideological political education in related teaching activities. In the teaching practice, we need to continuously obtain feedback in the teaching implementation, assessment and evaluation to improve the relevant scheme design, and then implement

feedback and improvement, to enhance the effect of ideological political education in a circular way.

#### **3.2. Integration of Teaching Objectives**

The learning goal of students for Python Programming is to master the basic concepts, principles and programming techniques of Python language, and flexibly use Python language for data analysis, so as to cultivate students’ capacity to analyse and deal with problems, and be provided with a correct application ability of Python language in artificial intelligence, economic management, and data analysis, etc.

The objectives of ideological political education of Python Programming are to improve students’ political ideology, moral quality, social responsibility and cultural quality, strengthen their four confidences, and cultivate socialist constructors and inheritors. Starting from the concept of course teaching with ideological political teaching, it should be combined with curriculum knowledge system. According to the talent training goals of Python Programming Course, this paper clarifies the knowledge content of the course, analyzes the ideological and political materials contained with it, grasps the integration point of knowledge with ideological and political elements, and integrates core socialist values, Chinese excellent traditional culture, and “four confidences” in the classroom. We should fully take our responsibilities so that professional education and ideological political education can go hand in hand, and form a synergistic effect. The integration of these two will be transformed into the elements and contents to improve students’ political literacy, moral quality, social responsibility and culture literacy. Students can imperceptibly accept the spiritual guidance on the level of socialist ideals, beliefs and value judgments in the process of knowledge learning and ability cultivation to become new type of economic and management talents with both integrity and ability.

The specific objectives are as follows:

- (1) Conduct professional literacy education -- cultivate students’ craftsman spirit of being meticulous, rigorous and striving for perfection;
- (2) Conduct patriotism education -- arouse students’ patriotic feelings, establish their social responsibility awareness, and hold fast to socialist core values;
- (3) Carry out fine traditional cultural education -- integrate Chinese traditional culture and cases, and establish students’ national pride and confidence;
- (4) Carry out “four confidences” education -- introduce the Party’s centennial struggle course and its famous achievements in leading the construction of new China into course teaching, and cultivate students’ firm

belief in “four confidences” by data analysis and comparison.

The goal of ideological political education and teaching goal of Python Programming are mutually supportive. By exploring the ideological and political materials contained in it, and effectively integrating them into the curriculum teaching, the two goals are mutually integrated so that it can achieve the combination and dialectical unity of morality and talent cultivation.

### ***3.3. Integration of knowledge Points and Ideological and Political Elements***

From knowledge points, teaching methods, computer practice, homework and other aspects, the paper defines the core knowledge points and its teaching objectives with ideological political education. By the combination of knowledge points with ideological and political elements, the teaching design in Python Programming Course is refined as follows.

**Knowledge Point 1:** An overview of the Python programming language -- sharing and open source. Through the introduction of open source technology, the major themes of knowledge sharing, common development and a community of common destiny for mankind are introduced, which let students realize the responsibilities of a big country and cultivate their sense of responsibilities.

**Knowledge Point 2:** The Syntax Rules of the Python programming Language. Through the program demonstration and classroom discussion, this paper explains the importance of abiding by the rules, which will establish the students’ awareness of rules, guide them to follow the school disciplines and grow up to be good citizens.

**Knowledge Point 3:** Basic Programming. Through the writing and debugging of a simple basic program, it will let students realize that a symbol, a punctuation, a space will affect the operation of the whole program, and even lead to wrong results, which will make students develop a serious and rigorous attitude towards study and work, and cultivate their craftsman spirit of being meticulous, rigorous and striving for perfection.

**Knowledge point 4:** Variables. By explaining how to use variables freely and flexibly in Python, it extends that freedom is relative, while constraint and freedom are a dialectical unity. Combining with the current epidemic, students can realize that self-discipline is the only way to gain real freedom. It will guide students to heed the national call, strengthen self-discipline, fight against the epidemic together, and cultivate their self-discipline spirit.

**Knowledge point 5:** List structure. The socialist core values are integrated into the list elements to

demonstrate the list construction, element access and traversal, which will imperceptibly affect students’ values.

**Knowledge point 6:** Dictionary Structure. By assigning exercises, the number of members of the Communist Party of China in each stage is taken as the case, and the number of members is taken as the value to build a dictionary structure for storage, so that we can feel the hard struggle process of our Party from weak to strong, leading the Chinese revolution to victory. This will make students strengthen the socialist road led by the Party and their confidence in the path.

**Knowledge point 7:** The “if” Statement. Combining the conditional choice of if sentence and the historical allusion of "fish and bear's paw can't have it both", teachers can discuss with students how to choose when they encounter dilemma. Teachers can guide students to understand that there will be many choices on the road of life, so they should build a right view on life and values in the future. College students can establish the concept of overall situation, attach importance to national interests, and cultivate the spirit of dedication for the country and the nation.

**Knowledge point 8:** The “for” Statement. Through the story of “putting grain on the chessboard” and the program design as well as demonstration, it explains the truth that constant effort brings success. What’s more, the story of iron pestle into needle guides students to develop down-to-earth and diligent spirit in study and research.

**Knowledge Point 9:** Multiple Loop Nesting. Through the description of “hundred dollars and chickens” question and realization of program design, students can feel the power of scientific calculation so that their computational thinking and scientific spirit can be cultivated.

**Knowledge point 10:** String Processing - Encryption and Decryption Algorithms. Using the string processing function to achieve a simple character encryption and decryption algorithm, and explain the demonstration. The introduction of network leaks and security theme raises students’ awareness of network security and improves network security to the strategic height of national security. It can cultivate students’ awareness of network security and keeping state secrets.

**Knowledge point 11:** Composition of Classes. Based on the background of fighting epidemic in Wuhan, students need to design the description of the composition of classes and anti-epidemic results. The functions, tasks and contributions are described in the design category respectively, and then realize the combined design, so as to complete the cooperation to beat the epidemic. After finishing the design tasks with group, they can realize “unity is strength”, and improve their teamwork spirit.

### 3.4. Teaching Method Design

(1) Case Teaching Method: Case teaching method is adopted to realize the integration of morality and knowledge cultivation, so that students can be given ideological and political education imperceptibly in professional learning. What's more ideological and political materials are also integrated in the design of specific cases and assignments. For example, when introducing the data structure of the list, we introduce Chinese socialist core values as list elements to construct the list objects and show them to students. We can also use typical examples, hot spots and other design teaching cases.

(2) Group Learning Method: In the course project work, the class is divided into learning groups, and each task is completed by division of labor. In the process of group teaching, we should further clarify the project tasks: project function analysis, module design, algorithm design and flow chart, code implementation and debugging, summary report writing and program demonstration, and oral defense. Each group is required to divide the work by itself finish the tasks: oral defense, acceptance and evaluation. During the evaluation, each group will comment and grade each other, explain the advantages and disadvantages of the project, guide students to think further, create a benign competitive environment, and create fair competition. Students' teamwork spirit, sense of competition and innovation can be cultivated through intra-group cooperation.

(3) Inquiry Learning Method: Inquiry learning method is oriented by problem solving; it sets appropriate application scenarios, and enlightens students' comprehending of the knowledge in the procedure of exploring problems. We can associate and understand the essence of education, and skillfully integrate ideological and political materials into the process of teaching, so that students can feel the major function of ideological political education in their own learning and growth.

### 3.5. Teaching Effect Evaluation

On the one hand, by observing students' classroom performance, teachers can find that course teaching with ideological political education stimulates students' taste for learning and improves their learning enthusiasm and initiative; on the other hand, through the computer testing and homework inspection, we find that students have developed a solid and rigorous learning attitude.

## 4. CONCLUSION

This paper attempts to combine ideological political education with Python programming learning, integrates ideological and political elements into professional

knowledge points, realizing the integration of morality education and intellectual development. In the follow-up teaching, we also need to further explore ideological and political materials in professional curriculum, optimize the classical cases, and explore more modes of teaching, so that ideological political education and professional courses could be better integrated.

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