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Exploration and Practice of IPTTAC——Taking the Course of Data Structure as an Example

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Abstract. Talent training in Colleges and universities is a process of the unity of education and talent cultivation. In the teaching process of data structure course, Teachers practice IPTTAC and explore a series of methods of IPTTAC. Breaking the boundaries of disciplines, carrying out benign interaction, engineering culture and IPTTAC going hand in hand, engineering ethics education, socialist core values and Chinese traditional culture should be applied to IPTTAC.Paying attention to teachers' ethics and style, teaching by words and deeds, it will prompt IPTTAC. In teaching, we should start from the professional curriculum itself, explore the content related to ideology and politics, extend and expand the curriculum content, and enrich the charm of the curriculum itself.

Keywords. Ideological and Political Theories Teaching in All Courses; Data structure; The core values of Chinese socialism; Engineering culture; Engineering ethics

1. Introduction

President Xi Jinping pointed out: "We should adhere to the central link of strengthening morality, run the ideological and political work through the whole process of education and teaching, realize the whole process and all-round education, and strive to create a new situation in the development of China's higher education. "This important exposition enriches and develops the theoretical system of ideological and political education in colleges and universities, reveals the essence of ideological and political education, and points out the direction for ideological and political education in colleges and universities. President Xi also pointed out:"Ideological and political work in colleges and universities relates to what kind of people to cultivate, how to cultivate, and for whom to cultivate ." To build a high-level talent training system, we must consider the ideological and political work system, pay attention to the construction of Ideological and Political Theories Teaching in All Courses(IPTTAC), and solve the problem of "two skins" of professional education and ideological and political education[1]. This thesis puts forward a higher strategic orientation for college students' ideological and political education and marks the core of ideological and political work[2].

The abbreviation of ideological and political education, also is known as ideological work or

ideological education. It is a social behavior in which certain classes and political groups purposefully exert ideological influence on people in order to change people's thoughts and guide people's actions to achieve certain political goals. The ideological and political work of the Communist Party of China is a practical activity to educate the people with the socialist and communist ideological system, inspire people's consciousness, improve people's ability to understand and transform the world, and mobilize people to strive for the current and long-term revolutionary goals. It should not only solve the problems of people's political position, political viewpoint and political behavior, but also solve the problems of people's world outlook, outlook on life and morality. Adam Smith, the founder of economics, wrote *The Wealth of Nation*s and *The Theory of Moral Sentiment*s. In his view, the prosperity of a society depends not only on self-interest motivation, but also on people's virtue. In the *Analects of Confucius·Yan Yuan,* Ji Kangzi asked Confucius about politics. Confucius said to him, "The ruler acts well, even if he doesn't give orders, the people also know what to do" In the language of modern politics, it means "politics is the moral example of society". Confucius also had this view in the *Analects of Confucius · Politics*: Governing with morality, governor will be as secure as the Polaris, surrounded by all the other stars[3].

If ideological and political education should run through colleges and universities, it is necessary to realize "Ideological and Political Theories Teaching in All Courses(IPTTAC)". Generally speaking, IPTTAC is to consciously add elements related to ideological and political education in the process of teachers' teaching, so that students can be influenced by ideological and political education, imperceptibly improve their ideological quality and moral quality, and cultivate high-quality talents with all-round development of morality, intelligence, physique, beauty and labor for the country. The integration of ideological and political education into the professional curriculum system should emphasize the initiative and scientificity of curriculum integration, and pay attention to the flexibility of curriculum integration in the dimensions of content, technology, relationship, space and time[4]. Fang Chuanlin et al. organically integrated ideological and political elements into experimental teaching, made full use of the combination of online resources and offline teaching, and adopted various teaching methods such as PBL and TBL to promote the smooth development of IPTTAC[5].

2. The Importance of Carrying Out IPTTAC of "Data Structure"

From the current situation of teaching, the school does not pay enough attention to ideological and political education. Most of them pay more attention to knowledge education, which aims to cultivate students with "high knowledge" and "high skills", and the effectiveness of students' ideological and political education is not enough. Some teachers do not have a deep understanding of ideological and political education. They believe that ideological and political education is only the business of ideological and political teachers, which has nothing to do with themselves. They only need to teach students knowledge and pass the exam. Teaching and educating people is a unified process. In fact, ideological and political education should be carried out in every course. Therefore, as a professional basic course of computer courses, data structure should be permeated of the ideological and political education in its course learning to realize the unity of teaching and education. Carrying out IPTTAC and imperceptibly influencing students' thoughts in class will not only make students learn professional courses more easily, but also prompt all-round developed talents cultivation and meet the needs of social development in the new era. In June 2020, the Ministry of Education issued the *Guiding Outline for The Construction of Ideological and Political Theories Teaching in All Courses in Colleges and Universities* (hereinafter referred to as the "Outline"), which pointed out that "all courses have the function of educating people, and all teachers have the responsibility of educating people"[1]. Every teacher must undertake the mission of disseminating knowledge, cultivating ability and shaping value to students. The outline points out that all colleges and universities must pay attention to IPTTAC. Since there are action guidelines and teachers need to practice them, more specific models are needed.

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3. Exploration on IPTTAC of Data Structure

It's a little difficult for many students to master all knowledge of this course,data structure In teaching, we should start from the "data structure" itself, explore the content related to ideology and politics, expand the course content, and enrich the charm of the course itself. In the teaching process of data structure, the author practiced the IPTTAC and felt deeply about the role of ideological and political elements in professional courses. Explore a series of   the IPTTAC construction methods, breaking the boundaries of disciplines, carry out benign interaction, engineering culture and IPTTAC going hand in hand, engineering ethics education, socialist core values and Chinese traditional culture should be applied to IPTTAC. Paying attention to teachers' ethics and style, teaching by words and deeds, it will prompt IPTTAC. It's not a hard truth, but a deep combination, active humor, traditional culture and so on. Specific examples are given below.

3.1. Breaking discipline boundaries and carrying out benign interaction

Break discipline boundaries and carry out benign interaction. Natural sciences and HSS (Humanities and Social Sciences) are not opposites[6]. The scientific spirit has the characteristics of truth-seeking, innovation and doubt. Humanistic spirit is a value orientation that respects human nature and personality, adheres to people-oriented position, and emphasizes people's emotion and experience[7]. Both of them can not be neglected in school education. For example, traversing binary trees is mentioned in the data structure course, which can be associated with transposition thinking. Traversing a binary tree refers to visiting each node in the tree according to a search path, so that each node is visited once and only once. The general data structure textbook describes three kinds of traversal, namely pre order traversal, middle order traversal and post order traversal. It takes a class to explain, and many students can't master it in class. However, the author uses the concept of "transposition thinking" in the humanistic spirit to explain that students can easily accept the idea of algorithm in more than ten minutes. Every time you visit a point, you have replaced your position to this point imaginatively, and then start from this point to consider where to go next, which vividly reflects the "transposition thinking". Transposition thinking is also a very important rule of life. Before accomplishing a task, one must conduct himself. Integrating ideological and political education into professional courses is not only vivid and interesting, but also raises the idea of knowledge points. Continuous transposition during traversal, it should keep analogizing transposition thinking in work and life.

3.2. Engineering culture and IPTTAC in the same direction

Engineering culture advocates the cultural connotation in engineering implementation, and attaches importance to the close combination of engineering practice and cultural education. It seems that IPTTAC and engineering culture are not related, but in fact, the logical starting point of engineering culture and curriculum ideological politics is the same. They go in the same direction and "They can't leave for a moment"[8].As Comrade Hsue-shen Tsien said, "Understanding system engineering always involves human factors". Therefore, engineering must be people-oriented! The charm of engineering culture is the wealth that teachers should give students in teaching. It is not only professional knowledge, but also supports professional knowledge and stimulates students to actively create and innovate[9].

3.3. Engineering ethics education enters the IPTTAC

Engineering courses pay attention to strengthening students' engineering ethics education, cultivating students' craftsman spirit of excellence, and stimulating students' feelings and mission of serving the country through science and technology[1]. In the 1970s, there were two cases that attracted worldwide attention, the zebra car fuel tank incident and the DC-10 plane crash. The two incidents caused huge casualties. The reason is that scientists and engineers engaged in R&D activities put profit and efficiency first, while ignoring the attention to the safety, happiness and well-being of the public.

In the field of Engineering Education in the United States, engineering ethics education is a part of engineering education. However, there are great differences on how to implement engineering ethics education. One of the main differences is how to integrate the content of engineering ethics into the engineering education system? Some colleges and universities take the engineering ethics course of 1-3 credits as a compulsory course for engineering students, others implement engineering ethics education by setting up other compulsory courses such as engineering and society, and some schools do not set up engineering ethics or similar courses alone, but require the content of engineering ethics to be included in the teaching content of engineering courses. The author believes that engineering ethics education can be carried out from a specific chapter in each course, so teachers need to explore such knowledge points. For example, in the course of data structure, we need to consider the engineering ethics of the software product when explaining the robustness, correctness and some calculation accuracy of the algorithm.

3.4. Attaching importance to teachers' ethics and style, teaching by example and words, promoting the IPTTAC

To do ideological and political education well in colleges and universities, we must deeply understand that the construction of teachers' ethics is the foundation and key. Teachers must be strict with themselves and establish a correct personal outlook on life and values, so as to better educate students and serve as an example for students. Only when teachers have excellent ideas can they better build a team of teachers with professional quality and noble morality.

For example, teachers can share the deeds of themselves and their colleagues who love to do good deeds with their classmates, but if they talk about these things abruptly in professional classes, they will not achieve the silent effect of the IPTTAC . Therefore, combined with the knowledge points of professional courses, they will appear natural and refined.In the chapter of "graph" in the course of data structure, when talking about the storage structure of the graph, you may wish to take an example. Each point represents a person, which is an edge connected between friends. When a person encounters difficulties, his friends find more friends to help him through the edge connection.The teacher then tells the students the story of helping their friends.

For another example, during the current COVID-19, using the story of oneself as a teacher volunteer to actively participate in the fight against the epidemic to make students can seriously obey the command of anti epidemic and study in the dormitory at ease.

3.5. Socialist Core Values Enter the IPTTAC

President Xi pointed out that we should persistently cultivate and carry forward the socialist core values and guide teachers and students to be firm believers, active communicators and model practitioners of the socialist core values at the national conference on ideological and political work on colleges and universities[2].Prosperity, democracy, civilization, harmony, freedom, equality, justice, rule of law, patriotism, professionalism, integrity and friendliness are the basic contents of the socialist core values. Socialist core values are put forward under the specific background of China's entry into a new era, based on the need to answer the essence of socialist values with Chinese characteristics, the need to shape the people's positive, healthy and scientific values, the need to build a socialist harmonious society and the need to build a socialist core value system[10].Socialist core values are the concentrated embodiment of contemporary Chinese spirit, condensing the common value pursuit of all the people. They are the guiding light in the value shaping process of college students, and are highly consistent with the reform goal of IPTTAC[11].

For example, the core idea of DIJKSTR algorithm for finding the shortest path is to select and update two operations: the selection operation is to find a path with the shortest length from these paths. The update operation is to adjust the other paths appropriately. If the path from the starting point to some other point can be made shorter through the currently selected point, it will be updated. In analogy with ideological education, students should pursue excellence in learning, which is to

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choose the operation, and the shortest is the best; When you are excellent, you should think of how to help others better, that is, update the operation, so be willing to help others. Such a very appropriate metaphor makes the ideological and political embellishment silently integrated into the classroom.

3.6. During the epidemic period, the positive energy of the group was used in the implementation of online courses to improve students' learning enthusiasm

In the spring of 2020, due to the impact of the epidemic, the implementation of online teaching has achieved a better effect than the previous offline classroom teaching, which benefits from the use of the group positive energy effect of active learning brought by online teaching.

In this semester, more than 400 software engineering students have studied the course of data structure.

All students and four teachers have entered the data structure course QQ group. Using the online judge system of Hangzhou Dianzi University to let students complete programming homework, using the author's own identity as the coach of programming competition, driving more than 20 team members to answer programming questions to more than 400 students. There are hundreds of programming questions and answers in the course group every day, and guided answers are used, which makes the learning atmosphere in the course group strong and the style of study excellent. The class taught by the author reaches 100% of the programming homework. The course was rated as rated as a high-quality course during the provincial epidemic prevention period and the first-class course in the province.

4. Conclusion

The fundamental function of colleges and universities is talent training, and the fundamental task is to establish morality and cultivate people. We should take it as an important guiding ideology, grasp the classroom, which is closely related to students, deeply carry out ideological and political (IAP)education in the classroom, and improve students' IAP literacy. IPTTAC should not only follow the traditional teaching methods, but also combine teaching with fun, so as to make the IAP education live and go deep into the hearts of students. We should effectively achieve the unity of "teaching" and "educating people" and improve the activity of the classroom. This paper makes an in-depth study on the specific implementation of IAP education of data structure, a computer professional course, and closely follow the characteristics of professional knowledge, and give a demonstration of the effective combination of professional courses and IAP elements.

The combination of ideology and politics curriculum and professional courses is also a change of the educational model. It has a qualitative improvement based on only teaching professional knowledge. While improving students' personal quality, it also improves teachers' educational ability. During practice, it is found that the class integrated with morality is popular with the students[12]. They consciously sit in the front row of the classroom, whose three-outlook is affected by the course. Through the implementation of ideological and political education in the data structure, the enthusiasm of students in class has also increased significantly, the interaction with teachers is more active and effective, and the group cooperation is also carried out effectively. Even in the late semester, the student would independently and creatively put forward the ideological and political elements corresponding to the knowledge points in the class, which makes the teachers feel satisfied and response excitedly. Ideology and politics curriculum is a teaching innovation that teachers' innovation guides students' innovation.

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Conflicts of Interest

All co-authors have seen and agree with the contents of the manuscript and there is no financial interest to report. We certify that the submission is original work and is not under review at any other publication.

Biography of Author(s)

Juan Zhou(1977-), female, postgraduate, Associate Professor, ICPC Asia Executive Director East Continent Council Deputy Secretary, Coach of ICPC, School of Software, East China Jiaotong University, majored in Computational Biology, Computer algorithm and analysis, the construction of Ideological and Political Theories Teaching in All Courses.

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