

Exploration of the Teaching Reform of Computer Composition Principles with Ideological and Political Education at Anqing Normal University

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Abstract: The teaching mode of the Computer Composition Principles includes theoretical and practical teaching. At present, there is a problem of inconsistency in the teaching content of the two methods in our school. To this end, this paper conducts online and offline hybrid teaching based on the learning platform and the virtual simulation experiment platform, and cleverly applies ideological and political elements to theoretical and practical teaching to practice ideological and political education. Finally, the combination of theoretical and practical teaching modes can further help students firmly grasp the core knowledge points and improve the teaching quality and level of this course.

Keywords: Theoretical teaching; Practical teaching; Ideological and political education; Online and offline

Online publication: October 25, 2024

1. Introduction

In recent years, with the development and progress of society, higher education has put forward higher requirements for cultivating talents with good ideological and moral qualities and innovative abilities. The traditional education method of computer major courses in colleges and universities mainly focuses on completing professional knowledge lectures and only takes into account professional ethics. It is difficult to cultivate comprehensive talents with all-round development.

In order to cope with some special situations (such as the epidemic), a new online and offline hybrid teaching model has been proposed^[1,2]. This model is based on an intelligent teaching platform (e.g., Rain Classroom) and uses a variety of different assessment methods to complete the explanation of course-related content online to improve the teaching quality of the course. Computer major courses generally include theoretical and practical teaching, but there is a mismatch between these teaching methods. By exploring online and offline theoretical and practical teaching, it can not only help students deeply understand the theoretical knowledge points of the course but also improve students' hardware design capabilities.

Course ideological and political education plays a critical role in implementing the educational concept of “establishing morality and cultivating people” [3-6]. Course ideological and political education is a way of ideological and political education. It refers to the introduction of ideological and political elements in the teaching process to help students cultivate good ideological and moral qualities. In order to comply with the requirements of the “Four New” and accelerate the construction of first-class undergraduate majors, Anqing Normal University attaches great importance to the construction of curriculum ideological and political education. While increasing the intensity of special work, the school adheres to the orientation of establishing morality and cultivating people, improves the four new construction measures, benchmarks the school’s school-running positioning, continuously updates the education and teaching goals, deepens the construction of key links in education and teaching, and builds a high-quality talent training system. Our school continues to carry out curriculum ideological and political construction work, strengthens the construction of the education quality assurance system, and thus improves students’ computer professional ability.

2. Analysis of the current teaching status of Computer Composition Principles

Computer Composition Principles is a professional basic course offered by our school for computer majors [7]. It is also a core course required in the postgraduate entrance examination. It plays an important role in the curriculum system and talent training system of this major and is key in improving students’ professional knowledge and skills. In recent years, our school has achieved outstanding results in the teaching reform of the Computer Composition Principles course, such as being approved as a national first-class undergraduate course. However, there are also the following shortcomings in our school’s teaching model.

2.1. Imperfect ideological and political teaching of theoretical courses

This course mainly introduces professional knowledge such as computer hardware structure and basic principles. The course content is very abstract and difficult for students to understand. At present, the theoretical teaching of this course in our school mainly adopts offline classroom teaching. The teachers are poor at using intelligent teaching platforms to achieve the diversity of teaching methods, such as Rain Classroom. In addition, since this course is a computer professional course with a strong theoretical nature, it is relatively difficult to integrate the ideological and political elements in the process of teaching theoretical knowledge. In the current theoretical teaching, the teachers focus on the professional knowledge of this course. Few teachers will cleverly integrate ideological and political elements into the teaching process to attract students to actively learn. These factors have greatly affected the quality and effect of theoretical teaching, which in turn leads to a high failure rate of students in this course.

2.2. Less application of ideological and political elements in practical teaching

In addition to theoretical teaching in the classroom, practical teaching is also a vital link in the entire teaching process. Through “visible, tangible, and doable” practical teaching, computer hardware theoretical knowledge is no longer out of reach for students. At present, the practical teaching of our school is mainly a combination of software and hardware, that is, based on the purchased hardware equipment DICE-CP226 model machine and virtual simulation experiment platform. Among them, the internal design of the hardware equipment is fixed, and students cannot understand the implementation principle of the hardware. In addition, since the hardware equipment is placed in a fixed laboratory, practical teaching can only be carried out in the laboratory. In order to solve the inconvenience brought to students by the practical method based on

hardware equipment, a virtual simulation experiment platform can be used to carry out practical teaching. This platform provides a new environment for the practical teaching of this course. It not only provides various virtual devices required for the experiment but also realizes the autonomous operation, design, and debugging of various devices. Under this platform, students can conceive and design according to their ideas and complete the entire experiment independently. However, no matter which method is adopted, it is not easy to integrate the ideological and political elements into the process of practical teaching.

2.3. Poor combination of theoretical and practical teaching

Theoretical teaching mainly teaches the theoretical knowledge of the course, and practical teaching involves designing some experiments to cultivate students' hands-on abilities. The two should complement each other. At present, the knowledge points and course arrangements of the theoretical and practical teaching of this course in our school are not aligned with each other, which results in a poor connection between theoretical and practical teaching, and it is difficult to form a unified whole. This leads to difficulty in achieving the expected teaching quality and level, which is inconducive to students' overall understanding and mastery of this course.

3. Reform of online and offline teaching modes integrating ideological and political elements

In view of the problems existing in the current teaching mode of Computer Composition Principles, this paper first uses the intelligent teaching platform and the virtual simulation platform to carry out online and offline hybrid teaching, cleverly applying ideological and political elements to theoretical and practical teaching and practicing ideological and political education in courses. Finally, theoretical teaching and practical teaching are combined to form a closed-loop teaching mode, improve the teaching quality and level of this course, and cultivate a group of all-round talents with both moral integrity and ability for the country and society. **Figure 1** shows the main research contents of this paper and their interrelationships.

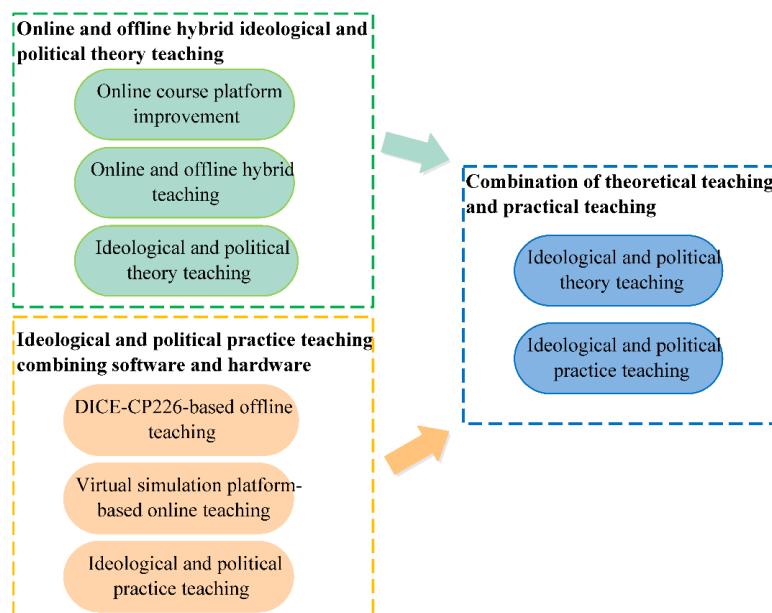


Figure 1. The main research contents of this paper

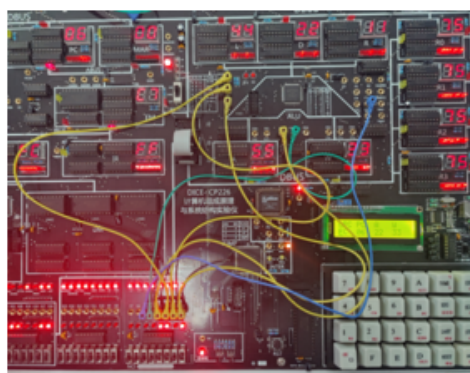
3.1. Online and offline hybrid ideological and political theory teaching

In view of the problems existing in the theoretical teaching of the Computer Composition Principles course in our school, this paper further improves the online and offline hybrid ideological and political theory teaching. Based on the intelligent teaching platform, the initial online teaching platform of the Computer Composition Principles course was improved, so that students could preview the course knowledge points before class, actively participate in class discussions during class, and repeatedly study the knowledge points that they did not understand after class. Through the implementation of efficient online teaching methods, students can be trained to actively learn and think. In addition, online teaching methods can meet students' needs for independent learning and enhance their innovative thinking and ability. Finally, online teaching is combined with offline teaching (e.g., facilitating exercise question answering) so that the two complement each other, maximize their respective advantages, and further improve the teaching quality and effect of the Computer Composition Principles course.

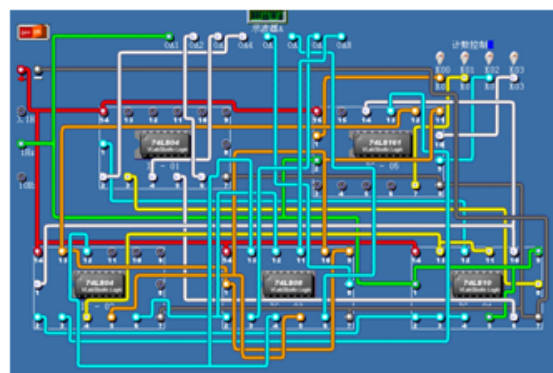
On this basis, ideological and political elements are applied to the explanation of theoretical knowledge of this course. This approach can not only avoid the dullness of explaining professional knowledge, stimulate students' interest in learning, help students understand and master the internal structure and working principle of computer hardware and software, improve the teaching quality of theoretical courses, but also help cultivate students' sense of social responsibility. For example, while explaining the CPU structure, the issue of Huawei's chip supply cut is cleverly mentioned to inspire students to study high-end technology and make contributions to the development of national hardware equipment.

3.2. Ideological and political practice teaching combining software and hardware

Given the existing problems in the practical teaching of the Computer Composition Principles course in our school, this paper utilizes two major experimental teaching platforms, including the hardware equipment DICE-CP226 and the virtual simulation experimental platform, to improve the existing online and offline hybrid practical teaching. **Figure 2** lists the main interfaces of the two experimental platforms. Among them, compared with the offline DICE-CP226, the online virtual simulation experimental platform is more flexible and not restricted by location. Students can carry out experimental tasks anytime and anywhere. Through actual software and hardware operation and design, it can not only help students understand abstract theoretical knowledge, including the operating mechanism of computer hardware, but also improve students' practical skills to solve real-life problems.



(a) DICE-CP226



(b) Virtual simulation platform

Figure 2. The main interface of the two practical teaching platforms

The integration of ideological and political courses is also an important part of the practical teaching of this course. Integrating ideological and political elements into the practical teaching process can not only cultivate students' teamwork spirit but also improve students' professional norms and standards in engineering practice.

3.3. Combination of theoretical and practical teaching

The Computer Composition Principles course consists of theoretical and practical teaching. The two are not independent of each other but have a very close connection. To this end, based on the above two research contents, this paper further combines theoretical and practical teaching integrating ideological and political elements. Theoretical teaching can help students understand the hierarchical structure, working principle, and key technologies of computer hardware. Practical teaching can help students deepen their understanding of classroom theoretical knowledge. Through "visible, tangible, and doable" practical teaching, the theoretical knowledge in the classroom is no longer abstract to students. In the process of solving practical problems, students can improve their practical hands-on ability in designing and implementing simple computer systems, and debugging hardware.

The theoretical and practical teaching are interdependent and promote each other. Through the combination of theoretical and practical teaching, students can not only deepen their understanding of classroom theoretical knowledge but also improve their computer hardware design level. It should be noted that when designing the course outline, it is necessary to ensure that the knowledge points of theoretical and practical teaching are aligned. For example, after the theoretical knowledge of memory word expansion and bit expansion is finished, students need to complete the memory word expansion or bit expansion experiment. Only in this way can theoretical teaching and practical teaching play the greatest role.

4. Conclusion

This paper applies the concepts of intelligent teaching and ideological and political education to the teaching of the Computer Composition Principles course, aiming to explore a new online and offline teaching model of the Computer Composition Principles course that integrates ideological and political education. Based on the intelligent teaching platform and the virtual simulation platform, online and offline hybrid teaching is carried out, and ideological and political elements are cleverly applied to the theoretical and practical teaching of this course, so that the ideological and political education content is combined with the content of the Computer Composition Principles course, forming an online and offline hybrid course ideological and political theory teaching and software and hardware combined online and offline ideological and political practice teaching. By organically integrating theoretical teaching into the ideological and political course with practical teaching, the two complement each other to form a unified whole, jointly promoting the transformation of students' thinking modes and enhancing their sense of responsibility, mission, and innovation.

Funding

- (1) National Natural Science Foundation of China (62302014)
- (2) Key Project of Science Research in Universities of Anhui Province of China (2023AH050492, 2023AH050497)

- (3) Anhui Province Graduate Education Teaching Key Project (2023jyxggyjY193)
- (4) Anqing Normal University Undergraduate Education Teaching Key Project (2023aqnujyxm15, 2023aqnujyxm12)
- (5) Anqing Normal University Undergraduate Education Teaching General Project (2023aqnujyxm34)

Disclosure statement

The authors declare no conflict of interest.

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