

Exploration and Practice on All-round Ideological and Political Design of "University Computer Foundation" Course

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Abstract. Under the background of promoting the construction of "big ideological and political course", this paper takes "University Computer Foundation" Course as an example to carry out the research on curriculum ideological and political teaching. Aiming at the problems such as "superficialization" and "blunt" existing in the current curriculum ideology and politics, combing the characteristics of "University Computer Foundation" Course, this paper determines the Ideological and political design concept; explores the curriculum Ideological and Political elements based on the design concept, and proposes an all-round course politics implementation design method combined with online and offline ways. Finally, the teaching content of "Decimal Numerical Representation" is practiced to show how to implement the curriculum ideological and political concept with the goal of "cultivating morality and educating people".

Keywords: University computer foundation, Ideological and Political Design, moral cultivation, all-round

1. Introduction

No one can stand without virtue, and the root of higher education lies in establishing virtue. Establishing moral character is at the center of the whole process of education, and ideological and political education is at the strategic high ground of casting souls and educating people [1]. As the first computer public foundation course of undergraduate education, university computer foundation is the first button for students to master the computer application skills. Therefore, deepening the ideological and political reform of university computer foundation course is of great significance for the implementation of the fundamental task of moral cultivation, helping students to forge loyal qualities and become the high-quality, specialized talents of information technology [2-3].

University computer foundation course aims to impart basic computational thinking and technical skills, while ideological and political education focuses on the cultivation of values, ethics and social responsibility [4]. The integration of the two is a complex task, and the key is to achieve the "smooth and silent" effect. Teachers need to carefully design teaching content to ensure that ideological and political elements can be naturally embedded in professional courses, avoiding hard splicing or deliberate preaching. Therefore, how to impart basic computer knowledge and technology while cultivating humanistic quality and social consciousness to students is a key challenge in curriculum ideological and political design and implementation [5].

In the new era, the combination of online and offline teaching, case-based teaching and various digital teaching methods provide new platforms and new means for the construction of ideological and political design of university computer basic course. Teachers can make full use of these new platforms and new means to expand the new ideas of the ideology and politics of university computer basic course, enhance the infectious force of curriculum ideology and politics, and better serve teaching and educating people [6]. Through the course construction in recent years, our university has explored a set of feasible and effective teaching mode in the design concept, element excavation, implementation method and other aspects of ideological and political design of "University Computer Foundation" course, which is of great significance to improve teaching quality and the effectiveness of curriculum ideology and politics for educating people.

2. Ideological and Political design Concept of University Computer Foundation Course

When designing the ideological and political concept of this course, we should keep in mind the original mission of "educating people for the Party and for the country", and fully consider the objectives of talent cultivation (i.e., political literacy, scientific literacy, engineering literacy, etc) and curriculum teaching objectives (i.e., knowledge, ability and emotional value objectives) [7]. Combined with the curriculum characteristics, we design four ideological and political themes, which are loving and strengthening of our country, creating the future with wisdom, craftsmanship and dream building, and virtue and character, shown in Figure 1.

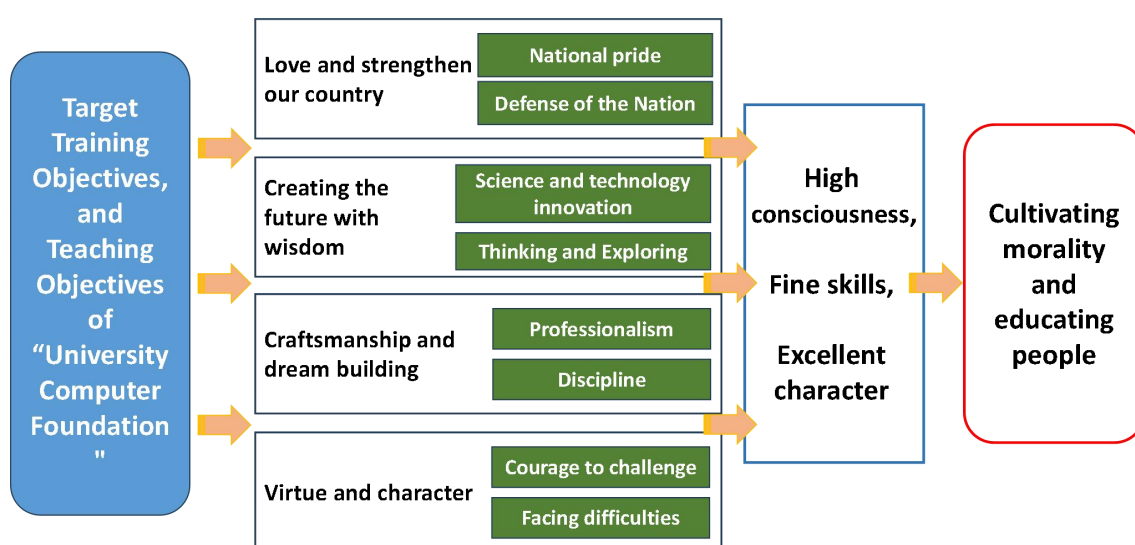


Fig. 1 Ideological and political design concept of university computer foundation course

The theme of "loving and strengthening of our country" aims to cultivate students' deep feelings for the country and the nation, stimulate students' patriotic enthusiasm and national pride, and form a firm political stance through strengthening the education of family and country feelings. The theme of "creating the future with wisdom" emphasizes the importance of scientific exploration and advocates a rigorous scientific attitude and a truth-seeking scientific spirit; At the same time, it encourages students to cultivate an innovative mindset, be brave to challenge traditional concepts, and actively explore new knowledge and technology, so as to make contributions to scientific and technological progress and social development. The theme of "craftsmanship and dream building" focuses on cultivating students' craftsman spirit, that is, the work attitude of excellence and dedication; At the same time, it strengthens security awareness education, so that students can always remain vigilant when engaged in various work to ensure information security. The theme of "virtue and character" advocates students to pay attention to the cultivation and improvement of personal morality, and form firm correct world outlook, outlook on life and values. Through the in-depth implementation of these four ideological and political themes, we are committed to cultivating new talents with "high consciousness, fine skills and excellent character", and contributing to the realization of the educational goal of "cultivating morality and educating people".

3. Excavating Ideological and Political Elements in University Computer Foundation Course

Guided by the above ideological and political design concepts, the course chapters and teaching contents of university computer foundation course are sorted out and analyzed in depth. For the important knowledge points of each chapter, we have condensed ideological and political elements

which fit the ideological and political design concepts, and the main ideological and political elements of this course are given in Table 1.

Table 1. Ideological and political elements of university computer foundation course

Chapter	Teaching Content	Ideological and Political Elements	Ideological and Political Design Concept
Chapter 1: Computing and Society	Brief history of the development of computing devices	Introducing China's significant contributions to the development of computing devices such as the “Shenwei-Taihu Light” supercomputer, to enhance students' national confidence, and cultivate their profound patriotic feelings.	Loving and strengthening of our country
Chapter 2: Introductio-n to Python	Python basic syntax	Explaining the basic syntax of Python (identifier specification, etc.), emphasizing code standardization and guiding students to learn independently by AI, to stimulate students' interest in programming, and cultivate students' lifelong learning habit and self-driven learning ability.	Creating the future with wisdom
Chapter 3: Computatio-nal Thinking	Computational Thinking	Introducing several core steps in using computational thinking to solve problems including decomposition, modeling, etc., to cultivates students' innovative consciousness and ability to solve practical problems with computational thinking.	Creating the future with wisdom
	Typical Algorithms	Explaining complex algorithms such as bubble sorting, to guide students to think and explore deeply, and improve students' logical analysis ability and innovative thinking.	Craftsmanship and dream building
Chapter 4: Information Coding and Data Representat-ion	Fundamentals of Information Theory	Introducing the basic knowledge of information theory such as information and information entropy and showcase the important role of information theory in communication, to deepen students' understanding of national defense security, and stimulate their patriotic feelings and determination to defend the country.	Loving and strengthening of our country
	Information Coding	Introducing the Ariane rocket explosion accident caused by the overflow problem in numerical coding, to help students to develop a rigorous scientific attitude, and have a high sense of responsibility and professionalism.	Craftsmanship and dream building
Chapter 5: Computer system	Computer hardware systems (von Neumann architecture, CPU)	Explaining China's chip “neck” development bottlenecks, the incident of the U.S. sanctions on domestic universities and Huawei, to guide students to face the difficulties and the courage to challenge.	Virtue and character
Chapter 6: Computer Networks and Application-s	History of computer network development	Introducing fiber optic and 5G communication technology to enhance students' national pride, and stimulate their sense of mission to contribute to national scientific and technological progress.	Loving and strengthening of our country

Chapter	Teaching Content	Ideological and Political Elements	Ideological and Political Design Concept
	TCP/IP Protocol	Analyzing how the TCP/IP protocol has changed the way information is disseminated, so as to raise students' awareness of network security and guide students to establish a strong sense of discipline and pay attention to information security and confidentiality.	Virtue and character, Craftsmanship and dream building
Chapter 7: Fundamentals of Database Technology Applications	Database Management System Software	Introducing the development of domestic database management system software, showing the transformation of China's information technology industry from running behind to running parallel and leading, to educate students the importance of independent innovation.	Creating the future with wisdom
	Relational database standard language SQL	Analyzing SQL project cases to simulate database management, data analysis and processing in military operations, to stimulate students' interest in information technology and cultivate students' spirit of scientific and technological innovation.	Creating the future with wisdom

4. All-Round Course Politics Implementation Method Combined with Online and Offline Ways

It is very important to abandon the single positive inculcation mode of traditional ideological and political courses in the process of integrating the ideological and political elements in university computer foundation course. Instead, a more contagious educational approach should be adopted, taking into account the characteristics of students' active thinking and strong information-based learning ability, so that the curriculum ideology and politics to the greatest extent quiet and infectious [8]. The all-round course politics implementation method in university computer foundation course mainly includes the following online and offline ways:

4.1 Embodying Ideological and Political Elements in Teaching Materials

The first is to adopt or compile the university computer foundation course textbook with ideological and political characteristic, which embody patriotic feelings, scientific literacy, craftsman spirit and other ideological and political elements. Second, with the help of intelligent teaching platforms such as Educoder, some expanded reading materials containing ideological and political elements can be put online [9]. For example, the history of China's independent innovation and development of computer technology is presented to students in the form of expanded reading materials to guide students implicitly, which is shown in Figure 2; Stories of outstanding scientists in the field of computers are introduced, such as their struggles, scientific research spirit and patriotic feelings, so as to motivate students to study hard and contribute to the scientific and technological progress of country and nation.

Expanded Reading 1-11: The Rise of the Tianhe Supercomputer Mystery Duel
“Tianhe” supercomputer mystery
 Gong Shenghui Zeng Fanxie

Excerpted from “The Rise of Duel - China's Supercomputing Power”, by Gong Shenghui Zeng Fanxie,
 published by the University of National Defense Science and Technology Press.

Supercomputing: The “Shangganling” of High Technology

In today's era, supercomputer is a veritable “weapon of the state”!

At the beginning of the 21st century, with 100 trillion times per second supercomputer technology peak was overcome. Countries around the world on a new generation of supercomputer attack stood on the same starting line. China's National University of Defense Science and Technology Galaxy team developed the Tianhe-1 “second phase of the system in 2010 successfully mounted the world supercomputer ranking champion.

Fig. 2 Example of online expanded reading materials

4.2 Integrating Ideological and Political Elements in Blended Teaching

4.2.1 Infiltrating ideological and political elements in case-based teaching

Case-based teaching leads students to interactively explore the specific issues hidden in the cases through the specific typical scenarios or events presented in the cases. Infiltrating ideological and political elements in case-based teaching guides students to use what they have learned to solve practical problems and think about the meaning behind them. For example, in the chapter of multimedia technology processing, the application cases of the image processing technology learned in the field of space remote sensing are introduced to help students truly feel the power of science and technology and mobilize their enthusiasm for scientific and technological innovation. Introducing the case of "Huawei's breakthrough in data compression technology" guides students to forge ahead on their own, to realize serving the country with science and technology.

4.2.2 Expanding ideology and politics through digital means

The blended teaching can use digital means to expand the breadth and depth of ideological and political education. Through digital means such as online learning platform and multimedia teaching resources, ideological and political elements can be presented to students in a more vivid and graphic way to improve their learning interest and participation. For example, micro videos about the latest development results of artificial intelligence can be made to bring visual impact and spiritual shock to students, so as to encourage students to pursue excellence and innovation; By playing short films related to the chip industry, students are inspired to think about the future of the domestic chip industry, and are motivated to aim at the forefront of science and technology, bridge the gap, and be courageous to go beyond. With the help of practical topics in “go-through” mode provided by Educoder, students' interest in learning and independent learning ability can be stimulated. For example, Figure 3 shows the result list of a practical topic, students can check the list and know their own ranking.

1		student1	2024-03-24 21:14	pass	4m34s	+910coins
2		student2	2024-03-13 19:05	pass	5m23s	+910coins
3		student3	2024-03-16 20:21	pass	7m21s	+910coins
4		student4	2024-03-14 13:16	pass	13m28s	+910coins
5		student5	2024-03-17 08:04	pass	18m25s	+910coins
6		student6	2024-03-13 23:54	pass	18m56s	+910coins
7		student7	2024-03-27 21:32	pass	20m6s	+910coins

Fig. 3 A list of programming practice topics

4.3 Accompanying Ideological and Political Elements in Practical Training Session

In the practice teaching, the task-driven experimental teaching method is adopted, in which the experiment tasks are arranged by using the “go-through” mode of Educoder platform. Students can complete the experiments by themselves according to the task requirements, or they can team up to complete them. Through in-depth understanding of theoretical knowledge and optimization of practice, it exercises students' practical ability and cultivate their good engineering literacy; it strengthens students' training in independent learning and cooperative exploration, and improves their practical innovation ability; it shapes students' spirit of focusing on scientific research, diligent study, striving for excellence, and continuous innovation.

Through the above three pathways, curriculum ideology and politics is carried out through the whole process in class and out of class in an online and offline-combined way to implement the fundamental goal of cultivating morality and educating people.

5. Ideological and Political Case of University Computer Foundation Course---Decimal Numerical Representation

Inside the computer, all data, including decimal numbers, is stored in binary form. However, some decimal numbers may not be accurately expressed in binary [10]. The teaching content of "decimal numerical representation" is practiced adopting the above ideological and political design concepts and pathway to achieve the teaching goals, which is as follows:

(1) In the theoretical teaching, the real case of "American Patriot missile interception failure" in the history of space is introduced. The main reason for the failure of interception and launch is that the timer in the Patriot missile took 0.1 seconds as the step length, and the computer cannot accurately represent 0.1. After 100 hours, the missile flight produced an error of nearly 700 meters, resulting in the interception failure. With the help of real cases, students are guided to pay attention to details, strive for excellence, and develop logical thinking which emphasizes safety, rigor and carefulness. At the same time, animation, video and other digital means (as shown in Figure 4) are used to attract students' attention and curiosity, in order to enhance the teaching efficiency.



Fig 4 "American Patriot missile interception failure" case display

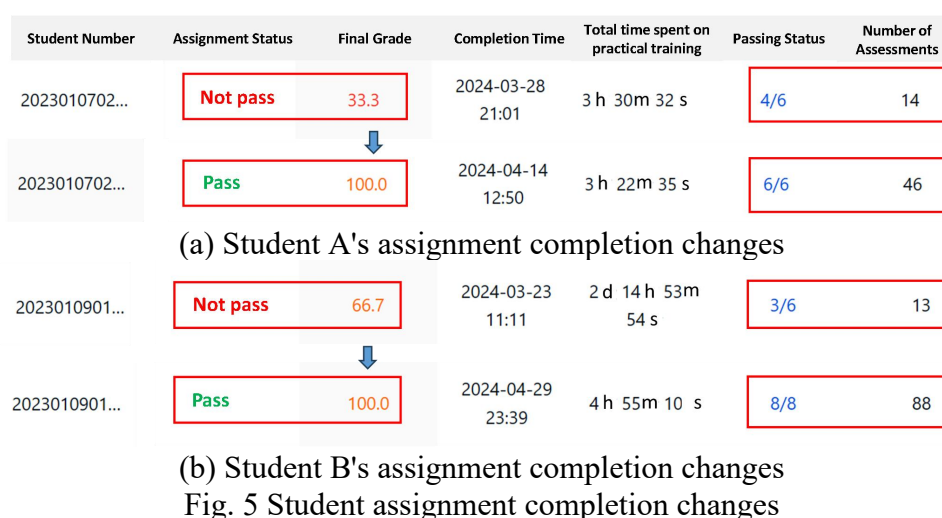
(2) In practical teaching, students are guided to simulate the process of Patriot missile interception failure through python programming. Thus, through intuitive data display, it deepens students' understanding of numerical representation in modern computer, cultivates students' behavioral awareness of paying attention to details, applying knowledge to practice, linking theory with practice, and encourages them to work hard and serve our country.

(3) In extracurricular expansion, reading materials are provided for students through an online and offline combined way to understand the requirements of computer numerical representation on computer processing bits, i.e., the requirements and challenges on computer hardware. By means of extra-curricular reading, we can expand the students' knowledge, guide them to think about the

current situation of computer technology development, stimulate their enthusiasm for learning and interest in scientific research, and contribute to our country's science and technology.

6. Evaluation of Ideological and Political Teaching in University Computer Foundation Course

Although it is still a difficult problem to evaluate ideological and political teaching in university computer foundation course, the good teaching effect of ideological and political teaching is bound to stimulate students' passion and effectiveness in learning of the professional courses [7,8]. With the help of Educoder, Rain Classroom or other intelligent teaching platforms, students' learning process data, such as the change of students' enthusiasm for completing assignment, class activity, etc., can be observed. That is we can indirectly evaluate the teaching effect of ideology and politics through the change of students' learning status. For example, Figure 5 shows the changes in the completion of practical assignments in Educoder platform for two students, A and B respectively, which reflects that the students' learning attitudes are more correct and their motivation for learning has been improved. In addition, on the basis of completing the learning content of the course, students also actively participate in the Chinese Computer Application Competition and so on. The high participation rate and excellent results can also indirectly reflect that the all-round course politics implementation method combined with online and offline ways helps to improve the teaching effect and realize the goal of educating people.



7. Summary

University computer foundation course, as a stepping stone for undergraduate students to get involved in the computer field, and its ideological and political design is of great importance to stimulate students' professional enthusiasm and shape scientific spirit and professional quality. This paper deeply analyzes ideological and political integration elements of university computer foundation course; Then, combined with the relevant practical experience in our university, we summarize up the all-round ideological and political implementation method of "University Computer Foundation" course, and give the ideological and political implementation design case of the teaching content of "decimal numerical representation".

Using the online and offline combined ways, through the three links of pre-course reading and development, in-class lectures and post-course practice, course politics can be integrated with an all-round way, forming the organic unity of knowledge transmission and ideological and political cultivation, which is of positive effect on the enhancement of teaching quality and achievement of talent cultivation goals.

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