



# The exploration and research of the effective integration of the cultivation of values and moral values and teaching

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**Abstract.** With the development of the Internet and the deepening of artificial intelligence technology, education and teaching have also ushered in earth-changing development. How to cultivate high-quality applied talents is a problem we face and think about. This paper will explore how to cultivate values and ethics while teaching theoretical knowledge in combination with the course "Digital Logic Circuit".

**Keywords:** Value; Moral outlook; Blend in; High-quality application type

## 1 Introduction

With the rapid development of science and technology, the Internet has become an indispensable part of people's lives. People can read news, study and play games on the Internet. Young people are exposed to more abundant and diversified information, which requires that the current education can no longer be limited to the imparting of theoretical knowledge in books and the cultivation of students' practical ability. At the same time, we should pay attention to the cultivation of students' outlook on life, moral values and values. There is a saying in ancient Chinese literature: "virtue without talent is not enough to help him succeed; Talent without virtue, virtue will help evil." Young students are the builders and successors of the future society, and ideological and moral construction is particularly important in the critical period when their personal values and moral values are formed[1].

The combination of ideology and politics with teaching is definitely not to pull a hard set and turn theoretical teaching into ideological and political courses, but to fundamentally achieve curriculum ideology and politics, and more is the integration of "moisten things silently". While teaching professional theories, it also exerts a subtle influence on students in various aspects such as the formation of good student habits, the formation of rigorous academic attitude, the formation of pioneering and innovative spirit, and the cultivation of patriotism[2]. Let students learn professional knowledge at the same time, personal quality is also improved.

After years of teaching reform and exploration of moral education, we have found that the integration of ideology and politics is not only in the classroom, but also in the after-class teaching assistance. We have divided the whole teaching process into three

stages before class, during class and after class[3], with different designs for each stage. At the same time, we have integrated these three stages with our school motto of "virtuous, truth-seeking, erudite and innovative". This article takes "Digital logic Circuit" course as an example, mainly discusses from the following points.

## 2 Teaching Reform and Moral Education Teaching Exploration

### 2.1 "Thick and Learned", Inspirational Practice, Positive Achievements

All kinds of teaching activities are carried out from the improvement of teachers' own quality. As the knowledge imparts and the most direct contact with students, teachers should first study hard, study hard, learn new technologies, be brave to forge ahead, broaden their scope of knowledge and vision, improve their ideological and political awareness, and strive to improve their comprehensive quality, so as to better lead students to make continuous progress. Therefore, the teacher of their own high standards, set an example, this is the most basic elements of moral education.

### 2.2 With the goal of Cultivating "High-Quality Applied Talents", do a Good Job in Teaching Deployment (before Class)

First of all, the teaching plan should be sorted out and included in the curriculum's educational objectives, moral education elements, ideological and political points, and teaching design. "High-quality applied talents" requires students to not only have excellent professional knowledge (technical ability), strong learning ability and innovative application ability (innovation ability). I also have good communication skills, teamwork skills, leadership skills, logical thinking skills and problem-solving skills. Starting from these perspectives, the moral education elements involved in the teaching of Digital Logic Circuit are decomposed and designed as shown in Table 1:

**Table 1.** Sheet 1 Design of moral education elements

Chapter distribution	ontent of courses	Element of moral education
First class	Course overview	Promote patriotism and inspire responsibility.
Combinational logic circuit	Boolean algebr	Rigorous and serious, the pursuit of true knowledge of the scientific spirit and positive and optimistic attitude to life.
Sequential logic circuit	Flip-Flop	<ul style="list-style-type: none"> <li>✧ No snowflake is innocent in an avalanche.</li> <li>✧ Stimulate students' learning interest and enthusiasm. Small devices play a large role.</li> </ul>
	Logical design	Cultivate students' "truth-seeking" spirit and computational thinking.
	Course design	Modesty and prudence, unity and cooperation.

The functions of each element of moral education are as follows:

1. Course overview----Promote patriotism and inspire responsibility, By introducing the position and function of the course "Digital Logic Circuit" in the curriculum system of computer science and technology majors, and combining the technical restriction event, For example, the "ZTE incident" and "Huawei incident" show the importance of technology control. The important role and application prospect of this course are introduced, and students' patriotic feelings and responsibility are stimulated.
2. Boolean algebra---- Rigorous and serious, the pursuit of true knowledge of the scientific spirit and positive and optimistic attitude to life, Boole character introduction: Although Boole grew up in a poor environment, but his thirst for knowledge and self-learning ability made him gradually become an outstanding mathematician and logician. Inspire and encourage students to continue to "seek truth", "explore" and "innovate", admonishing students that in the era of rapid development of science and technology, they need to have the consciousness of independent learning and lifelong learning, and have the ability to continue to learn and adapt to social development.
3. Flip-Flop

There are two points here:

First, No snowflake is innocent in an avalanche.

Do not stop doing a good thing because it is too small, nor do you stop doing an evil thing because it is too small. An ancient Chinese fable uses the phrase "the straw that broke the camel's back" to describe when things are pushed to their limits, when a small thing can change the whole picture. It's like a trigger, a trigger, an instant change. Therefore, we should not stop doing a good thing because it is small, nor do we do a bad thing because it is small, we should believe in the "avalanche effect".

Second, Small devices play a large role, introduce the application field of triggers, such as computer memory, stopwatch, alarm system, etc., through the evolution and application of triggers, stimulate students' interest in learning and improving circuits.

1. Logical design ---- Cultivate students' "truth-seeking" spirit and computational thinking, Through logical abstraction, the symbolization of thinking is accomplished, and students' "truth-seeking" spirit and computational thinking are cultivated. It enables students to conduct research on complex engineering problems in the field of computer applications based on scientific principles and methods related to computer disciplines.

The cultivation of computational thinking ability has become one of the hot research topics at home and abroad. In March 2006, Head of the Department of Computer Science, Carnegie Mellon University.

Professor Ren Zhou Yizhen published an article entitled "Communications of the ACM" in the authoritative journal of American computers Thinking - "Computational Thinking" article, The concept of computational thinking was put forward for the first time[4], Academician Chen Guoliang believes that scientific thinking can be divided

into theoretical thinking, experimental thinking and computational thinking, and computational thinking is one of the three components of scientific thinking. The computational mind is everywhere[5], Computational thinking is the application of mathematical, computer and other theoretical knowledge to solve practical problems. Through thinking training, students will find that some seemingly complex problems, logical abstraction, logical relations are actually very simple, so in circuit design, logical abstraction is the first place.

2. Course design ---- Modesty and prudence, unity and cooperation. Independent innovation is not done behind closed doors, not alone, students can assume the role of individuals, team members and leaders in a multidisciplinary team context. In the process of guiding students' team learning and self-exploration through the course design, students' practical innovation ability, team collaboration ability and technology application ability are improved.

The course "Digital Logic Circuit" was opened earlier, in the first year of college. Students at this stage continue the learning habits of high school, and many of them have no sense of teamwork at all. Therefore, in the course design process, it is necessary not only to apply the theoretical knowledge learned, but also to guide students' sense of teamwork and assist each group in task division and effective communication.

Combining the design of the above moral education elements, combining discipline competition and scientific research, adopting project teaching method and designing teaching cases, In addition, the teaching platform is used to send course tasks before class, use flipped classroom or case analysis in class, and strengthen them after class. Combining the three stages, teaching and moral education complement each other.

### **2.3 The Combination of a Variety of Teaching Methods, Moral Education Should be "Moistening Things Silently" (in Class)**

As is shown in Fig1, Moral education and teaching theory penetrate each other, and really penetrate moral quality, values and cultural literacy into the circuit classroom[6,7], but it should not be too blunt. Classroom moral education is not moral education curriculum. Through the design of the above moral education elements, with full preparation before class, the class will be more efficient. Flipped classroom can be appropriately used in class to discuss cases. These cases can be related to design cases, or they can be related to theoretical knowledge of life, and pay attention to the cultivation of students' thinking.

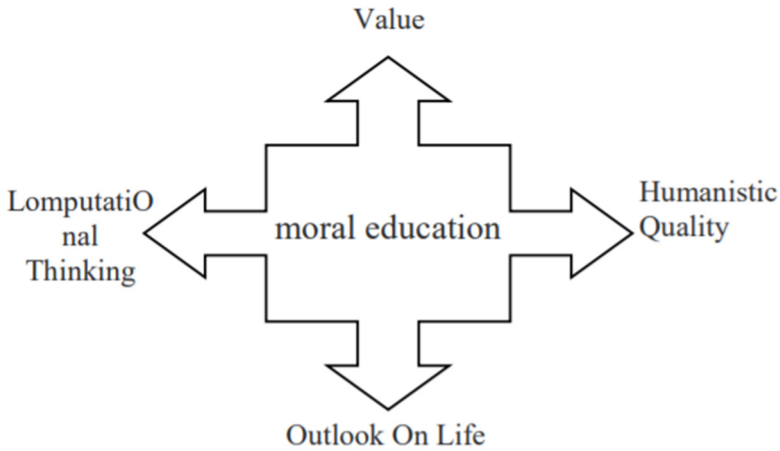


Fig. 1. Moral cultivation

At this point, the training of thinking is relatively simple, teachers only need to pay more attention to the guidance of students, such as how to carry out logical abstraction in combinatorial logic design; In the BCD adder, the input binary value is converted to BCD code and then addition operation, or advanced addition operation and then converted to BCD code output, coding conversion can be first, and how many different programming methods can be used for the same function. The discussion of such logical relations not only requires students to be able to correctly analyze logical functions, but also to be able to divergent thinking and solve problems with different ideas, so as to improve students' computational thinking ability.

#### 2.4 Combining Discipline Competition and Scientific Research, Strengthen the Professional Knowledge of after-School Auxiliary Links and Improve the Quality of Students (after Class)

First of all, we should have the spirit of "seeking truth" for basic knowledge and establish the cultural concept of integrity.

Homework is an indispensable part of the teaching process, through which the knowledge can be strengthened and consolidated. Therefore, urging students to complete homework independently and cultivating a good style of study can truly improve students' autonomy in learning[8].

Secondly, combined with the discipline competition, encourage and give play to the students' "innovative" spirit, and cultivate patriotic feelings.

Just completing the basic theoretical knowledge in class is far from enough for the improvement of professional application ability, and it is also necessary to encourage students to actively innovate and tap their potential. One of the most effective ways is subject competition. Subject competitions related to digital logic circuit courses include system ability and integrated circuit competitions, which are related to chip design.

From the "ZTE Incident" to the "Huawei incident", the students have learned the painful lesson that core technology is subject to people. By participating in such competitions, the students will find that they can also design some high-end chips, especially the students who win the competition, they will find that their knowledge can be integrated with the society and make contributions to the society. Thus greatly increasing their sense of social responsibility and mission.

After class, it is an important supplement to the teaching process. Class time is limited. In order to make more effective use of the after-class stage, students should first improve their awareness of honesty and trustworthiness and put an end to various false behaviors. According to the students' mastery of knowledge, teachers can cultivate each student's test training through the online remote experiment platform. Based on the standardization of education and teaching, the theory is to better guide and guide practice, and at the same time, it is guided by scientific research and focuses on discipline competition to effectively improve students' application ability, innovation ability and team cooperation ability. At the same time, discipline competition also provides teaching materials for classroom teaching, which is also of great help to the improvement of teachers' quality and classroom teaching quality.

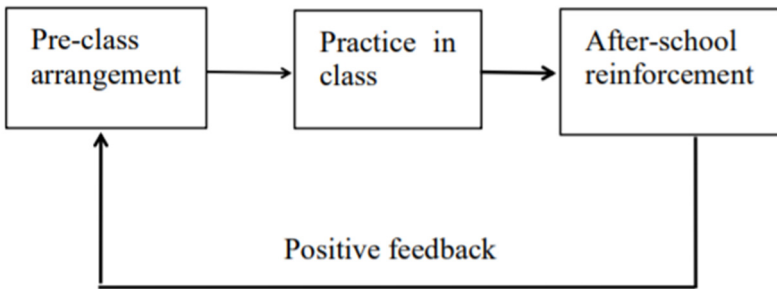


Fig. 2. "Three plus one" virtuous cycle

### 3 Conclusion

This paper takes "Digital Logic Circuit" as an example and aims to cultivate high-quality applied talents. Based on the three stages of pre-class, mid-class and after-class, combined with our school motto and project teaching method, and integrated with ideological and political elements, this paper starts from pre-class deployment to the practice of planning and deployment during class, and then strengthens the link after class. The whole process is not only the cultivation of students' quality and application ability, but also the improvement of teachers, and finally forms a virtuous circle, As is shown in Fig 2. According to the actual operation and feedback, students' innovation ability, application ability, practical problem solving ability, computational thinking and social responsibility have been greatly improved.

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