Discussion on the Training Path of Engineering Graduate Students in New Period

Tao JIN[1,*], Hongjuan Zhou[1], Fenggang Yan[1], Shuai LIU[1]

[1] School of Information Science and Engineering,, Harbin Institute of Technology (Weihai Campus), Weihai, Shandong province，China

hitwhjintao@126.com

*corresponding author

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Abstract: The military-civil integration has already become one of the national strategies. With the guidance of this strategy, Chinese universities and colleges are responsible for cultivating high-quality talents competent for both military and civilian services. By probing into the current university management system, courses of study and assessment standards, this paper analyzes the problems of graduate training in Chinese universities and colleges under the strategy of military-civil integration, and puts forward some ideas for its reform. A new path of reform is provided in this paper on the graduate training in Chinese universitiesand colleges from the perspectives of information exchange, the development of interdisciplinary and assessment feedback., and other related attempts.

1. Introduction

The framework of military-civil integration has put forward new requirements for the talent training program in the national defense universities. At present, China's economic construction is in a stage of rapid growth; therefore, the development of national defense and local economy has an urgent demand for talents competent for both military and civilian services. At the present stage, the talent training in universities and colleges in China mainly adopt the serial training mode, in which theory learning in the universities and enterprise internship program are combined for graduate training. This kind of serial training mode cannot give full paly to the complementary advantages of teaching and practice resources and realize the benign interaction between supply and demand. It is still a simple superimposed compound training, and lack of high degree of cooperation among componential elements. As a result, the advantages of military-civil integration in the talent training process are not fully revealed. Therefore, it has become an urgent need to reform the talent training program in national defense universities, especially the high-quality graduate training program.

2. The current problems of the graduate training in national defense universities

2.1. Obvious boundary of military and civilian scientific research and lack of effective information exchange mechanism in national defense universities

Due to historical and practical reasons like the need for confidentiality in the military industry, the existing scientific research management framework in national defense universities basically adopts the research management system splitting the military and civilian research pursuit[1], which, to a certain extent, makes it impossible for the industry demanders and technology providers to establish effective communication across the boundaries of the military and civilian research fields[2]. From the development history of modern science and technology, military powers, as they realized the importance of national military security, often make sustained and stable investment in national defense and talent training, the fact of which has produced the result that advanced technology often first appears in the field of national defense and military field which has large

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investment and urgent demand. For example, radar using electronic information technology, atomic bomb using nuclear energy technology, rocket and satellite using space technology and other advanced technological achievements all made their appearance in the field of military applications, resulting in the development situation in which military industry is much stronger than civilian one. In recent years, this development situation has gradually changed. The rapid development of information technology based on artificial intelligence and big data in the civil field has greatly expanded the application scope of traditional information technology, and is gradually empowering military technology[3]. It is not difficult to see from the law of development that the technological developments in the military and civil fields are complementary, and the development process of each field is not independent of the other. The earlier the military-civil integration and communication is carried out, the earlier the opportunity can be seized and the transition be realized from technological lead to strategic lead.

2.2. Single body of acquired knowledge system and weak interdisciplinary in graduates resulted from the discipline as the only training unit

The existing colleges and universities formulate the training plan basically by taking the discipline as the training unit. Due to the lack of in-depth understanding of the major national needs for interdisciplinary, there is a lack of interdisciplinary and integration with other disciplines in the process of talent cultivation in national defense universities, the fact of which result in the disciplinary barriers and lack of a systematic and forward-looking perspective in the breadth of talent cultivation[4]. At the same time, the specialization of talent training perspective also leads to the decentralization of scientific research professionals and unbalanced development in each research field. In general, the frontier achievements of military science and technology in the world are mostly the product of interdisciplinary development. Therefore, it is necessary to break the barriers between disciplines in the graduate training process, overcome the disadvantage of existing talent training system which focus on the specialization instead of on the width of knowledge scope, and to a certain extent, expand the breadth and dimension of the cognitive field of the discipline[5].

2.3. Lack of consciousness of quality management and standard in the process of cultivating scientific research and practice in graduates

As the main birthplace of new ideas and innovative technologies, universities and colleges have always been pursuing the direction of scientific research and talent training. The exploration and development of science and technology follow their own intrinsic laws. In the early stage of development, 1% success rate can be regarded as an innovative breakthrough, the fact of which, in the process of scientific research and graduate training, leads to the neglect of cultivation of consciousness of quality management and standards. In contrast, military technology pays more attention to stability and reliability of the research. Consciousness of quality management and standard run through the whole process of scientific research on the national defense. These two different orientations lead to great differences in the requirements for talent ability. How to strengthen the consciousness of quality management and standards in the process of talent training is a challenge that needs to be confronted by national defense universities within the framework of military-civil integration strategy.

3. A new path of graduate training reform in national defense universities

3.1. Strengthening the information communication between the supply side and the demand side and building a bridge between the supply and demand of technology competent for both military and civilian purposes

The current common way of communication between military and civil technology is that scientific research institutes, as the technology demand side, directly connect with traditional technology institutions as the supply side[6]. One the one hand, scientific research institutes, as the demand side of technology, are not able to keep pace with the development trend of new technology

and the development status of the industry. They often encounter problems that cannot be solved by themselves, and there is few opportunities for them to meet their demand. Therefore, they are in the dilemma of being not able to make bricks without straw. On the other hand, some emerging institutions that have already mastered cutting-edge technology are also in the dilemma in which they have no chance to carry out their ideals because they are unable to understand the technical needs in the field of national defense in time. In the process of talent training, universities with national defense characteristics also encounter the same situation. One of the basic characteristics of military-civil integration strategy is to realize the cultivation and developments of talents and technology competent for both civil and military services. The scientific research management departments of universities and colleges should establish an effective information interaction mechanism at both sides of the supply and the demand in order to realize the safe, effective and timely exchange of information, thereby provide an accurate direction for the talent training in national defense universities, and promote the efficient implementation of military-civil integration strategy.

3.2. Building interdisciplinary training system to meet the needs of tracking academic frontier and strengthening military-civil integration

Under the strategy of military-civil integration, one of the main objectives of graduate training in national defense universities is to cultivate innovative talents competent for both military and civil services for the military and scientific research institutes. The outlook and quality of the cultivated talents directly affects the development of national defense[7]. Therefore, under the strategic framework of military-civil integration, the cultivation of graduate students in national defense universities must be oriented to the academic frontier and national demand. On the one hand, the graduate training must keep up with the direction of development and trend of international academic frontier to ensure that it does not fall behind in the supply side of science and technology; on the other hand, it must aim at the major demand of national defense to ensure that the demand of national defense technology can be properly satisfied in the future. Only from both of the supply side and demand side can we meet the needs of national development and provide competitive back-up talents for the sustainable development of national defense. In addition, we should also build an interdisciplinary training system among disciplines. On the one hand, we should make full use of the existing traditional advantageous disciplines in universities and colleges and, by giving full play to their advantages, enhance their integration with national defense disciplines; on the other hand, we should actively explore the integration of national defense disciplines and the emerging ones in order to maintain the development competitiveness and provide greater support for the training of dual-use talents.

3.3. Enriching the existing assessment mechanism and valuing the feedback on the quality of talent training

To establish a reasonable quality assessment and evaluation system for talent training is one of the main tasks for universities and colleges[8]. Under the strategy of military-civil integration, we should establish a variety of reasonable and effective evaluation mechanisms according to the types and tasks of graduate training. In the process of formulating the assessment system, we should not only adopt strict standard of solid theoretical foundation, but also aim to meet the requirements of strengthening practice and seeking innovation by keeping up with the academic frontier, following the major needs and focusing on the individual development. In this way, the cultivation in graduates of the ability of sustainable development will be ensured. The transition from the nodal assessment to the formative assessment will provide the feedback and guidance on the cultivation process as soon as possible. In addition, we should establish a long-term feedback mechanism of talent training. Through the exploitation of the external evaluation, such as survey on the social needs, investigation of the requirements of employers, and regular and continuous tracking of employed graduates, we can find out the deficiencies in the work of talent training in the

universities and colleges, adjust the training program in time, and form a long-term, closed-loop and timely evaluation and feedback system.

4. Conclusion

Military and civilian integration is not only a national strategy, but also a systematic project. It takes ten years to build a tree, but a hundred years to build a man. Only by continuously developing new channels and methods of military-civil integration in higher education, cultivating more dual-use talents with quality and quantity, meeting the needs of empowering the country and strengthening the army, and forming a positive interaction between talent training and military-civil integration, can the implementation of the strategy of military-civil integration embark on the road of sustainable development.

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