

# Vocational And Technical Education for Non-Commissioned Officers Based on Combat-Oriented Teaching

Congli Wang\*, Xiong Li

Non-Commissioned Officer Academy of PAP, Hangzhou, China

\*Corresponding author: cong7592@126.com

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**Abstract:** In this paper, taking the professional course of career and technical education for non-commissioned officers as an example, we mainly study the case-based practical teaching. Focusing on the principles and methods of teaching content construction, it proposes a teaching content construction method based on the topological map of case-based knowledge points. It verifies the feasibility and teaching effect of the technique through teaching practice.

## 1. Introduction

Through the investigation and analysis of the current teaching content of information technology non-commissioned officers' vocational and technical education, we found that after years of continuous revision and improvement, the curriculum construction has made significant progress. However, there is still a particular gap from the requirements of actual combat. There are problems such as the setting of the teaching content of the true combat characteristics is not apparent, teaching content update lags behind the needs of the actual combat, and the difficulty in transforming the teaching content system.

Various new teaching methods began to test, all with good results. Jiang proposed a method that project-based curriculum research of vocational education based on the task [1-2]. It strengthens the link between curriculum and work. Huang discusses how online education can effectively support "Disrupted Class, Undisrupted Learning" according to seven elements: smooth communication platform, appropriate digital resources, convenient learning tools, diverse learning styles, flexible teaching organization, effective support services, and close collaboration among government, schools and enterprise [3-4]. Shi analyzes the logical path that technological changes affect the talent training of vocational education, and conducts realistic analysis and countermeasure research based on constructing an analysis framework [5]. Zhong proposed integrating vocational education and general education to help modernize the education governance system and governance capabilities [6].

Reformation of education and teaching must be advanced ceaselessly. It is the everlasting subject of Petty Officer Academy development [7]. The sergeant plays an important role in the army. The research of sergeant education is of significant importance to deepening defence and army reform in the new period [8]. In order to implement the actual combat teaching reform into the classroom, and to guide the comprehensive reform of the actual combat of the non-commissioned officer education, the structural adjustment and connotative reform of the teaching content has a vital necessity and urgency. Therefore, combined with the theoretical topic of the institution's discipline and profession: the reform study of actual combat teaching, we put forward the reform method of content centered on cases through a lot of research, analysis and summary. The method has clear steps, strong direction and wide application, with solid practicality and operability.

## 2. The content construction method of the actual course is based on cases

In accordance with the essential requirements of combat-oriented teaching, course teaching should closely follow the actual combat training of the troops, highlighting the information construction of

the armies, combat issues under the conditions of information technology and the hot spots and complex topics on the post, fully reflecting the essence of the subject content and frontier knowledge. Accordingly, this paper designs and proposes the following basic principles and methods for the construction of actual combat teaching contents.

### **2.1 Basic principles of actual combat teaching content construction**

In response to the actual needs and current situation of actual combat teaching content, we adopt a wide range of borrowing and integration of innovation, and take the ideas of other universities about the construction of course teaching content as essential research materials. Combined with the resources of our course construction, we integrate the existing teaching resources to carry out the overall design.

The construction of the actual combat teaching content should follow the following three basic principles:

Firstly, it should focus on the actual problems and countermeasure ideas in the basic combat training of troops. Aiming at many key and challenging issues of combat training of non-commissioned officers in the army, combined with the basic needs of current army combat readiness and combat training, theoretical and practical methods are used to select typical research cases to enrich the application examples of teaching contents and improve the relevance and applicability of teaching contents. Through the questionnaire survey conducted in four units according to the two directions of fixed communication and mobile communication, a total of 67 questionnaires were received, including 33 for mobile communication and 34 for fixed communication. They provided material for the preparation of teaching cases.

Secondly, we should pay attention to the border and future trends of job-related information technology development. The teaching content should follow the academic frontier and technological development dynamics, pay attention to the latest combat theories and ideas, expand students' disciplinary horizons, and help them carry out active thinking and research practice.

Thirdly, it is necessary to highlight the need for personalized talent training. Following the differences in job requirements, learning interests and learning characteristics of students in different majors, the curriculum teaching content standards are formulated, and teaching topics and research subjects are flexibly combined to meet the needs of students' individual development and future job requirements.

### **2.2 Basic principles of "case-knowledge" relationship topology mapping**

According to the above three principles, the course content is sorted out by drawing a topology diagram of "case-knowledge points" to further clarify the reform ideas and methods of teaching content. When drawing the topology diagram, the following three principles should be noted.

Principle 1: The principle of main contradictions

The first principle that needs to be considered when drawing a topology diagram is the principle of the main point of conflict. Each case is designed around the main contradiction point. After digging deep into the contradiction point, carefully preparing the contradiction point and cleverly activating the contradiction point, many knowledge points will be involved. The supporting role of these knowledge points for resolving of the case conflict is called weight, which can be divided into primary knowledge points, secondary knowledge points, and tertiary knowledge points.

The primary knowledge point has a direct and vital supporting role in resolving the main conflict point and is the central learning content that needs to be focused on for this case study. Generally, the comprehensive cases in multi-disciplinary fields are significant, and the cases in professional disciplines in vocational areas are medium-sized cases, which will contain several primary knowledge points. In contrast the cases in the classroom in curriculum teaching are small cases, which involve fewer primary knowledge points, usually 1 to 2 knowledge points. In the classroom cases, the primary knowledge points are usually new knowledge points that need to be learned.

Secondary knowledge points support the learning of primary knowledge points.

Principle 2: Principle of thought leadership

The second principle to keep in mind when drawing the topology of the "case-knowledge" relationship is the principle of thought leadership. In general, people's analysis and understanding of the problem is gradually developed according to the logical connection of "analysis-judgment-hypothesis-decision". Topological mapping should follow the general rules of cognitive activity, play a role in guiding the direction of thinking and developing thinking skills, and improve the teacher's ability to analyze and solve problems in case teaching.

First, based on the facts described in the case, the environmental background and influencing factors of the central issue of the case are carefully analyzed around the case theme. In that step, the main contradictory points are drawn out, and a series of primary knowledge points are analyzed. These points of knowledge may be correct or incorrect. Then, based on the results of the analysis, the problem is accurately defined, and the central contradictions of the problem are correctly judged, and false primary knowledge points are removed. Subsequently, the idea of solving the problem is proposed based on hypotheses about the subject of the event, the achievement of the goal, the process of the activity and the elements of the conditions. It is gradually expanded to the secondary knowledge point. Finally, remedial measures are proposed by comparing different scenarios, selecting a decision option, and predicting what might happen in implementation. The aim is to establish a horizontal and vertical connection between the primary and secondary knowledge points.

According to the above process, when drawing topological diagrams, we should pay attention to the principle of thinking guidance, establish the topological relationship between knowledge points and realize the combination of points and surfaces according to the cognitive rules of students.

#### Principle 3: Principle of logical construction

During the case study and discussion, it is essential to guide students to establish logical relationships between the knowledge points. The establishment of logical relationships not only alleviates the isolated nature of knowledge points, but also strengthens the role of the connections between them. Bringing scattered knowledge points together facilitates the development of students' logical thinking. In drawing the topology diagram, you can refer to the way of drawing a mind map to indicate the logical relationship between the knowledge points.

After analysis, there are six common logical relationships between knowledge points as follows.

The relationship between the whole and the parts, also known as the class and order. It is like the relationship between the main trunk and the branches of a tree, where the main box leads the components, and the two cannot be juxtaposed or reversed. This relationship generally exists between the main contradiction point and the subordinate knowledge points.

The relationship between primary and secondary is the relationship between focus and general. The two have no affiliation, but are related to each other in the same topology diagram, influencing and complementing each other.

Parallelism is a relationship that is not subordinate to each other but relatively independent. It usually exists between knowledge points of the same level.

Progression is the relationship between the different stages of development from introduction to mastery of the same knowledge point.

The point and face relationship are that the face is composed of numerous issues. If points and faces are intrinsically related, then points can be used instead of faces in the analysis.

Cause and effect relationship is a necessary and objective cause and effect relationship between knowledge points. Revealing it can enhance the persuasive and compelling power of the case.

A case-knowledge topology map based on the various logical relationships described above can quickly improve the teachers' control over teaching cases. It is used to help students identify transparent logical relationships between knowledge points, alleviate the isolation of knowledge points, and establish the complete knowledge structure required for the case.

The basic structure of the topology diagram is shown in Figure 1.

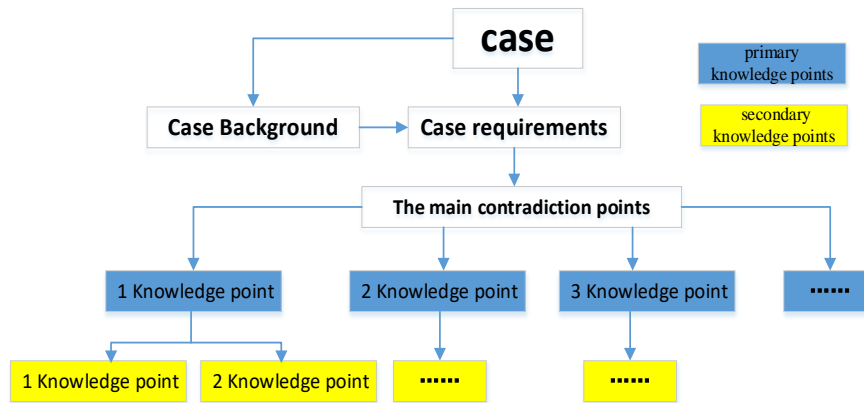


Figure 1. Case-knowledge topology diagram

### 2.3 Construction method of actual combat teaching content

According to the principles of actual combat teaching content construction and case-knowledge point topology mapping method, we decomposed and designed the knowledge points with the teaching case of ultra-short-wave communication in a task, as shown in Table 1. We sort out and reconstruct the teaching contents. Through this method, the relevant knowledge points involved in the case are decomposed, so that students can grasp the form characteristics of the network in the task, and form a complete system of knowledge points. The teacher can follow Table 1 for scientific teaching design, determine the approach to be taken for each knowledge point during the lesson, and improve the quality of the class.

Table.1 Refinement of knowledge points

Case	Ultra-short-wave communication in task
<b>Case Background</b>	The distance between Zhenkang City and Fengshui Town is 40km, the topography of the two places is complicated, and the electromagnetic signal is seriously disturbed, so it is required to establish an ultra-short wave communication network between the two places.
<b>Case Requirements</b>	The mission requires a long communication distance, which satisfies about 40km. The terrain of the task is mountainous, so it is necessary to ensure that the network has no interference and the voice quality is good.
<b>Primary Knowledge Points 1</b>	<b>Choice of communication networking method</b>
<b>Secondary Knowledge Points 1.1</b>	Calculation of base station communication distance
<b>Secondary Knowledge Points 1.2</b>	Influencing factors of communication distance
<b>Secondary Knowledge Points 1.3</b>	Base station erection
<b>Primary Knowledge Points 2</b>	<b>The setting of frequency point</b>
<b>Secondary Knowledge Points 2.1</b>	Selection of frequency points

<b>Tertiary Knowledge Points</b>	Compare the allowed frequency range with the frequency range of the device
<b>Secondary Knowledge Points 2.2</b>	Division of frequency points
<b>Tertiary Knowledge Points</b>	The principle of network communication and the number of terminals
<b>Secondary Knowledge Points 2.3</b>	The problem of signal interference
<b>Tertiary Knowledge Points</b>	Continuous tone coded squelch system

### 3. Analysis of teaching effectiveness

In order to verify the teaching effect of the method, two teaching classes were selected for the experiment, using the traditional teaching method and the case teaching method, respectively. The results of the teaching quality analysis are shown in Figure 2. As can be seen from the data in the figure, the overall level of students improved significantly after adopting the case-based knowledge point topology proposed in this paper to reconstruct the teaching content. This shows that students are not only able to form a complete knowledge structure of this case, but also able to analyze the case needs and transfer and expand their knowledge on their own. The scientific and effectiveness of this method is verified.

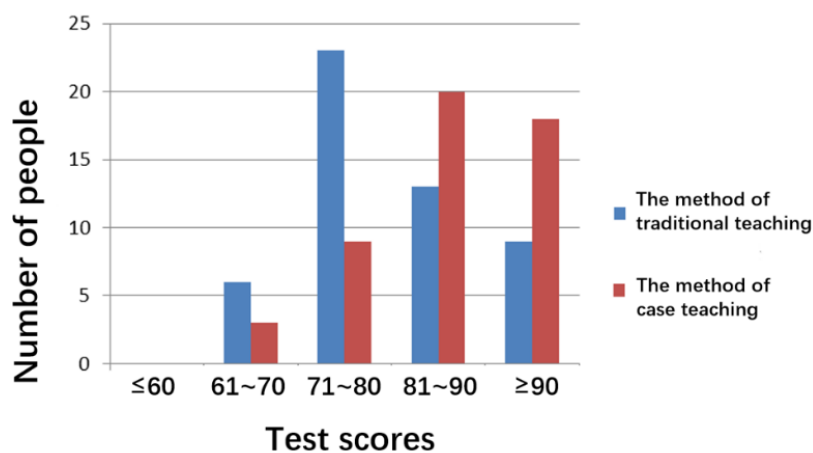


Figure 2. Comparison of teaching effectiveness

### 4. Conclusions

This paper takes the reform of actual combat teaching content of non-commissioned officers' vocational and technical education as the starting point, researches the problem of reconstructing actual combat teaching content, and proposes the teaching content construction method based on the topological map of case-knowledge points. The method is highly scientific and practical. It breaks the traditional teaching content to be distributed by chapter-section knowledge points, which helps students to form a complete knowledge structure of the knowledge points. This plan lays the foundation for reconstructing the content of the teaching materials and provides a method for reforming the content of actual teaching.

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