

# Research on the practice of collaborative teaching mode between python programming course and ideological and political education

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**Abstract.** In response to the problem that ideological and political education cannot be well integrated into programming courses, an exploration was conducted on the ideological and political education teaching mode of the "Python Programming" course. Firstly, the current situation of ideological and political education in this course was analyzed. Then, the specific design of the course's ideological and political teaching mode was explored from three aspects: knowledge point introduction, theoretical explanation, and practical application. A collaborative ideological and political teaching mode was constructed that integrates procedural courses with ideological and political education. Finally, the proposed collaborative ideological and political education model was put into teaching practice and its actual effectiveness was evaluated. The practical results have shown that the proposed collaborative ideological and political teaching model has achieved the coordinated integration of curriculum teaching and ideological and political education, stimulated students' subjective initiative in learning, and improved the effectiveness of ideological and political education.

## 1 Introduction

Teachers should make full use of classroom teaching as the main channel in the teaching process, deeply extract various ideological and political elements related to the course content, and complement and promote each other with ideological and political theory courses, fundamentally answering the question of "what kind of people to cultivate, and ultimately achieving the goal of moral education and talent cultivation [1]. Therefore, how to fully explore and condense the ideological and political elements closely related to professional courses, and organically integrate them with the knowledge points of course content, is a key issue that needs to be addressed in the current process of ideological and political education in courses.

The course of "Python Programming" is a public foundational course for first-year computer majors offered by our university. This course involves multiple majors, has a wide audience, and covers a wide range of areas. The traditional teaching mode usually follows the explanation of grammar and the verification of practice. The content in the course is

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complex and abstract, and there is strong logic between each chapter. It is difficult to accurately identify the ideological and political elements that are relevant to the course content, and there is less involvement in student moral education<sup>[2]</sup>. To this end, it is necessary to reform the teaching mode of the "Python Programming" course, starting from the actual teaching situation, deeply mining and refining various ideological and political elements closely related to the knowledge points of the course content, and deeply integrating them with the corresponding knowledge points of the course, exploring a new mode of collaborative promotion between the "Python Programming" course and ideological and political education.

## **2 The problems of integrating ideological and political elements into Python programming**

### **2.1 Lack of exploration of ideological and political elements in teaching content**

When carrying out ideological and political education, targeted ideological and political elements are not explored from a professional perspective, suitable ideological and political content cannot be extracted, and the natural organic integration of ideological and political elements with strong professional knowledge cannot be achieved. The knowledge points of the "Python Programming" course are complex and abstract, with strong theoretical and practical aspects, which leads to the deep "hiding" of ideological and political elements. This requires teachers to conduct in-depth research on the course outline and textbook content, and comprehensively explore ideological and political elements.

### **2.2 The integration of course knowledge and ideological and political elements is not high**

After investigation, it was found that some teachers unconsciously attach importance to the teaching of professional knowledge and neglect the educational function of ideological and political education in the curriculum during the teaching process. In addition, some teachers' exploration of ideological and political elements does not quite match the content of the curriculum, and they use a rigid approach to integrate them into teaching. This leads to insufficient connection between the ideological and political education in the curriculum and the knowledge points taught, and students are unable to receive moral education subconsciously in the process of learning professional basic knowledge. The silent effect of ideological and political education is also not well implemented, making it difficult to achieve the goal of educating people<sup>[3]</sup>.

## **3 Design of ideological and political education for the course of "python programming"**

To address the issue of integrating ideological and political elements into the "Python Programming" course mentioned above, this article explores the establishment of a collaborative teaching model for professional courses and ideological and political education based on knowledge point introduction, theoretical explanation, practical application, and course induction process, namely the collaborative ideological and political teaching model.

In the stage of theoretical explanation, teachers can appropriately extend and expand the principles of being a person and doing things based on a certain knowledge point in Python

language, and teach students these principles through theoretical explanation or storytelling, thereby implicitly introducing ideological and political education into the theoretical explanation of the knowledge point. For example, when explaining the naming rules of variables, functions, classes, and objects in Python language, further expansion should be made to establish connections with elements such as no rules, no boundaries, and compliance with various laws, regulations, and rules formulated by the country, so that students can deeply understand and comprehend the principles of moral integrity, public morality, and strict personal morality. When explaining the concepts of classes and objects, by comparing them, students understand that classes are abstractions or generalizations of objects, and objects are concrete instances or manifestations of classes. On this basis, the Marxist philosophical view is extended and combined with the spirit of science to enhance their ability to correctly understand, analyze, and solve problems. For example, when explaining the knowledge points of functions in Python language, through the definition and calling of functions, functions are the core of process oriented. A large function can be decomposed into several closely related small function modules for implementation, expanding the importance of division of labor and cooperation, and enhancing students' teamwork awareness and confidence in solving complex problems.

In the practical application stage, teachers can integrate ideological and political elements of relevant knowledge points into application cases, first briefly introducing the background of the case, and then formally entering the design and analysis of the case program. For example, in the chapter on third-party libraries in Python programming, the core ideas of the 20th Report are used as the application background to count the most frequently used words in the report, leading to the design cases of Jieba library and Wordcloud library. This case study can help students master knowledge points such as how to install third-party libraries, how to operate files, how to use these two libraries for word segmentation and generate word clouds.

In summary, the knowledge points introduced by ideological and political stories and the teaching cases constructed based on specific application practices are both ideological and political education based on intuitive ideological and political materials related to the knowledge points, which are classified as explicit ideological and political education. In contrast, during the process of theoretical explanation, teachers use clever teaching design and reasonable teaching methods to guide ideological and political education, which belongs to implicit ideological and political education. For example, when explaining Python variables, it is pointed out that program defined variables only store temporary data, and after the program runs, the variable will be released and the data will be lost. Inspire students on how to permanently save data, thereby introducing file knowledge points. Through heuristic and progressive guidance, we aim to inspire students to develop a strong sense of innovation.

In the final stage of course induction, it is necessary to sort out, summarize, and generalize the relevant knowledge points taught in the course, deepen students' understanding and mastery of the relevant knowledge points, further clarify and condense the emotional goals of teaching, and excavate and refine ideological and political elements from the content of the course teaching knowledge points, thus forming a closed loop to strengthen the breadth, depth, and temperature of ideological and political education.

Exploration of Ideological and Political Elements in the Course of Python Programming

## **4 Exploration of ideological and political elements in the course of python programming**

Preliminary part of program design: Non adherence to rules in daily life, using the case of traffic accidents caused by rules, students can understand the importance of programming standards, which in turn leads to the need for programming design in the process design

according to code specifications and syntax rules, otherwise warnings or exceptions may occur, emphasizing the importance of moral and legal awareness, and citing. Provide relevant content on the programming section.

Control structure and program debugging section: Based on the gradual implementation of garbage classification across the country, different types of garbage will be provided. Provide different handling suggestions and introduce the branch structure knowledge points in this section. While learning branch programming, students establish environmental awareness, encourage active participation in ecological environment construction, and improve their learning sense of social responsibility in life.

Combination data type section: Based on the report of the 20th National Congress of the Communist Party of China, ask students about high-frequency words that appear in the report. The frequency of appearance of language, which leads to the combination of data types such as lists and dictionaries; Further inquire with students to extract high-frequency words from them. To help students understand that the prosperity of the country, the happiness of the people, and the great rejuvenation of the Chinese nation all depend on the group of the CPCs' Weaving and leading, inspiring students' love for the Party and the country, thereby enhancing their political identity.

The section on functions and modular programming: The Chinese Tiangong Space Station is a massive engineering project that requires collaboration among multiple teams. This serves as an introduction to the concept of functions and modular programming design. It helps students understand the role of functions and modules while recognizing the importance of division of labor and collaboration. This approach fosters their sense of teamwork and enhances their confidence in tackling complex and challenging problems.

Document Section: Using the Prism Incident as a starting point, the narrative delves into the extensive collection and analysis of documents and data involved in the event. This serves as a segue into introducing file-related knowledge points in Python. While students learn and master file operations, they also enhance their awareness of national information security protection.

## **5 Evaluation of the effectiveness of ideological and political education in curriculum**

Based on the integration points of ideological and political elements designed from the three aspects of knowledge introduction, theoretical explanation, and practical application, we conducted a questionnaire survey among a total of 91 students from the 2021 and 2022 classes. In this survey, each integration point of ideological and political elements in the course knowledge was rated on a scale of excellent (5 points), good (4 points), average (3 points), poor (2 points), and bad (1 point). Finally, we calculated the corresponding average scores for the 12 designed integration points of ideological and political elements, which ranged between 4.54 and 4.85, with an average score of 4.70. The results indicate that the related integration points of ideological and political elements designed within the course knowledge have received unanimous recognition from the students.

We conducted a segmented statistical analysis of the final grades of a total of 91 students from the 2021 and 2022 classes we taught, categorizing their grades into five levels: A, B, C, D, and E. Here, grade A is defined as scores ranging from 90 to 100, grade B from 80 to 90, grade C from 70 to 80, and grade D from 60 to 70. Students scoring below 60 were classified under grade E. The pass rate accounted for 96.7% of the total number of students, achieving a satisfactory expected outcome.

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## **References**

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