Research on the Reform of Trinity Cooperative Teaching Mode in the Vocational Training

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Abstract. The implementation of multi-cooperative teaching is an important way to promote education reform and train high-quality innovative talents. In order to improve the teaching level and talent training quality in military academies, this paper refers to the cooperative teaching mode of industry-university-research in local universities, and explores the reform of trinity cooperative teaching mode in the teaching of vocational training majors in military academies. The paper introduces the connotation of trinity cooperative teaching mode, expounds the advantages and relationships of academy theory teaching, military online teaching and troop practice teaching, analyzes the significance of trinity cooperative teaching mode, explores the implementation strategy of trinity cooperative teaching from four aspects of cooperative education system design, teaching platform building, teaching content optimization and teaching resources construction. The teaching practice shows that the trinity cooperative teaching mode can promote the deep integration of teaching, expand teaching methods, stimulate students' interest in learning, and is widely recognized by the troops and academies. It is of great significance to optimize the mode of military talent training, improve the teaching quality of military academies and the quality of military talent training.

Keywords: trinity; teaching mode; cooperative education; vocational training

1   Introduction

The educational reform and development practice in colleges and universities shows that the training of high-quality application-oriented talents must follow the principle of open and cooperative education, integrate the forces and resources, and build an integrated talent training system, so as to expand the path of talent training and improve the quality of talent training.

The cooperative education of local universities started early. By promoting the cooperative education of universities, research institutions and enterprises actively, establishing the industry-university-research innovation platform, carrying out online teaching vigorously, and building the industry-university-research trinity curriculum system and teaching mode, the virtuous cycle mode of co-development of teaching and research, co-education and co-progress of talent training with the characteristics of "school-enterprise joint innovation, scientific research feeds back teaching" has been formed initially .

After years of teaching practice, many universities have carried out a lot of research on the mode, method and path of industry-university-research institute cooperative education, and

achieved fruitful results of the talent training mode [1-4]. Reference [5][6] studies the teaching mode of industry-university-research institute cooperative education. Reference [7] analyzes the keywords of educational literature on industry-university-research institute cooperative education from 1996 to 2016, summarizes the research hotspots and frontier issues of industry-university-research institute cooperative education, and draws three conclusions and implications in the research field of industry-university-research institute cooperative education. Reference [8] studies the application progress on education of artificial intelligence technology and the frontier and trend of educational technology application, and discusses the industry-university-research frontier of educational informationization. Reference [9] analyses the problems existing in the current practical teaching, puts forward the corresponding solutions from three aspects: military intelligent computing practical teaching system practical teaching cooperation and practical guidance mode. Reference [10] summarizes the experience of joint teaching and joint training of universities and forces in recent years.

Based on the existing research results, in view of the problems existing in the current teaching of the military academies, this paper explores the trinity cooperative teaching mode in the teaching of the vocational training major, and studies the method to integrate the educational resources of academies and troops, optimize the teaching mode, improve the teaching quality, so as to improve the combat quality and practical ability of military talents.
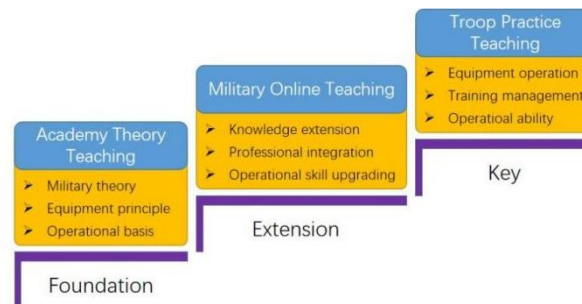
2   Connotation

The trinity cooperative teaching mode is a teaching mode which combines three teaching methods of academy theory teaching, military online teaching and troop practice teaching, and realizes the combined teaching of online + offline, in-class + outside-class, theory + practice. It is an innovative military talent training mode integrating teaching, practice, training and combat, which is constructed by military academies and combat troops through cooperative innovation on the basis of demand sharing, resource sharing and achievement sharing. It is an important measure to promote the co-education of military academies and combat troops, improve the quality of talent training, and improve the combat capability of the troops. The teaching mode of the trinity cooperative teaching is shown in Figure 1.

The trinity cooperative teaching mode aims at the training of students' military quality and combat ability. It forms a cooperative relationship of complementary advantages, resource sharing and common development in talent training, military research and teaching innovation by giving full play to the respective teaching advantages of academy theory teaching, military online teaching and troop practice teaching. The relationship of the trinity cooperative teaching mode is shown in Figure 2.
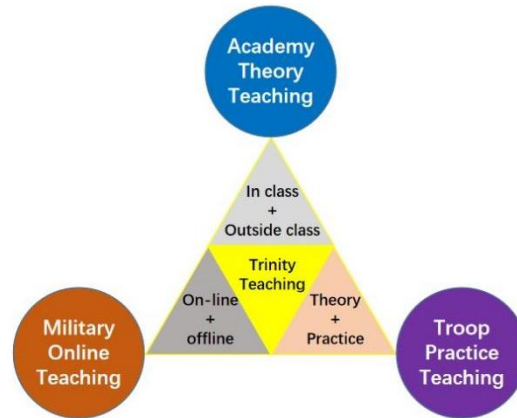
Fig. 1. The teaching mode of the trinity cooperative teaching

Fig. 2. The relationship of the trinity cooperative teaching mode

Academy theory teaching is the basis of military talent training. The theory teaching of military academies takes the actual needs of the troops as the traction, takes serving the troops as the purpose, takes the training of actual combat ability as the core. Through the basic, theoretical and systematic teaching in the military academies, students can master the theoretical knowledge of military, understand the principles of military equipment, and cultivate good military quality.

Military online teaching is the extension and supplement of academy theory teaching and troop practice teaching. Military online teaching relies on high-quality online educational resources, rich teaching content and teaching methods to expand students' professional knowledge, optimize the knowledge structure, deepen the understanding and mastery of theoretical knowledge, promote professional integration, cultivate students' cooperative spirit, innovative spirit and practical ability, improve joint combat ability, and realize the whole process of independent and flexible learning.

Troop practice teaching is the key of the military talent training, which has distinct characteristics of actual combat and is an important way to improve the fighting ability. The main task of the troop practice teaching is to consolidate students' military theoretical knowledge, promote the transformation of theory into practice and the transformation of

knowledge into ability, make students to master equipment operation skills, improve the ability to organize and manage, and develop good fighting quality.

Academy theory teaching focuses on the connotation and foundation; Military online teaching focuses on the consolidation and extension; Troop practice teaching focuses on transformation and application.

Academy theory teaching, military online teaching and troop practice teaching are the "three carriages" of military talent training. The functions of the three teaching methods are complementary. They are not only connected with each other, but also have different functions and focuses. It is difficult to improve the quality of talent training by only relying on any teaching method alone. It can promote the overall improvement of military talent construction level by applying the trinity teaching comprehensively and making the three teaching methods unified in the practice of cultivating new high-quality military talents organically.

3 Significance

The trinity cooperative teaching mode is an important measure to deepen the reform of education and teaching, optimize the talent training mode and promote the cooperative training of military talents in military academies.

3.1 Conducive to optimize the talent training mode

The trinity cooperative teaching mode can realize the coordination and integration of offline teaching, online teaching and military practice in function and resource, and can promote the jointing and coupling of military talent training in ability requirements, training objectives and training paths. Through the trinity cooperative teaching, the troop participates in the teaching activities of academies deeply, provides suggestions for talent training and curriculum construction of academies, studies and makes talent training programs jointly, sets up practical teaching courses scientifically, organizes and arranges practical teaching activities reasonably, and makes talent training programs, curriculum teaching content and practical teaching more close to the combat needs of the army. It can promote the improvement of students' practical innovation ability and military quality effectively.

3.2 Conducive to promote integrate of teaching deeply

Through the trinity cooperative teaching, it is conducive to master the military talent training needs and the quality of military talent training accurately, so as to carry out targeted teaching; It is beneficial to track and find the problems existing in the current talent training, and propose solutions together; It is conducive to accelerate the transformation of military training results, and promote the latest training methods, combat methods and fighting cases into the classroom; It will help the academies give full play to the intellectual and technological advantages, solve the practical problems existing in the combat training of the troops, and cultivate high-level military talent; It is conducive to promote the deep integration, functional complementarity, resource sharing and cooperative education of colleges and troops, carry out research on military theories, fighting and training methods innovation, and cooperative teaching reform, and promote the improvement of talent training quality and combat capability of troops continuous .

3.3 Conducive to improve the quality of talent training

Through the trinity cooperative teaching, it is conducive to give full play to the advantages of rich teaching resources and flexible and efficient teaching methods of military online education, carry out visualized, personalized and diversified teaching through the teaching method of "theory + practice, virtual + practical", increase students' interest in learning, improve students' learning autonomy, so as to support the theory teaching of colleges effectively. Relying on military practice teaching, it provides students with a real practice teaching environment, combines the cultivation of students' practical ability and innovation ability with military training organically, lets students participate in military combat and training deeply and master the latest situation of the army, consolidates the theoretical knowledge learned in academies, combines theoretical knowledge with military training, enables students to deepen their understanding of military theoretical knowledge and their cognition of military combat and training, promotes the transformation of teaching mode from one-way lecture-style teaching to two-way interactive teaching, enhances the communication between teachers and students, and mobilizes the subjective initiative of students in learning.

4 Implementation Strategy

The implementation strategy of the trinity cooperative teaching includes cooperative education system design, teaching platform building, teaching content optimization and teaching resources construction. The teaching implementation plan of the trinity cooperative teaching is shown in Figure 3.
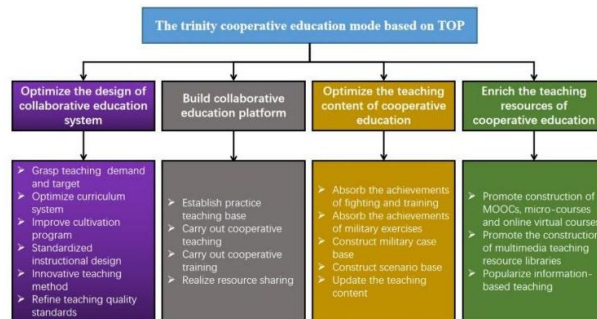

Fig. 3. The implementation plan of the trinity cooperative teaching

4.1 Optimize the design of cooperative education system

Through exchanges and cooperation between military academies and troops, it makes the teaching of military academies match the needs of military combat and talent training accurately. Guided by the needs of military talent, the planning and design of the teaching system of military academies should be optimized, and the new mechanisms and modes of training composite application-oriented military talent through the cooperation of academies and troops should be explored actively, so as to realize the standardized, scientific and normal development of the trinity cooperative teaching. The specific measures include: grasping the talent training objectives accurately, improving the talent training program, formulating the

talent training object maps, road maps and construction maps scientifically, standardizing the course teaching design, updating the teaching content, innovating the teaching methods, refining the talent training quality and standard, etc.

4.2   Build cooperative education platform

In accordance with the idea of "going out and inviting in", the cooperative education platforms of academies and troops should be built, the education mechanism of "resource sharing, complementary advantages and cooperative education" should be explored, and the course teaching mode of "close to the troops, close to the equipment and close to the station" should be constructed. Give full play to the unique advantages of practical education of the troops, make use of the abundant training resources of the troops, construct an integrated practical teaching base in various ways, provide good practical teaching conditions for talent training, enable the students to train repeatedly in an environment close to actual combat, so as to deepen the understanding of theoretical knowledge and deepen the cognition of military combat training. Through the cooperative teaching and training of the troops and the academies, inviting troop commanders to conduct lectures for students in the academies, it expands the methods and approaches for the troops to participate in the talent teaching, promotes the results of military training, classic cases and methods of fighting and training into the classroom as soon as possible, and accelerates the transformation into teaching application.

4.3   Optimize the teaching content of cooperative education

According to the teaching characteristics of military academies and the rules of military talent training, guided by the needs of actual combat training, the curriculum teaching content is updated dynamically, the achievements of military theoretical innovation and the reform of military fighting and training is absorbed widely, the new methods of fighting and training are enriched into textbooks and classroom teaching, so as to promote the integration of the research results of military training and the teaching of academies and strengthen the pertinence and effectiveness of military theory teaching. The achievements of military exercises and drills are incorporated into the curriculum teaching. The practical teaching design which is driven by drill data, implementation plan, organizational process, training methods and classic cases is carried out, and the construction of case base and scenario base is promoted to ensure the comprehensiveness and applicability of teaching content. Focusing on the update and development of future combat styles and weapon equipment, new theories, new technologies, new equipment and new methods of war can be introduced into the teaching content in time to make that the teaching content is dynamic and prospective, so as to ensure that the teaching content is always "fresh", "dynamic" and "practical", and adapt to the future wars.

4.4   Enrich the teaching resources of cooperative education

According to the military talent training needs of troops and the core competence expansion needs of combat stations, combining the advantages of the main responsibilities and disciplines of the academies, with the help of information teaching means, relying on the networked, interactive and open learning platform, the construction of teaching resources such as MOOCs, micro-courses, online virtual courses is promoted, so as to meet the diverse, personalized and independent learning needs of students. The construction of 3D model library, audio-video library, multimedia animation library and other multimedia teaching

resources is promoted vigorously, so as to give full play to the advantages of multimedia teaching resources in visualization, vividness and diversity, stimulate students' interest in learning, and enhance students' desire for knowledge. Keep up with the pace of education information construction, promote the information teaching mode and the application of internet, big data, artificial intelligence, virtual reality and other modern technologies in teaching vigorously, use the network information-based teaching platform to carry out online teaching, explore the implementation of networked, digital, intelligent and personalized teaching, promote blended teaching, flipped classroom and other modes that combine online teaching and offline teaching, and form an information-based teaching system of "network + education" to give strong support to academy teaching and military training.

5   Practical Results

In recent years, we have made a bold exploration of the trinity cooperative teaching mode in the vocational training teaching. We have tested and verified this teaching mode by means of survey and research, planning and design, teaching implementation and feedback, optimization and improvement, and achieved some preliminary results.

We have conducted extensive research on the feasibility and necessity of this teaching mode, consulted the academies and the troops fully, reconstructed the professional curriculum system and curriculum quality standards, established a long-term and stable cooperative education relationship with the troops, built a number of practice and training bases, and developed a number of online courses, micro-courses and multimedia teaching resources.

Through teaching practice, it stimulates students' learning enthusiasm effectively and improves classroom teaching effect. As shown in Figure 4, 96% of the students believe that this mode can stimulate interest in learning, 88% of the students believe that this mode can improve innovative spirit, 82% of the students believe that this mode can improve exploration spirit, 93% of the students believed that this mode can consolidate the theoretical basis, 89% of the students believed that this mode can expand professional knowledge, 95% of the students believed that this mode can improve equipment operation skill, and 91% of the students believed that this mode can improved the command level.
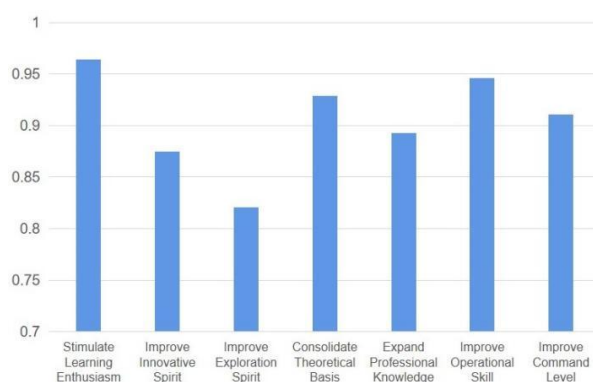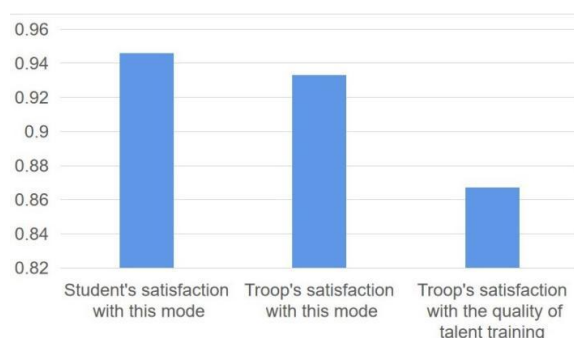

Fig. 4. Investigation of the teaching effect

This teaching mode has been widely recognized by the academies and the troops. As shown in the Figure 5, with 95 percent of the students and 93 percent of the troops approving this teaching mode.

Fig. 5. Investigation of the teaching satisfaction

The graduate students are widely praised by the troops and meet the needs of the actual combat of the troops. The satisfaction of the troops with the graduate students has reached to 87%.

6   Conclusion

Based on the current teaching situation and education reform requirements of military academies, and relying on the online teaching platform and the troop practice teaching platform, this paper makes a bold exploration of the trinity cooperative teaching mode, and carries out the practice in the teaching of vocational training major. It shows that the trinity cooperative teaching is an effective way to improve the combat ability of troops, fighting skills of students and the educational level of academies, as well as an important mechanism to realize complementary advantages, win-win cooperation and common development. Systematic, gradual and phased learning and training are organized by colleges through academy theory teaching, military online teaching and troop practice teaching. It extends students' learning from "inside the classroom" to "outside the classroom", optimizes talent cultivation mode, enriches teaching resources and teaching methods, stimulates students' interest in learning, promotes the deep integration of teaching, and improves the teaching level and ability of teachers and the quality and efficiency of military talent training.

References

[1] GAO Guijuan. (2012)Discussion on the reform of production-university-research cooperative education under the background of improving the quality of higher education. Higher Agricultural Education, 2:43-45. DOI:10.13839

[2] LI Weiming, LI Chunyan. (2011)Research on the cultivation mechanism of innovative talents in colleges and universities under the mode of production-university-research cooperation. Modern educational management, 5:102-105. DOI:10.16697

[3] XIE Taiping. (2019)Exploration and practice of application-oriented talents training under the mode of production-university-research cooperation. Industrial Innovation, 3:59-60+78.

[4] ZHANG Luying, CHENG Qinglin, HALING Bins, JIANG Peng. (2019)Exploration and practice of cooperative education of industry, university and research to improve the quality of higher engineering education. Disciplines Exploration, 14:71-72. DOI:10.16400

[5] Miao Yanhua, Dai Dongbing, Dong Baolian, Shen Huayu. (2014)Research on College-Enterprise Cooperation Model for Application-oriented Colleges and Universities. China Educational Technology & Equipment, 4:121-123. DOI:10.3969

[6] Zhao Yibing. (2021)Exploration and Practice on Improvement of Practical Innovation Ability for Application-Oriented Undergraduate Colleges Based on the Deep Integration of Industry-university-research. China Modern Educational Equipment, 371:145-147. DOI:10.13492

[7] WANG Jiaying. (2018)The hot spots and frontiers of the research on industry–university–research cooperative education in china in the past 20 years. Education Research Monthly,11.23-32.DOI:10.16477

[8] ZHONG Yu, GUO Rui. (2019)To build an international community of industry-university-research cooperation in education informatization. Journal of World Education, 10: 11-14.

[9] Wang Changjian, HUANG Zhen. (2021)Practical teaching mode of military intelligent computing based on "product, teaching, research, war" four-in-one model. Journal of Higher Education Research, 4:115-120.

[10] FU Guangming，LIU Weidong. (2013)A Study on the Innovative Mode of Joint Teaching and Joint Training between Military Universities and Army Units. Journal of Higher Education Research, 1:42-44. DOI:10.3969