

Teaching Exploration of Integrating Ideological and Political Elements into Irrigation and Drainage Engineering Course

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Abstract

In the new era, new requirements for the ideological and political construction of courses are put forward for the teaching of professional courses in colleges and universities. It is an important task to excavate the ideological and political education resources contained in professional courses, integrate into the teaching of professional courses, form a synergistic effect with ideological and political courses, and realize the goal of moral education. Irrigation and drainage engineering is a core compulsory course for agricultural water conservancy engineering specialty, and it is very important status in professional course. It is of great significance to explore the ideological and political elements in the course of irrigation and drainage engineering, analyze the integration mode of ideological and political elements and the course of irrigation and drainage engineering, and explore the synchronous implementation of ideological and political elements and the course of irrigation and drainage engineering. It has important significance to realize moral education, cultivate the feelings of the country, realize the value guidance, and improve the teaching effect.

Keywords

Ideological and Political Elements; Irrigation and Drainage Engineering; Teaching Process; Teaching Exploration.

1. Introduction

In June 2020, the Ministry of Education issued the Guidelines for the Ideological and Political Construction of Curriculum in Colleges and Universities, which clearly requires the comprehensive promotion of the ideological and political construction of curriculum in colleges and universities, and the in-depth excavation of the ideological and political education resources contained in the curriculum of various disciplines in colleges and universities, so as to form a synergistic effect between explicit education and implicit education [1]. For a long time, there has been a loose connection between professional course teaching and ideological and political education. Only pay attention to the cultivation of knowledge ability and ignore the value guidance. Ideological and political construction of curriculum, especially professional core curriculum is imminent [2]. Irrigation and drainage engineering, as a compulsory core course of agricultural water conservancy engineering, excavates the ideological and political elements in the course, analyzes the integration mode of ideological and political elements and irrigation and drainage engineering courses, and discusses the synchronous implementation of ideological and political elements and courses. In order to comprehensively promote rural revitalization and accelerate the modernization of agricultural and rural areas, excellent agricultural water conservancy engineering talents are cultivated [3].

2. Deeply Excavate the Ideological and Political Elements of Irrigation and Drainage Engineering

The fundamental purpose of ideological and political education is to establish morality and cultivate people. The realization of educational function of irrigation and drainage engineering course depends on the excavation of ideological and political elements of the course. Only by deeply excavating the ideological and political elements in the course can the effect of ideological and political education be improved.

2.1. Based on Subjects and Specialties Assigned or Served by Irrigation and Drainage Engineering Courses

Irrigation and drainage engineering is a science that studies and uses irrigation and drainage engineering measures to regulate farmland water status and change regional water conditions in order to eliminate floods and droughts, rationally and scientifically use water resources and serve the development of agricultural production. According to 《subject classification and code》 (GB /T13745), the course belongs to the first-level discipline of natural science-related engineering and technology, the second-level discipline is agricultural engineering, the third-level discipline is farmland water conservancy including irrigation engineering, drainage engineering, etc., and the subject code is 4165025. According to the professional classification of the Ministry of Education of the People's Republic of China, this course serves the agricultural water conservancy engineering specialty in engineering disciplines.

Agricultural water conservancy specialty in Hebei Agricultural University has a long history. It originated from the department of farmland water conservancy established in 1931 and was formed in the department of agricultural and forestry engineering in 1946. In 1949, it was renamed the department of farmland water conservancy. In 1999, according to the adjustment opinions of undergraduate majors in colleges and universities of the Ministry of Education, the specialty of farmland water conservancy engineering was changed into agricultural water conservancy engineering. In 2020, the agricultural water conservancy project specialty passed the professional certification of engineering education, and the same year was approved of the national first-class undergraduate specialty construction points. The training objectives of this major are as follows: to adhere to morality education, to cultivate applied engineering and technical talents with social responsibility, to adapt to the needs of regional economic and social development and the coordinated development of Beijing-Tianjin-Hebei region, to comprehensively develop morality, intelligence, physique, beauty and labor, to have the basic theory, basic knowledge and skills of agricultural water conservancy engineering, to have innovative entrepreneurial spirit and strong practical ability, and to be able to engage in survey, planning, design, construction and management in water conservancy, water conservation, urban water supply, construction and other fields.

Food security is an important foundation for national security. More than a billion people need to eat, which is the largest national condition in China. The report of the Nineteenth National Congress of the Communist Party of China clearly pointed out it to ensure national food security, the Chinese bowl firmly in their hands. At present, there is 1.28×10^8 hm² cultivated land area in China, and the effective irrigation area is 0.69×10^8 hm², which is the largest irrigation country in the world. The irrigation area accounts about 50% of the country's arable land produced 75% of the country's total food and more than 90% of the economic crops [4], the lifeline of the field in water. The average grain yield of irrigation area in China is 8550 kg/hm², which is 1.8 times of the national average yield and 2.9 times of the dryland average yield. Irrigation engineering plays an important role in increasing grain yield and harvest.

2.2. Combination Students' Professional Quality in Future

After graduation, students majoring in agricultural water conservancy can adapt to the needs of social and economic development and modernization of agricultural water conservancy. The professional quality of future work requires physical quality, humanistic quality and scientific literacy, as well as harmonious and sound personality; correct values and analytical judgment ability, strong sense of social responsibility; understanding the basic requirements of agricultural water conservancy projects for hard work, clear the connotation of basic professional ethics and related laws and regulations, and earnestly abide by in practice.

Through course case of the ancient water conservancy celebrities and ancient water conservancy projects, it is necessary for students to understand that excellent water conservancy talents should not only have professional knowledge and skills, but also have the professional quality of social responsibility, hard work, perseverance and dedication. The legend of Dayu has a history of 4000 years. Dayu put forward the control water strategy changing blocking into dredging and taking advantage of the situation. It lasted 13 years before and after, and finally succeeded in controlling water. Dayu's water management embodies the spirit of the Chinese nation not afraid of hardships and hardships, and the spirit of innovation and realism. In 605 B.C., the Prime Minister of Chu State, Sun Shuao, presided over the construction of the Qisiyulou Irrigation District, which was later called a hundred miles square without dependent rainfall irrigation; In 597 B.C., he presided over the construction of Que Bei, the earliest water storage and irrigation project in China, which made Shou county become the granary of Chu State. Gu Zuyu, a scholar in the Qing Dynasty, called Que Bei as the foundation of farm economic in Huainan. Sun Shuao devoted all his life to serving the country and people. He managed water scientifically and innovated bravely. Mao Zedong once called him "a great water conservancy expert".

2.3. Combination the Practice of Socialism with Chinese Characteristics

There is a serious shortage of water resources in China, its contradiction between supply and demand is prominent, and the spatial and temporal distribution is uneven, which poses a serious threat to agricultural production. According to China Water Resources Bulletin, the total water consumption in 2020 is $5812.9 \times 10^8 \text{ m}^3$. Among them, agricultural water consumption is $3612.4 \times 10^8 \text{ m}^3$, accounting for 62.1% of the total water consumption, and agriculture is a major water user. The agricultural water problem is mainly the contradiction between water shortage and food security in the new period. In March 2012, the sixteen-word policy of water control in the new era, which is water saving priority, spatial balance, systematic governance, and two-handed efforts, was put forward. To implement the priority of water saving, agricultural water saving should focus on improving the efficiency and benefit of agricultural water use, ensuring national water security and food security, and promoting rural revitalization. Vigorously develop efficient water-saving irrigation, promote irrigation modernization, and improve water-saving facilities construction and operation management ability.

The ideological political elements are deeply explored according to the disciplines and majors that the irrigation and drainage engineering course belongs to or serves, the professional quality for students' future work and the great practice of socialism with Chinese characteristics, as shown in Table 1.

Table 1. Summary of ideological and political elements of irrigation and drainage Engineering course

Number	Course Objectives	Course Content	Ideological and Political Elements
1	Mastering the existing form of farmland water and the regularity of soil water movement	Soil moisture existence form in farmland and Its effectiveness to Crops, measurement of soil moisture content, Soil moisture movement equation, soil moisture movement regularity under infiltration and evaporation conditions, SPAC System	1) Seeing the essence through phenomena and mastering the regularity of development of things; 2) System thinking and speculative consciousness by learning farmland water movement regularity, SPAC system
2	Mastering crop water requirement and irrigation system, irrigation rate and irrigation water consumption	Influencing factors and calculation methods of crop water requirement, irrigation system, water balance principle, irrigation rate, irrigation water consumption	1) The regularity of crop water requirement leads to dialectical materialism; 2) Systematic thinking and speculative awareness of food production.
3	Mastering irrigation Technology, Planning and design of efficient water saving irrigation project	Surface irrigation and improved surface irrigation technology, composition, advantages and disadvantages, irrigation quality index, planning and design of sprinkler irrigation, micro-irrigation, and pipeline water conveyance irrigation systems	1) Agricultural water consumption status, the central policy of water saving priority ; 2) National feelings, mission and responsibility; 3) Deeply implement the strategy of ' storing grain in the ground and storing grain in technology , devote themselves to the construction of the motherland and stimulate patriotic enthusiasm; 4) Bottlenecks problem, into the industry construction.
4	Mastering the planning and design of irrigation channel system	Composition, planning and layout of irrigation canal system, calculation of design flow, design of Longitudinal and cross section of canal, canal lining, canal system buildings, irrigation source and water intake mode	1) Ancient irrigation engineering examples, stimulate four confidence, cultivate craftsman spirit; 2) Systematic thinking and speculative consciousness; 3) Cultivating scientific spirit and innovative consciousness; 4) Human-water harmony, focusing on ecological and environmental protection.
5	Mastering planning and design of drainage engineering	Farmland drainage tasks, drainage standards, drainage measures, drainage ditch system composition and layout, drainage flow calculation, drainage ditch longitudinal and cross section design, drainage area	1) Comprehensive management of drought and flood, cultivate systematic thinking and speculative consciousness; 2) Saline-alkali land management, improving the quality of cultivated land reserve resources, social mission and responsibility; 3) Ecological environmental protection consciousness.
6	Irrigation and drainage system management	planning of water consumption in irrigation district, and its implementation, water measurement technology, and informatization in irrigation district	1) Agricultural water conservancy is the cornerstone of stable grain production, ensuring national food security, social responsibility and mission; 2) Irrigation district informatization, socialist modernization; 3) Ecological environmental protection consciousness.

3. Organic Integration of Ideological and Political Elements and Irrigation and Drainage Engineering Course

The integration of ideological and political elements and irrigation and drainage engineering courses can enrich teaching content, cultivate home and country feelings and realize value guidance; enhance teacher-student interaction, active classroom atmosphere, improve learning effect; optimize teaching process, enhance knowledge continuity and improve teaching effect. The integration of ideological and political elements and curriculum is not limited to the study of professional knowledge of irrigation and drainage engineering, but also integrates the ideological and political elements of education into curriculum norms, classroom teaching, practical activities and autonomous learning. Through the integration of the whole process, multi-directional and immersion, a systematic and complete education system is formed.

3.1. Integration of Ideological and Political Elements into Curriculum Norms is the key to the Realization of Moral Education

Curriculum specification is the guiding document of subject teaching. Curriculum specification clearly stipulates the position and role of the course in the professional teaching plan, determines the basic tasks and requirements of the teaching of the course, and determines the basic content, emphases and difficulties of each chapter and section according to the connection between the knowledge system of the subject and the related leading courses and subsequent courses, which can reflect the new achievements and development direction of the subject. At the same time, the principles and class hours of teaching organization and implementation of this course should be put forward. Integrating ideological and political elements into curriculum standards is the key to realize moral education. The teaching content of irrigation and drainage engineering is composed of introduction, irrigation and drainage engineering principle, irrigation and drainage engineering planning and design, and irrigation and drainage engineering management. Through learning this course, students can understand and master the basic principles of irrigation and drainage, the planning and design methods of irrigation and drainage system and the basic knowledge of irrigation and drainage engineering management, and understand the new technologies and development trends at home and abroad in this field. Students have the ability to engage in planning, design, construction and management of farmland water conservancy projects, and can independently undertake the planning and design of small and medium-sized irrigation areas and irrigation and drainage engineering management.

Curriculum objectives effectively support professional objectives in three aspects: quality, knowledge and ability. According to the characteristics of irrigation and drainage engineering course, historical self-confidence and cultural self-confidence are integrated into the course by teaching case of ancient water conservancy projects such as Dujiangyan and Yellow River Diversion Irrigation District, and water control Celebrity, for instance Dayu and Libing, and the historical materialism is penetrated. Through the achievements of irrigation and water conservancy construction in different periods of New China, such as the Red Flag Canal and the Three Gorges Project, it fully reflects the superiority of the socialist system to concentrate on major events, and strengthens students' confidence in socialist road and system. Through learning agricultural water conservancy policy and the concept of water management, systematic and dialectical thinking of students are strengthened. These ideological and political elements are organically integrated with the curriculum content, and the curriculum standards are revised and improved to cultivate excellent hydraulic engineering talents for the construction of a socialist country.

3.2. Integrating Ideological and Political Elements into Course Teaching is the Implementation Plan to Realize Moral Education

Classroom is the main activity place for teachers and students to communicate. In the teaching of the original knowledge, the integration of ideological and political elements can enrich the teaching content, promote the cultivation of humanistic quality and home and country feelings from the teaching of simple knowledge, cultivate students to establish a correct world outlook, values and outlook on life, ignite students' learning enthusiasm, set lofty goals, and devote themselves to the construction of the industry. At the same time, the integration of ideological and political elements into irrigation and drainage engineering can activate students' thinking, improve classroom atmosphere and classroom participation, enhance communication and interaction between students and teachers, make the classroom more emotional and temperature, and improve classroom teaching effect.

Taking the first preface of irrigation and drainage engineering as an example, the integration process of ideological and political elements and teaching was discussed in paper. The teaching contents and educational objectives of the introduction part of irrigation and drainage engineering are shown in Table 2.

Table 2. Teaching Cases of Teaching Content and Educational Objective in Introduction

Section	Teaching Content	Curriculum Knowledge and Educational Objectives
introduction	Regional characteristics of farmland water conservancy in China	1) Irrigation and drainage in different regions - adapted to local conditions, systematic controlling, dialectical materialism; 2) Report of the Nineteenth Congress; 3) Water conservancy is the lifeline of agriculture and the cornerstone of stable food production. The people take food as their heavens, and the Chinese should firmly put the bowl in their own hands to cultivate social responsibility and sense of mission.
	History of Farmland Water Conservancy Development in China	1) Ancient water conservancy projects – national pride, enhancing historical and cultural confidence; 2) Celebrities of ancient water management - the spirit of the Chinese nation not afraid of hardships and hardships, and the spirit of public forgetfulness and innovation in water conservancy work; 3) Achievements in farmland water conservancy construction since the foundation of the People's Republic of China — confidence in socialist road and system.
	research objective and basic content of Irrigation and drainage engineering	1) Adjust the farmland water condition, Qisiyulou Irrigation District- Scientific water control, comprehensive treatment of drought and flood, dialectical materialism thought; 2) Changing regional water conditions, the South-to-North Water Transfer Project – enhancing the Four Self-Confidence, and the superiority of the socialist system concentrating on major events; 3) The current situation of agricultural water consumption, large water consumption, low efficiency - neck problem, commit to industry construction.

The introduction part mainly includes the regional characteristics of farmland water conservancy in China, the development history of farmland water conservancy in China, the research objective and basic content of irrigation and drainage engineering. In China's vast territory, the development of agricultural water conservancy conditions is also different with

different natural characteristics. According to the precipitation, it is divided into perennial irrigation zone, unstable irrigation zone and rice irrigation zone in China. According to the characteristics of different regions, the temporal and spatial variation of precipitation is mastered, and the comprehensive management of irrigation, flood control, waterlogging control, drainage and prevention of salinization is adjusted to local conditions to enhance the dialectical materialism. Water conservancy is the lifeline of agriculture and the cornerstone of stable grain production. People take food as the day, the Chinese people to the bowl firmly in their own hands, cultivate students' sense of social responsibility and mission, set up a lofty goal.

The second part has a long history of irrigation in China. In 3000 BC, agricultural irrigation was recorded in the Yellow River Basin. The Shang Dynasty farmland water conservancy project appears in the written records; in the Western Zhou Dynasty, canal works developed further. In 2020, the total number of world irrigation engineering heritages in China reached 23, covering almost all types of irrigation projects. It is the country with the richest types, the most widely distributed and the most prominent irrigation benefits. By watching Dujiangyan video, stimulate national pride, enhance historical and cultural confidence; at the same time, in this part, let students participate in the discussion, feel the spirit of the Chinese nation is not afraid of hardships and arduous struggle and innovation and realism, so as to arouse students' resonance and cultivate national feelings. According to the First National Water Census Bulletin, there are 98002 reservoirs with a total storage capacity of 932.312 billion m³, 268476 sluices with passing 1 m³/s and 2685 rubber dams; pumping station 424451, 456 irrigation areas with an irrigation area of 2×10⁴ hm² and above were designed, with an irrigation area of 0.187×10⁸ hm²; 7316 irrigation districts with an irrigation area of 0.067×10⁴ hm²~2×10⁴ hm² are designed with an irrigation area of 0.149×10⁸ hm²; There are 205.82×10⁴ irrigation areas of 3.33 hm² ~ 0.067×10⁴ hm², and the irrigation area is 0.228×10⁸ hm². The self-confidence of socialist road and system is strengthened by the great achievements of farmland water conservancy since 1949.

The third part of the content of farmland moisture condition is insufficient or too much, will affect the normal growth of crops, and then affect the yield. Irrigation is the water conservancy regulation measure for insufficient farmland moisture, and drainage is the regulation measure for excessive farmland moisture. By introducing the project of Qisiyulou Irrigation District, which was built under the auspices of Sun Shuao in Chu state, it was infiltrated to students for scientific water control, comprehensive treatment of drought and flood, and innovation. Change and adjust the regional water regime, citing the case of South-to-North Water Transfer Project, through cross-basin, cross-regional water transfer, to solve the imbalance in the allocation of water and land resources, to solve the problem of drought in the north. Enhance the "four self-confidence," fully embodies the superiority of the socialist system "focus on major events." At present, the effective utilization coefficient of farmland irrigation water in China is 0.565 [5], which is still lagging behind the irrigation water utilization coefficient of 0.7~0.8 in developed countries. In response to the "water saving priority", students strive to learn professional knowledge and skills and participate in industry development. Only by combining their own development with national, ethnic and social needs can greater achievements be created.

3.3. Integrating Ideological and Political Elements into Practical Teaching is an Important Aspect of Realizing Morality Cultivation

The practical teaching of irrigation and drainage engineering course includes course experiment and course design. The course experiment includes soil infiltration experiment, micro sprinkler performance test experiment, drip irrigation experiment and sprinkler irrigation experiment. The course experiment not only consolidates the learned knowledge, but also helps to cultivate student's ability. The integration of ideological and political elements into

practical teaching is conducive to cultivating students' scientific and rigorous attitude to doing things, being good at observing and thinking, seeing the essence through phenomena, mastering the regularity of utilization, and strengthening dialectical materialism. The course design link makes the knowledge continuous, understands the guidelines, policies and laws and regulations related to agricultural water conservancy projects, and grasps relevant norms and procedures, such as "irrigation and drainage engineering design standards"(GB 50288-2018), "water-saving irrigation engineering technical specifications"(GB/T50363-2018), "sprinkler engineering technical specifications"(GB/T 50085-2007),"micro-irrigation engineering technical standards" (GB/T 50485-2020),"pipeline irrigation engineering technical specifications" (GB/T 20203-2017), etc. Clear the basic professional ethics and related laws and regulations, and earnestly abide by in practice.

The student-centered teaching concept adopts the project teaching method in the teaching process, which is holistic, comprehensive and exploratory. Students apply the knowledge and skills of new learning and learn while doing. It is a typical student-centered teaching method and is very important for training students' practical ability. Each group with 4 to 6 members freely select 1 to 2 of the five projects, including crop irrigation system formulation, lawn sprinkler irrigation engineering design, drip irrigation engineering design, irrigation channel planning and layout in M irrigation area, and low pressure pipeline irrigation engineering design. Students independently plan and carry out projects. In the implementation of the project, cultivate students' ability to analyze and solve problems, understand the theoretical thinking, methodology and value judgment behind problems and knowledge, stimulate students' ideological collision and realize value guidance. At the same time, learn to do things, enhance the sense of responsibility, team spirit.

3.4. Integrating Ideological and Political Elements into Students' Autonomous Learning is an Important Expansion to Realize Moral Education

Guiding students' autonomous learning is a necessary supplement to classroom teaching. Integrating ideological and political elements into autonomous learning, there should focus on improving students' thinking ability, value analysis and value judgment, understand the basic principle of doing things, establish socialist core values, firmly realize the great dream of national rejuvenation, and shoulder the mission and responsibility of realizing national rejuvenation. For example, as a natural extension of classroom teaching, students are asked to consult materials and understand the story behind the construction of the Hongqi Canal in Lin county of Henan Province. The Hongqi Canal diverts water from Shanxi Province to Lin County, relying only on one hammer, one shovel and two hands, forming a 1500 km Hongqi Canal in the cliff cliffs and cliffs of Taihang Mountain. cuts 1250 hills and through 211 tunnels, sets up 151 aqueducts, and excavates 2.225×10^4 m³. The brave and diligent people in Lin county solve the ten years of drought, water is expensive as oil survival situation, put the personal interests on the side, choose the collective and country, it has taken ten years to establish Hongqi Canal, which is known as the eighth wonder of the world water conservancy. Learning self-reliance, hard struggle, unity and cooperation, selfless dedication of the Hongqi canal's spirit, enhance the road of socialism with Chinese characteristics confidence, theoretical confidence, system confidence, and cultural confidence. Through group discussion and exchange of information and reading experience, students are encouraged to think actively, improve the ability of value analysis and value judgment, establish socialist core values, and realize the organic integration of ideological and political elements and professional courses.

4. Conclusion

Irrigation and drainage engineering course is a core compulsory course for agricultural water conservancy engineering specialty. According to the subject and specialty of course service,

combined with the professional quality requirements of future work and the practice of socialism with Chinese characteristics, the ideological and political elements are deeply excavated and integrated into curriculum standards, classroom teaching, practical teaching and autonomous learning. Curriculum norms are the guiding documents of subject teaching. The integration of ideological and political elements into curriculum norms can comprehensively, systematically and clearly present quality education and the cultivation of professional knowledge and ability, which is conducive to the gradual implementation according to the plan. The integration of ideological and political elements into curriculum norms is a key link. The integration of ideological and political elements into classroom teaching is the focus of realizing morality education. Classroom is the main place for teachers and students to communicate. Through case teaching, discussion teaching and project teaching, students can realize value guidance in the process of solving problems. The integration of ideological and political elements into practical teaching is an important aspect. In the process of doing things, we should cultivate a scientific and rigorous attitude, be good at observing and thinking, clarify the basic professional ethics and its related laws and norms, and seriously abide by them; the integration of ideological and political elements into autonomous learning is an important development, improving students' thinking ability, value analysis and value judgment, understanding the basic principle of doing things, and establishing socialist core values. The integration of ideological and political elements can enrich teaching content, cultivate home and country feelings and realize value guidance; enhance teacher-student interaction, active classroom atmosphere, improve teaching effect.

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