



Exploration and Practice of Ideological and Political Teaching Mode of Environmental Fluid Mechanics Under the International Talent Training Mode

Yumin Wang¹(✉), Zhi Li¹, Haiying Gao², and Hongmei Fan¹

¹ School of Energy and Environment, Southeast University, Nanjing, China
wangyumin@seu.edu.cn

² School of Civil Engineering, Southeast University, Nanjing, China

Abstract. In the traditional teaching of environmental hydrodynamics for post-graduates majoring in environmental engineering, the concept, theory and formula of the basic course are relatively complex, and the teachers generally focus on the explanation of theoretical knowledge, while ignoring the excavation and teaching of the ideological and political elements contained in the course. Taking the fluid mechanics course as the starting point, this paper explores the ideological and political teaching and implementation path in the course. Through the excavation and design of multi-dimensional ideological and political elements, this paper integrates the ideological and political education into the teaching process of fluid mechanics of environmental engineering specialty to realize the training goal of value shaping, ability training and knowledge teaching.

Keywords: Environmental hydrodynamics · Ideological and political teaching · Exploration · Implementation path

1 Significance of the Study

Internationalization is the trend of world development. With the development of global economic integration, the cooperation between countries is becoming closer and closer, and the competition is becoming more and more fierce. If China wants to take the lead in the global competition, it needs to build a high-level and international talent team to meet the needs of the new era [1]. Cultivating international talents has become the development orientation of higher education. The idea of educational internationalization has long been put forward by western countries. The United States, Germany and other countries carry out a variety of international education to promote students to reach the standard of world-class knowledge. In recent years, China has also begun to pay attention to the cultivation of international talents and actively promote the internationalization of education [2].

Environmental hydrodynamics is a compulsory basic course for master's degree students majoring in environmental science and engineering. It mainly studies the diffusion,

migration and transformation of pollutants in water. The course of environmental fluid dynamics contains large numbers of ideological and political elements, such as ecological awareness, green development, environmental protection concept, social responsibility, historical mission, etc. it is necessary to improve students' ideological and moral level and comprehensive quality in the process of professional knowledge teaching [3]. We should integrate internationalization and ideological and political elements into the teaching mode of environmental fluid dynamics, improve the leading value of the course, and cultivate master's students majoring in Environmental Science and engineering into an international reserve force for implementing environmental protection and building a green home.

2 Existing Problems

2.1 Single Form of Ideological and Political Teaching

Compared with the ideological and political education in other countries, China has a slight deficiency. Since the 1970s and 1980s, higher education in the United States has combined knowledge indoctrination with cultural infiltration, such as infiltrating ideological education in history teaching, and taking on-site teaching as a supplementary form of school moral education, such as simulating presidential election, and analysing the root causes of World War, etc. In these ways, the United States naturally infiltrates its culture and values into the thoughts and the behaviors of students. In China, ideological and political education is too single and ignores the important role of network media in ideological and political Education [4]. The research field of environmental hydrodynamics has penetrated into various environmental pollution factors (organic pollution, eutrophication, disinfection by-products, coliforms, micro-organisms, micro plastics, etc.) in multi-scale water bodies (rivers, lakes, reservoirs, cities, estuaries, groundwater, water supply networks, drainage networks, etc.), which can effectively solve all kinds of environmental pollution and major events of concern to the national economy and the people. In the world, the frequency of water environmental pollution events is less, and more attention is paid to large-scale water environmental changes, such as environmental changes and biological variation caused by climate change, environmental temperature changes caused by the construction of large-scale water conservancy facilities, migration of living species, etc. In addition, Chinese traditional values have also been affected by the development of globalization in the process of nationalization. Under the impact of western culture, Chinese traditional culture has affected students' ideology, which needs to be correctly guided and put forward new challenges to China's traditional ideological and political education model.

2.2 Decoupling of Ideological and Political Elements from Curriculum Content

Teachers' teaching contents are separated from ideological and political elements, and cannot naturally penetrate into students' thoughts and behaviors. They fail to make a convincing explanation for the social hot issues concerned by postgraduates. Under the impact of Western cultural trends, it is very easy to produce bad value orientation. At

the stage of postgraduates, the close combination of Ideological and political elements and course content of environmental fluid dynamics can not only meet the needs of international talent training mode, but also comply with the development of the times. In the context of internationalization, it is of practical significance to deeply excavate the ideological and political elements of the course of environmental fluid dynamics to cultivate the international level of postgraduates.

2.3 Difficult to Achieve the Goal of International Training

Under the international talent training mode, colleges and universities need to make great efforts in the following four aspects in order to realize the real internationalization of talent training: 1) retain the excellent elements in Chinese education; 2) Introducing reasonable elements in western education; 3) Comprehensively shaping students' sound personality; 4) Cultivate students' correct values and world outlook. The research means of environmental hydrodynamics in China are also constantly in line with international standards, such as the application of some new technologies in environmental hydrodynamics, such as "3S" technology (Geographic Information System GPS), artificial intelligence, expert system, deep learning theory, fuzzy set theory and optimization algorithm, which has effectively promoted the rapid development and internationalization of the scientific research level of environmental hydrodynamics in China.

3 Reform and Innovation

3.1 Mining Ideological and Political Elements

3.1.1 Cultivate Patriotism

Environmental hydrodynamics aims to study the diffusion, migration and transformation laws of pollutants in water, solve the environmental problems caused by the rapid economic development, guide students to bravely shoulder the glorious mission entrusted by the times, and inspire students' confidence and courage to solve major engineering problems in the context of the new era. At present, China is faced with frequent international environmental disputes, such as the concept of carbon peaking and carbon neutralization technology put forward around the Paris Agreement, the requirements for environmental protection put forward by the Montreal Convention to protect the ozone layer, making students aware of the inequality of international voice in dealing with international disputes related to the environment, "falling behind will be beaten", and improving students' patriotic awareness, Enhance students' national self-confidence and pride.

3.1.2 Cultivate Awareness of Ecological Environment/Sense of Historical Mission

Since the outbreak of COVID-19 in 2020, it has caused heavy damage to the domestic and international economic life. It is not very clear about the transmission route and effective preventive measures of novel coronavirus in the air, and the large-scale transmission of SARS virus in Amoy Garden community in Hong Kong in 2003 led to more

than 300 residents infected, 42 people died, and many families were separated. The research on the spread of virus in the environment must rely on the interdisciplinary intersection of medicine and environmental hydrodynamics. Therefore, environmental hydrodynamics can solve the real environmental pollution problems, make the graduate students majoring in environmental engineering clear their sense of historical mission in the teaching process, and contribute to solving the pollution problems at home and abroad.

3.2 Reform Teaching Methods

3.2.1 Introducing “Flipped” Classroom

The concept of flipped classroom is applied to the teaching of environmental hydrodynamics. In recent years, wasp hydraulic and water quality simulation software, ground-water simulation, hydraulic and water quality simulation of water supply network, etc. are combined to query the English literature of recent three years in international high-level journals (such as water research, Journal of water resources planning and management, Journal of hydraulics, Journal of environmental engineering, etc.), Each graduate student will be assigned a document. During the course, students will complete the document translation and PPT report, hold discussions with students in class, expand the understanding and mastery of graduate students on the research field and research scope of this course, understand the problems of environmental hydrodynamics of international concern, improve students' enthusiasm, stimulate students' creative ability, and achieve the teaching goal of international standards.

3.2.2 Make Full Use of Network Resources

Making full use of online network resources, the MOOC course of environmental fluid mechanics of Hehai University, combined with self-made teaching materials, explains and supplements offline while watching online videos, so as to realize the complementary advantages of online teaching and offline teaching. Make full use of Internet online resources, arrange students to explore the ideological and political elements of environmental hydrodynamics at home and abroad, especially international environmental disputes and China's coping strategies, so as to enhance students' patriotic consciousness and enhance students' national self-confidence and pride. At the same time, collect relevant English documents on the topic of environmental fluid mechanics that need to be translated by students and assign them to students, so that students can understand the international frontier research of environmental fluid mechanics; Further use the Internet to collect international environmental protection institutions related to environmental fluid dynamics and their focus in recent years, so that students can turn their vision from the domestic environment to the international environment, form a clearer understanding of the future development of the environment, and produce the inner driving force to study hard and strive for improving China's international status and voice in the field of environment.

4 Conclusions

To sum up, with the development of international talent training mode, higher quality requirements are put forward for all aspects of the quality of environmental protection talents. As such, the traditional teaching methods are not competent for the ideological and political teaching activities of postgraduates majoring in environmental engineering. Therefore, in this paper the reform and innovation in the teaching of environmental fluid mechanics from the aspects of excavating ideological and political elements and reforming teaching methods were discussed, which can give better play to the teaching effect of Ideological and political courses and continuously meet the needs of international talent training mode for environmental protection talents.

Acknowledgments. The paper is funded by “Project of Ideological and political education and teaching reform of graduate courses in Southeast University in 2022”.

References

1. Baomei Zhang (2019). On the innovative teaching method of political theory course in Colleges and universities Yinshan journal, 32 (4), 107–112 (in Chinese).
2. Chunyan Shan (2022). The internationalization of postgraduate courses in Chinese universities Higher education development and evaluation, 36 (4), 97–107 (in Chinese).
3. Fujing Pan, Zhenjiang Jin, & Shaohong You (2020). Exploration on Ideological and political teaching reform of environmental engineering courses in Colleges and universities Science, education and culture, 33, 91–93 (in Chinese).
4. Yamei Lan, Shiming Wang, Qihong Song, Shuang Liu, & Juntong Yuan (2019). On the ideological and political education of engineering fluid mechanics in Colleges and universities Education and teaching forum, 39, 46–47 (in Chinese).

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter’s Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter’s Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

