

Research on the Path of Improving the Curricular Ideological and Political Ability of Specialized Teachers in Aeronautics and Astronautics

Xucheng Chang^{1,2}, Bing Kong³, Yuanpeng Liu¹, Chao Zhang¹, Gaofeng Ren¹, Zhenghe Wang¹ and Zhi Geng¹

¹School of Aerospace Engineering, Zhengzhou University of Aeronautics, Zhengzhou 450046, China

²Collaborative Innovation Center for Aviation Economy Development of Henan Province, Zhengzhou 450046, China

³Zhengzhou Technical College, Zhengzhou 450010, China

Abstract: The ideological and political construction of specialized curriculum is an important measure to build a large pattern of all-round education for all staff. As the concrete implementer of ideological and political construction of specialized curriculum, the specialized teachers are the "main force" to realize the ideological and political construction of specialized curriculum. In this paper, the importance of ideological and political ability of specialized teachers is firstly illustrated, and then the deficiencies of ideological and political ability of specialized teachers are analyzed and summarized. In combination with the problems of weak teaching consciousness, insufficient theoretical knowledge and low teaching level in ideological and political education of specialized teachers, the constitutive elements of ideological and political ability of specialized teachers are proposed. From the ability to grasp moral awareness and political direction, ability to explore ideological and political education elements, ability to apply theory and teaching design, ability to grasp details and timing of ideological and political education, etc. For specialized teachers of aeronautics and astronautics, based on the constituent elements, the path to improve their ideological and political competence of the specialized curriculum is elaborated, from four dimensions: the cultivation and transformation of moral education consciousness, the supply of ideological and political content and the innovation of teaching methods and means, the organization and management of classroom teaching process, and the intersection and integration with the team of ideological and political teachers. It provides the path reference for the improvement of teachers' ideological and political ability needed to comprehensively promote the ideological and political construction of specialized curriculum.

Keywords: Ideological and political education of specialized curriculum, Aerospace, Specialized teachers, The constituent elements, Ascension path.

1. Introduction

Curriculum ideological and political education is invisible education, which is the specialized teachers to transfer specialized knowledge while realizing the value guidance to students. The importance of ideological and political education was stressed at the 2016 National Conference on Ideological and Political Work in Colleges and Universities and the 2018 National Education Conference. "Teachers should adhere to the unity of explicit education and implicit education, excavate the ideological and political education resources contained in other courses and teaching methods, and realize the all-round education of all students" was put forward in the 2019 National Ideological and Political Theory Teachers' Symposium (hereinafter referred to as the "Symposium").

2. The Importance of Specialized Course Teachers' Ideological and Political Ability

"The key to a good ideological and political theory course lies in teachers" was emphasized in the "symposium". Teachers are the main body of classroom teaching. In the course of ideological and political construction, a team of teachers with high moral awareness and strong moral ability should be built first[1]. Therefore, in the process of promoting the ideological and political construction of the curriculum,

the role of teachers should be given full play. The role of specialized course teachers in curriculum ideological and political construction has been discussed by domestic scholars. The first factor that has the greatest influence on college students' thoughts, deeds and growth is the teacher of specialized courses, which is also the key element of the ideological and political reform of the curriculum. It is necessary to enhance the ability of ideological and political work in specialized development, so as to realize the unity of teaching and educating[2]. Teachers of specialized courses rely on courses and technical ability to conduct ideological and political education. The demonstration and guidance of ideals and beliefs are more systematic and gradual, and the contents of ideological and political education are vivid and persuasive, which expand and enrich the extension and connotation of ideological and political education, and enhance the effectiveness of ideological and political education[3]. Teachers of specialized courses are the direct implementers of ideological and political education and play an important role[4]. It can be seen that teachers of specialized courses play a key role in the course of ideological and political education.

The purpose of ideological and political education is to help students set up correct ideas and improve their ideological and political quality. The cognition of ideological and political education in the curriculum and the practical ability of specialized teachers play a crucial role in improving students' ideological and political accomplishment and

promoting students' growth[5]. The improvement of ideological and political education consciousness and ability of specialized course teachers is the key to strengthen the construction of curriculum ideological and political teachers and carry out curriculum ideological and political education[6,7]. The requirement of "improving teachers' awareness and ability of ideological and political construction in the curriculum" was put forward in the Guiding Outline of Ideological and Political Construction in the Curriculum of Higher Education (hereinafter referred to as the Outline) issued by the Ministry of Education in May 2020[8].

The aerospace major cultivates special technical talents for aerospace science and technology, aviation industry and other fields. Teachers of specialized courses have the education consciousness of patriotism and love of aerospace industry, as well as the ability to practice curriculum ideology and politics, pass on the spirit of serving the country and dedication in classroom teaching, which has a significant impact on students' ideas and concepts. Therefore, the cultivation of students' ideological and political literacy is closely related to teachers' ideological and political ability, which is particularly important in aerospace majors.

3. Problems of Ideological and Political Ability of Teachers in Specialized Courses

Due to the lack of ideological and political consciousness, the difference of specialized background and the difference of course objectives, the design and practice of ideological and political education are generally lacking in the teaching process of specialized courses. The data show that up to 86.8% of teachers believe that ideological and political education is not part of the teaching process and content of specialized courses, in the classroom teaching process of specialized courses[9].

The problems existing in the ideological and political ability of teachers of specialized courses have been studied by domestic scholars. At the level of teachers themselves, Literature [10] points out that there are still some gaps in the awareness and ability of teachers of specialized courses to carry out ideological and political teaching, and there are differences in different disciplines, compared with teachers of ideological and political courses. Literature [11] points out that the lack of subjective willingness and the lack of educational reform ability are two aspects of specialized teachers' insufficient ideological and political ability in the curriculum. Literature [12] points out that the lack of understanding of importance, the lack of ideological and political theory knowledge and the unimproved level of educational scientific theory are the problems existing in the practice of ideological and political theory of specialized teachers. Literature [13] points out that the main problems existing in the process of ideological and political education of specialized teachers are relatively weak ideological and political awareness, relatively traditional teaching methods, relatively simple curriculum ideological and political situation creation, and the coordination ability of ideological and political education needs to be improved. Therefore, at present, the lack of ideological and political ability of teachers of specialized courses mainly includes the lack of ideological and political education consciousness, the lack of theoretical knowledge of ideological and political courses, and the low level of ideological and political teaching.

To sum up, an important factor hindering the comprehensive promotion of the construction of "ideological and political education in curriculum" is the lack of specialized course teachers' ideological and political ability in practice, which is not conducive to improving students' ideological and political literacy.

4. Elements of Ideological and Political Ability of Teachers of Aerospace Specialized Courses

The composition of curriculum ideological and political education ability needs to be combined with the teacher's own quality, the subject of the major, the learning section of the students, the teaching object to make a comprehensive analysis. Compared with general engineering majors, the cultivating target and subject of aerospace majors have certain particularity. Therefore, the components of ideological and political ability of teachers of aerospace courses are analyzed, from the aspects of moral awareness and ability to grasp the political direction, ability to explore ideological and political education elements, ability to apply theories and teaching design, ability to grasp the details and timing of ideological and political courses.

4.1. Moral awareness and ability to grasp political direction

It is the fundamental task of higher education in China to train useful talents who will strive for a lifetime in the cause of socialism with Chinese characteristics. As a gathering place of various ideological trends, colleges and universities are faced with a more complex and severe domestic and international environment. College students need to be correctly cultivated and guided, because they are affected by various non-mainstream ideologies and multiple values in the society. To love the aerospace industry, and to have the feelings of serving the country, the spirit of dedication is an important quality for the aerospace major students, so it is particularly important to cultivate the ideological and political quality of students. In higher education, teachers are the ultimate executor to foster virtue through education, so the moral awareness and the ability to grasp the political direction of college teachers are very important, which directly relates to the establishment of students' correct values.

4.2. The ability to explore ideological and political education elements

It is the premise of carrying out ideological and political education in specialized courses to identify and dig out relevant ideological and political resources in combination with curriculum knowledge content. Hidden ideological and political education resources, such as the spirit of serving the country, feelings of home and country, socialist core values, dialectical thinking methods, and engineering ethics, are contained in the curriculum knowledge of aviation and aerospace majors. Teachers of specialized courses need to have certain ability to dig out and use the above resources in the teaching process of specialized courses. Therefore, combined with the reality of the discipline, major and course, the ideological and political education resources contained in the course can be sorted out and excavated by the specialized course teachers, which plays an important role in enhancing the educational function of the course and consolidating the

foundation of the ideological and political development of the course.

4.3. Ability of theory application and teaching design

Curriculum ideological and political education is not a simple "curriculum + ideological and political content", let alone the transformation of specialized courses into ideological and political courses. It cannot simply add ideological and political content into the teaching design of specialized courses, nor present ideological and political content as an independent teaching link, but organically integrate ideological and political elements into the teaching process, teaching methods and teaching organization of specialized courses. How to design, combine and integrate the ideological and political elements in the knowledge system of specialized courses, and how to organically integrate them into the teaching of specialized courses in a way of "changing the rain and moistening things silently", reflects the ability of specialized course teachers to combine the theory and practice. Only by applying the theory to practice, can curriculum ideological and political education achieve the unity of explicit education and implicit education. Therefore, the ability of ideological and political education theory application and teaching design of specialized course teachers is the key to exert the educational function of specialized course.

4.4. The ability to grasp details and timing in the curriculum ideological and political education

Ideological and political education in the specialized curriculum should be mainly taught with specialized knowledge. Ideological and political education is a function of moral education added on the basis of specialized knowledge in the specialized curriculum. It should not occupy a large amount of classroom teaching time, otherwise it will dominate the classroom, and deviate from the teaching concept of "salt dissolves in water" and "moistening things silently". Therefore, teachers of specialized courses should learn to pay attention to the details of the teaching process, be good at grasping the fleeting educational opportunities in the course of classroom organization, and integrate ideological and political education into the classroom teaching organization at the right time, so as to realize the organic integration of specialized knowledge and ideological and political education.

5. The Path of Improving the Curricular Ideological and Political Ability of Specialized Teachers in Aeronautics and Astronautics

The construction path of curriculum ideology and politics includes micro and macro levels. On the micro level, it mainly includes textbook construction, curriculum reform and teaching innovation, etc., and on the macro level, it mainly includes concept design and system construction, etc.[14]. According to the elements of ideological and political ability of teachers of aerospace specialized courses, from the level of teachers, research and exploration have been carried out on improving path of ideological and political ability of teachers of aerospace specialized courses, from the cultivation,

integration and transformation of moral awareness, the supply of ideological and political content and the innovation of teaching methods and means, the organization and management of classroom teaching process, and the cross and integration of ideological and political teachers.

5.1. The cultivation, integration and transformation of moral consciousness

Teachers of specialized courses in colleges and universities shoulder the dual responsibilities of foster virtue and knowledge teaching, which is an important part of the realization of all-round and whole-process education. In view of specialized teachers' lack of systematic theoretical knowledge of moral education, experience and methods of integrating moral education into the classroom and other problems, teachers' moral awareness and ability should be trained through special reports on moral ethics, case analysis and discussion of curriculum ideological and political affairs, first-class curriculum observation and learning, and ideological and political teaching reform forums and conferences. The basic ability and accomplishment of moral education are gradually acquired, through the continuous strengthening of personal moral awareness.

The theoretical knowledge of moral education and knowledge of specialized courses acquired should be integrated by teachers of specialized courses on the basis of moral education awareness, and should be converted into persuasive views and logic that students can easily accept. Moral education concept and consciousness can be actively transformed into educational behavior, through the teacher skills competition as the carrier, by the specialized course teachers. If the education consciousness can be implemented and carried out in every teaching activity, the all-round curriculum ideological and political education can be realized.

For example, teachers of aerospace majors can regularly participate in the Ideological and political teaching reform Forum of national aerospace courses to improve their moral awareness and ability through learning and communication.

For example, teachers of aerospace majors can regularly participate in the Ideological and political teaching reform Forum of national aerospace courses to improve their moral awareness and ability through learning and communication. In addition, the integration and transformation of teachers' moral awareness can be promoted through the way of "promoting teaching through competition", by actively participating in the teaching competition of "curriculum Ideology and politics" in colleges and universities, teachers' teaching innovation competition, etc.

5.2. The supply of ideological and political content and the innovation of teaching methods and means

The Outline points out that the knowledge and humanity of the curriculum should be enhanced from the perspectives of major, industry, country, international, culture and history. The guiding character, epochal character and openness of the curriculum should be improved, the engineering ethics education of students should be emphasized and strengthened, the craftsman spirit of great power to keep improving should be cultivated, and the national feeling and mission of serving the country with science and technology should be stimulated[8].

The training of natural science knowledge and engineering ability is the main content of specialized courses of aeronautics and astronautics. The combination of Marxism and scientific spirit should be paid attention to by teachers of specialized courses. Ideological and political elements such as scientific spirit, craftsman spirit, aviation service to the country, feelings for the country and mission should be explored in the case of aviation elites and exemplary deeds, which emerged in the course of the development of aviation and aerospace history.

For example, in "Fundamentals of Control Engineering", a basic course of aerospace disciplines, students can be guided to think about the key points and emphases of complex engineering problems in aircraft control in combination with key focus issues in the theory of root trajectory analysis, and their ability to view and deal with problems can be cultivated.

In "Introduction to Unmanned Aerial Vehicle System", a basic specialized course, the technical advancement of China's domestic UAV can be introduced, and students' sense of national pride and national honor can be cultivated. Through introducing the application of Caihong, Wing Loong, DJI and other UAVs in flood relief, emergency rescue and other scenes, combined with the knowledge of UAV application.

In "Aircraft Control Principle", a major course, students can be guided to carry forward their learning spirit, innovative spirit and patriotic spirit, and students' sense of patriotism and dedication can be cultivated through the introduction of Qian Xuesen's story and important contribution to the control theory in the field of aviation and astronautics, combined with the knowledge of the development history of aircraft control.

The use and innovation of teaching methods and means is an important link in curriculum ideological and political teaching design. The comprehensive use of information technology should be strengthened, and a variety of different teaching methods and means can be used by teachers of specialized courses, such as online and offline mixed teaching, project case teaching, problem discussion teaching, etc., in the era of "Internet +" and "artificial intelligence +". Students' interest in learning can be strengthened, motivation and enthusiasm can be promoted through the construction of novel and rich classroom teaching models in a reasonable combination of ways.

For example, a hybrid online and offline teaching model has been adopted in the course 'Introduction to Unmanned Aerial Systems'. In the knowledge teaching process of "Multi-rotor UAV System and Composition", the first step is to learn the knowledge of "Structure and composition of domestic UAV" in MOOCs before class, and discuss the question of "How can the technology of domestic UAV reach the world leading level?" Is reserved. Second, in the process of in-class teaching, the problem discussion teaching method is adopted. Students can participate in the classroom discussion and interact with each other through the mobile terminal. Students' views can be refined and summarized through the high-frequency word statistics function in the use of smart classroom tools. "Independent innovation is the road to national prosperity" can be recognized by students, through the way of guidance, the spirit of scientific and technological innovation and the spirit of mission can be cultivated.

5.3. The organization and management of classroom teaching process

Classroom teaching is the main channel to achieve the goal of ideological and political education in the curriculum. Teachers of specialized courses should strengthen their ability to organize and manage classroom teaching, and the quality of moral education in specialized courses should be constantly improved.

In the pre-class preparation, first of all, students should be studied by teachers of specialized courses in an all-round way, including students' learning ability and habits, specialized knowledge system, current learning interests, ideological status, formed values and so on. Secondly, the ideological and political education elements implied in natural science and engineering science should be sorted out and summarized, the elements that match the course of this major should be selected, the appropriate ideological and political teaching theme should be designed, the teaching design should be perfect, and the preparation work for classroom teaching should be completed.

In the course of classroom teaching, a good ideological and political teaching environment and cultural atmosphere should be created by teachers of specialized courses, the emotional relationship with students should be cultivated, the way that students enjoy should be selected, and a good channel of spiritual communication between teachers and students and between students and students should be formed. Through the above methods, the classroom can become more friendly, and the teaching objectives of ideological and political education of the course can be accomplished in a subtle way, taking advantage of the opportunities for ideological and political education in the course of classroom teaching.

In the after-class evaluation, the effect of education needs to be evaluated and reflected by teachers of specialized courses. Whether the goal of ideological and political teaching can be achieved or not should be tested by students' sense of gain. In the evaluation, the two dimensions of professional curriculum knowledge and ideological and political education should be comprehensively considered, and the educational concept of "OBE" should be adopted to evaluate the whole process of the development of students' ideological and political quality with the learning effect as the outcome goal. At the same time, the curriculum ideological and political teaching process needs to be reviewed and summarized, the problem-based curriculum ideological and political teaching reflection needs to be carried out in time, the curriculum ideological and political teaching objectives and teaching process need to be constantly revised. Through the above methods, the development of ideological and political teaching in the curriculum and teachers' personal ideological and political ability in the curriculum can be improved.

For example, China's aerospace industry has attracted more attention from students, so the video of the autonomous docking between Shenzhou 14 manned spacecraft and the air combat station was introduced into the classroom teaching, combined with the current hot news about the construction and development of China's space station, in the pre-class preparation of classroom teaching. Taking the autonomous docking control system as the case, combining with the knowledge of "Composition of automatic control System" in

the basic course of Control Engineering, the composition of control system is introduced from the aspects of system perception, signal input and feedback, controller and control object. Through the above methods, individuals as part of the team to perform their roles can be mapped, control tasks can be accomplished excellently, and the team spirit of students can be cultivated.

In the after-class session, discussion topics with the themes of team spirit, love and dedication are designed, combined with the knowledge of "control system composition", and published in the form of homework on the online course platform. After the homework is completed by the students on the online course platform, the teachers participate in the online activities of the students. The achievement of students' ideological and political goals and knowledge goals is evaluated by students' feedback after class. Questions such as the appropriateness of the course case and the understanding of the implied ideological and political content were investigated through the questionnaire, so that the reflection of the teaching process was completed and the organization and management of the teaching activities of this course could be revised in the following teaching.

5.4. The cross and integration of ideological and political teachers

Teachers of specialized courses pay attention to the research and teaching of specialized knowledge, and their ideological and political education ability is limited by the level of ideological and political literacy. Ideological and political teachers are not familiar with the specialized course content, so their teaching process is divorced from the specialized knowledge background. Due to the lack of effective communication and cooperation between teachers of specialized courses and teachers of ideological and political courses, collaborative education effect is difficult to form.

The cross-integration of teachers of specialized courses and ideological and political courses is an important way to realize collaborative education and comprehensive improvement of talent quality in colleges and universities. Teachers of specialized courses can establish ideological and political teaching teams together with teachers of ideological and political courses to establish a cooperative relationship. The ideological and political theory knowledge, ideological and political elements in specialized courses, and the integration of ideological and political elements can be helped by the teachers of ideological and political courses. The lack of professional knowledge background and characteristics of engineering courses of ideological and political teachers can be helped by specialized course teachers, so as to improve the ability of ideological and political teachers to construct teaching situations..

For example, a 6-person ideological and political teaching team involving aerospace science and technology, control science and engineering, philosophy and other disciplines was formed by connecting teachers of unmanned aircraft systems engineering and teachers from the School of Marxism. A monthly collective teaching and research activities to prepare lessons, communicate and discuss are organized by the course team. Based on this, ideological and political education resources in specialized courses have been jointly sorted out and explored, teaching design of specialized courses has been guided, teaching cases and scenarios of ideological and

political courses have been assisted, and the purpose of specialized courses and ideological and political courses teaching in the same direction and collaborative education has been realized.

6. Summary

The construction of curriculum ideology and politics has put forward requirements for the education level of teachers in specialized courses. The lack of ideological and political ability of teachers of specialized courses was obtained based on the literature research method. The elements of ideological and political ability of teachers of specialized courses are analyzed and summarized, taking aerospace majors as an example.

Through research and exploration, the cultivation path of specialized course teachers' ideological and political ability has been obtained, at the level of teachers themselves. First, the awareness of oneself should be first improved through training, communication and other ways. Secondly, moral consciousness should be transformed through teaching competition. Second, information technology should be applied, curriculum ideological and political teaching design ability should be promoted and practiced, through the research and exploration of teaching methods and means innovation, in the transformation process. Thirdly, teachers of specialized courses can complement each other with ideological and political teachers to achieve the effect of collaborative education.

The above methods can provide a path reference for the improvement of ideological and political ability of teachers of other specialized engineering courses, and improve the teaching effect of ideological and political education of specialized courses in colleges and universities.

Acknowledgment

This work was supported by the Key Technologies R & D Program of Henan Province (NO. 212102210026), the Higher Education Teaching Reform research and practice project of Henan Province (NO. 2019SJGLX374/2021SJGLX472), the Higher Education Research Project of Henan Higher Education Association(NO. 2021SXHLX076), the Education and Teaching Reform Research and Practice Project of Zhengzhou University of Aeronautics(NO. zhjy2275/zhjy2272/zhjy2277/ Exploration and practice of construction of Industrial College of Zhengzhou University of Aeronautics), the Graduate Education Reform and Development Research Project of Zhengzhou University of Aeronautics(NO. 2022YJSJG28/2022YJSJG08/2022YJSJG09), the Excellent online open course of Henan Province(NO. [2021]474-200), the Open online course of Zhengzhou University of Aeronautics(NO. [2021]1-4), the key Scientific and Technological Project (Social Development Field) of Henan Province, China (No. 212102310093).

References

- [1] Guojuan Li. Curriculum ideological and political construction must firmly grasp the five key links [J]. China Higher Education, (2017) No. Z3, p. 28-29.
- [2] Zhenlei Wang. On the three-dimensional approach of ideological and political reform of college curriculum[J]. Ideological & Theoretical Education, (2019) No. 10, p. 72-75.

- [3] Chenying Wu. Discussion on the "ideological and political Thinking" ability of specialized course teachers [J]. Journal of Henan Institute of Education(Philosophy and Social Sciences Edition), Vol. 39 (2020) No. 01, p. 56-59.
- [4] Hongjie Yue. Research on the Construction of Curriculum Ideological and Political Teaching Ability of Teachers of Professional Courses in Colleges and Universities [J]. Modern Education Management, (2021) No. 11, p. 66-71.
- [5] Guoxi Gao. The improvement of teachers' ideological and political consciousness and ability in curriculum [J]. Educational Research, Vol. 41 (2020) No. 09, p. 23-28.
- [6] Chenggong Liu. Grasp the key point of comprehensively improving the consciousness and ability of college teachers in curriculum ideological and political construction [J]. Ideological & Theoretical Education, (2020) No. 10, p. 10-15.
- [7] Run He, Lixuan Chen. An analysis on the way to improve the ideological and political ability of professional course teachers in colleges and universities[J]. The Party Building and Ideological Education in Schools, (2021) No. 18, p. 63-65.
- [8] Information on: http://www.gov.cn/zhengce/zhengceku/2020-06/06/content_5517606.htm.
- [9] Fei Mo. Ideas of Specialized Course Teachers' Absence from Ideological and Political Education in Institutions of Higher Learning [J]. Journal of Zunyi Normal University, Vol. 12 (2010) No. 04, p. 94-97.
- [10] Daokun Lu. Some Core problems and Solutions in the implementation of Ideological and Political Education in Curriculum - Based on the discussion of professional curriculum Ideological and political education [J]. Ideological & Theoretical Education, (2018) No. 03, p. 64-69.
- [11] Yankui Qi. On Courses Construction Containing Ideological and Political Education From Perspective of Whole Curriculum [J]. Heilongjiang Researches on Higher Education, Vol. 38 (2020) No. 01, p. 124-127.
- [12] Hong Zhang, Li Li. The cultivation of teachers' professional ability in courses for ideological and political education [J]. Journal of Zhejiang University of Technology(Social Sciences), Vol. 19 (2020) No. 02, p. 222-226.
- [13] Xujuan He, Dan Yang. On Triple Logic of Improving Curriculum Ideological and Political Ability for Teachers of Professional Courses in Colleges and Universities in New Era [J]. Journal of Hengyang Normal University, Vol. 43 (2022) No. 01, p. 136-140.
- [14] Yuan He. College Specialized Faculty's Abilities in Curricular Ideological and Political Education and its Cultivation Paths [J]. Jiangsu Higher Education, (2019) No. 11, p. 80-84.