



Research on the Ideological and Political Teaching System of Optical Measurement Professional Courses Based on Outcome Based Education

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Abstract. This article takes Outcome Based Education (OBE) as the teaching concept and studies the ideological and political teaching system of optical measurement courses. Firstly, the scientific connotation of OBE teaching philosophy was analyzed. Secondly, a teaching system for ideological and political education in the field of optical measurement has been established. On this basis, a scientific and reasonable professional system evaluation model has been formed. This study can enhance the job holding ability, innovation ability, and comprehensive quality of students, and has certain promotion and application value.

Keywords: professional curriculum systems; curriculum ideology and politics; outcomes-based education idea; optical measurement

1 Introduction

In June 2020, the Ministry of Education issued the "Guiding Outline for Ideological and Political Construction of Higher Education Curriculum". The outline points out that ideological and political education should be integrated into the talent cultivation system, comprehensively promote the ideological and political construction of university courses, give full play to the educational role of each course, and improve the quality of talent cultivation in universities^[1]. Since then, various universities have conducted a series of studies on integrating ideological and political education into their curriculum, such as Xia Song from Southwest Jiaotong University, Yu Lijuan from Jilin University, and Zhuo Na from Inner Mongolia Jiaotong Vocational and Technical College^[2-4]. The above paper reports are limited to incorporating ideological and political elements into science and engineering courses, without analyzing the ideological and political teaching system of professional courses, and lacking an evaluation of the ideological and political teaching system of courses. In terms of curriculum reform research on OBE (Outcome based education) education concepts, Alsabhan from Saudi Arabia analyzed the relationship between curriculum modification, the complementary effect of OBE and student performance^[5]. Zamir et al. from Pakistan analyzed the shift from

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engineering education to OBE education philosophy^[6]. On this basis, in order to establish the ideological and political goals of "cultivating morality and cultivating people" and the teaching goals of "cultivating people through war", the optical measurement teaching and research team, guided by the OBE education concept, scientifically designed the ideological and political teaching system for this major's curriculum, clarified the requirements and content focus of the ideological and political construction goals of the curriculum, made morality and cultivating people the central link, and integrated ideological and political work throughout the entire process of education and teaching. Through the study of the ideological and political education system in professional courses, it is possible to enhance the dual cultivation of teachers and students, and cultivate students' patriotism, scientific literacy, innovative spirit, and dialectical thinking in various aspects of teacher ethics and professional conduct demonstration and guidance.

2 The Construction of Curriculum Ideological and Political System Based on OBE Concept

2.1 OBE Teaching Concepts

OBE is a way of using reverse thinking to construct a curriculum system. In 1981, American scholar Spady W.D. first proposed ^[7] in his book "Results Based Education: Disputes and Answers", which is carried out through three elements: "student-centered, student-oriented, and focused on continuous improvement". Student-centered learning stimulates students' interest in learning through autonomous, cooperative, and exploratory learning methods. Both students and teachers are the main participants in the classroom, jointly participating in and completing the implementation of the curriculum. In terms of student-oriented learning outcomes, OBE is a structure and system that focuses on learning outcomes to drive all course activities and evaluate student learning outcomes. In this educational model, what students learn and whether they succeed are far more important than how and when to learn. The focus on continuous improvement is to adopt diverse and hierarchical evaluation standards. Evaluation emphasizes the connotation of achieving learning outcomes and individual learning progress, without emphasizing comparison between students. This teaching philosophy assigns different evaluation levels from unskilled to excellent based on the degree to which each student can meet educational requirements, and conducts targeted evaluations. Through a clear understanding of students' learning status, it provides reference for schools and teachers to improve teaching ^[8].

The Noncommissioned Officer School of the University of Aerospace Engineering deeply implements the new era education policy, adheres to cultivating morality and talents, prioritizes ideological and political construction, ensures the correct political direction of education, and aims to "win the top soldiers on the front line, set a benchmark for grassroots construction, and hold positions as military craftsmen". The main focus in the field of optical measurement is to cultivate high-quality and specialized new military talents who are capable of operating optical measurement equipment and

possess both moral integrity and talent. Therefore, the course system design of this major based on the OBE concept is shown in Figure 1. Set professional talent training goals based on the job requirements of the students being trained, To closely meet the development needs of the aerospace industry, cultivate high-quality and specialized new type of sergeant talents with a college degree in higher vocational and technical education, high military and political quality, proficient professional skills, and strong training and management capabilities, adapt to the needs of national defense and military construction, meet the requirements of winning information warfare, and be competent in the operation and maintenance of optical measurement equipment, possessing both moral integrity and talent.

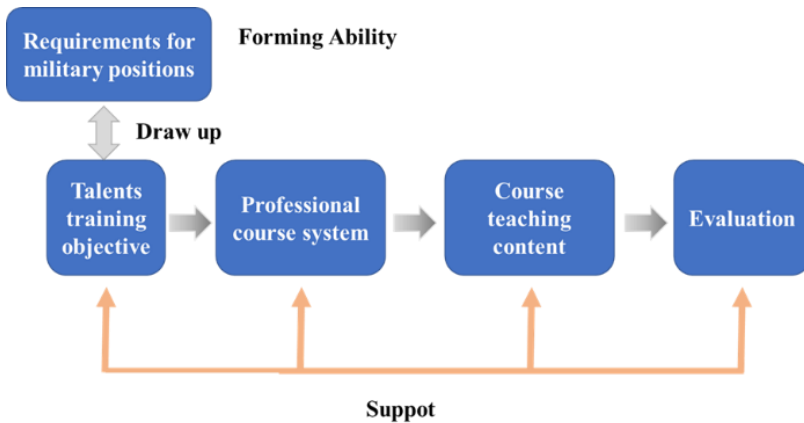


Fig. 1. Curriculum System Design Based on OBE Concept

According to the training objectives of optical measurement professionals, a curriculum system for optical measurement majors is established, which is mainly divided into two categories: basic courses for job positions and courses for job positions. In terms of course teaching content, the basic courses aim to cultivate students' necessary professional knowledge in engineering optics, optoelectronic sensors, optoelectronic measurement technology, and other fields for their positions. The purpose of the courses is to enable students to master the skills of operating and using optical measurement equipment, maintenance, troubleshooting, and diagnosis in aerospace measurement and control tasks. The two types of curriculum teaching content not only impart knowledge and cultivate skills, but also integrate ideological and political education, moral education, and ideological and political education, ultimately forming a mechanism and pattern of collaborative education between ideological and political education and professional courses, integrating knowledge transmission, ability cultivation, and value guidance, as shown in Figure 2.



**Spiritual externalization in action
Dreams take root on the ground**



Father of Aerospace –
Qian Xuesen

Patriotic sentiment



lunar probe

Starry Sea



China Space Station

Future prospects

Ideological and political guidance, soul building and education

Fig. 2. Course ideological and political education

In terms of assessment and evaluation, process assessment and summative assessment are combined to reflect students' autonomous learning and course participation, and summative assessment reflects students' mastery of knowledge and skills. Among them, the course team has established a scientific blended teaching evaluation system based on the online and offline blended teaching mode. As shown in Figure 3, it is mainly reflected in: ① Diversified assessment methods. Relying on the Rain Classroom online platform to analyze the data of students' learning process, timely detect and evaluate students' learning effectiveness, dynamically improve teaching strategies, and provide timely feedback, including pre classroom testing, post classroom testing, independent questioning in the discussion area, feedback in the discussion area, online assignments, and student evaluations. ② Diversified assessment subjects. Under the premise of teacher evaluation as the main focus, introduce student self-evaluation and mutual evaluation into the evaluation system to reflect the objectivity of evaluation. ③ Diversified assessment content. Combining online and offline, pre class, in class, and post class, utilizing the advantages of online platforms to increase various forms of assessment content such as discussions, quizzes, and summaries, reflecting the hybrid characteristics of the assessment system.

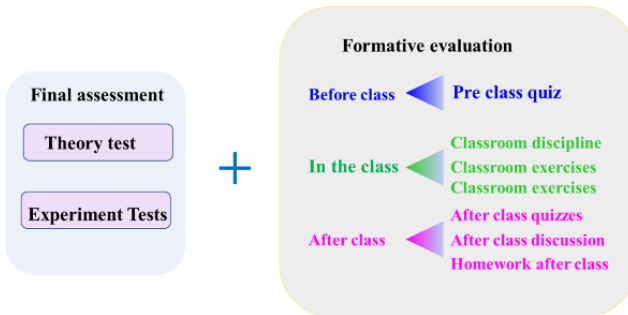


Fig. 3. Diversified assessment and evaluation system

2.2 The Ideological and Political Education System of Optical Measurement Major

According to the job requirements and talent cultivation goals of the optical measurement major, a scientific ideological and political teaching system for the optical measurement major curriculum is established, as shown in Figure 4. The ideological and political goal of the curriculum is to establish core values, study basic knowledge diligently, and establish the content of basic vocational education courses in military colleges. The ideological and political goal of the professional course is to form professional confidence, to train professional skills, and to set up the content of optical measurement courses. The ideological and political goal of practical training courses is to cultivate professional literacy, refine job skills, and create practical training course content. The ideological and political goal of the second classroom course is to cultivate personal strengths with the tireless spirit of science, and establish student interest learning groups. Ultimately, in the context of ideological and political education in the curriculum, a complete professional curriculum system will be established to achieve ideological and political education in all courses, and education for all teachers.

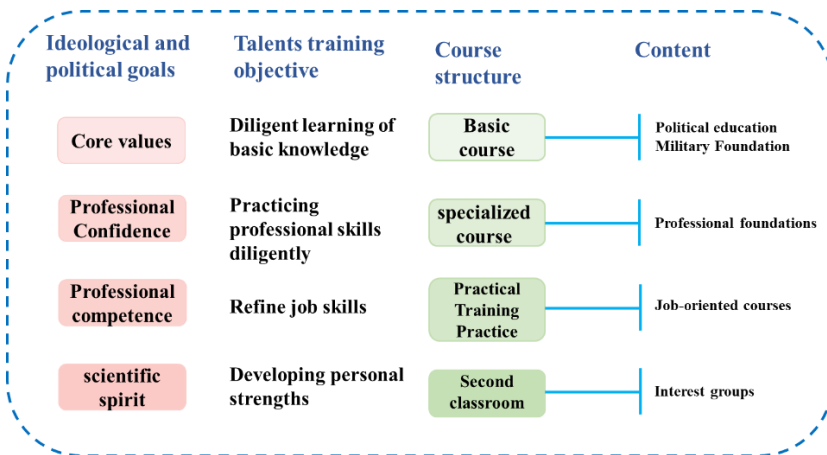


Fig. 4. The Framework of Ideological and Political System for the Course of Optical Measurement

In the teaching process, implement the teaching mode of "three entry" of ideological and political elements [9]. As shown in Figure 5, the curriculum of ideological and political education is integrated into textbooks, classrooms, and minds. Firstly, based on the curriculum system, a case library of ideological and political education will be formed, and the ideological and political education textbooks for aerospace measurement and control technology (optical measurement) professional courses will be compiled to form the foundation of the ideological and political education mode for professional courses. Secondly, integrating ideological and political cases into classroom teaching, emphasizing the use of ideological and political elements to solve teaching difficulties, mobilizing students' learning enthusiasm, expanding their horizons,

enhancing their ability to understand professional knowledge, continuously exploring ways and methods of integrating ideological and political elements into classroom teaching, and striving to moisten everything silently. Finally, integrating ideological and political theories into the minds of students is the most difficult and crucial part to achieve, as the students trained in military academies are a special group. They are still young children in their families and society, and are the backbone of military construction and equipment operation and maintenance in the military. Under the influence of the Internet, their thinking is relatively active and they lack self-discipline, making it easy for them to deviate from politics and policies. Therefore, incorporating ideological and political theory into their minds, on the one hand, fundamentally solves the problem of students' "learning in". The learning in of ideological and political theory is to achieve ideological resonance with students. On the other hand, it is necessary to improve teachers' qualities of "strong politics, deep emotions, new thinking, broad vision, strict self-discipline, and positive personality". This is because the teaching teachers themselves have high quality, which can truly infect and impress students, make students feel that ideological and political courses are "knowledgeable and interesting", improve the "rise rate" and "participation" of the classroom, and enhance students' "sense of gain".

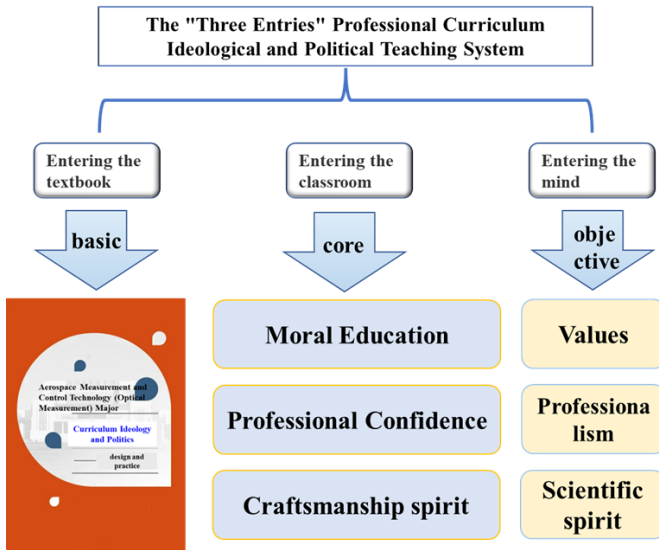


Fig. 5. The "three entry" mode of ideological and political education

3 Evaluation of the Course System for Optical Measurement

In the evaluation method of the ideological and political teaching system for optical measurement courses based on the OBE teaching philosophy, it strictly follows the requirements of "promoting construction through evaluation, promoting reform through evaluation, promoting management through evaluation, combining evaluation with

construction, and emphasizing construction" [10], with "what to evaluate, how to evaluate, and who to evaluate" as the main line. As shown in Figure 6, a professional course evaluation system is formed based on the quality of talent cultivation among students in military academies, the practical ability of military positions as the evaluation indicator, the "knowledge, ability, and quality" as the evaluation method, the actual requirements of military positions as the evaluation subject, and the survey of military internship positions and graduate students as the evaluation feedback. The system shapes value in teaching, Integrate ability cultivation and knowledge transfer organically, with students as the center, starting from practical problems, establish a professional knowledge system, and improve students' ability to comprehensively apply the knowledge and skills they have learned to solve practical problems.



Fig. 6. Course Evaluation System for Optical Measurement

For vocational education students in military academies, evaluating learning outcomes is not only about evaluating students' academic performance at the classroom and school levels, but more importantly, it is about evaluating the teaching situation of their major through tracking surveys and job positions of graduating students, and using this as feedback to further deepen the creation of professional talent training models, plans, and systems. Therefore, in the context of ideological and political education in the curriculum, the establishment of an optical measurement professional course evaluation system based on the concept of OBE is of great significance for the improvement of job abilities and career development of graduate students in the entire teaching evaluation and reform. In the future, the ideological and political education system for optical measurement courses will also be improved by establishing comprehensive quantitative evaluation standards for competent positions, conducting follow-up surveys on student learning output evaluation, evaluating students' graduation grades, providing feedback on courses, and inviting frontline military experts, scholars, and equipment development manufacturers to conduct on-site inspections and guidance, in order to

improve the ideological and political education system for optical measurement courses.

4 Conclusion

General Secretary Xi Jinping points out: Colleges and universities across the country should adhere to the central link of cultivating morality and talents, and integrate ideological and political work throughout the entire process of education and teaching. The important speech of General Secretary Xi Jinping, pointed out the direction for vocational colleges to achieve collaborative education between "curriculum ideological and political education" and "ideological and political courses". Vocational colleges should integrate ideological and political education throughout the entire process of education and teaching, so that the subject system, curriculum system, professional system, and management system are complementary and interdependent, and effectively update the teaching philosophy of the teacher team, excavate curriculum ideological and political teaching resources, and construct a curriculum ideological and political teaching evaluation system, To establish an orderly mechanism for ideological and political education in the curriculum [11-12].

This article focuses on the current research status of the ideological and political teaching system for professional courses in military higher vocational colleges. By studying the existing ideological and political theories and professional course systems, combined with the actual situation of the school, and guided by the OBE education concept in the context of ideological and political courses, a curriculum system for optical measurement is constructed, which is conducive to the improvement of students' innovation and entrepreneurship abilities and comprehensive literacy. At the same time, in the process of students' independent learning, it can help them fully realize their potential and achieve greater improvement, ultimately becoming talents who contribute to the military and the country.

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