

Exploration and Practice of Online and Offline Hybrid Teaching Mode in Equipment Training

Qiwu Wu^{1,2}, Tao Tong^{2,*}

¹ Key Laboratory of Counter-Terrorism Command & Information Engineering (Engineering University of PAP), Ministry of Education, Xi'an, 710086, China

² School of Equipment Management and Support, Engineering University of PAP, Xi'an, 710086, China

* Corresponding author: Tao Tong (Email: tongtao2023@163.com)

Abstract: Traditional equipment practical training teaching mainly focuses on group practical operation, and there is a problem of physical space limitation. This paper takes the practical training teaching method as the research object, designs the online and offline hybrid teaching mode of equipment practical training courses, relies on the "1+N" new practical training teaching platform and the high-quality resources of military-civilian integration, takes "teaching + learning + examination + evaluation" as the main line, and realizes the optimization of practical training content, the integration of curriculum ideology and politics, and the innovation of teaching methods. Through the comprehensive transformation of such courses, it further stimulates students' enthusiasm for loving and protecting equipment, integrating learning and thinking, and comprehensively improves students' job competence and the teaching quality of equipment practical training courses.

Keywords: Equipment Practical Training Teaching; Online and Offline Hybrid Teaching; Job Posting; Curriculum Ideology and Politics.

1. Introduction

With the continuous development of technology, equipment is also constantly updated, which puts forward higher requirements for equipment practical training teaching. Equipment practical training teaching is an important part of cultivating students' practical ability and innovative spirit, and it is of great significance for improving students' comprehensive quality and professional competitiveness. In order to better adapt to this change, we need to reform and innovate equipment practical training teaching. The online and offline hybrid teaching mode is a new teaching mode in the current education field. It combines the advantages of online and offline teaching and can better meet the learning needs of students. Therefore, this paper will explore and practice the online and offline hybrid teaching mode of equipment practical training to improve teaching quality and effect.

2. The Advantages of Online and Offline Hybrid Teaching Mode

Traditional equipment practical training teaching usually adopts the method of grouped practical operation, which has some problems. Firstly, due to the limitations of physical space and teaching resources, it is difficult to meet the teaching needs of large-scale and high-efficiency. In traditional equipment practical training teaching, students need to conduct practical training at specific times and places, which limits the scale and efficiency of teaching. At the same time, the number of some high-end equipment is limited, which makes it difficult to meet the practical training needs of all students. Secondly, the lack of an effective interaction and feedback mechanism is not conducive to stimulating students' interest and initiative in learning. Traditional equipment practical training teaching mainly focuses on teacher demonstrations and student imitation, lacking an

effective interaction and feedback mechanism, and students' learning effects cannot be fed back and improved in a timely manner. In addition, the learning process of students lacks personalized guidance, which makes it difficult to meet the needs of different students. Finally, the teaching content is relatively outdated, and there is a certain gap with actual needs. The content of traditional equipment practical training teaching often focuses on textbooks, with a slow update rate, and it is difficult to keep up with the development of equipment and changes in actual needs. This leads to a difference between the learning content of students and the actual work scenarios, affecting the improvement of their practical ability.

Online and offline hybrid teaching mode combines traditional classroom teaching with modern information technology to realize the sharing of teaching resources and the diversification of teaching methods. Compared with the traditional teaching mode, the online and offline hybrid teaching mode has the following advantages:

(1) Breaking through the physical space limitation: Through the network platform, students can learn the equipment practical training course at anytime and anywhere, no longer limited by time and space.

(2) Enriching teaching resources: Through the network platform, various teaching resources such as videos, audio, pictures, and documents can be integrated to enrich the teaching content.

(3) Realizing personalized learning: Students can choose learning content and learning methods according to their own learning progress and needs to realize personalized learning.

(4) Promoting teaching interaction: Through the network platform, teachers and students can interact in real time, teachers can understand students' learning situation in a timely manner, and students can also ask questions and feedback to teachers in a timely manner.

3. The Design of Online and Offline hybrid Teaching Mode for Equipment Practical Training

3.1. Optimization of Practical Training Content

Based on the actual needs of the military and the development of equipment, timely update the teaching content to ensure that the knowledge learned by students can match the actual needs. At the same time, professionals can be invited to participate in textbook writing and course design, improving the professionalism and practicality of teaching content. This can ensure that students' learning content is closely linked to actual work scenarios, and improve their practical abilities.

In equipment training courses, practical operation is a very important link. By appropriately increasing the proportion of practical operations, students can deepen their understanding and mastery of knowledge through personal experience. This can improve students' hands-on ability and problem-solving ability.

By introducing case teaching, students can master knowledge through the analysis and resolution of practical cases. Teachers can choose representative cases for students to discuss, analyze, and propose solutions in groups. Through this approach, it can stimulate students' interest and initiative in learning, and improve their ability to analyze and solve problems.

3.2. Integration of Curriculum Ideology and Politics

In equipment training teaching, ideological and political elements of the curriculum can be integrated to guide students to establish correct values and professional ethics. Specific approaches can be taken from the following aspects:

(1) Emphasizing the supremacy of national interests: In equipment training and teaching, the principle of prioritizing national interests should always be emphasized to make students aware of their responsibilities and missions. By

introducing the national security situation, equipment development process, and other methods, students can be guided to establish national awareness, enhance their sense of responsibility and mission. This can cultivate students' patriotism and sense of social responsibility.

(2) Cultivating the spirit of unity and cooperation: In equipment training teaching, it is necessary to focus on cultivating students' spirit of unity and cooperation. Students can learn to cooperate and achieve mutual benefits through group practice, team projects, and other methods. At the same time, some cases of team collaboration can be introduced to guide students to deeply understand the importance of team collaboration. This can improve students' teamwork and communication skills.

(3) Advocate for the awareness of loving and protecting clothing: In equipment training teaching, attention should be paid to cultivating students' awareness of loving and protecting clothing. Students can recognize the importance of equipment for national security and economic development by introducing its importance and development history. At the same time, some practical activities that love and protect clothing can be set up to guide students to actively participate. This can enhance students' sense of responsibility and mission.

3.3. Innovation of Teaching Methods

Via the online-offline hybrid teaching model, we use learning platforms, textbooks, cases, background information, and other forms to send pre-class preview content to students. Students are asked to prepare independently or in groups to establish raw perceptual knowledge. During class, under the guidance of the instructor, students think deeply, gradually construct their unique knowledge system, and enhance their ideological and political literacy. After class, through literature reading, thesis writing, project practice, skill competitions, and other means, students' understanding of theories, techniques, and methods is strengthened. By using high-quality online learning resources, we carry out hybrid teaching, strengthen interaction with students during and after class, help students discover their learning bottlenecks, share their learning insights, and solve their learning confusion.

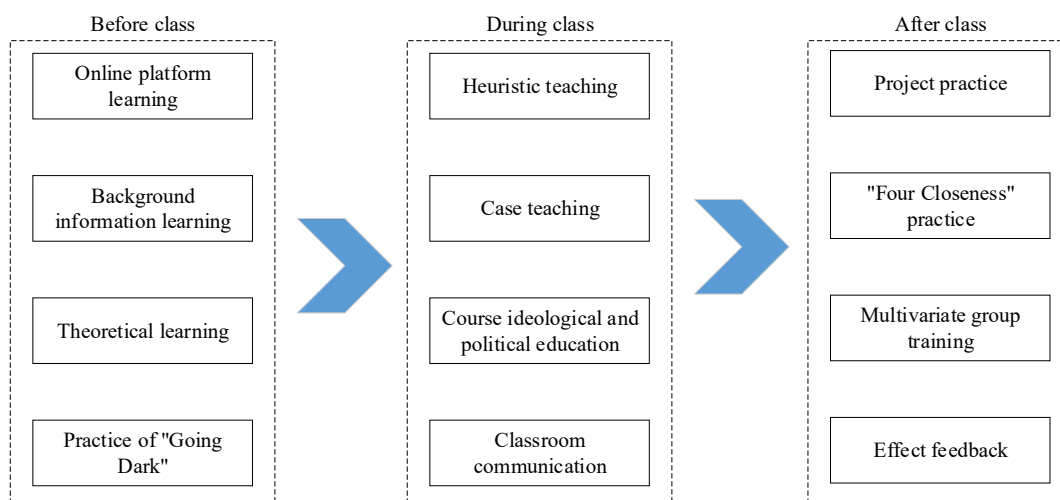


Fig 1. The process of online and offline hybrid teaching

Equipment training courses actively adapt to the requirements of modern teaching, continuously deepen the innovation of teaching content, methods, and means, and strengthen equipment operation and case analysis to

comprehensively improve the quality of classroom teaching. At the same time, during the implementation of the course, attention should be paid to holding the "pre-class preparation meeting, in-class exchange meeting, and after-class summary

meeting". Teaching methods include blackboard writing, multimedia, micro-lectures, physical equipment display, physical equipment training, etc. Blackboard writing is mainly used to establish and sort out the knowledge structure of the course, multimedia and micro-lectures are mainly used for knowledge explanation, physical equipment training is mainly used for the formation and strengthening of professional skills, and online teaching resources are mainly used for the strengthening of weak basic knowledge and the expansion of the latest relevant knowledge.

3.4. Reform of Assessment Mode

The equipment practical training course adopts an integrated multi-dimensional evaluation scheme, and the final course grade consists of formative assessment and summative assessment. Among them, the formative assessment is conducted through a combination of homework exercises, classroom performance, experimental reports, online learning status, comprehensive practice, etc., accounting for 40% of the total grade; the summative assessment is the final examination of the course, using a closed-book examination format, accounting for 60% of the total grade. The course adopts a pass/fail grade system, and if the summative assessment score is fail, the overall course grade is fail.

The formative assessment adopts a unified evaluation standard, including homework exercises and experimental reports, experimental operations and manual practice, classroom performance and learning situation, and online learning situation. The online score consists of four parts: course material learning, homework, quizzes, and posting. Quantitative scoring is carried out based on actual learning situation, and the formative assessment score registration form is completed. The final assessment focuses on the relevant theories, techniques, and equipment of equipment training, with a focus on testing the mastery of knowledge and skills by students, and scoring based on exam results.

By focusing on the learning process of students, promote the improvement of blended learning effectiveness. Through online learning, pre class assignments, classroom performance, and post class assignments, we comprehensively evaluate the learning ability and effectiveness of students from multiple temporal and spatial dimensions. In the future, we will gradually increase the proportion of process assessment.

4. Conclusion

The online and offline hybrid mode teaching of equipment practical training is a new teaching model that can effectively improve the effect and quality of equipment practical training teaching. By designing teaching resources, teaching activities, and teaching evaluations, building a new practical training teaching platform and integrating high-quality resources of military-civilian integration, the online and offline hybrid teaching of equipment practical training courses can be realized. Keeping close to practical teaching and closely

following the mission requirements under modern conditions, by using online and offline mixed methods, the organic combination of "online and offline, theory and practice" can be realized, which can further improve the teaching effect and quality, and cultivate students' practical ability and innovative spirit.

Acknowledgments

This work is supported by The Youth Innovation Team of Shaanxi Universities, the campus level project of Engineering University of PAP (No.WJX2023114, No.JLY2023086, No.WKY202322), the Young and middle-aged scientific research backbone projects of Engineering University of PAP (No.KYGG201905) and the basic research foundation project of Engineering University of PAP (No.WJY202019, No.WJY202144, No.WJY202233), the PAP's Military Scientific Research Mandatory Project (No.WJ2020A020048, No. WJ2021A030100), the PAP's Military Theory Research Project (WJY22JL0236), the PAP's national defense science and technology innovation project (No.ZZKY20223103).

References

- [1] Zhu Guangyao, Wang Shuqin. Analysis of problems and improvement strategies in college training bases under the background of industry education integration: Taking rail transit equipment manufacturing training bases as an example [J]. Industrial Innovation Research, 2023, (24): 180-182.
- [2] Yang Heran, Sun Xingwei, Li Shanshan, etc. Exploring the integration of ideological and political education into engineering courses under the background of new engineering disciplines - Taking the course of "Mechanical Manufacturing Equipment Design" as an example[J]. Education and Teaching Forum, 2023, (52): 133-136.
- [3] Liu Jie, Zhou Bing, Ying Jiaju, etc. Exploration and practice of ideological and political education in night vision technology and equipment courses under blended learning mode [J]. China Education Technology Equipment, 2023, (22): 26-28.
- [4] Sun Yunyun, Sun Yiling. The application of AI technology in practical training and teaching of equipment manufacturing majors [J]. Paper Equipment and Materials, 2023, 52 (11): 225-227.
- [5] Wei Fengci, Zhang Tao, Luo Pan. Research on online and offline training teaching of intelligent manufacturing based on digital twins: Taking the industrial robot assembly and adjustment training course as an example [J]. Journal of Xichang University (Natural Science Edition), 2022, 36 (04): 124-128.
- [6] Zheng Hualin, Li Binglin, Li Benjie, etc. Research and practice on the hybrid "Gold Course" teaching model of online and offline - taking the basic course of mechanical manufacturing as an example [J]. Higher Education Journal, 2022, 8 (21): 25-28.
- [7] Shen Limin, Li Haisheng, Wang Yanfei, etc. Construction of a hybrid online and offline practical teaching and evaluation system: Taking the "Production Internship" of process equipment and control engineering as an example[J]. Industrial and Information Education, 2021, (07): 73-77.