

A Preliminary Study on Integration of Ideological, Political Courses into Fluid Mechanics Course

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Abstract: It is important to take ideological and political course in current universities. An urgent problem exists among college teachers is how to impart professional knowledge to college students with guiding them to recognize the world and themselves in the right path. According to the characteristics of the basic courses and the characteristics of teaching methods in mechanical engineering, this paper takes fluid mechanics as an example to analyze how to excavate the ideological and political elements from the course. In order to improve students' interest in learning and master the professional knowledge, promote the affinity of ideological and political education, and help students recognize the world and themselves softly, this paper analyze the method of combining the professional knowledge of fluid mechanics with moral education skillfully.

1. Introduction

The country and nation will be strong while the education is strong. On December 8, 2016, the general secretary Xi Jinping clearly pointed out that the foundation of the universities is to foster virtue through education . We must adhere to foster virtue through education as the central link. Run the ideological and political work through the whole process of education and realize the whole process of educating people in all directions. Strive to create a new situation in the development of China's higher education. The growth of contemporary college students has its own rules and the most important thing is all-round development^[1].

As a college teacher, how to impart professional knowledge to students with guiding their world outlook, outlook on life and values correctly is a urgent problem, which we should focus on at present. If the thoughts of students are positive and correct, the goal of "educating people" in the process of teaching will achieve. The basic courses for mechanical majors usually require strong logical reasoning. Therefore, most professional teachers think that it is difficult to integrate the rational thinking characteristics of basic courses with the emotional ideological and political education^[2]. As a teacher of mechanical department, how should we explore the connection between knowledge points in professional courses and ideological and political education? Meanwhile, the

students will not hate the ideological and political education. The study in this paper can help us take ideological and political education softly and make students receive the ideological and political elements we transmit to them subtly while learning knowledge points.

As an important branch of mechanics, fluid mechanics is an important technical foundation course. It takes fluid as the research object, studies the relationship between fluid and fluid and the relationship between fluid and solid. It is widely used in engineering practices, such as the working principle of manometer, flowmeter and other instruments. As a basic course of mechanical, it is necessary to carry out the ideological and political research of courses related to fluid mechanics.

2. The deficiency of ideological and political research in fluid mechanics course

At present, the domestic ideological and political elements of fluid mechanics have not yet played a full role in educating college students. The main reasons are as follows:

First, the characteristics of the curriculum cause very few ideological elements included in the textbooks. Many concepts in fluid mechanics are abstract and easily be confused. It has a lot of formulas and definitions^[3]. The course's textbook requires strong logical reasoning. In addition to the small amount of fluid mechanics developments history data that may be involved in the introduction, the textbook inevitably lacks the ideological and political elements of education.

Second, same with most courses, teachers lack thinking about the elements of the course in the preparation process^[4]. As a discipline to explore the law of fluid motion, there are a lot of professional knowledge points. However, the time arranged by department is usually pressed. The main thinking about the course considered by most teachers is how to explain the knowledge points thoroughly. Hence, there is no time and energy to carry out the function of ideological and political elements.

Third, teaching methods are relatively behind. Yu^[5] pointed out that current teaching and training of young teachers mainly focus on teaching skills. They have the ability to explain the more difficult knowledge in the classroom in an easy-to-understand way. Students absorb the knowledge by the kind of cramming teaching method with listening attentively and taking notes carefully in the classroom. But it is easy to make students think that study professional knowledge is boring. This method will reduce students' learning initiative. Meanwhile, it will reduce the initiative of teachers to dig deep into the elements of political thinking in the teaching process.

3. How to explore the ideological elements in the fluid mechanics course

In view of the above deficiencies, this paper discusses how to explore the ideological and political elements in the course of fluid mechanics.

3.1 Explored from the history of fluid mechanics

Fluid mechanics is developed from human constant struggle with nature. During the long history of its development, numerous significant conclusions and results are produced, such as, Archimedes's principle, Bernoulli equation. We can assign some tasks, for example, let students search the information on the internet to realize that the great scientists is how to get the conclusion. We can stimulate students' curiosity and desire by this method. Curiosity and thirst for knowledge is a quality that many contemporary college students lack.

At the same time, China also has a lot of celebrities and achievements in fluid mechanics. We can cultivate students' national pride through the introduction of ancient fluid mechanics achievements and research results. For example, Dujiangyan Water Conservancy Project, the only existing dam-free water intake project in the world that is still in playing. Teachers can assign tasks after class for

students to refer to relevant information when explaining relevant fluid mechanics knowledge points. This method may help students marvel at the wisdom of the ancients while absorbing knowledge points. In addition, through the achievements and research results of modern fluid mechanics in China, students' patriotism will be stimulated ^[6]. For example, Qian Xuesen, a famous aerodynamicist in China, broke through numerous obstacles to return to China. He has been pushed forward the launch of China's missiles and atomic bombs for at least 20 years by unremitting efforts.

3.2 Explored from quotes

Many famous people in fluid mechanics are not only scientists, but also philosophers. They have unique insights on life when studying the laws of fluid mechanics with rigorous mathematical deduction and precise scientific experiments. We can strengthen the wisdom of these scientists in the process of recording, and analyze whether there is any part related to the knowledge of fluid mechanics in these famous quotes. If there is, we can explain the knowledge through such a group of famous quotes, so that students can deepen their memory of the knowledge. At the same time, it can also help us to solve some bad emotions and other problems around by thinking about life and so on.

3.3 Explored from daily life

Fluid mechanics comes from life and is used in life. A common phenomenon living around us is likely to contain a lot of fluid mechanics knowledge. For example, fluid mechanics can be used in the design of water gun toys or a car. We can guide students to look around carefully and let them analyze why this part is designed in this way and what is the reason of that phenomenon. In this way, students can improve their observation ability and cultivate their ability to think well.

3.4 Explored from cutting-edge technology and today's news

Current rapid progress in the development of science and technology, it brings us a more convenient life, a certain knowledge point in the fluid mechanics of the interpretation, if a design just uses this knowledge, you can put this part of the technology is how to use this knowledge to solve method and students to tell or to let the students to access to information, research and explanation is given. In this way, students can not only enhance their operational ability, but also make students feel that the knowledge used in the original advanced technology is in front of them, and cultivate students' sense of mission. In addition, some would happen in today's world and fluid or related professional can also and students talk about talk about current affairs, such as in May 2020 in Dongguan Humen bridge shaking event occurs, assign students to the corresponding search the work ahead of time, the end of the event and students in the classroom or share in the chat software, let the student to participate. The sharing process is combined with the Tacoma Canyon Bridge accident in the 1940s to talk about the phenomenon of vortex vibration, so as to improve the responsibility of mechanical students and let them understand the importance of designing a reasonable and safe structure.

At the same time, the proportion of daily life, cutting-edge technology and current affairs should be appropriately increased. These aspects are easier for students to participate in the discussion process and improve their participation. These methods require the teacher read a large amount of references or take attention on current events. Meanwhile, teachers should found the relationship between them and course knowledge points. They should organize the relationship either. Then, they can give students rich knowledge, and improve the learning enthusiasm, and the influence of the subconscious to their words and deeds at the same time.

4. Exploration and practice of the combination of fluid mechanics course teaching and course ideology and politics

Despite the current teachers' research into the fluid mechanics course ideological elements [6-9], such as the introduction section of ancient Chinese achievements of fluid mechanics stimulate students' sense of national pride. We can introduce the idea of dialectical materialism thought in the process of talking eddy. Combined with the above method of exploring ideological and political elements, we can integrate ideological and political elements into the teaching process of fluid mechanics from the following aspects.

First, since fluid mechanics is a course requiring strong logical reasoning, in its development process, there must be no lack of rigorous logical theoretical derivation cases. During the process of teaching fluid statics, we can take founder of Archimedes buoyancy law - Archimedes law as an example. The simple story later widely circulated Archimedes legend for the identification of golden crown of the king, and thus lead to Archimedes' discovery of the law is the combination of theory and practical application, combining technology and rigorous mathematical reasoning in his book. On Floating Bodies, the law of buoyancy is derived from an ideal model through rigorous mathematical derivation. From these cases, we can see that although it may seem to be a very simple and basic law at present, its discovery can only be obtained by countless experience accumulation, good at summarizing and rigorous logical mind, which is exactly the ability that a mechanical student needs to possess.

Secondly, as an indispensable substance, fluid is the object of study in life, medical treatment, industry, military and other fields. The continuity equation in fluid dynamics can be explained in combination with the example of blood circulation system theory. When the Bernoulli equation is explained, students can use Bernoulli's principle to explain why there are yellow police lines in the waiting area of high-speed trains or subways, preventing passengers from getting too close to high-speed trains. Or use the banana ball principle to help students understand Bernoulli's equation more easily. These knowledge of fluid mechanics derived from life is too numerous to enumerate. When talking about these knowledge points, students are often inspired to recall or observe the surrounding life, so as to cultivate students' ability to be good at thinking and think more about the connection between knowledge points and life. A mechanical student, after entering the society, if he is good at observation, good at thinking and good at summarizing, inspired by common phenomena, he may improve his ability of structural design to a great extent. At the same time, from the life phenomenon or sports activities make students themselves to discover once the knowledge learned in class can greatly improve the students' interest in learning, in XX grade classroom situation, for example, through classroom practice found that based on the theory of Bernoulli equation principle, lets the student unfold banana ball, for example, or high iron yellow line principle 85% of the students in the class actively participated in the discussion, and compared with those without the discussion, the proportion of students mastering the knowledge point increased by about 12%. After class, students were surveyed in the form of questionnaire, taking "cultivating students' innovation ability and carrying out classroom discussion" as the research object, and the teaching effect of this method was counted by questionnaire star. It was found that students' recognition of this method was relatively high.

The knowledge of fluid mechanics can also help us to teach students a lot of attitudes towards life. For example, when talking about PASCAL's law, we can mention PASCAL's famous words: "Man is just a reed, the most fragile thing in nature, but he is a reed that can think", so as to tell students that we should fully realize our shortcomings, but also to see their own advantages and dignity; For example, when we talk about critical Reynolds number from some ideological elements, such as a series of events had order, suddenly in a tipping point, a small change has been increased rapidly,

which leads to the whole system trajectory has been thoroughly shuffled, complete disorder, so at the time of life need to grasp the critical point and so on.

Table 1: Statistical results

Degree	Number of students	Percent/%
Degree A	12	57.14
Degree B	9	42.86
Degree C	0	0
Degree D	0	0
Degree E	0	0
Effective number: 21		

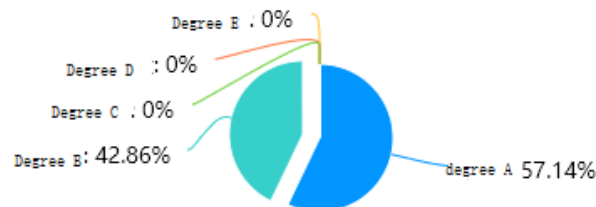


Figure 1: Statistical results

5. Summary and discussion

Through the above methods, to explore and use the rich ideological and political elements contained in professional courses to carry out moral education for students and give full play to the ideological and political education function of college courses is not only the internal need to implement the fundamental task of moral cultivation, but also the meaning of ideological and political work in colleges and universities under the new situation ^[4]. Combined with the above analysis, the fluid mechanics course related knowledge and ideological elements find point of contact is completely feasible, then after find a point of contact is the key to how clever these point of contact for curriculum design, the convection strength for students to improve learning interest and at the same time, absorb the relevant knowledge, the ideological education into the teaching process of fluid mechanics, help students improve professional quality, rational and objective to look at the problem silently.

After the above exploration, the ideological and political elements of exploration were incorporated into the teaching plan, and it was found that the classroom atmosphere was much more active than before, and the enthusiasm of students in class was improved. Analysis its reason, a small class time is 40-45 minutes, if in this period all imparting knowledge, too much content, students' learning easy exhaustion, and can't guarantee in the 40-45 minutes between concentrate on completely, but the ideological elements in the form of stories or living examples into the classroom, the students. The equivalent of classroom time to rest, can be relaxed for a short period of time, sometimes to let the students to participate in the discussion, not only let students deepen the impression of knowledge, but also an effective way to improve students' concentration, when to continue on the current or next knowledge, students are more likely to focus on classroom learning. In this way, it can silently teach students the correct values and professional views, and help students improve their efficiency in class and learn knowledge points more easily.

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