

AIGC-empowered Innovation in Ideological and Political Education of Python Programming Courses

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Abstract: In the intelligent era, the Python programming course has become increasingly important in college education. To achieve the goal of cultivating people with moral integrity and make use of the new opportunities brought by Generative Artificial Intelligence (AIGC) to education and teaching, this paper mainly introduces the active exploration of using AIGC to empower the ideological and political education construction of the Python programming course. It gradually delves into the integration of ideological and political elements from a macroscopic perspective, elaborates on the process and methods of using AIGC to design ideological and political teaching cases for this course, and explores the specific measures to evaluate the effectiveness of ideological and political education empowered by AIGC in this course. This exploration innovatively realizes the ideological and political education construction of the Python programming course with AIGC, which has promotional value for the ideological and political education construction of other programming language courses.

Keywords: AIGC; Python programming; Ideological and political education in courses; Teaching case design; Evaluation of ideological and political education effectiveness

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1. Introduction

With the continuous development of artificial intelligence and big-data research, the Python language, characterized by its simplicity, high efficiency, and powerful computing ecosystem, has become one of the most popular languages currently^[1]. For the effective implementation of Python programming course teaching, the design of ideological and political teaching cases is a prerequisite, which is related to the effectiveness or even the success of the course teaching^[2]. The effective combination of ideological and political education in courses and teaching case design is particularly important for cultivating students with computational thinking, information literacy, and innovative abilities, and it serves as an important foundation for using information technology to solve professional problems in the future^[3].

In a Python programming course, only the ideological and political teaching case design that is subtle and

influences students imperceptibly can touch their hearts. So, what ideological and political elements should be integrated into the Python programming course? How can we use AIGC to design teaching cases that incorporate these elements? How can we evaluate the effectiveness of ideological and political education? Can AIGC also be used to empower this evaluation? This paper introduces some active explorations of using AIGC to empower the ideological and political education construction of the Python programming course^[4].

2. Ideological and political elements in Python programming courses

The ideological and political elements of Python programming courses must be designed from the top-level. From a macroscopic perspective, in accordance with the “Guidelines for Ideological and Political Education Construction in Higher Education Courses” issued by the Ministry of Education, the ideological and political education in Python programming courses can be integrated from five aspects: political identity, love for the country and home, cultural literacy, awareness of the rule of law, and moral cultivation^[5]. Each aspect has more specific requirements, and the difficulty of integration varies. They can be divided into four levels for gradual exploration and practice:

- (1) The first level: Deepening the education of career ideals and professional ethics, corresponding to moral cultivation. It includes: (a) Through career-ideal education, guiding students to understand their interests and strengths, establish positive career ideals, and clarify their development goals and directions; (b) Guiding students to analyze the relationship between professional ethics and social responsibilities, enhancing students’ sense of social responsibility and professional integrity, and cultivating good professional ethics of abiding by laws and regulations and being honest and trustworthy. The ideological and political elements at this level are relatively easy to integrate. On the one hand, all teachers have received education on career ideals and professional ethics. On the other hand, due to the wide application prospects of Python, it is easy to find specific application cases for the teaching of different majors. For example: (a) Students can experience their self-value through the application of Python in solving professional problems; (b) Iterative project practices can be used to cultivate students’ meticulous and rigorous engineering attitude, as well as the awareness and ability of exploration and innovation^[6].
- (2) The second level: Strengthening the education of excellent traditional Chinese culture, corresponding to cultural literacy. It includes the 18-character core ideological concepts of advocating benevolence, emphasizing people’s livelihood, keeping integrity, upholding justice, advocating harmony, and pursuing common ground. These concepts represent the core strength, value pursuit, code of conduct, ethical principles, unique qualities, and social ideals of Chinese culture, respectively. The excellent traditional Chinese culture has a long history and permeates many aspects such as literature, art, customs, and science and technology. Its profound heritage provides rich and diverse materials for ideological and political education in courses. Integrating these elements into the Python programming course can not only enrich the teaching content, protect, and inherit them but also help strengthen college students’ cultural confidence and cultivate their love for the country and home, and noble character^[7]. The ideological and political elements at this level are also relatively easy to integrate because all teaching teachers have been influenced by traditional Chinese culture. For example: (a) Traditional literature can be used as teaching materials for string indexing, tuple traversal, and string calculation; (b) Folk cultures such as traditional festivals and the Chinese zodiac can be used as teaching materials for sequence calculation, program control structures, and functions; (c) Scientific achievements such as the Four Great

Inventions, the 24 Solar Terms, and ancient mathematics can be used as teaching materials for sequence calculation and program control structures.

- (3) The third level: Cultivating and practicing the core socialist values, corresponding to love for the country and home. For the value goals at the national level, they are prosperity, democracy, civility, and harmony; at the social level, they are freedom, equality, justice, and the rule of law; at the individual level, they are patriotism, dedication, integrity, and friendship^[8]. The ideological and political elements at this level are of medium difficulty to integrate, requiring teachers to have a comprehensive and in-depth understanding and recognition of the core socialist values. For example: (a) When teaching basic data types, through the “Power of Making Progress Every Day” case, students can feel the amazing power of making a little progress every day, and gradually cultivate the craftsman spirit of concentration and perseverance; (b) When teaching basic branch structures, through the “PM2.5 Air Quality Reminder” case, advocate green travel methods that save energy, improve energy efficiency, and reduce pollution^[9,10].
- (4) The fourth level: Thoroughly carrying out constitutional and legal education, corresponding to the awareness of the rule of law. It includes the basic principles and rights of the constitution, the instructions and norms of the law, the concepts and values of the rule of law, and legal practice and legal ideology. Integrating these into the Python programming course helps to enhance citizens’ national and legal awareness, promote the modernization of the social governance system and governance capabilities, and maintain social stability and the order of the rule of law. The ideological and political elements at this level are the most difficult to integrate. Teachers need to have a comprehensive and in-depth understanding of constitutional and legal education, which is often lacking among professional-course teachers. It is best to explore with teachers of legal education. A clever strategy is to use relevant documents as teaching materials for word-frequency statistics and word-cloud analysis^[12,13].

3. Design of ideological and political teaching cases for Python programming courses empowered by AIGC

Currently, it can be easily verified that AIGC can generate teaching cases for specific knowledge points. However, many teachers find that the quality of the generated cases is poor, causing them to lose confidence in using AIGC. The reason lies in their failure to master the way of interacting with AIGC properly. For Python programming courses, to use AIGC to quickly and efficiently generate high-quality ideological and political teaching cases, the following interactions are required:

- (1) Preset the role, the purposes are as follows: (a) To ensure that AIGC’s behavior and answers in the dialogue are consistent with its role setting; (b) To manage and adjust users’ expectations of AI capabilities through role-setting; (c) To enhance users’ sense of participation and satisfaction through the role’s personality and behavior characteristics. For the design of ideological and political teaching cases in Python programming courses, AIGC needs to be preset as a Python programming course teacher. For example, in the dialog box with AIGC, you can input the prompt: Assume you are now a Python programming teacher^[14].
- (2) Assign tasks, that is, let AIGC know what tasks it needs to complete. For the design of ideological and political teaching cases in Python programming courses, it means asking it to write a teaching case for a certain knowledge point that integrates a specific ideological and political element at a certain level. If you only know the ideological and political elements involved in a certain knowledge point at a specific

level or have no ideas at all, you can also ask AIGC to help match suitable ideological and political elements. For example, after defining the role, you can continue to add the prompt: Now, please design an ideological and political teaching case for strings that incorporates the concept of benevolence from outstanding traditional Chinese culture.

- (3) Add constraints, that is, to describe the task requirements in more detail. To ensure that a satisfactory teaching case can be generated as much as possible, you can limit the composition of the teaching case content and the word count requirements. For example, after assigning the task, you can continue to add the prompt: Please generate relevant content according to the requirements of the template for the National Computer Course Ideological and Political Teaching Case Competition, covering eight aspects: case title, teaching objectives, concerns of ideological and political education in the course, the three forms of case abstraction, theory, and design, professional conduct, paths to inspire, awaken, and encourage students to strive for progress, exercises, and references^[15].
- (4) Set goals, that is, to specify the goals and effects that AIGC is required to achieve. For the design of ideological and political teaching cases in Python programming courses, it means specifying the ideological and political goals or effects that AIGC is expected to achieve. For example, after adding constraints, you can continue to add the prompt: Enable students to implicitly and heuristically gain a deep understanding of the social ideal of pursuing common ground from this Python programming case.

After inputting this series of requirements, if you are not satisfied with the ideological and political teaching case for the Python programming course generated by AIGC, you can optimize the generated content through dialogue until you are satisfied.

4. Evaluation of the effectiveness of ideological and political education in Python programming courses empowered by AIGC

The evaluation process of the effectiveness of ideological and political education in courses from the perspective of students can be implemented in three steps. First, determine the value goals to be detected. Second, determine the evaluation dimensions. Finally, develop the evaluation scale. The value goals to be detected need to be aligned with the attitude and values goals in the teaching objectives. To check whether the ideological and political teaching in the course really takes root in students' minds and produces practical results, the evaluation dimensions should not only focus on the rational dimension of students' sense of gain but also the practical dimension of the sustainability of development. When evaluating the rational dimension of the sense of gain, it is necessary to examine the content that students learn. When evaluating the practical dimension of sustainability, it is necessary to examine the long-term transformation of students' values. The development of the scale needs to follow three principles: simplicity and intuitiveness, imperceptibility to students, and logical consistency. Simplicity and intuitiveness mean that the scale should not be too complex. For example, it can be scored on a five-point scale. Imperceptibility to students means that students should not feel that they are doing ideological and political education when completing the scale, so as not to make them dislike it. Logical consistency means that the content and data in the scale can reflect the achievement of the value goals.

5. Conclusion

This paper starts from a macroscopic perspective and, according to the difficulty of integrating ideological and

political elements into Python programming courses, deeply and meticulously explores the value and methods of their integration into Python programming courses from five levels. At the same time, regarding the application of AIGC in the design of ideological and political teaching cases and the evaluation of effectiveness in courses, four key links, namely presetting the role, assigning tasks, adding constraints, and setting goals, are clarified. This provides specific guidance and practical paths for teachers to use AIGC to carry out high-quality ideological and political teaching in courses and evaluate its effectiveness. With the continuous development and improvement of AIGC technology, its application prospects in the ideological and political education construction of Python and other programming language courses will be broader. In the future, it is expected that through more intelligent interaction methods, AIGC can more accurately generate ideological and political teaching cases that meet the requirements of Python programming courses and the characteristics of students for teachers, further enhancing the effectiveness of ideological and political education.

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