Research on the development of equipment operation skills based on a statistical analysis of data

Hongtian Liu[1, *], Jianwei Zhang[1], Yang Cao[1], Chao Song[1], Liu Yao[1]

[1] Weapons and Control Department, Army Academy of Armored Forces

*Corresponding author.Email: zgyliuhongtian@sohu.com

Abstract. Through an in-depth understanding of the training situation of the basic units, the new tasks, new demands and new changes in the training of the basic units were analysed. In the light of the above new situations, this paper identifies the main contradictions and problems in the teaching of the course on the use of equipment, and then puts forward suggestions to further strengthen the teaching and training of equipment operation skills, in order to achieve the purpose of promoting the quality of the teaching of the course as well as the personnel training.

Keywords: operation skills, teaching, training, reform

1 Introduction

In order to better understand the training situation at the basic unit level, this paper focuses on analysing the new tasks, needs and changes in the use of equipment in the basic unit training, identifying the main contradictions and problems in the teaching of courses on the use of equipment, and then putting forward suggestions for further strengthening the teaching and training.

2 Analysis on the demand side

2.1 Current training status

The author has conducted research on some of the basic units, mainly conducting interviews and a questionnaire survey on the training status of the units. The questionnaire was first drafted on the basis of consultation with some of the personnel, and then revised and finalised in consultation with the members of the project team. The questionnaire is anonymous and has 14 questions on equipment training, all of which are choice questions, 9 of which are single choice and 5 of which are multiple-choice. In order to avoid incomplete coverage of the questionnaire design, making some personnel have questions but nowhere to reflect, 2 open-ended questions and answers were specially

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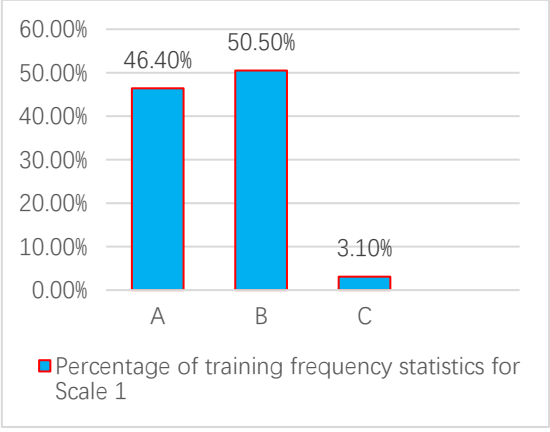
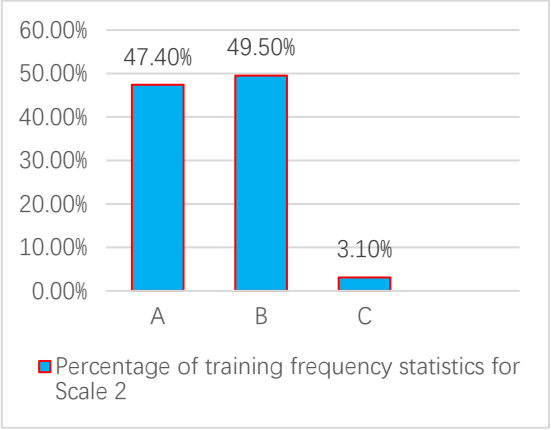
designed in the survey, allowing participants to freely express their opinions and suggestions on the training of equipment operation skills.

A total of 97 valid questionnaires were collected from all types of personnel in the units (see annexe for statistics, hereinafter). Through the statistical analysis on the questionnaires returned, we sorted out and summarised the questions and came to more realistic conclusions about the training of equipment operation skills in the units.

Based on the statistics and data collated from the questionnaires, the actual situation with regard to the training of equipment operation skills in the units is highlighted in the following areas:

Firstly, the frequency of sizeable confrontation training conducted at the basic level is relatively high. As shown in Figure 1, among them, units that have organised more than five times the scale one training accounted for 46.4%, and those that have organised less than five times accounted for 50.5%. Those that have organised more than five times the scale two training accounted for 47.4%, and those that have organised less than five times accounted for 49.5%. The results of the analysis show that the task of carrying out confrontation training is extensive and heavy, and that the demand for comprehensive training in the use of equipment is great and demanding, while also placing higher demands on the skills training in the use of equipment that is in a fundamental position.

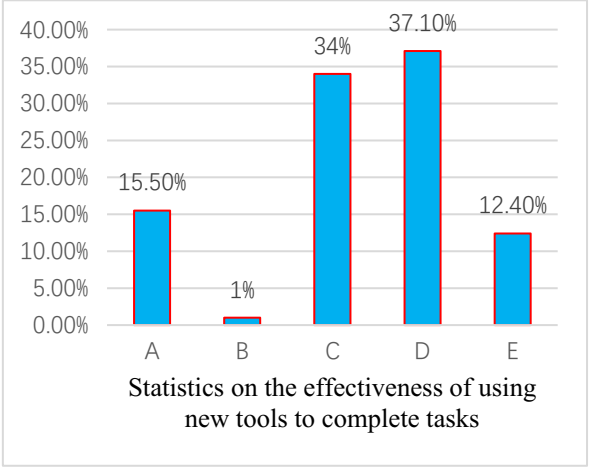




A. over 5 times; B. less than 5 times; C. none

Fig. 1. Frequency statistics of confrontation training

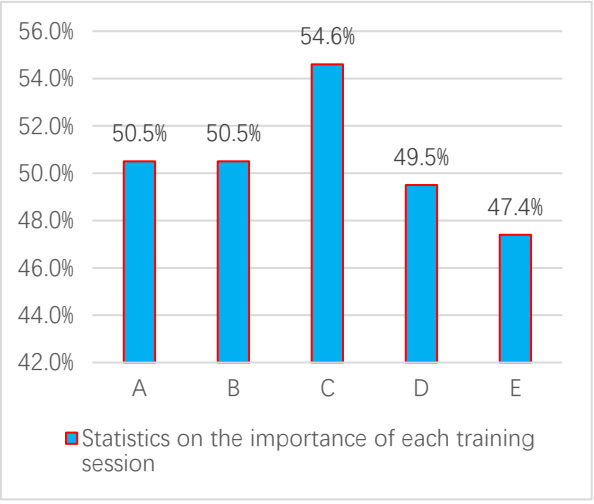
Secondly, in training, the use of new means to complete the task was not satisfactory. The percentage of those who have not used the new means is 15.5%, those who do not know how to use them is 1%, those who can use them but unreasonably is 71.1%, and others are 12.4% but no specific reasons have been written down, see Figure 2. From the statistics, the proportion of tasks not completed using the new means reached 87.6%, indicating that the use of the new means in training is not satisfactory, and that the new means are still not as effective as they should be. Therefore, there is still a long way to go in forming the capacity, so training in the use of the new means is urgent.



A. never used; B. do not know how to use; C. can use but not all of it; D. use but unreasonably; E. others

Fig. 2. Statistics on the effectiveness of using new tools to complete tasks

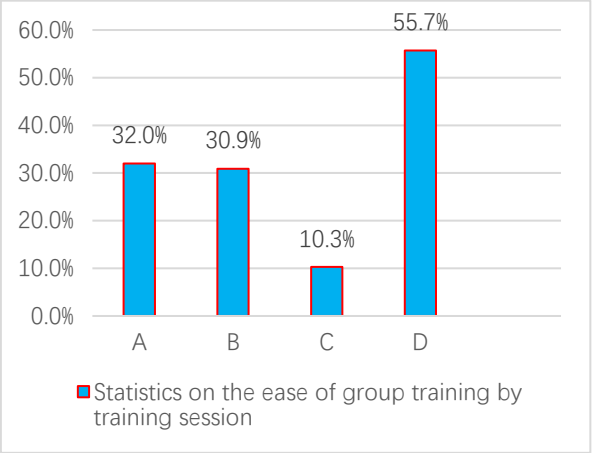
Thirdly, every training session is indispensable in building a solid foundation of operational skills. As shown in Figure 3, the percentage of those who think that the principle is more important is 50.5%, those who think that the practice is more critical is 50.5%, those who think that the basic training is more important is 54.6%, those who think that the application training is more important is 49.5% and those who think that the single-assembly comprehensive training is more important is 47.4%. These statistics show that skills training is in a fundamental position, and each link in training is essential, from the principles, practice, basic training, application training to comprehensive training, each link should be coherent, forming the main line of a continuous line. In particular, the study of principles should not be neglected, only by understanding the principles can one operate and use the equipment better; comprehensive training for single-assembly is also indispensable, as it makes the enhancement of the application skills more effective. The feedback from questions 15 and 16 of the questionnaire also confirms the above opinion, with 17 people suggesting that theoretical studies should be organised first to build up a solid theoretical foundation before carrying out practical training; 13 people suggesting that comprehensive training, as well as application training, should be organised.



A. principles; B. practice; C. basic training; D. application training E. single-assembly

Fig. 3. Statistics on the importance of building a solid foundation of skills by component

Fourthly, in terms of organising training, it is difficult to organise training for certain skills. As shown in Figure 4, 32% of the participants found it difficult to organise training in operational skill A, 30.9% found it difficult to organise training in operational skill B, and 55.7% found it difficult to organise training in comprehensive operational skills. The statistics show that there is a shortage of professionals who are able to carry out training in certain operational skills and that there is a greater need for training.



A. operational skill A; B. operational skill B
C. operational skill C; D. comprehensive operational skills

Fig. 4. Figure 4. Statistics on the group training of skills

2.2 Changes on the demand side

Analysis of the actual situation through interviews and questionnaires shows that the new tasks, needs and changes on the demand side are mainly as follows.

First, the need to carry out comprehensive training is great and demanding, so as to meet the task of carrying out large-scale training needs.

Secondly, the need for training in the use of the new tool is great and urgent. The training will enable the personnel to master the tools in order to give full play to the functions of the new tools.

Thirdly, the training should be carried out in accordance with the main line of "principles - practice - basic training - application training - comprehensive training".

Fourthly, the troops have a greater demand for teachers who can organise and carry out training in the use of the skills.

3 The Teaching Method Analysis of the Course

The courses on the use of equipment belong to the in-class teaching, which is the main channel and the main position for cultivating students' equipment operational ability. The ability to use equipment as a kind of ability and literacy needs to be accumulated over a long period of time. The main function of extra-curricular teaching and training is to supplement and further strengthen the in-class teaching content of equipment operational ability in response to the shortage of classroom hours [2]. The courses on the use of equipment and the extra-curricular teaching and training on the equipment operational ability are an integral part of each other and are inseparable, serving to develop the equipment operational ability together.

By analysing the new changes on the demand side, combined with the actual training situation of equipment operational capability, the core problem in the current course teaching is that the training content, session design, training organisation, assessment and evaluation are not sufficiently and accurately aligned with the demand side and cannot well meet the future demand. There is a need to carry out in-depth teaching and training reforms to promote the optimisation and efficiency of the curriculum [3]. The problems are mainly reflected in the following aspects:

The first is that, in response to the actual situation on the demand side, the content setting of application training and comprehensive training in the training of equipment operational capability is still relatively small compared to the actual demand, and the level is not enough to meet the task demand of carrying out confrontation training. The reason for this is that, from the point of view of demand, there is not enough content for application training and comprehensive training in the in-class teaching of equipment use courses, and thus less relevant content is set. In addition, although there is currently a comprehensive training curriculum for the use of equipment, the specific content is not in line with future requirements. Moreover, in the subsequent skills training, the focus is mainly on practical training and basic training, while application training and comprehensive training are not enough, making it difficult to achieve the desired goal of skills mastery.

Secondly, in view of the actual situation that new means of operational skills and comprehensive operational skills training are in greater demand, the setting of relevant teaching content in equipment operational ability training is relatively small, and students' skills in these two areas cannot be effectively exercised, which affects students' ability to improve. At present, although these two aspects of skills training are involved, neither systematic nor in-depth, and can not be integrated into the scale of confrontation training for the effective exercise of skill. Complementary training with appropriate training elements can be considered.

Thirdly, the teaching design of training in the use of equipment is in accordance with the main line of "principles - practice - basic training - application training - comprehensive training", without the implementation of coherent training, which limits the effectiveness of basic skills mastery [3]. At present, the equipment skills training is set up with the learning of construction and working principles, practical training, basic training, application training and some comprehensive training. Problems include: the degree of fit between theoretical learning and the knowledge required for skills training is not high enough, and the pertinence of guidance for practical training is not strong enough, which affects the training effect; the interval between theory and skills training is long, which affects the effect of close integration of theory and practice. Appropriate time can be arranged for theoretical review before the start of skills training to improve the effect of closely integrating theory and practice; application training and comprehensive training are not set up enough, making it impossible to better improve students' comprehensive application skills on the basis of basic training.

Fourthly, there is a greater demand for "teachers" who can organise and conduct training. At present, there is not enough training for students to be able to take on the role of a junior teacher. Although the teaching content is set up, it is combined with intensive training before graduation and the organisation of real-time simulations. The

three aspects of teaching, learning and testing are still far from adequate, and do not allow students to really get into their roles and "teach" authentically.

Fifth, the assessment is not yet scientific and reasonable enough. At present, the main way to assess students in completing several prescribed training contents is relatively simple, and the content and way of assessment are still not scientific enough to effectively meet the requirements of high standards in the future, and also cannot test students' mastery of skills in a very scientific way. The assessment-oriented role of using examinations to know the real situation, to check the leakage and to promote training is still not obvious.

4 A Tentative Plan for Curriculum Reform

In light of the changes on the demand side and the identified deficiencies or problems in the teaching of the course, this section makes recommendations to further improve the quality of the teaching of the course.

4.1 Ideas for curriculum reform

First of all, the objective of training should be to meet future needs, following the principles of "precise alignment, reasonable setting, scientific training and effective assessment". Moreover, it is necessary to follow the training line of "principle-practice - basic training - application training - comprehensive training", focusing on basic skills training, highlighting key skills training, and taking into account comprehensive training, confrontation training, strengthening skills mastery and testing, and training students' ability to use the equipment in stages and in a continuous line [5]。

4.2 Suggestions for curriculum reform

4.2.1. Reasonable setting of training content.

The first is to implement training in a coherent manner in accordance with the main line of "principles - practice - basic training - application training - comprehensive training", so that skills training conforms to the training principles and objective laws of skills generation, so that the skills mastered by students through a coherent main line of training have both "breadth" and "depth".

Secondly, each training link needs to be reasonably well set up to ensure that the main line of training is "uninterrupted" and the "foundation for skill generation is firm". First of all, the principle of combining theory and practice should be implemented, so that theory and demand match, theory and practical training equipment match, and theory and training content match. Secondly, where conditions permit, suitable application training and single-assembly comprehensive training is more conducive to the formation of skills in the use of a wide range of equipment, enabling students to be more adaptable to the demands of multiple future tasks.

4.2.2. Focus on the scientific implementation of teaching.

First, the training should follow the principle of starting from difficult to strict, from easy to difficult, from simple to complicated, and step by step; take the method of highlighting the key points, precise lecture and more practice; be organised and implemented scientifically in accordance with the foundation first and then application, divided practice first and then combined practice[6].

Secondly, the focus should be on basic skills training, highlighting the training of key skills, and taking into account comprehensive training and confrontation training. Moreover, it is necessary to combine theory and practical training, with theory as a supplement to help understanding and practical training as the main focus to strengthen skill generation; to place emphasis on practice and basic training to effectively lay the foundation of skills; reasonably set the training environment and conditions, properly carry out comprehensive training to strengthen the formation of comprehensive skills under real combat conditions.

4.2.3. Strengthen the cultivation of group training ability.

The first is to incorporate the cultivation of group training ability into the training plan of equipment operational ability, reasonably set the training content of group training ability, so that students can organise and carry out the training of relevant content through training. They can become a teacher with excellent skills, competent for the future organisation and implementation of teaching needs.

4.2.4. Make the most of assessment guidance.

Firstly, through the scientific setting of assessment content, reasonable selection of assessment methods and strict formulation of assessment standards, the effective examination of students' skills mastery is emphasised to test the quality of learning and training.

The second is to give full play to the assessment-oriented role of examinations to know the real situation, check the leakage and promote training. Through the assessment to effectively identify the degree of students' skills mastery, counter-check the problems in the implementation of the course and the weak links of students' training to make up for it, and promote the continuous improvement of the quality of teaching and training of the course.

The third is the flexible selection of a variety of assessment methods. The flexible assessment methods should be set at the right time and occasion to fully mobilise students' enthusiasm, attention, conscientiousness and creativity according to the content and purpose of the assessment, so as to ultimately achieve the purpose of improving teaching effectiveness.

4.2.5. Improve training and security conditions.

Firstly, the relevant rules and regulations should be improved to further optimise the arrangement of the teaching and training plan for the academic year and to implement it according to the plan. It is necessary to designate people responsible for the relevant

rooms, to ensure that the contents are carried out according to the plan as well as the effect.

The second is to improve the corresponding teaching and training security conditions, build the equipment, venues, facilities, teaching materials and other teaching security means that match the teaching sessions, to meet the needs of carrying out application training, comprehensive training and confrontation training, to guarantee the smooth implementation, quality. In turn, the effect of teaching and training can be brought into play, ultimately promoting the improvement of talent training quality.

5 Conclusions

It is important to strengthen the key skills training for the new equipment, especially the application of skills under confrontation conditions, so that students can adapt to the development and meet the future training needs for new equipment and new training tasks, and avoid the phenomenon of "disconnection" between training equipment and new equipment.

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