

Practice and Exploration on Ideological and Political Education in Curriculum of Earthquake Hydrology

Xin Liao, Yun Shi, Chenyue Hu, Chunping Liu, Luming Zhang

School of Ecology and Environment, Institute of Disaster Prevention, Beijing 101601, China

Abstract: Earthquake Hydrology is a discipline and specialized course that studies the interaction or relationship between earthquakes and hydrological processes. It is an important component of the curriculum of disaster prevention and mitigation. From the perspective of curriculum construction of ideological and political education, we explore the specific ways to combine the teaching of “Earthquake Hydrology” with the ideological and political education of the curriculum, to improve the theoretical knowledge and practical skills while improving college students’ ideological and moral quality and comprehensive literacy. In addition, a survey shows that through the ideological and political construction of the curriculum, not only the college students’ critical thinking ability and practical innovation ability were enhanced, but also the college students’ emotional attitude and humanistic qualities were improved. More importantly, the college students’ patriotic feelings and sense of social responsibility were enhanced. This study can provide experience reference for the construction of ideological and political education in the curriculums of disaster prevention and mitigation.

Keywords: Earthquake Hydrology; Ideological and political education in curriculum; Curriculum construction; Curriculum exploration

1. Necessity and objectives

1.1 Necessity

In May 2020, the Ministry of Education of the People’s Republic of China issued the “Guidelines for Ideological and Political Construction in Higher Education Curriculum”, which explicitly called for promoting teaching reforms with the goal of “Ideological and Political Education in Curriculum”. The aim is to achieve the organic integration of ideological and political education with the education of knowledge systems. Earthquake hydrology, as a core and distinctive curriculum for major of Groundwater Science and Engineering in the Institute of Disaster Prevention, plays a significant role in cultivating college students’ scientific thinking abilities in enhancing earthquake prediction based on hydrological phenomena and in fostering college students’ comprehensive awareness of disaster prevention and mitigation. Throughout the teaching process of Earthquake Hydrology, we are actively exploring effective approaches to incorporate ideological and political education into professional curriculum.

Previous studies have shown that research on earthquake hydrology, through monitoring and analysis of groundwater data, such as groundwater levels, temperature, and chemistry (including groundwater quality), has played a significant role in earthquake prediction during numerous earthquakes in the world (Xu, 2015; Wang and Manga, 2021). With continuous technological advancements and expanding applications, the research scope and application of Earthquake Hydrology are constantly broadening. It not only contributes to earthquake monitoring, prediction, and disaster mitigation, but also extends to fields such as environmental monitoring and groundwater resource management (e.g., Lupi et al., 2015; Wang et al., 2018).

1.2 Objectives

The concept of curriculum construction of ideological and political education in Earthquake Hydrology is guided by Xi Jinping’s Thoughts on Socialism with Chinese Characteristics for a New Era. The specific goals of this curriculum are as follows: firstly, to cultivate individuals with humanistic literacy who can care about society, show concern for others, and possess noble character and good behavioral habits; secondly, to develop individuals with scientific literacy who can grasp the fundamental theories and practical

skills of the curriculum and apply their knowledge to solve real-world problems; thirdly, to cultivate a sense of social responsibility, enabling the college students to provide professional technical support for earthquake disaster warning, prediction, and disaster reduction and rescue efforts, and contribute to the development and progress of society.

2. Specific plan

In the process of construction of ideological and political education in curriculum of Earthquake Hydrology, the teaching team has undertaken construction practices from various aspects, including teaching content, teaching methods, teaching tools, and the design of the teaching process. The specific plan is as follows.

2.1 Identifying the key points

Based on a survey questionnaire, the following issues have been identified in ideological and political education in curriculum teaching, along with specific approaches to address them.

Teaching content. Emphasize the teaching of professional knowledge while integrating ideology and political elements of social responsibility, patriotism, craftsmanship, and professional habits. Meanwhile, in answering the key, difficult, and hot issues that college students are concerned about, we help college students understand the current needs of social development and the current development of the specialty. The organic combination of ideological and political content and theoretical knowledge of curriculum, such as combining the touching stories of excellent craftsmen.

Teaching methods and approaches. Focus on interactive teaching methods rather than a lecture-style approach. For example, use open-ended questions as starting points to stimulate student thinking and discussions, allowing college students to freely express their viewpoints and ideas. Employ group discussions encourage college students to actively explore and contribute and facilitate collaborative problem-solving.

2.2 Systematization of teaching content

The teaching content of the curriculum includes the impact mechanisms of earthquakes on hydrological systems and water cycle processes, the relationship between seismic disasters and hydrological disasters, as well as the fundamental knowledge and skills of earthquake disaster prediction and response. The teaching content of the curriculum incorporates elements of innovation, civic awareness, social responsibility, and industry responsibility, such as introducing the successful prediction process of the Haicheng earthquake, aiming to cultivate college students' sense of professional identity and honor. With a goal-oriented approach, the curriculum construction aims to explore the ideological and political elements of curriculum teaching by emphasizing the destruction caused by earthquakes, the economic and human losses resulting from major secondary disasters in the introductory part of the curriculum, and to stimulate college students' awareness of the importance of conducting earthquake monitoring and prediction research. For more details on the ideological and political elements in other chapters.

2.3 Innovative teaching methods and approaches

The curriculum adopts primarily case-based teaching and practical teaching methods to enhance college students' understanding and mastery of knowledge and skills. Additionally, the curriculum incorporates multimedia teaching and experimental teaching methods, taking inspiration from Chen and Yao (2022)'s "lecture, inquiry, reflection, research, and discussion" integrated teaching approach. Drawing on domestic and international classic cases, the curriculum encourages an in-depth understanding of the key points and difficult topics through teacher-student interaction and case discussions. Through classroom discussions, group debates, and other activities, teachers and students discussed ideological and political issues related to disaster prevention and reduction, social development, and sustainable development. These activities aim to stimulate students' innovative thinking and abilities. Finally, through group-based curriculum presentations and the writing of curricular papers, the curriculum achieves effective improvement in teaching outcomes.

3. Effectiveness of curriculum construction

To assess the effectiveness of incorporating ideological and political elements into the curriculum of Earthquake Hydrology for the 2020 class of Groundwater Science and Engineering, a questionnaire survey was conducted among the college students. The survey results are presented below:

Firstly, in terms of ideology and morality, through the integration of curriculum teaching and ideological and political education, 67.79% of college students expressed their intention to translate the knowledge they have acquired into practical action, thereby establishing correct values, cultivating patriotism, and emphasizing personal character and behavioral norms. During the teaching process, it was perceived that the teachers lead by example, positively influencing college students' innovative thinking, solid

knowledge foundation, integrity, friendliness, and other aspects. Over 50% of college students believed that the teaching instructors had a significant impact on their personal development.

Secondly, in terms of teaching assessment, single assessment methods such as curriculum exams and adherence to behavioral norms received recognition rates of 30.51% and 47.46% respectively. However, the combined mode of curricular exams and adherence to behavioral norms was approved by 52.54% of college students. This curriculum emphasizes the integration of practical activities and curriculum teaching, enhancing college students' interest and engagement through daily behavioral assessments. At the same time, the acquired professional knowledge and ideological and political education are subtly reinforced in college students' daily lives. College students not only value academic achievements but also prioritize the cultivation of spiritual civilization.

Lastly, in terms of social responsibility and professional competence, the survey results indicate that teaching students relevant anecdotes about prominent figures, current social issues, and employment prospects in the classroom can effectively attract and guide college students to develop a strong sense of social responsibility. This, in turn, helps college students solidify their professional foundations and enhance their expertise. College students are encouraged to apply their acquired knowledge and skills to solve practical problems and approach unexpected disaster events with a positive mindset. Moreover, the increased sense of social responsibility and enhanced competence lead college students to pay more attention to earthquake disasters. They seek to understand and discuss measures for earthquake prevention, mitigation, and response, striving to contribute to the seismic disaster reduction efforts of our country.

4. Prospects and reflections

The ideological and political construction of the Earthquake Hydrology curriculum will continue to be carried out and further improved to better meet the development needs of higher education in the new era. It is crucial to have prospects and reflections on the following aspects:

In terms of teaching content, Earthquake Hydrology will further increase its coverage of issues related to groundwater resources, water environment, and water hazards caused by earthquakes. Additionally, the curriculum will place greater emphasis on practical applications and cutting-edge technologies relevant to the field, such as mathematical modeling and remote sensing techniques. Furthermore, the teaching content will be more closely aligned with national, societal, and industry needs, such as addressing secondary groundwater resources and water environment issues resulting from earthquakes.

In terms of teaching methods, the Earthquake Hydrology curriculum will place greater emphasis on interactive and personalized instruction. For example, by utilizing online teaching platforms and virtual laboratories, college students will have increased opportunities to participate in classroom and practical activities. The teaching methods for ideological and political education will become more diverse and innovative, incorporating approaches such as social practice and volunteer services. These methods aim to provide college students with deeper engagement in society, thereby enhancing their sense of social responsibility.

Acknowledgements

This research was supported by the Undergraduate Education Research and Teaching Reform Project of the Institute of Disaster Prevention (JY2021B23), the Hebei Province Postgraduate Excellent Course Construction Project (KCJPX2023056), the Spark Program of Earthquake Science (XH23063A), the Fundamental Research Funds for the Central Universities of China (ZY20215104 and ZY20215102), the State Key Laboratory of Earthquake Dynamics (LED2022B06). We also thank Qi-Long Tang and Meng-Yuan Cao for providing valuable suggestions.

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