ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202309_6(9).0046

Implementation Path of Curriculum Ideology and Politics in Architectural Physics

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Abstract

In order to achieve the fundamental task of "three comprehensive education", integrating ideological and political education into curriculum teaching has become the direction of curriculum reform in various education of disciplines today. For engineering universities, implementing ideological and political education in architectural physics courses has natural advantages. In the exploration of ideological and political elements, we can start with the development history of domestic and foreign architecture, the stories of architectural designers, and the basic principles and laws contained in architectural planning and design that can be seen everywhere in daily life, to deeply explore the rich ideological and political elements contained in them. In the implementation of ideological and political education in the curriculum, it is necessary to design teaching that conforms to the purpose of ideological and political education, and implement it into classroom teaching through various teaching methods.

Keywords

Architectural Physics, Curriculum Ideology and Politics, Implementation Path.

1. Introduction

The Ministry of Education actively implements the requirements of the Central Committee of the Communist Party of China on curriculum ideological and political education, and mainly completes top-level design from three aspects. Firstly, in terms of the coverage of curriculum ideological and political education, all higher education institutions should incorporate curriculum ideological and political education into all aspects of teaching. All university teachers should take on the responsibility of "three comprehensive education", deeply reflect on the integration of ideological and political education in courses, and practice the process of combining ideological and political education in courses. All courses should include the ideological and political aspects of the curriculum, rather than just ideological and political courses with unique scenery. Secondly, the teaching content should go hand in hand with ideological and political courses, and incorporate socialist ideals and beliefs into the course teaching, so that students can deeply understand the love for the party, patriotism, and socialism, love the collective, love the people, enhance moral cultivation, practice the socialist Chinese Dream, implement socialist core values, carry out socialist rule of law, labor, mental health education, and education on excellent traditional Chinese culture. Finally, higher education institutions should promote the construction of curriculum systems, and make curriculum ideological and political education an important part of curriculum establishment, teaching outline approval, and evaluation of teaching plans, truly implementing curriculum ideological and political education in all aspects of teaching implementation.

2. Current Situation of Architectural Physics Teaching

As a fundamental and important theoretical course of the architecture major, architectural physics involves many physical problems in architectural technology, architectural

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environment, and planning and design, and is an important component of architectural technology and environmental science. Undergraduate architectural physics course is usually divided into three major chapters, namely building thermal engineering, building optics, and building acoustics. The main focus is on studying physical phenomena such as heat, light, and sound in buildings and the environment, and analyzing the interaction between these physical phenomena and buildings.

The most basic purpose of teaching architectural physics is to enable students to master the basic knowledge of architectural thermal engineering, architectural optics, and architectural acoustics through classroom theoretical lectures, extracurricular assignments, and survey. This lays the foundation for continuing learning in conjunction with architectural majors and enables students to adapt to the needs of knowledge in architectural physics (heat, light, sound, etc.) in future work. The higher teaching purpose is to enable students to establish a preliminary understanding of energy consumption, energy conservation, low-carbon, green, ecological, and environmental concepts in architectural design through this course, laying the foundation for conscious use of ecological livability and green health concepts in future design work, and contributing to sustainable human development. The current teaching status of architectural physics is mainly as follows:

(1) Insufficient understanding of the curriculum and lack of motivation to learn for students

From the practical experience of teaching architectural physics, students often prioritize whether to directly apply what they have learned to spatial planning, architectural design, and engineering drawing as their primary pursuit of learning professional courses. This utilitarian demand to some extent weakens students' understanding of the importance of architectural physics courses and learning motivation. The teaching content of architectural physics is mainly based on the knowledge of mathematical physics. The quality of architectural functions depends on building materials, the realization of effects depends on architectural design, and the landing results depend on the level of architectural technology. Therefore, it is often positioned as a marginalized professional theoretical course that is difficult to experience, apply, and achieve results. In addition, for a long time, in the education of architecture majors, there has been a greater emphasis on building forms and techniques that can reflect specific achievements, which to some extent weakens the teaching of ideological and political education, architectural cultural connotations, architectural physical environment, and other aspects. This further leads to students being unable to correctly understand the purpose, methods, and significance of learning architectural physics courses from the beginning of enrollment education. Therefore, in the process of learning architectural physics, there is a lack of intrinsic motivation for self-directed learning, passive response, and only satisfaction with what is taught in classroom.

(2) The teaching content is outdated and difficult to adapt to industry development

From the perspective of the current teaching situation of this course, due to the influence of the architectural education environment, the emphasis of professional training plans, teaching construction, and other aspects on this course is far less than that of planning and design courses. This leads to a relatively isolated teaching of architectural physics courses, and a relative lack of ideological and political aspects of the course, making it difficult to cultivate students' cultural confidence and sense of mission, as well as to enhance their innovative thinking, engineering literacy, and craftsmanship spirit, thus affecting the effective transformation or creative practice of theoretical knowledge in architectural physics. Faced with the national energy conservation and emission reduction strategy of the 14th Five Year Plan and the background of new engineering construction, intelligent and information-based teaching methods are increasingly developing, which also puts forward higher requirements for the teaching of architectural physics. On the basis of updating classic textbooks, it is also necessary to strengthen the learning and application of modern teaching technologies, deepen

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architectural physics technology in the new era, and further strengthen the teaching methods of architectural physics. Improving ideological and political education in architectural physics courses is also urgent.

(3) The teaching mode is outdated, and there is insufficient positive interaction between teachers and students

The design of teaching activities in architectural physics classrooms is not autonomous, free, and open enough. Under the large class system, teachers have a "one size fits all" approach to teaching form, a "one size fits all" approach to teaching requirements, a "consistent" approach to teaching methods, and a "fixed" approach to teaching content. This leads to a lack of positive interaction between teacher teaching and student learning, providing students with a relatively dull and monotonous learning path. Students are bound by the rigid teaching mode of the teacher when they receive course learning, and their thinking patterns are inevitably constrained, unable to generate strong learning interest and provide positive classroom feedback. Students' self-learning ability and willpower are weak, and classroom teaching is still a very important part of undergraduate teaching. If it is not possible to stimulate students' learning during classroom teaching, it will be difficult for students to flexibly use learning strategies to solve problems when encountering difficulties outside of class. This further leads to a lack of confidence and positive physical and mental experience among students, making it difficult to start learning, unplanned, easily frustrated, and always giving up. Under this mindset, learning relies on the teacher's hand to hand instruction, lacking autonomy and innovative spirit.

3. The Advantages and Necessity of Implementing Ideological and Political Education in The Curriculum

(1) The course itself has rich connotations and is easy to expand

It is imperative to integrate the traditional teaching of architectural physics into the curriculum ideological and political education. As a discipline closely related to production and life, architectural physics derives its theoretical knowledge from observation and practice of nature and life, and has natural advantages related to production and life. This facilitates teachers to introduce theoretical teaching from actual life and integrate the implementation of curriculum ideological and political education.

There are differences between architectural physics and general physics, with a greater emphasis on the application of sound, light, and heat in architectural design. It is an interdisciplinary field aimed at creating a comfortable, healthy, and efficient physical environment. The knowledge of architectural physics comes from human production and life practices, and in the process of its emergence and development, it naturally carries elements of curriculum ideology and politics. The research scope of architectural physics is limited to microclimate environments, such as the physical environment of a building; Large to local climate environments, such as urban heat islands, urban dry islands, etc. The knowledge of architectural physics encompasses all aspects of human living environment, and is a science closely related to life. It is also a concrete manifestation of the closest combination of natural science principles and life. Therefore, carrying out ideological and political education in architectural physics courses has inherent advantages. Teachers should make good use of these advantages and actively explore and expand the path and methods of integrating ideological and political education into curriculum teaching.

(2) Closely connecting with life is beneficial for introducing teaching

Architectural physics includes rich natural science principles and is presented in beautiful spatial planning forms and architectural structures. Some theorems, laws, and conservation laws in physics are organically integrated with human living environments, with rich aesthetic

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significance and cultural connotations. They can be integrated into ideological and political education while imparting knowledge. When discussing the indoor thermal environment of buildings, knowledge points about thermal comfort and indoor thermal environment factors are introduced through people's perception of the cold and hot inside the building in daily life; Using situational teaching methods and problem-oriented teaching to cultivate students' thinking methods of observing things around them and actively seeking answers; By streamlining the logical relationship between indoor thermal environment, human thermal comfort, and human thermal balance, we aim to help students establish a "people-oriented" architectural design concept. The combination of rich theoretical knowledge, personal experience in life, and physical laws in architectural physics can promote the implementation and effectiveness of curriculum ideological and political education.

(3) Discipline progress is closely related to national development and policies

The development process of architectural physics cannot be separated from the science and technology development of the country and the progress of human civilization. The planning and design of buildings must also comply with the national ecological and environmental protection requirements and carry out construction activities in accordance with the situation. It can be seen that architectural physics is more easily integrated with ideological and political factors such as national sentiment, grand historical perspective, and speculative thinking compared to other disciplines. It is a good carrier for enhancing students' sustainable design concepts and establishing their values of green and low-carbon construction. At the same time, in order to improve students' innovative thinking, engineering literacy, and craftsmanship spirit, the teaching of architectural physics courses also needs to be based on the process of national development to carry out teaching, deepen students' sense of mission and responsibility, and further provide students with internal motivation to improve their comprehensive quality abilities such as ideological and political qualities, innovative and creative thinking, and practical skills.

(4) Modernized technological updates to assist in the implementation of ideological and political education in the curriculum

The classic textbooks on architectural physics are relatively outdated, lagging behind the rapidly changing technological development of the construction industry and detached from production reality. From the perspective of textbooks, there is a lack of ideological and political factors; and from the perspective of teaching modes, it is relatively rigid. Curriculum teaching is usually centered around teaching, neglecting the subject status and role of students in learning, and not paying enough attention to the application of modern educational technology. Therefore, the curriculum content and teaching forms urgently need to be updated. Excessive emphasis on imparting theoretical knowledge in construction engineering can lead to insufficient improvement in students' innovative thinking and insufficient cultivation of engineering practical abilities. The allocation of experimental hours in architectural physics is usually limited. To address the above issues, simply increasing the number of hours is not enough. Therefore, on the basis of theoretical teaching, it is usually necessary to make up for the limited experimental hours through teacher presentations to achieve the goal of showcasing cutting-edge technology in the industry. Architectural physics is a discipline closely related to practice, and the process of demonstrating experiments and students conducting experiments is a concrete manifestation of theory guiding practice. While improving students' hands-on and brain skills, experiments can also enhance their observation, reasoning, and reasoning abilities. The experiments themselves have the characteristics of intuition and vividness, making physics theory more credible. Integrating ideological and political education into the experiment process will inevitably improve the ideological and political effect of the curriculum.

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4. Implementation of Ideological and Political Education in Architectural Physics Curriculum

(1) Integrating curriculum ideology and politics education into Teaching Design

The teaching design of the course should be organized around the course objectives, teaching content, and teaching objects. How to integrate ideological and political elements into classroom teaching and learning, and how to design teaching that meets the educational goals, are the key to teaching in the classroom and the fundamental guarantee for achieving the ideological and political goals of the course. On the basis of the traditional teaching design of architectural physics courses, integrate ideological and political education into the curriculum to assist in improving various aspects of teaching design. In the design of teaching objectives, it is not only necessary to integrate the ideological and political objectives of the curriculum, but also to further refine the implementation design, connection design, and implementation method design of integrating ideological and political education into teaching while designing the teaching process. Good teaching design inevitably includes good curriculum ideological and political design. In the background of curriculum ideological and political education, the two are inseparable and complementary.

(2) The Implementation of Curriculum Ideology and Politics in Teaching

The teaching of architectural physics should be based on completing the explanation of course knowledge points, organically combining the ideological and political elements of the course, and determining the appropriate ideological and political elements of the course according to the actual scenarios involved in the course. For physical laws, concepts, and logical rules, they contain rich Marxist philosophical ideas. However, in the traditional teaching process, these ideas are not easy for students to discover, let alone understand and comprehend. This requires teachers to summarize the philosophical ideas until they extract their essence, and guide students to understand and assist them in discovering and comprehending independently the philosophical ideals during the teaching process. For example, the sunlight of buildings needs to be designed according to specifications, such as the "Urban Residential Area Planning and Design Specification" and the "Dormitory Building Design Specification". Different buildings correspond to different design specifications, guiding students to strengthen the design logic of people-oriented and tailored to local conditions, establish a rational organization of objective factors, and optimize the thinking mode of planning and design. In the process of learning, make students fully aware of the relationship between the local and the whole, as they are inseparable parts. Sunshade design can only have a sense of rhythm and hierarchy when coordinated with the overall layout of the building facade, while also taking into account color and texture, considering light and shadow effects, and ultimately presenting an ideal local design effect. When it comes to the chapter on architectural acoustics, it can be combined with national projects such as the China Pavilion and the National Grand Theater to explain the design concept of architectural symbolism to students, highlighting the spirit of great craftsmanship; These two buildings combine the unique architectural culture of China and absorb excellent Western architectural design concepts; Remind students not to worship foreign things and blindly copy and imitate, but to dare to consider problems from reality, understand the principles of promoting strengths and avoiding weaknesses, and introduce new ideas.

(3) Evaluation of the ideological and political effects of after-school courses

At present, there is a lack of a systematic evaluation mechanism for the effectiveness of the implementation of ideological and political education in courses, and there is no well-designed content on who to evaluate, what to evaluate, and how to evaluate. This also leads to the evaluation of the effectiveness of ideological and political education in courses being a difficult link to measure. In the teaching design of architectural physics, more emphasis should be

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placed on the exploration and practice of ideological and political elements to ensure that the curriculum ideology and political meets the original intention of the teacher's teaching design. Like specific teaching content effects, which can be reflected in after-school exercises and exam papers, the ideological and political effects of the curriculum should also be measured through tests and exams.

The ideological and political elements of the curriculum are diverse, and their objectives are also complex and not unified. The ideological and political methods of the curriculum are rich, and different courses, different teaching parts of the same course, and different knowledge points contain different ideological and political factors, which make it difficult to intuitively express the ideological and political effects of the curriculum. It is difficult to quantify evaluate the effectiveness of ideological and political education in courses, and it cannot be immediately reflected upon completion of teaching. Curriculum ideological and political education is like planting the seeds of true, speculative, and patriotic ideological and political education in students' hearts. Waiting for the seeds to grow into towering trees in students' hearts, helping them reflect their specific and correct values through their specific actions, problem-solving methods, and a round of curriculum ideological and political education is completed in a closed loop.

5. Conclusion

The use of ideological and political education in architectural physics courses has natural advantages. In the exploration of ideological and political elements, we can start with the development history of domestic and foreign architecture, the stories of architectural designers, and the basic principles and laws contained in architectural planning and design that can be seen everywhere in daily life, to deeply explore the rich ideological and political elements contained in it. To fully utilize the function of ideological and political education in architectural physics courses, teachers need to integrate ideological and political education into the traditional teaching design of architectural physics courses, so as to assist in improving various aspects of teaching design; On the basis of completing the explanation of course knowledge points, organically combine course ideological and political elements, and determine appropriate course ideological and political elements based on the actual scenarios involved in the course; In the teaching design of architectural physics, more emphasis should be placed on the exploration and practice of ideological and political elements to ensure that the curriculum ideological and political meets the original intention of the teacher's teaching design. Deeply exploring ancient technological and cultural knowledge, stories of architectural masters, and combining ideological and political elements such as national engineering, with students as the center, stimulating students' internal learning motivation, thereby cultivating patriotism and enhancing cultural confidence.

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