



Construction and practice of Engineering Ethics graduate high quality course

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ABSTRACT. The construction of high quality graduate courses is of great significance to improve the innovation ability and training quality of graduate students. As an important part of graduate education, engineering ethics is directly related to the value orientation of engineering talents. The exploration and practice of Engineering Ethics graduate high quality course, after 2 years of construction, completed the adjustment of course content and course structure, improved teaching methods and means, and perfected course teaching resources. The implementation and effect show that: broaden the students' vision, improve the students' learning enthusiasm, enhance the teaching effect, and achieve the expected goal of the course.

Keywords: Engineering ethics; Quality courses; Teaching reform; Graduate education; Flipped classroom

1 Introduction

As socialism with Chinese characteristics enters a new era, the requirement for talents in the new era is not only to have excellent technology and ability, but also to have good professional ethics and cognition, and to be able to make correct judgments and choices when facing conflicts of interest and difficulties in professional activities. As a practical course integrating science education and humanities education, Engineering Ethics aims to improve students' ethical quality and strengthen their sense of social responsibility. At the same time, it can shape students' socialist core values, establish a career concept for the benefit of the public, and cultivate their ethical insight, ethical judgment and ability to deal with ethical dilemmas. Make it become a high-level complex engineering management personnel with both virtue and talent. Since the 1990s, strengthening engineering ethics education and improving the social responsibility of engineers and other engineering practitioners has become an important content of engineering education certification, and has also become one of the important symbols of

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H. Li and Z. Nie (eds.), *Proceedings of the 2023 2nd International Conference on Sport Science, Education and Social Development (SSESD 2023)*, Advances in Social Science, Education and Humanities Research 781, https://doi.org/10.2991/978-2-38476-122-7_9

international engineering education level.[1]In 2000, China officially opened the engineering ethics education course. In 2018, the Guiding Opinions on Formulating Training Programs for Engineering Master's Professional Degree Graduates issued by the Academic Degrees Committee of The State Council clearly included the engineering ethics course into the category of public compulsory courses for engineering master's professional degree graduates, and it was offered to engineering master's professional degree graduates in 2018. Its practical teaching has been extended from individual colleges to science and engineering colleges, and has gradually changed from theoretical elective course to compulsory course.[2]However, from the perspective of teaching practice, the relevant courses of engineering ethics education are still in the initial stage, and there are still problems such as lack of teaching content and case resources, single teaching method, shortage of full-time teachers, and difficulty in interdisciplinary teaching organization, which make it difficult to effectively spread engineering ethics knowledge.

In order to overcome the common problems existing in the practice of engineering ethics education, this paper discusses the characteristics of the course of engineering ethics and the problems existing in the teaching, improves the teaching methods and means, improves the knowledge system and the teaching system, and achieves the purpose of improving the teaching quality of the course and the ability to solve practical problems and the innovation ability.

2 Problems existing in the teaching of engineering ethics

2.1 Single teaching mode leads to students' sense of laziness

With the development of The Times, knowledge is updated faster and faster. The traditional way of teaching began to appear some drawbacks, which seriously limited students' learning enthusiasm. In addition, with the change of teaching mode, MOOC teaching, flipped classroom and other emerging teaching methods have begun to be widely promoted and used. "Master" style graduate teaching can only attract students to close their eyes and shake their heads to read hard, which intangibly limits students' ability to think independently, create independently and practice independently.

2.2 There is no effective evaluation mechanism for students' learning process

At present, there is a lack of evaluation mechanism for all important aspects of students, teachers' teaching and students' learning are basically in a state of disconnection, students cannot predict how teachers will carry out teaching, and teachers cannot timely adjust teaching content according to students' learning conditions. Therefore, many students have the psychology of giving up when they learn a certain slope because of the increasing number of problems they do not understand.[3]

2.3 The curriculum is not sufficiently condensed

The existing theoretical system and knowledge system of engineering ethics are complicated and loose, and lack of combining and refining of their theoretical system and knowledge system. There is no refined knowledge system with logical relations. Teachers and students can not effectively realize the teaching and learning of the basic contents of engineering ethics in the limited classroom teaching.[4]

2.4 Teaching focuses on professional knowledge teaching learning courses ideological and political education is not systematic

Due to the large content of this course and the few class hours, teachers often focus on the teaching of professional knowledge in actual teaching. Although some attempts have been made to promote the teaching reform of curriculum ideology and politics, there are still problems such as unclear orientation of curriculum ideology and politics goals and lack of scientific systematic thinking. The degree of integration of ideological and political elements with professional knowledge is not deep, and even some care about one thing and lose another, which damages the teaching effect of ideological and political courses.

3 Thoughts and measures of curriculum construction

3.1 Adopt diversified teaching methods to improve classroom efficiency

With the vigorous development of "Internet +" in various industries, teaching methods in the education industry should be more advanced. Shift the focus of traditional classroom teaching, guide students to learn independently, adopt "online" + "offline", flipped classroom, case teaching and other teaching methods, communicate and discuss at irregular intervals, strengthen online communication between students and teachers, students and students, solve problems in time to stimulate students' learning initiative and enthusiasm, and improve teaching effect.[5]

3.2 Establish a sound evaluation mechanism and establish multiple assessment models

Due to the adjustment and reform of the teaching method and teaching content, the examination method of this course is bound to be improved. The assessment method should be changed to focus on ordinary learning, and "whole process evaluation" should be carried out on postgraduates' learning. The assessment method is to adopt the model of classroom performance + case analysis homework + comprehensive examination and evaluation of final paper. Course final grade = usual class grade (20%) + homework grade (30%) + final paper grade (50%).

3.3 Follow the development direction of the discipline frontier to improve the teaching system of engineering ethics

In combination with the condensed knowledge system of engineering ethics and the integration of ideological and political content, under the guidance of practice, the engineering ethics curriculum system is reformed, and the teaching syllabus, teaching mode, teaching means and evaluation of educational achievements are innovatively improved. The idea of transforming engineering ethics education from theoretical rationality to practical rationality and from instrumental rationality to value rationality is transformed into practical teaching practice.[6]

3.4 Strengthen the whole course ideological and political education to form a complete curriculum ideological and political education system

Adhere to the whole-person education, whole-process education, and all-round education, take moral cultivation as the fundamental task of course teaching, and ensure that professional knowledge teaching and ideological and political education walk in the same direction, forming a synergistic effect. Integrating socialist core values and excellent traditional Chinese cultural thoughts into the knowledge system of engineering ethics, forming the content of engineering ethics course with Chinese characteristics, highlighting the fundamental goal of "cultivating morality and educating people", is a beneficial attempt in the theory and practice of the sinicization and localization of engineering ethics, and is also a concrete practice of the educational concept of "curriculum ideology and politics" in postgraduate education.

4 The practical effect of curriculum construction

4.1 The classroom atmosphere is active and the teaching effect is improved

The use of MOOCs, flipped classrooms, case discussions and other teaching methods and means enlivens the classroom atmosphere, increases students' learning enthusiasm and participation, and improves the teaching effect. In addition, the teaching materials, course resources and their exemplary role continue to use the national standard teaching materials for engineering graduate education. The Engineering Ethics MOOCs, classroom teaching videos, flipped classroom videos, courseware PPT, case teaching resources, etc. were systematically organized and edited to form a high-quality course resource library.

4.2 The teaching effect is remarkable and the students' learning enthusiasm is increased

After 2 semesters of exchange and practice, students are very interested in the new form of assessment model. In this way, it can comprehensively evaluate students' performance and learning effect in course learning, stimulate students' innovative ability and enthusiasm in the process of assessment, and help teachers find students' bright spots, which not only improves students' learning enthusiasm, but also improves teaching effect.^[7]

4.3 The curriculum content is more abundant and the knowledge system is more perfect

It has sorted out and condensed the theoretical system and knowledge system of engineering ethics, explored the core values of socialism and the ethical thoughts in the excellent traditional Chinese culture, and integrated them with the theoretical system and knowledge system of engineering ethics in multiple dimensions. The course system of engineering ethics has been reformed, and the teaching syllabus, teaching mode, teaching means and evaluation of educational results have been innovatively improved.^[8]

4.4 Construct the curriculum ideological and political system to carry out the basic task of moral education

By integrating socialist core values and excellent traditional Chinese cultural thoughts into the knowledge system of engineering ethics, the course content of engineering ethics with Chinese characteristics has been formed, highlighting the fundamental goal of "cultivating morality and educating people",^[9] which is a beneficial attempt in the theory and practice of Sinicization and localization of engineering ethics, and also a concrete practice of "curriculum ideological and political education concept" in postgraduate education.^[10]

5 Conclusions

The construction of high quality courses plays an important role in the cultivation of graduate talents. The construction of courses should focus on the cultivation of talents and the construction of curriculum resources. After 2 years of construction practice, the construction of "engineering ethics" quality course has achieved obvious results. The engineering ethics curriculum system under the guidance of "curriculum thought and politics" has been constructed, the engineering ethics knowledge system conforming to the teaching practice of the school has been sorted out and condensed, and a new teaching mode conforming to the characteristics of engineering ethics education has been

explored. It enriches the course learning resources, broadens the students' vision, improves the teaching effect, and achieves the expected goal of high-quality course construction.

ACKNOWLEDGMENTS

This project has been funded by Shandong Provincial Graduate Education Quality Course (SDYKC21111) and Shandong Provincial High Quality Professional Degree Teaching Case Base (SDYAL2022098).

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