



Research on Ideological and Political Education in Principles of Computer Composition

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Abstract. Aiming at the problem of how to integrate the ideological and political elements into the course of Principles of Computer Composition silently, realize the same direction of professional knowledge teaching and curriculum ideological and political education, and then promote the comprehensive development of computer students, this paper analyzes some problems existing in the integration of curriculum teaching into ideological and political education, illustrates the path of curriculum ideological and political education through the importance of curriculum ideological and political education, and puts forward some suggestions from the role of teachers. This paper discusses the methods of ideological and political education from the aspects of orientation, syllabus design, teaching material revision, teaching process guidance and so on.

Keywords: Principles of Computer Composition · Ideological and Political Education · Teaching Practice · Computer Education Reform

1 Introduction

Student cultivation in universities is the unity of the process of education and the process of talent cultivation. The courses offered in universities should not only teach professional knowledge, but also have the function of ideological education. Professional course teachers in universities shoulder the responsibility of educating people. Therefore, we need to dig deep into the potential ideological and political education theory in professional courses, and guide students to establish a correct outlook on life and values while imparting professional scientific knowledge. In 2016, general secretary Xi Jinping put forward the view that “Ideological and political work in universities is related to what kind of people to train, how to train people and who to train for people”, which further enhances the importance of ideological and political education in universities [6–8]. In 2019, the General Office of the CPC Central Committee and General Office of the State Council jointly issued *Several Opinions on Deepening the Reform and Innovation of Ideological and Political Theory Courses in Schools in the New Era*. In 2020, the Ministry of Education issued *Guideline for the Ideological and Political Construction of University Curriculum*, which provides an action guide for the ideological and political construction of university curriculum. As a professional course teacher in universities, it is an unshirkable responsibility of the times to change the traditional teaching concept,

implement curriculum reform, and integrate the ideological and political elements into the professional course teaching [2].

The ultimate goal of curriculum ideological and political education is to educate students, and its core task is to cultivate new people for the country. At present, many universities across the country have carried out the research on the teaching reform of ideological and political education of curriculum to promote the effective integration of ideological and political education and professional education, and give full play to the ideological and political education function of various professional courses. According to the spirit of the document guiding the ideological and political construction of college courses, the teaching reform of the course of *Principles of Computer Composition* is carried out in this paper. Taking the course as a foothold, the basic task of moral education is implemented, the ideological and political elements are reasonably infiltrated into computer professional knowledge, and the ideological and political education is carried out silently in the teaching process of professional courses, which is of great significance to promote the all-round development of college students [3].

2 Teaching Thought of Ideological and Political Education

After preliminary research, the course team thinks that there are some problems in the integration of *Principles of Computer Composition* into the ideological and political education of the course. Contemporary college students are generally born after 2000, growing up in the background of different cultural exchanges, integration and communication. Computer students rely much more on the Internet than any other majors, and will use more foreign electronic products. Therefore, they have more abundant information and distinct self-consciousness, and are easily infiltrated by the ideology of western countries. Therefore, it is necessary to guide the computer students to consciously resist the bad network information, strengthen the four self-confidence, and set up lofty ideals and beliefs in the teaching of *Principles of Computer Composition*. Computer specialty belongs to science and engineering specialty. It is a subject developed on the basis of mathematics, physics and other basic sciences combined with technical experience. It has the main characteristics of researching engineering characteristics and the purpose of cultivating talents with practical application ability. Most people (even some computer teachers) think that this major rarely contains ideological attributes, and fully support the view that “science and technology have no borders”. However, the emergence, development and application of any science and technology are closely related to the national advocacy and demand, especially in the field of computer science. Therefore, teachers need to carry out targeted guidance education in the course teaching, imperceptibly change the students’ consciousness of “science and technology is without borders” [1].

Professional course is the basic carrier of ideological and political education in universities. The *Principle of Computer Composition* is a required course and a core course for computer majors. It is very important for computer students to establish the concept of computer hardware system. The course contains rich recessive educational resources and has great advantages in ideological and political education. Curriculum ideological and political education is not the opposite of professional curriculum, but to integrate the salt of ideological and political education into the soup of professional

education, so as to achieve the goal of the two in the same direction [9]. Therefore, the analysis and mining of the connotation of ideological and political education in the course of *Principles of Computer Composition* can give full play to the synergistic effect of ideological and political education and professional courses. The teaching goal of the course is to cultivate students' scientific spirit and ability to solve practical problems. The course has strong theoretical and comprehensive practicality, which is very conducive to the implementation of ideological and political education. Students not only need to learn theoretical knowledge, but also need to carry out experimental operation. The recessive elements of ideological and political education run through the course theory and experimental teaching from beginning to end. By guiding students to understand the development history of computer, CPU, memory and the latest scientific research results in China, it is helpful to enhance students' national self-confidence and cultivate students' lofty ideals and beliefs. Through the experimental operation of the course, it can cultivate students' scientific and rigorous learning and working attitude. Some knowledge points of the course are highly related to the hot issues at home and abroad, such as the USA sanctions against China For the chip incident, the State Council upgraded the integrated circuit major to a first-class discipline, and so on. Combining these cases with traditional curriculum teaching is more conducive to cultivating students' independent thinking ability and stimulating students' patriotic feelings.

3 Curriculum Ideological and Political Design

3.1 New Role Orientation of Professional Course Teachers

Teachers are the main body of the implementation of ideological and political education in universities, and are one of the key factors to promote the ideological and political education in the curriculum. Moral education is the teacher, and moral integrity is the model. Therefore, it is very important to improve the professional quality of ideological and political education and the ability of ideological and political teaching of computer professional course teachers. College teachers should go out of the traditional teaching mode, give full play to their subjective initiative, change their own positioning as professional course teachers, complete the role transformation and new positioning, constantly improve the ideological and political awareness of the course, strengthen the four consciousness, firm the four self-confidence, firmly achieve the two maintenance, constantly improve their political and moral quality. Professional course teachers need to take patriotism, love the party and love socialism education as the key link to guide the growth and success of college students, integrate it into the whole teaching process of *Principles of Computer Composition*, draw a strong background of home and country feelings with excellent Chinese culture, and guide college students to use computer science knowledge to grow into new people of the times fighting for the great rejuvenation of the Chinese nation [4, 5].

3.2 Integrating Ideological and Political Objectives into Syllabus

In order to really implement the ideological and political education of the course, we need to first reflect the ideological and political content in the syllabus of *Principles*

of *Computer Composition*, and revise the syllabus by means of consulting literature, national policies and other university curriculum materials. The old curriculum syllabus focuses more on the teaching of computer professional knowledge and ability training, and ignores the ideological and political education to a certain extent. Therefore, we need to further improve the training objectives of ideological and political education on the basis of the goal of teaching professional knowledge. Combining with the knowledge points of the course, we fully excavate the ideological and political elements, and integrate them into materialism education, patriotism education, moral quality education, ideal and belief education. In the syllabus, we construct the relevance matrix between “teaching content - ideological and political elements - ideological and political education”. Table 1 is an example of the relevance matrix, which can be presented clearly and intuitively in this form.

Table 1. Curriculum ideological and political relevance matrix

Teaching contents	Ideological and political elements	Materialist education	Patriotism education	Moral education
Introduction to Computer System	The growth story of von Neumann, the father of computer	√		
System bus	Cooperation among three kinds of bus	√		
Computer memory	The development history of memory		√	√
Input/Output System	Storage and output of Chinese characters in I/O devices		√	
Operation method	The thought that complement code takes part in operation instead of original code	√		
Computer instruction system	Introduction of RISC-V instruction system made in China		√	√
CPU structure and function	The principle and method of instruction pipelining	√		

3.3 Teaching Materials Supplement Ideological and Political Cases

The course of ideological and political education is not simply forced to join the ideological and political education in the course of Principles of Computer Composition. If the ideological and political education is too rigid and rigid in the teaching process, students will often have rebellious psychology, which will reduce the quality of education. Therefore, case heuristic teaching can be used. This requires professional course teachers to carefully design teaching materials such as PPT and after-school exercises, collect and organize teaching cases outside textbooks, and integrate social hot issues and China's latest scientific research achievements into the teaching process as typical cases, such as the USA sanctions on Huawei chip, the State Council's promotion of integrated circuit major to a first-class discipline, the high performance memory of China made *guangweiyi Pro Series*, and Tsinghua University achieving high temperature quantum anomalous Hall insulator research and so on. Some typical cases related to the course are shown in Table 2.

Through the description of these real cases, we can integrate family feelings, moral cultivation, craftsmanship spirit into the course teaching, guide students to understand the national policies, enhance students' national confidence, cultivate students' lofty ideals and beliefs, and let students learn professional knowledge and realize the transmission and infiltration of values imperceptibly.

Table 2. Examples of Ideological and political cases

Teaching contents	Ideological and political case	Case type
CPU structure and function	USA sanctions against Huawei chip	International events
Introduction to Computer System	The event of the State Council upgrading the integrated circuit major to a first level discipline	National policy
CPU structure and function	The Fourteenth Five Year Plan focuses on supporting the chip industry's neck sticking problem	National policy
Computer memory	High performance memory of China made <i>guangweiyi Pro Series</i>	Scientific and Technological Achievement
Computer memory	Research on high temperature quantum anomalous Hall insulator realized by Tsinghua University	Scientific and Technological Achievement
Computer instruction system	RISC-V architecture chip made in China	Scientific and technological achievement
Introduction to Computer System	Sunway TaihuLight	Scientific and technological achievement

3.4 Pay Attention to Ideological and Political Guidance in the Teaching Process

In the teaching process of *Principles of Computer Composition*, teachers need to pay attention to ideological and political guidance, reasonably adjust the teaching content in combination with ideological and political objectives, timely introduce ideological and political materials and examples into classroom teaching and experimental teaching, and make full use of classroom discussion, flipped curriculum teaching methods, problem driven teaching methods to improve students' participation, to achieve seamless integration of ideological and political education in curriculum teaching, to avoid copying mechanically. Curriculum ideological and political education is not only a kind of identification, but also a kind of promotion on the level of curriculum knowledge, a kind of silent infiltration of moistening things. According to the content of the course, teachers need to constantly guide students to think actively in the process of teaching, and complete ideological and political education silently. For example, they can guide students from the following aspects.

- a) When talking about the hierarchical structure of computer system, we need to make it clear that the calculator, controller, memory, input device and output device are complementary and inseparable. At the same time, memory is the center of computer. Thus leads to the content of ideological and political course, want to achieve a great goal, a person's strength is weak, need to rely on the strength of the team, and the team needs to have a strong core, and then guide students to resolutely do two maintenance.
- b) When talking about the teaching content of data check code, we need to make it clear that any person or team is likely to make a wrong judgment, so we need to establish an effective supervision mechanism. Reasonable supervision can make the team more clear about the goal, avoid going astray, and then guide students to build up the four consciousness.
- c) When talking about the computer instruction system, we need to make it clear that the completion of any instruction needs to comply with the specification of the instruction set, make clear the function and meaning of each instruction, design in strict accordance with the specification, and do not design at will, so as to guide students to continuously improve their political literacy.
- d) During the experimental operation, students need to master some basic operations such as circuit design, CPU design, memory design to form a practical and realistic working attitude and rigorous and meticulous working style. It can guide students to establish the Marxist concept of integrating theory with practice and seeking truth from facts.

4 Investigation on Teaching Effect

The teachers of the course team began to explore the ideological and political teaching of the course *Principles of Computer Composition* in early 2020, and applied it to sophomores majoring in computer science and technology. After the end of the course teaching, the teaching effect of the ideological and political course was investigated. It should be noted that because the ideological and political teaching is different from the

Table 3. Feedback form of teaching achievements

Evaluation content	Very satisfied	Satisfied	Generally dissatisfied	Dissatisfied
Overall curriculum	38%	55%	7%	0%
Theoretical teaching	44%	52%	3%	0%
Experimental teaching	37%	54%	9%	0%
Political teaching	52%	47%	1%	0%

traditional teaching, the teaching effect of ideological and political course often depends on the joint efforts of professional teachers, ideological and political teachers and counselors, and all aspects of collaborative education are inseparable. After the course of *Principles of Computer Composition* is over, the teachers of the course team conduct a survey in the form of feedback questionnaires, and randomly select 200 students to issue questionnaires. The final feedback results are shown in Table 3.

It can be seen from Table 3 that the students are relatively satisfied with the teaching method of integrating ideological and political education into the curriculum, and the overall satisfaction is more than 90%, which means that this teaching method has been recognized by the students. However, the experimental teaching needs to be further improved in the future. At the same time, at the students' forum, the students' representatives reflected that this teaching method cannot only improve the learning effect, but also promote the all-round development of students, and fully affirmed the effect of ideological and political education in the course of *Principles of Computer Composition*.

5 Conclusion

The above is some of the thinking and practical experience of course team in the *Principles of Computer Composition* teaching into the ideological and political education, the ideological and political course is a supplement to the traditional classroom teaching of professional knowledge, but also an educational trend. Teachers of professional courses in universities should adhere to moral education, integrate the ideological and political education in the teaching of professional courses, give full play to the role of the main channel of the classroom, change the teaching concept, implement the curriculum reform, and implement the moral education scientifically and reasonably. The research results show that the ideological and political education of *Principles of Computer Composition* course has achieved the same direction of professional training and ideological and political education, and achieved good teaching effect.

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