

Exploration and Practice on “Moral Penetrating Class” Teaching Model in Higher Education—Taking "Digital Logic" Course as an Example

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Keywords: Moral Penetrating Class; Digital Logic; Moral Education; Higher Education; Teaching Model

Abstract. In order to meet the requirements of nowadays scientific and technological development and high-quality practical talent cultivation and better implement socialist core values, this paper organically penetrates content of moral education into classroom teaching and teaching activity and explores the teaching model and teaching method of “moral penetrating class”, taking the course of Digital Logic as an example, aiming at the present shortcomings of university students such as lack of collective idea, poor self-discipline and low learning initiative. Directing at the target of “moral penetrating class” and stressing the idea of “students first”, this paper puts forward the specific implementing schemes of moral penetration teaching. In order to comprehensively use a lot of teaching methods and means in teaching process, this paper raises a designing model combining the concepts of six-step teaching method and teaching activity chain and penetrates content of moral education into it, so as to realize “moistening things softly and silently like spring breeze and rain”. Such practice not only enriches the connotation of moral education of universities but also offers a brand-new method and teaching model for computer professional courses teaching in universities.

Introduction

Moral education is an important part of personnel training system in Colleges and universities, and it is a powerful guarantee for training high quality talents. The course of Digital Logic is an important compulsory basic course in computer science and technology major and also a “foundation stone” of hardware course, acting as a connecting link between the preceding and the following in computer hardware course. With a mission of cultivating students’ basic skill of analyzing and designing digital system, it lays a foundation for cultivating technicians for computer system analysis, system design and system integration. College curriculum has the characteristics of practical and professional. How to integrate the content of moral education into the teaching of Digital Logic is the main problem in this paper.

Teaching Objectives of Moral Penetrating Class

The goal of moral education teaching is to actively explore ways and means of moral education, to combine knowledge with moral education, to bring out the best in each other, and finally to build up the innovative moral education system in higher education. The innovative moral education system in higher education mainly includes four aspects as follows: construction of "good faith" as the core of the human morality; construction of "responsibility" as the core of the work morality; construction of “patriotism” as the core of citizen morality; construction of "self perfection" as the core of the social survival morality.

Teaching Content Design of Moral Penetrating Class

(1) Professional ethics education

Cultivate students’ professional consciousness of loving work and being devoted to duty, making them have high vocational sense of honor and pride; cultivate students’ integrity consciousness of

stressing quality and emphasizing credit, making them seriously perform commitments they make to the society and other people; cultivate students' rule consciousness of observing law and discipline and competing fairly, making them conscientiously resist various bad profession practice; cultivate students' cooperation consciousness of collaboration and overall situation, making them help and support each other; cultivate students' enquiry mind of hardworking and continuous progress, making them keep up with the pace of era development, enjoy learning, be good at learning and improve skills constantly; cultivate students' enterprising spirit of striving hard and being diligent and thrifty, making them engage in their profession with the work attitude and responsibility a master has.

(2) Social moral education

Social moral is a basic behavioral norm in social public life and an important component of socialist moral system. Cultivate students' personality of behaving well, respecting others and being kind and polite, cultivate students' social responsibility of enjoying helping others and acting bravely for a just cause, cultivate students' social overall situation idea of caring for public properties, observing rules, protecting environment and loving nature, and cultivate students' living philosophy of knowing laws, obeying laws and controlling themselves.

(3) Collectivism education

Guide students to love collective, care for collective, focus on collective benefits, and understand that they should stress country and collective benefits at any time and that personal benefit should follow collective benefits; educate students to actively compete for honor for collective and cherish and maintain collective honor.

(4) Education on view of life and view of value

Cultivate students' noble personality of being scrupulous in separating public interests from private interests, not being greedy for small profits and goodness & integrity, cultivate students' strong personality of not being afraid of difficulties and constantly striving to become stronger, and educate them to observe socialist concept of honor and disgrace represented by "eight honors and eight disgraces"; cultivate students' view of happiness of being indifferent to fame and wealth and keeping silence, and cultivate students' life idea of loving life, loving living and being positive and optimistic.

(5) Scientific spirit education

Inspire students' thinking and promote their complete and in-depth understanding on things, by means of innovation, and cultivate students' realistic approach spirit of freeing mind and seeking truth from facts; make them have the demonstration spirit of fact respecting and honesty, the entrepreneurial spirit of stubbornness, insistence and perseverance, the innovation spirit of advancing with times and exploiting innovation, the skepticism of daring to query without fearing power, the independent spirit of pursuing truth and upholding democracy, the team spirit of collaboration and mutual help, the inclusiveness of speaking frankly and sincerely and making common progress and the outstanding spirit of squareness and excellence.

Specific Implementing Schemes of Moral Penetrating Teaching

Moral Penetrating Teaching is implemented through the following five forms:

(1) Examples

Introduce the question needing to be explained by introducing concrete living examples and life scenes. Analyze the nature of problem by means of analogy and lead students to grasp the nature of problem and think about the problem from multiple perspectives so as to make them develop scientific spirit of science & preciseness and innovation and understand the principle of behaving and working. Encourage students not to be afraid of difficulties, to be bold in querying and to find their own advantages. For instance, when explaining circuit design including unrelated conditions, lead students to comprehensively consider problem and solve problem using every condition which can be used, through comparison of two different methods, so as to simply circuit structure; when explaining circuit design with multiple output variables, compare sharing phenomena in life (knowledge sharing, homework copying, bid cheating and so on) and then summarize which are

helpful sharing (knowledge sharing) and which are harmful sharing (homework copying, bid cheating) so as to guide students to observe laws & disciplines and professional ethics, be honest and trustworthy and enjoy helping others.

(2) Experimental Process

During experimental process, create group collaboration and clear division of labour to cultivate students' professional spirit of collaboration, self-discipline, devotion and forward-looking. For the problems arising in experimental process, encourage students to expand their way of thinking and be brave to innovate, and make them develop scientific spirit of seriousness, preciseness and excellence. Cultivate them to form work style of being honest & trustworthy and seeking truth from facts through the inspection and acceptance of experiments.

(3) Current News

Pass on positive energy timely at class and after class combining current news and social hot spots happening. Make students develop character of carrying forward justice, punishing the evil and praising the good, being honest and observing laws, being upright and kind, and being ready to help others, through typical examples. Using successful pioneering deeds, encourage students to expand their way of thinking, go ahead bravely, make persistent efforts and be willing to devote themselves. Lead students to find their niche in life, do things with purpose and do well in career planning by interpreting employment policies. Choose appropriate examples based on the employment situation and test result of this major to help students regain confidence, excavate their potential and have stronger learning enthusiasm.

(4) Celebrity Anecdotes

Explain celebrity anecdotes combining this major's characteristics or order students to watch celebrity stories after class to make them learn from examples and carry out practice while increasing knowledge. Make students develop scientific spirit of science, preciseness and progress by explaining the story of Von Neumann; make them develop entrepreneurial spirit of not being afraid of difficulties and making persistent efforts by explaining the story of Qi Baishi. Cultivate students' attitude of being optimistic, aggressive, active and upward and feeling of loving work, devoting to duty and loving the country and the people; encourage them to depend on themselves and become strong combining business stories of contemporary celebrities. Make students master the rules of conduct of respecting others and getting along with others equally through some visiting topics.

(5) Personal Experience

As a teacher, first of all, he/she should elevate his/her own moral cultivation, constantly improve himself/herself, pass on positive energy, influence students unconsciously and naturally and grow jointly with students. In teaching, he/she should share his/her learning and employment experiences to lead students to choose correct learning directions and avoid detours. Combining some typical living examples, he/she should guide students to care about their parents, respect teachers and love school, love class and be ready to devote themselves. He/she should pay attention to feeling exchange with students, respect students and timely guide them to set up active and optimistic view of life and correct view of value.

Teaching methods and means of Moral Penetrating Class

Mobile devices and a variety of teaching methods are used to realize the diversification of teaching modes. Classroom teaching uses a variety of forms, combined with theoretical knowledge and practical application, to maximize the mobilization of students' initiative, thereby improving the quality of teaching. In the course of teaching, the teacher uses heuristic teaching method to put forward some living examples or problems, and guide the students linking up the two seemingly isolated knowledge point, and then help them to constitute a complete knowledge system. By using analogical teaching method, some concepts, strategies and ideas are related to the vivid examples in real life, which makes it easier for students to understand and grasp the teaching content and grasp the key ideas. Based on multimedia teaching, the traditional teaching method is used to supplement and improve the students' perceptual and rational knowledge. Case teaching method is used to help

students understand with the aid of physical and case. Interactive teaching methods are also used to encourage students to participate actively, and take the initiative to explore. This method improves the interest of study, at the same time, it also improves the students' ability to innovate.

In order to better practice the concept of “creative education”, and explore new ways of turning teaching, during the class teaching, mobile phones, tablet and other portable devices with the help of software APP are used to carry out a variety of forms of teaching activities, such as: brainstorming, online group discussion, classroom testing, etc.,and then a “mobile handheld school” is build up. This new type of flipped teaching mode can dig the potential of the students, and cultivate their innovative ability, so it can achieve good teaching results.

Teaching process design of Moral Penetrating Class

(1) Teaching process design

The whole teaching process is divided into six steps, namely, the six-step teaching method. Teaching process design flow flow chart as shown in Figure 1.

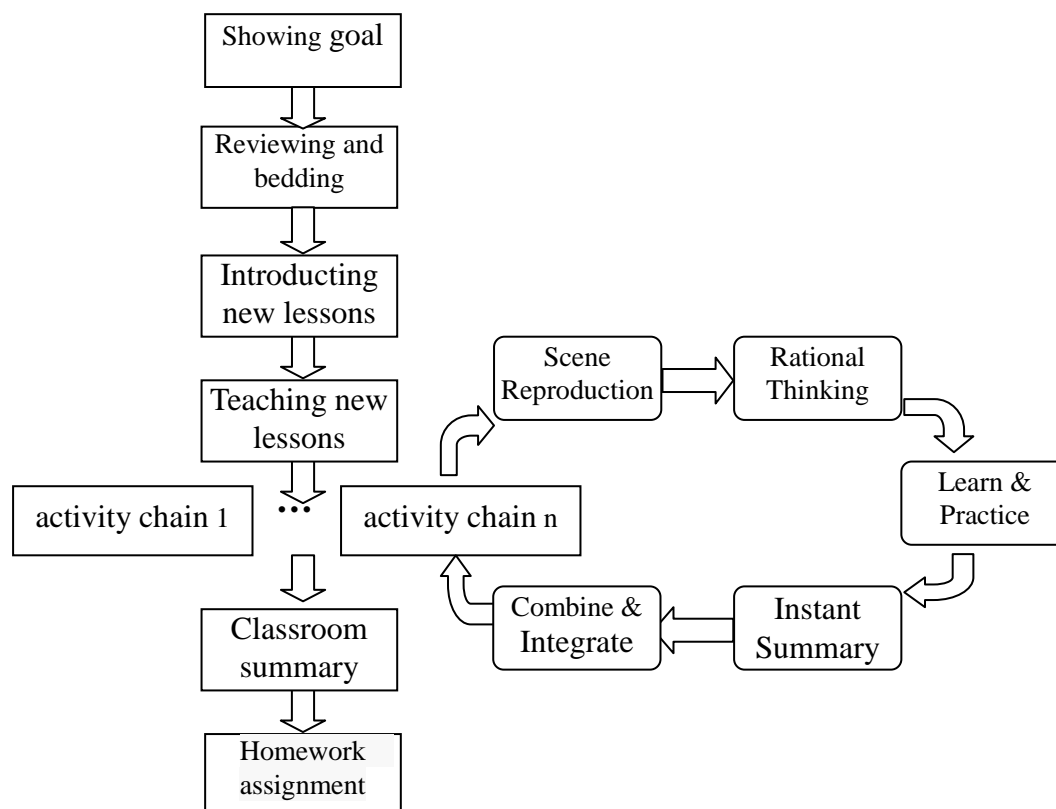


Fig.1. Teaching process design flow chart

- Showing goal: Before the class, the main content of this lesson is written on the blackboard, showing to the students. Let the students have a general understanding.
- Reviewing and bedding: Ask the students of questions learned last lesson, and review the relevant knowledge of this lesson. The main knowledge points are written on the blackboard.
- Introducing new lessons: The main content of this course is put forward by asking questions to initiate class discussion.
- Teaching new lessons: The new curriculum content is divided into several knowledge modules and each module corresponds to a teaching activitie chain. Each activity chain includes five sections: Scene Reproduction, Rational Thinking, Learn & Practice, Instant Summary, Combine & Integrate.
- Classroom summary: The teacher summarizes the content of the classroom teaching, and

points out the matters need to attention. By emphasizing the details of the deal, teacher hopes students to develop a scientific, rigorous attitude and innovative thinking, and then improve their ability to analyze and solve problems.

- Homework assignment: Combining with the content of this lesson, the teacher assigns homework to students.

(2) Design of teaching activity chain

- Scene Reproduction: Teacher uses typical examples of life to introduce the problem;
- Rational Thinking: Teacher explains the essence of the problem by citing data and analysis the problem deeply.
- Learn & Practice: Teacher aims to achieve the problem demonstration, by introducing subject examples, which are closely related to the knowledge.
- Instant Summary: After the completion of the problem, the teacher summed up the substance of this type of problem, where you can add moral education content according to the actual situation.
- Combine & Integrate: Teacher uses brainstorming and other forms to expand the application of the problem, and achieve cognitive sublimation of students.

(3) Design example of teaching activities chain

Example: combinational logic design problem with un-inversion variable provided. This problem requires students to design a combinational circuit, used to determine the compatibility of blood donors and blood recipients.

【Scene Reproduction】

First, ask the students to watch a news video named “Ji'nan people queuing overnight to donate blood for pregnant women” within one minute.

Then ask the students to discuss:

- What do you think about this news? What would you do if you met this kind of thing?
- Not all people are suitable for blood donation, only the blood type compatibility of people can donate blood. Then what is the compatible principle of the blood type?

【Rational Thinking】

Medical examination of blood type is the use of chemical reaction, if we start from a computer professional point of view, to design such a combination circuits, in order to determine whether blood type of donors and recipients are compatible, do you know how should you do? Next, the rules of blood group coding are introduced. This problem is gradually moving towards the combinatorial logic design problem.

【Learn & Practice】

The expression of the output function is written according to the blood group compatible coding rule. Two methods will be used. The first method is a general solution. According to the general rules of blood type, an output expression is got, and then the students could find that the result is not ideal, because the circuit is not simple enough. Next, teacher begins to guide students changing the coding rules, by putting the O blood on the front line and defining the variables. At this time the students find that the expression of the output function is simple. Finally, teacher ask students to compare the two methods and give their own judgment. Obviously, the second method is ideal.

【Instant Summary】

This example tells us:

- From the point of view of solving the problem, different coding methods determine the structure of the circuit. So we should pay attention to try a variety of methods and strive for perfection.
- Blood donation, duty bound, gifts of roses, fragrance in hand. Willing to help others is a noble virtue. If you give your help to people who
- If you often help others when they need help, the world will become more harmonious and beautiful.

【Combine & Integrate】

Initiate a brainstorming session: Teacher provides a similar problem with un-inversion variable

provided. The circuit should be realized by NAND gates. After finished, students are required to take photos about their results with a mobile phone and upload the photos to the cloud-class.

Conclusion

After a semester of teaching and learning, good teaching effect has been achieved obviously. In the past, some students have a weak sense of time, often late for school. Some students are not serious, and do not seek to progress. Homework plagiarism is a common phenomenon. Especially in computer courses, the program plagiarism is even more serious. Most students do not have a sense of collectivism, and they are very selfish. Now through the moral education, the above phenomenon has been greatly improved, the whole class has a new spirit. Varieties of classroom teaching methods are more likely to be accepted and recognized by students. Network platform and the use of mobile phone APP make learning more personal, and greatly improve students' interest in learning. Practice proves that the above measures can achieve the purpose of improving the teaching effect primely. But the moral education is a long-term process, and it needs the teachers and students to insist and work hard for a long time.

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