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Research on Graduate Engineering Ethics Based on Hotspot Integration

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Abstract. To adapt to the development of science and technology, engineering ethics education methods should improve. Under the existing problems of ethics education in universities, this paper proposes the education reform model based on integrating hot issues and ethical elements. This strategy emphasizes mainstream values in teaching objectives; In terms of educational themes, pay attention to the practice of Lide tree requirements in the curriculum system of engineering majors; In terms of educational methods, we highlight the infiltration education under the concept of curriculum education. This model helps to encourage graduate students to think about themselves, deeply investigate the significance and judgment of engineering ethics, and establish ways to deal with ethical dilemmas when establishing profound ethical dilemmas effectively.

1. Introduction

Since entering the industrial society, the number and field of engineers have expanded rapidly. They have increasingly become the backbone of serving social affairs and determining social development. The development in engineering largely determines the destiny of human beings, and engineering technology, as the primary way to transform science into reality, also profoundly affects the future fate of science. With the development of engineers and their related associations, engineering ethics gradually enters people's vision, mainly derived from the needs of the professional management and industry autonomy of engineers. Scholars such as Mike W. Martin believe that: "Engineering ethics consists of responsibilities and rights that should be approved by those who engage in engineering, as well as ideals and personal commitments to be expected in engineering [1]."

With the continuous development of society and economy, the engineering and technical activities in modern society are becoming more and more frequent, and a series of engineering quality and technical problems have caused a profound impact on nature, culture, people's life, and engineering itself. The HMS Challenger crash of the 1970s [3] and the Douglas DC-10 plane crash [4] are related to engineering ethics. The application of engineering technology in social production and life is not only the engineering itself but also closely related to nature, humanity, environment, society, ecology, and moral factors. Engineering ethics is the ethical reflection on these factors.

The engineering ethics course is a required introductory course for graduate engineering students. It is a course emphasizing how to put the theories and knowledge into practice according to a series of ethical norms such as public order, conventions, laws, and regulations. The course serves as an interdisciplinary discipline across the liberal arts and science disciplines to analyze the possible ethical problems in the engineering field and the possible ethical conflicts between different individuals and groups [5]. It aims to make the proper guidance for students in their future engineering careers when

ethical dilemmas arise. Make students form a preliminary understanding of the possible ethical difficulties in the future and master specific coping methods. Cultivating modern engineering and technical personnel with a high sense of social responsibility, professional knowledge, and professional quality [6].

2. Current status of Engineering Ethics Education

It is a required course for engineering graduate students, with many choosing systems and a wide influence range. Therefore, it is an important position to carry out "curriculum ethics." It is of positive significance to carry out the research and exploration of "curriculum ethics" for this course. Engineering ethics education has become the primary support for engineering ethics practice, and engineering ethics is gradually moving towards "engineering ethics pedagogy [7]".

Scholars such as Charles Edwin Harris view engineering ethics as part of an engineer's engineering thinking, identity, and professional practice, "Engineering ethics is thinking like an engineer. Teaching engineering ethics is part of engineering teaching [2]." How to guide students to correctly establish a scientific outlook on life, values, and world outlook is also the significance of engineering ethics, so the engineering ethics education work in colleges and universities is complex and systematic engineering; how to do it? Compared with undergraduates, the implementation of graduate courses is quite different from undergraduate teaching in terms of knowledge structure characteristics, knowledge development level, the connection with majors, and the degree of attention. Therefore, the following problems exist in graduate engineering ethics course education:

2.1. Ethical objectives and course content of relevance

Under the current situation, the ethical objectives and the curriculum content are not close enough, and it is difficult to provide a guiding engineering ethics curriculum for the practical engineering ethics difficulties. The cases and knowledge involved are generally limited to engineering application ethics. This kind of analysis and understanding is based on the personal, professional ethics, professional quality, and even individual character of students or engineers. This method lacks the depth of the refinement of the essence of things, let alone is unable to provide standardized guidance for students' specific behaviors, especially in the face of ethical difficulties when the personal moral understanding of engineering ethics is no longer comprehensive. The teaching of engineering ethics should not be limited to the engineering ethics judgment itself. Still, it should establish a relationship with the daily hot events to cultivate a better understanding of engineering ethics among graduate students.

2.2. Project cases

Classical engineering cases are old and highly professional, which cannot cause students to think actively. In ethics teaching, more attention is paid to the transmission and explanation of knowledge. At the same time, the cases related to teamwork and project engineering experience are often ignored. The relevant issues are the key for students to understand and accept the ethical elements. Graduate students have significant barriers in their professional fields compared to undergraduate students due to different research directions. Use of classic teaching cases, usually focusing on a particular engineering field. Although it can ensure that although ethical theory is closely around ethical elements, it is not at the same level as the social issues that students pay attention to. It is difficult for students to integrate reality with moral education, and the ethical part of ethics is often superficial and will not think deeply, and this kind of education method will get half the result with twice the effort.

2.3. It is difficult for the existing examination methods to encourage students to pay attention to them

At the same time, the evaluation of the learning effect of courses can not fully reflect students 'understanding of ethics and hinders students' active thinking about ethical content. It is necessary to explore the knowledge further and establish a matching curriculum assessment mechanism so that students are interested in learning something, learning something to use, and learning something to

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develop. When students face engineering problems, policies, and regulations as the basis for engineering ethics judgment.

3. Education for Integrating Into Hot Spots

The engineering ethics course content focuses on engineering practice and the characteristics of ethics. From the teaching goal setting, the teaching content adjustment, teaching system construction, teaching method reform, formulate and implement the plan and the plan through the theory of classroom teaching and experimental practice teaching, the moral education penetration throughout the whole teaching process. Excavate the invisible teaching resources of the "engineering ethics" course, and impart the knowledge with temperature and thickness. With the organic integration of moral education elements as the way, focusing on the core values, social responsibility, and the professional quality of the electric power industry, the active education is coordinated and formed in the teaching process of the "engineering ethics" course in a planned and step-by-step way. The curriculum ethics reform of the "engineering ethics" implementation plan includes improving understanding, exploring the elements of moral education, designing ethics teaching, clarifying the division of labor and taking their respective responsibilities, and making timely summary and consolidation. Details are as follows:

3.1. Guide the current engineering spots

Carry out the research of ethics teaching reform, introduce current political hot-spots into engineering ethics courses, and guide students to think deeply about life and work by contacting the relationship between current events and engineering ethics that students focus on. At the same time, a practical, ethical evaluation mechanism should be established to truly integrate the elements of ethical investigation in the classroom, after class, or during an examination to strengthen students' attention and understanding of moral teaching. To help students accept ethics courses, the entry point, the guiding ideology, is to pay attention to the combination of knowledge and value, doctrine and acceptability. This requires combining ethics with the hot events that students are currently concerned about and thinking about and guiding students to establish a correct way of thinking. To "persuade people by reason, to be people with emotion," to touch the depths of emotion and soul. At the same time, integrating into the ethics and students' in-depth psychological communication kills many birds with one stone. Give typical ethics cases in the curriculum teaching process, and each case should have educational goals, ideological and political education integration points, educational methods and carrier channels, and expected results. When introducing content, we should pay attention to scientific rationality but also add emotional infiltration.

Therefore according to the characteristics of the curriculum, our teaching process can combine with ethics. For example, we should combine energy conservation, low- carbon, and ecological progress with publicizing and practicing energy-saving, low-carbon, and environmental improvement and cultivate the scientific spirit of pursuing truth and the craftsman spirit of striving for excellence. Combined with the discussion of politics and hot current affairs, we will guide students to spontaneously cultivate their world outlook, outlook on life, and values and develop students' excellent ideological and moral qualities.

3.2. Ethical elements and engineering cases

Due to the different subject connotations, attributes, and knowledge systems, each professional course has various forms and methods of curriculum ethics. However, before the implementation, teachers must carry out the top-level design of "curriculum ethics" and establish a complete teaching system. This course first revised the syllabus according to the requirements of curriculum ethics and set relevant teaching objectives. Let the students understand that they must guide their practice through policies and regulations. At the same time, students also have the necessity and motivation to understand and learn' engineering ethics.

Sublimate practical cases and current political hot spots into ethical elements, including craftsman spirit, resistance spirit, aerospace spirit, and a comprehensive education concept of "moral education" as the fundamental task of education to cultivate more talents who develop morally,

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intellectually, physically, an estate and labor for the society. Under the guidance of teaching objectives, an appropriate and diversified teaching process should be used to discuss hot current affairs in class. After class, online courses should add ethical elements, such as the "History Review" section that tells the life stories of scientists in the development history of engineering ethics. Methods To enrich the whole process of course teaching and play videos about ethical content before class. Further, a series of elements such as the theory of two mountains and the craftsman of great powers are introduced to verify them in empirical cases to encourage students to understand the fundamental judgment basis of ethical dilemmas in engineering ethics.

3.3. Improve the existing ethical examination methods

The existing ethical examination methods are mainly ethical reports, which is difficult to guide students to think actively and pay attention to the moral content. This project plans to use a variety of ethical examination mechanisms, including integrating ethical elements into the homework, examining students' ability to deal with ethical dilemmas in the exam, and adding features combining ethics and current political hot topics in the course papers.

4. Implementation Methods

The research of this project is divided into three stages: first, to integrate teaching design and ideological and political teaching into theoretical courses to ensure that ideological and political practices will not be separated from academic studies and make it difficult for students to accept; second, to improve the correlation between ideological and political courses, theoretical courses and teachers' own scientific research and practical experience. So that the students can quickly understand the relationship between the three; the third is to build the cases with ideological and political attributes so that the ideological and political characteristics can more perfectly integrate into the classroom teaching and comprehensively improve the students' comprehensive quality and moral level.

4.1. Classroom aspects

In implementing course education, teachers need to impart professional knowledge into ideological education and consider the innovation of teaching methods. We can't let students quietly sit on their seats listening to let them be fully busy, such as participatory teaching. Through various activities—discussion method, case method, algorithm, etc.- teachers fully mobilize students to participate in the classroom and let the students to the teaching content in class into the brain.

Each project of the course teaching is both related and relatively independent. At the end of each project, the project assessment form is filled in. In the project assessment and evaluation, the assessment points mainly include three stages: theoretical knowledge, practical knowledge, and the connection between the two ideological and political courses. Further realize the all-round development, the sound personality of the quality education requirements. The teaching objectives should guide students to establish a correct outlook on life and values; teaching content fully explores the educational factors of relevant knowledge and maintain the bottom line in teaching evaluation. Therefore, the applicants believe that the "curriculum ideological and political affairs" evaluation should be considered based on integrating the original curriculum evaluation from the teacher, student, department leadership, and teaching supervision.

4.2. Case reform

This article will be ideological and political content into the case, divided into self-cultivation, family, governance, and patriotism. The primary research will be the following content in the teaching case:

(1) Personal: Personal cultivation is the realm achieved after experiencing the process of self-understanding, self- anatomy, self-education, and self-improvement in the depths of individual hearts, which mainly includes: benevolence, righteousness, propriety, wisdom, faith, gentleness, courtesy, loyalty, filial piety, fraternity, integrity, diligent, upright and brave. Improving personal cultivation is an effective means to enhance ethical engineering standards, prevent the occurrence of engineering

risks, and reduce engineering safety risks; and is fundamental for engineers to abide by rules and regulations, laws and regulations actively, and correct values;
(2) Family: Family is one of the most important social relationships. Work and family are two complementary individuals, rather than contradictory bodies, and should be considered simultaneously. Maintaining a good family relationship and establishing a correct internal family internal value system can help engineers develop a healthier and more optimistic working attitude and are a strong guarantee for engineers to adhere to a good style;
(3) Career: Professional ethics is the minimum moral bottom line and industry norms people must follow in their professional activities. Therefore, students must first be taught to abide by the rules and disciplines, abide by the engineering ethics, and establish the correct ethical thinking is the premise of being a sound engineer;
(4) Country: Patriotism reflects people's deep feelings for their own country, demonstrates their dependence on the motherland, and is the unity of people's sense of belonging, identity, dignity, and honor to their homeland, nation, and culture. The moral requirements, political principles, and legal norms regulate the relationship between individuals and the collective.

4.3. Quality evaluation

Statistics of the assessment results of each unit or stage, the effect feedback of methods includes teaching knowledge points, related professional operation skills and ability, course ideological and political content, learning harvest, experience, etc. The leadership level of the department mainly considers the combination of ideological and political design of the course, including goal embodiment, content combination, and effective display. The story of teaching supervision especially feels from the comprehensive effect of teaching, including teaching attitude, education preparation, and teaching effect.

5. Conclusion

Future emerging social industries and economic and social development need high-quality compound engineering talents with solid practical ability and international competitiveness. It is increasingly important to construct an engineering ethics model suitable for higher engineering education requirements, which is also a significant challenge for the current engineering ethics education. Focus on the new background era to carry out the fundamental task of Khalid ents. It helps to expand the way and channels of engineering ethics education. Enhance the transverse of engineering ethics education by forming an interdisciplinary, cross-professional engineering ethics education implementation mechanism. The course education requirements in the concrete implementation of engineering professional education activities help from the collaborative education effect. This paper uses ethics education to integrate homework, essays, and exams to strengthen personality and moral education. At the same time, in the classroom, self- display and discussion link further enhance the students' ethical discussion and communication to deepen the educational significance.

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