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The Design of Curriculum Ideological and Political in the Course of "Solid Waste Treatment and Disposal" and the Exploration of Relevant Elements

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Abstract

The integration of curriculum ideology and politics is essential for reinforcing efforts to instill moral values in students, achieving the dual goals of knowledge transmission and value formation. This study outlines a comprehensive framework for incorporating ideological and political education into the "Solid Waste Treatment and Disposal" course, effectively intertwining these principles with the educational content. The framework emphasizes the seamless integration of core socialist tenets, ecological civilization, research integrity, and social responsibilities within the pedagogical process. The aim is to cultivate students' patriotism, commitment to ecological civilization, innovative spirit, and personal development. It is anticipated that this infusion of curriculum ideology and politics will enable students to simultaneously acquire knowledge, develop values, and enhance their skills.

Key words: Solid waste treatment and disposal; Ideological and political education in curricula; Ideological and political components; Ecological civilization

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Ideological and political education is a pivotal instrument for instilling cultural confidence in higher education students and serves as a cornerstone for the essential mission of moral character development. This comprehensive educational doctrine aims to fully realize the core endeavor of moral training, with course-centric ideological and political education emerging as a novel paradigm. Traditionally, environmental engineering has been perceived as a discipline with limited employment opportunities, extensive learning content, and strong practical relevance. This perception has narrowed students' views and discouraged them from pursuing this major, contributing to a skill shortage in environmental protection sectors. However, the escalating deterioration of the global environment has intensified the urgency for conservation, and the global demand for expertise in sustainable development is surging, highlighting the need for more professionals in this field. Consequently, it is imperative to instill professional pride and ecological consciousness in environmental engineering students through course-centric ideological and political education. Environmental engineering curricula are inherently rich in these educational aspects, positioning them at the forefront of cultivating essential values. By embedding ideological and political concepts more deeply into environmental engineering education, we can establish a cohesive educational framework that transforms excellent cultural traditions into intrinsic attributes of collegiate students. This approach encompasses all levels of the university experience, reinforcing the acceptance of ideological and political teachings, thereby bolstering cultural confidence and nurturing superior, innovative environmental specialists with a strong national ethos, environmental acumen, holistic quality, and creative prowess.

The 'Solid Waste Treatment and Disposal' course is a critical theoretical component of our university's Environmental Engineering program. It provides a

comprehensive discourse on the origins, categorization, collection, preprocessing, physicochemical and thermal treatments, biological processing, resource reclamation, and the safe handling of hazardous and radioactive solid waste (Wang, et al, 2021). The curriculum revolves around the central theme of treatment, disposal, and resource recovery of solid waste, focusing on the fundamental concepts, tenets, techniques, and technological advancements related to waste management. As an applied technical subject, the course integrates a wide range of methods, principles, and case analyses. In today's educational landscape, embedding ideological and political instruction within this syllabus is vital for developing environmentally literate professionals grounded in socialist core ideology. The challenge lies in effectively harnessing the ideological and political dimensions and the moral instruction potential of the 'Solid Waste Treatment and Disposal' course. Exploring the course's intellectual core through examination of reports, policies, regulations, recent trends, and technologies related to solid waste, as well as understanding President Xi Jinping's ecological development philosophy encourages eco-friendly production, sustainable development, and circular economic values. Furthermore, empowering students to apply scientific reasoning to identify, analyze, and address environmental challenges is crucial. The ultimate objective is to synchronize knowledge transfer with value inculcation throughout the instructional process."

1. HOLISTIC APPROACH TO IDEOLOGICAL AND POLITICAL EDUCATION IN THE "SOLID WASTE TREATMENT AND DISPOSAL" COURSE

The "Solid Waste Treatment and Disposal" course aims to provide students with a comprehensive understanding of the characteristics, classifications, principles, and technologies of solid waste management encompassing handling, disposal, and resource conversion. Through an in depth examination of the solid waste life cycle, including its origins, associated risks, contaminant transport, treatment alternatives, and sustainable use, students will gain proficiency in core methodologies for processing, disposing of, and reusing solid waste (Hao, et al, 2022). This instruction not only imparts technical insights but also lays a solid foundation for subsequent professional engagement in relevant engineering and research sectors (Zheng, Mei, and Li, 2024). Exploration of Curriculum Ideology and Politics in the Course of Solid Waste Treatment and Resource Utilization.

In pursuit of comprehensive ideological and political training within this course, our primary goal is to cultivate moral character in students, reflecting the principles of Outcomes-Based Education (OBE). The program aligns with the "four confidences" inherent in the Chinese socialist ethos, endorsing core socialist principles while equipping students with a robust foundation in scientific research techniques. This integra (Liu, 2018) [5tion of ideological and political education is intricately woven throughout the syllabus, resulting in an educational strategy that is diverse in elements, extensive in scope, and immersive in process. This pedagogical approach fosters students' commitment to their country and institution, encourages responsible and ethical behavior, and motivates excellence in academic and professional pursuits. Moreover, it provides a holistic educational experience where students gain specialized knowledge while also evolving personally, culminating in integrated outcomes that encompass value formation, skill advancement, and knowledge dissemination.

Constructing this integrated teaching framework begins with an overarching design aligned with the OBE driven objectives of the program. It progresses through a detailed examination of course content, highlighting discussion areas and conducting thorough evaluations of each facet of the curriculum. The aim is to identify synergies between curriculum ideology, political considerations, and discipline specific instruction. This involves pinpointing various integration points and devising effective methods for delivering ideological and political instruction seamlessly. The instructional outline for the course is then refined to incorporate a rich array of teaching approaches and materials aimed at implementing this integrated pedagogical model. Finally, the success of the ideological and political education is assessed through student feedback and exploratory questions designed to evaluate their assimilation of knowledge and the pedagogical ethos.

2. EXTRACTING IDEOLOGICAL AND POLITICAL INSIGHTS FROM THE "SOLID WASTE TREATMENT AND DISPOSAL" COURSE

In alignment with the Outcomes-Based Education (OBE) teaching philosophy, the "Solid Waste Treatment and Disposal" course rigorously examines the intersection of its specialized knowledge and the principles of ideological and political education. By adopting a pedagogical approach that emphasizes value formation, skill enhancement, and knowledge dissemination, the curriculum carefully distills and amplifies the ideological and political elements embedded in its teaching methods, foundational concepts, and the development and application of relevant technologies. This thoughtful integration of the "four confidences" central to socialist ideology in China, alongside core socialist values and comprehensive training in scientific research methods,

is woven throughout the educational experience. The aim is to cultivate students who are not only proficient in the principles of ecological civilization but also possess an innovative mindset, a sense of patriotic duty, and a strong work ethic. This approach fosters a harmonious blend of technical expertise and ideological instruction within the realm of "Solid Waste Treatment and Disposal." Additionally, the course is dedicated to the continuous improvement of ideological and political education, adapting its strategies to align with the unique characteristics of our institution while addressing the environmental sector's need for well-rounded, high-caliber professionals.

2.1 Fostering a Sense of National Commitment among Students

In alignment with the Outcomes-Based Education (OBE) teaching philosophy, the "Solid Waste Treatment and Disposal" course rigorously examines the intersection of its specialized knowledge and the principles of ideological and political education. By adopting a pedagogical approach that emphasizes value formation, skill enhancement, and knowledge dissemination, the curriculum carefully distills and amplifies the ideological and political elements embedded in its teaching methods, foundational concepts, and the development and application of relevant technologies. This thoughtful integration of the "four confidences" central to socialist ideology in China, alongside core socialist values and comprehensive training in scientific research methods, is woven throughout the educational experience. The aim is to cultivate students who are not only proficient in the principles of ecological civilization but also possess an innovative mindset, a sense of patriotic duty, and a strong work ethic. This approach fosters a harmonious blend of technical expertise and ideological instruction within the realm of "Solid Waste Treatment and Disposal." Additionally, the course is dedicated to the continuous improvement of ideological and political education, adapting its strategies to align with the unique characteristics of our institution while addressing the environmental sector's need for well-rounded, high-caliber professionals.

2.2 Fostering Mainstream Values in Students for Ecological Civilization and Environmental Consciousness

The National Ecological and Environmental Protection Conference held on May 18-19, 2018, marked a significant milestone in China's commitment to ecological progress with the formal introduction of President Xi Jinping's thought on ecological civilization. This concept is now a cornerstone of Xi's broader ideology on socialism with Chinese characteristics for the new era. Within this framework, constructing ecological civilization serves as a guiding principle to protect our environment and promote sustainable development, ensuring harmony between humanity and nature (Liu, 2018). Solid waste pollution presents a pressing challenge to these objectives. Without proper treatment, solid waste can lead to widespread pollution affecting soil, water, and air, thereby threatening ecosystems and biodiversity. Its complex composition and large volume hinder China's efforts to construct an ecological civilization. Addressing solid waste is therefore not a peripheral task, but fundamental to realizing a beautiful China (Wen and Nie, 2013). To embed the principles of ecological construction into education, the solid waste curriculum must be carefully designed to promote students' mainstream values regarding ecological civilization. By instilling the principles of "harmlessness, reduction, and resource recovery" from the outset of the course, students gain a profound appreciation for these tenets and their importance in assessing a region's ecological progress (Ji and Zheng, 2019). The transformation of Hangzhou's waste management practices, from simple dumping to sustainable, resource centric approaches, serves as a compelling example. It illustrates the application of the "Two Mountains" theory, reinforcing the idea that effective waste management can lead to flourishing landscapes and turn waste into a valuable resource (Zhou, 2023). Special lectures can expand on topics such as urban waste resource recovery and the promotion of "zero-waste cities," highlighting their role in fostering ecological urban development. Chinese ecological perspectives continue to evolve alongside socio-economic growth and policy changes, as reflected in phrases that shift focus from "both golden mountains and green waters" to "valuing green waters over golden mountains." (Wu, et al, 2019)

To keep pace with rapid technological advancements, course material must remain relevant, reflecting the latest intelligent solutions. Students are encouraged to take on the responsibility of contributing to the nation's ecological civilization. By weaving the philosophy of nurturing a "resource-conserving, environmentally friendly society" throughout the curriculum, the course explores the theoretical, technological, and practical aspects of solid waste treatment. Encouraging broader discussions and active engagement both inside and outside the classroom, the course addresses various scales of waste utilization, from household waste repurposing to industry-wide initiatives aimed at achieving zero solid waste emissions in sectors like ceramics. These discussions can extend to macro-level themes, such as industrial restructuring, the development of the secondary resources or "vein" industry, and the pursuit of a resource-conserving society. By stratifying content to address distinct levels of environmental understanding, the course uniquely positions itself to awaken students' awareness regarding waste utilization. It enriches their curiosity about recycling methodologies, technologies, and policies,

fostering a deeper environmental consciousness. Through this comprehensive pedagogical strategy, the educational tools not only inform but also inspire, shaping responsible, ecologically-minded citizens for the future.

2.3 Cultivating Students' Character Development and Innovative Thinking with a Scientific Spirit

Introduce the history of technological development, the latest scientific advancements, and innovative cases in the field of solid waste treatment, disposal, and resource recovery to foster a rigorous scientific attitude in students. Encourage them to uphold the scientific spirit, be bold in innovation, and contribute their efforts towards solving solid waste issues. For example, by introducing the perspective that "solid waste is often seen as raw material misplaced," guide students to consider what kind of person they want to be and how to live their lives. It is not a concern if one does not immediately create value; what matters is the willingness to strive and uncover one's worth. Through "thousands of hammerings," one can become a valuable talent serving the people, contributing to society and the country, differing only in terms of timing and space. Introducing the history of crusher development, in industries such as metallurgy, ceramics, cement, and mining, where large quantities of raw materials and reusable waste require processing using crushers, the evolution from simple mortars and pestles to modern automated continuous high yield grinding and sieving machines demonstrates that any development is not achieved overnight but requires a gradual process. Learning is like this, and so is life; it demands long-term effort and persistent study to continually refine oneself. When explaining the derivation of screening probability, since it is challenging to describe screening probability comprehensively using mathematical forms, assume particles are spherical and their positions relative to the screen are random. Derive the probability of particles passing through the screen holes to inspire students' curiosity, guiding them to adopt a scientific spirit. Use basic scientific principles and methods under ideal conditions to design meticulously and apply logical scientific thinking to solve problems.

2.4 Professional Ethics and Rule of Law

The definition of solid waste is established by the "Law of the People's Republic of China on the Prevention and Control of Solid Waste Pollution" (hereinafter referred to as the "Solid Waste Prevention and Control Law"). This law clearly defines solid waste, highlighting that the definitions, technical norms, and processes involved in solid waste treatment, disposal, and resource recovery must adhere to the administrative regulations, standards, and laws set forth by the state. This understanding fosters a consciousness of environmental rule of law among students. By explaining the relevant laws and regulations related to solid waste treatment, students learn about the critical role of the rule of law in environmental protection. This cultivates their legal awareness and reinforces their commitment to abiding by the law. The course emphasizes the eight systems of hazardous waste management, underscoring that effective environmental protection requires a robust scientific management framework. It prioritizes "people-oriented, safety first" principles and seeks to eliminate the risk of "secondary pollution." Through this focus on professional ethics and legal compliance, students are equipped not only with the technical knowledge necessary for solid waste management but also with the ethical and legal grounding to act responsibly and effectively in their future careers.

Awareness of bottom lines and bottom-line thinking represents a crucial aspect of this course's professional competency development. Similarly, in the ecological segment, it is vital to address the delineation of ecological protection red lines. These red lines serve as management boundaries for ecological spaces, the national ecological safety baseline, and the ecological support framework for green development. The ecological protection red lines indicate regions within ecological spaces that possess uniquely significant ecological functions, necessitating stringent protective measures. These areas safeguard and maintain national ecological safety, constituting the baseline and lifeline. Typically, they encompass vital ecological regions essential for water source conservation, biodiversity preservation, soil and water retention, windbreak and sand fixation, and coastal ecological stability. They also include ecologically sensitive and vulnerable areas, prone to issues such as soil erosion, land desertification, rocky desertification, and salinization. Through the study of this section, students will cultivate a sense of baseline awareness for ecological environment protection, reminding them to adhere to these baselines and red lines in both their studies and future endeavors, avoiding transgressions.

3. CONCLUSION

The "Solid Waste Treatment and Disposal" course occupies a significant position within the Environmental Engineering and Environmental Science curricula. It integrates a wide range of ideological and political elements, including environmental awareness, ecological civilization development, resource circulation concepts, the mission of scientific and technological innovation, social responsibility, and professional ethics. As a crucial course embodying these elements, it is essential that the delivery of its content remains interconnected with ideological and political education. Instructors should leverage their professional expertise and political literacy to seamlessly weave ideological and political education into the classroom experience, reinforcing the principle of harmony between humans and the environment. This

approach not only enhances students' ideological and political qualities but also contributes to the broader goals of building a harmonious society and advancing ecological civilization.

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