ISSN: 2664-9640

Research on the Construction of an Integrated and Efficient Training and Evaluation System for Flight Dispatchers, Driven by Digital Technology and Integrating the Concept of CBTA

Liang Zhang

Guangzhou Civil Aviation College, Guangzhou 510000, China

Abstract

The flight dispatch teaching team of Guangzhou Civil Aviation College focuses on the existing problems in the field of flight dispatch training, innovatively integrating the CBTA core concept of "Competency Based Training and Assessment based on Competency: Analysis, Data Driven; Capability Based: Precise Determination, Data Reflected", and is committed to exploring a new training mode for flight dispatch talents: using advanced technologies such as big data analysis and artificial intelligence to accurately quantify and dynamically track the learning behavior, ability performance, and training effectiveness of trainees, ensuring the scientificity and accuracy of training decisions, and realizing personalized customization of training content and refined management of the training process; Relying on new generation information technologies such as virtual reality, by simulating real operating scenarios, students can accurately grasp the core skills and key knowledge of dispatch business under data-driven guidance.

Keywords

Data Driven; Flight Dispatch; CBTA; Training Mode.

1. Introduction

Smart civil aviation is an important component of the strategy of building a strong civil aviation country, and its core lies in using modern information technology to enhance the safety, efficiency, and service level of the civil aviation industry. With the rapid development of technologies such as big data, cloud computing, and artificial intelligence, the civil aviation industry is undergoing unprecedented changes. In this context, the training and evaluation of flight dispatchers are also facing new challenges and opportunities. How to use digital technology to improve training effectiveness, optimize training effectiveness evaluation mechanism, and cultivate high-quality professional talents has become an urgent problem to be solved in the construction of smart civil aviation. Translate in this context, the training and evaluation of flight dispatchers are also facing new challenges and opportunities. How to use digital technology to improve training effectiveness, optimize training effectiveness evaluation mechanisms, and cultivate high-quality professional talents has become an urgent problem to be solved in the construction of smart civil aviation. The traditional flight dispatch training and evaluation system mainly relies on paper-based textbooks, simulator training, and manual evaluation, which have many shortcomings. Firstly, the update speed of paper textbooks is slow, making it difficult to keep up with the pace of industry development; Secondly, the high cost and limited resources of simulator training make it difficult to meet the needs of large-scale training; Finally, manual evaluation is subjective and inefficient, making it difficult to ensure the fairness and accuracy of the evaluation results. CBTA (Competency Based Training and Assessment) is a new training concept proposed by the International Civil Aviation Organization (ICAO) for civil aviation professionals. It emphasizes the establishment of a

ISSN: 2664-9640

competency framework and evaluation system from three aspects: knowledge, skills, and attitudes. The core of CBTA lies in clarifying the competency requirements for the position, ensuring that trainees meet the required competency standards through systematic training and evaluation.As the only unit authorized to obtain CCAR65 training qualifications in the central and southern regions of China, Guangzhou Civil Aviation College has adhered to the educational philosophy of "driving with digital technology as the core, cultivating excellent flight dispatch talents with competence as the core" since the beginning of the training. It systematically promotes a competency based flight dispatch training and evaluation system: training and evaluation based on competence as the framework and characteristics, emphasizing performance and measurement standards, and conducting training based on specific performance standards.

2. Implementation Path

2.1. Path 1

Guided by systematic theoretical research and relying on teaching and academic research paths, the theoretical cornerstone of a flight dispatch training and evaluation education system based on CBTA (Competency Based Training and Assessment) is constructed. Based on the Civil Aviation Safety Capacity Building Fund Project - Research on Optimization of Flight Dispatcher Training Process and Organizational Structure from an International Perspective, this project summarizes and explores from a theoretical perspective, and constructs the theoretical foundation of a competency based flight dispatch training and evaluation education system. Firstly, establish the process framework and theoretical foundation of the flight dispatcher training system under the CBTA concept in civil aviation higher vocational colleges; Secondly, analyze and summarize the current situation and existing problems of China's flight dispatcher training system; Thirdly, based on the research in the first two stages, a strategic model for the development of the flight dispatch training system is constructed using the CBTA method. Guided by the strategic development model, a competency based flight dispatch training and evaluation education system is proposed for civil aviation higher vocational colleges.

2.2. Path 2

School enterprise cooperation, integration of industry and education, relying on artificial intelligence and information technology to build an integrated flight operation guarantee training environment, providing empirical data and training environment for conducting CBTA (Competency Based Training and Assessment) based flight dispatcher training. Closely focusing on the new trends and technological requirements in the field of flight dispatch, and following the concept of "integration of industry and education, integration of science and education, and joint construction and sharing", we aim to promote the online and offline sharing of flight dispatch education equipment and teaching content through the use of artificial intelligence, information technology, and other technologies; Realize the transition of professional practical training teaching from demonstration and verification to practical, design based, and innovative; Realize the functions of independent teaching and data fusion training; Realize the construction of a virtual simulation teaching environment for collaborative operation and support of flights, airlines, air traffic control, and airports based on the full process of flight operation and support, guided by multiple needs and aimed at real and complete business scenarios; Implement unified design and centralized deployment, effectively avoiding duplicate construction and wasting resources.

2.3. Path 3

School enterprise cooperation, integration of industry and education, relying on information technology to build a multi-dimensional information-based simulation training teaching

ISSN: 2664-9640

resource library, providing accurate resources for conducting CBTA (Competency Based Training and Assessment) based flight dispatcher training. Conducting flight dispatcher training based on CBTA (Competency Based Training and Assessment), real job training projects are important carriers for phenomenon cognition, knowledge learning, application experience, innovation exploration, etc. In the experimental scenario, students are able to analyze and identify problems, independently learn problem-solving methods, conduct virtual simulation experiments to solve problems, and obtain summary and evaluation results. The integrated and efficient education system for flight dispatch training and evaluation is based on real flight dispatch operation support positions, simulated practical environments, and real job cases. It focuses on the cultivation of basic practical abilities, comprehensive practical abilities, and innovative practical abilities, and designs a virtual simulation experiment simulation training case training project teaching resource library around the specific job positions of flight dispatch operation support in three levels: immersive experience module, integrated training module, and research innovative training module. The library is designed in a step-by-step manner from easy to difficult. The immersive experience stage mainly focuses on virtual simulation experience, with the aim of enabling students to understand and recognize the work environment and important knowledge points; The integrated training stage mainly guides students to use professional knowledge to train on assignment processes, key technologies, and quality management methods such as dispatch operation support; The innovative application stage mainly relies on virtual simulation platforms to guide students to participate in cutting-edge research and technology verification in flight dispatch operation support, and to carry out innovative and entrepreneurial projects. Focusing on the construction of experimental projects, based on students' learning stages, knowledge structures, cognitive patterns, and ability goals, an organic combination is formed to form a virtual simulation experimental project teaching resource library in the field of flight dispatch.

2.4. Path 4

Collaboration between schools and enterprises, integration of industry and education, relying on information technology to establish a multidimensional evaluation system for the quality of flight dispatch training and teaching, providing a precise assessment mechanism for conducting flight dispatch training based on the CBTA concept. Develop a CBTA (Competency Based Training and Assessment) based evaluation standard system for the quality of flight dispatch training and teaching. In order to ensure the improvement of students' comprehensive practical ability, strengthen the evaluation of the entire teaching process, enhance the overall and systematic evaluation of teaching organization and management, teaching process, and teaching effectiveness, and form an objective evaluation and quantitative practical teaching evaluation system for different disciplines and professional categories; Firstly, improve the three-level supervision institutions of schools and departments. The teaching management department of the school is responsible for the management, monitoring, and guidance of the entire teaching process, while the departments are responsible for the overall planning, management, quality monitoring, and summary of the entire teaching process, and improve the supervision of the teaching and research office; Secondly, establish a diversified external monitoring entity, strengthen communication and exchange with education administrative authorities, and involve more experts from industry enterprises in teaching; Thirdly, the school strengthens the third-party teaching evaluation work and requests external institutions to conduct questionnaire surveys on graduates and employers regarding teaching.

ISSN: 2664-9640

3. Construction Effectiveness

3.1. Effectiveness 1

Based on the concept of CBTA (Competency Based Training and Assessment), relying on new generation information technologies such as virtual reality and artificial intelligence, we deeply integrate information technology and practical teaching, construct a simulated and virtualized experimental teaching environment, and integrate the core job skills of flight dispatch operation support into the virtual simulation training platform; We have developed virtual simulation teaching resources for three levels of experimental teaching: basic practical experiments, comprehensive practical experiments, and research exploration experiments. We have integrated the core job responsibilities and workflow of flight dispatch operation support into virtual simulation teaching resources, forming a high simulation experimental teaching environment. In practical training, we cultivate students' understanding of different job cognitions based on their majors, understand the relationship between core job skills and the external environment of the enterprise, broaden students' practical knowledge breadth, experience the real work environment of the enterprise, enable students to perceive and adapt to future practical work environments in advance, and enhance their confidence and ability; We have developed virtual simulation teaching resources for three levels of experimental teaching: basic practical experiments, comprehensive practical experiments, and research and exploration experiments. We have integrated the core job responsibilities and workflow of flight dispatch operation support into the virtual simulation teaching resources, forming a high simulation experimental teaching environment. We train students to do different job cognition and understand the relationship between core job skills and external environment of the enterprise according to their majors in practical training, expand the width of students' practical knowledge, experience the real job environment of the enterprise, and enable students to perceive and adapt to the future actual job environment in advance, enhancing their confidence and competence;By using virtual reality, multimedia, human-computer interaction, and utilizing technologies such as databases and communication networks, we have achieved bold innovation in the experimental teaching environment, content, methods, and means, helping students master theoretical knowledge and increasing opportunities for hands-on and practical experience. This has led to bold innovation in the experimental teaching environment, content, methods, and means. This has enabled students to better grasp the theoretical knowledge related to flight dispatch operation support, significantly enhance their self-learning ability, and significantly improve their practical and innovative abilities.

3.2. Effectiveness 2

An open, interactive, and intelligent virtual simulation experiment platform has been constructed using information technology. Through computer networks, virtual simulation experiment teaching resources can be fully shared with civil aviation enterprises, further leveraging the demonstration center and radiation effect of experimental teaching. By utilizing the network sharing platform of the virtual simulation laboratory, resource sharing between different majors, universities, and enterprises has been achieved, strengthening cooperation and communication between enterprises and schools. Carry out innovative work on the mechanism and system of virtual training bases for flight dispatch operations, implement mechanisms for integrating industrial innovation needs, project information, collaborative opening of technical service platforms, project incubation and cultivation, and technology achievement promotion, solve the problem of dispersed professional industry, teaching, scientific research, and innovation resources, and support the cultivation of professional talents.

ISSN: 2664-9640

3.3. Effectiveness 3

On December 11, 2019, the first Civil Aviation Central South Region Flight Dispatcher Vocational Skills Competition was held with the support of our hospital's "Flight Dispatch Operation Control Simulation Training Platform" for the final of the flight dispatch simulation and practical operation segment. In recognition of our hospital's contribution to the competition, the Civil Aviation Central South Region Management Bureau awarded us the "Special Contribution Award". At the same time, we have strengthened cooperation and communication with airlines and other enterprises, relying on various virtual simulation platforms built to carry out civil aviation technology verification work, providing a good technical director platform and research environment for researchers.

4. Conclusion

The deep application of digital technology has brought revolutionary changes to the training and evaluation of flight dispatchers. By integrating advanced technologies such as big data, cloud computing, and artificial intelligence, not only has personalized customization and dynamic adjustment of training content been achieved, but the accuracy and efficiency of evaluation have also been significantly improved. The integration of the CBTA concept has made the training and evaluation system more focused on the core competency building of dispatchers. The integrated and efficient training and evaluation system for flight dispatchers, driven by digital technology and integrating CBTA concepts, is not only an innovation and transcendence of traditional training models, but also an active exploration and practice of future talent cultivation models in the aviation industry. The successful implementation of this system is of great significance for improving the safety level and service quality of China's aviation transportation industry, and promoting high-quality development of the industry.

References

[1] Li Zihan. Practice and Exploration of Competency based Dangerous Goods Training and Evaluation [J]. Civil Aviation Journal, 2024, 8 (01): 7-11.

[2] Zhang Xu, Peng Luyi, Liu Xuetao, et al. Evaluation of Flight Dispatcher Competence Based on G1-CRITIC Combination Weighting Model [J]. Journal of Shenyang University of Aeronautics and Astronautics, 2023, 40 (06): 76-84.

[3] Yu Lu. Preliminary Exploration of Flight Dispatcher Training Based on CBTA Concept [J]. Transportation Enterprise Management, 2022, 37 (04): 97-99.

[4] Tang Lianghao, Li Mingdi, Wu Shunxin Research on the Construction of DRM Capability Evaluation Model for Flight Dispatchers from the Perspective of EBT [J]. Journal of Anyang Institute of Technology, 2024, 23 (02): 13-21. DOI: 10.19329/j.cnki. 1673-2928.2024.02.004.

[5] Wang Qianlong. Research on the Construction of XP Aviation Dispatcher Training System Based on Competency Model [D]. Yunnan University, 2018.

[6] Wang Jianliang, Mei Hui. Model Construction and Promotion Strategy of Digital Competence of Vocational College Teachers under the Background of Education Digitalization [J]. Education and Career, 2024, (14): 91-97. DOI: 10.13615/j.cnki. 1004-3985.2024.14.003.

[7] Liu Qinggen. The Value Implications, Current Status, and Enhancement Strategies of Digital Competence Development for Vocational College Teachers in the Intelligent Era [J]. Research on Vocational Education Development, 2024, (02): 53-61. DOI: 10.19796/j.cnki. 2096-655.2024.02. 007.

[8] Editorial Department of this magazine. The Way to Enhance Teachers' Digital Literacy and Competence in the Era of Artificial Intelligence: A Review of the Parallel Conference on Enhancing Teachers' Digital Literacy and Competence at the 2024 World Digital Education Conference [J]. China Education Informatization, 2024, 30 (03): 37-42.