The Literature Review for Implementing Competency Based Training and Assessment (CBTA) for Thai Pilots

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Abstract

Competency-based training and assessment (CBTA) is a framework developed for pilot training requirements, aligning seamlessly with the rigorous benchmarks the International Civil Aviation Organization (ICAO) sets. This complete exploration delves into the nuanced dimensions of the Pilot CBTA Framework. The discourse navigates through its foundational evaluation and extends to the labyrinth of capacity challenges predicted through implementation. Furthermore, it sheds light on strategic pointers tailored to the aviation industry, unveiling pathways for overcoming impediments. Ultimately, insights converge to articulate a comprehensive angle on the vitality of CBTA integration, presenting a roadmap for effective assimilation into the tricky fabric of pilot training methodologies. Despite the revolutionary strides presented through Competency-Based Training and Assessment (CBTA) within the realm of pilot training, the implementation for Thai pilots stands at a crossroads, beset by challenges entrenched in operational intricacies and cultural issues. Integrating CBTA into Thai pilots' education cloth requires nuanced information on the operational panorama and a keen awareness of the cultural dynamics influencing training methodologies. Navigating this intersection needs greater than remote fixes; it necessitates holistic, industry-extensive answers that cope with the multifaceted nature of these challenges. Crafting a successful direction ahead requires a strategic orchestration of resources, cultural sensitivities, and collaborative efforts to recalibrate the trajectory of pilot training in Thailand closer to a CBTA-centric paradigm.

Keywords: CBTA, Pilots, Training and Assessment, Competency, ICAO, Thailand

Introduction

Within the scope of the ICAO Annex 1 and the study's focus, it's commendable to emphasize the higher place of the DOC 9868, 3rd edition - Procedures for Air Navigation Services [PANS] – Training (ICAO, 2020). The DOC is complementary to the SARPs in Annex 1 and contains specified material and provisions for implementing the training for pilot licenses, ratings, and other provisions. It was primarily used by the study on the following aspects:

Understanding of the ICAO competency framework; Considerations of the CBTA approach to pilot's training and assessment; Development and implementation of competency-based activities; Considerations of the available Instructional Systems Development [ISD] methodology to design CBTA contents and materials; Considerations on the instructor's and developer's course competencies; and Possible suggestions of the use of CBTA methodology applied to other licenses.

Simultaneous with DOC 9868, the study used the DOC 9941 AN/478, 1st edition - Training Development Guide Competency-based Training Methodology (ICAO, 2011). This DOC presents the proposed methodology to develop instructional materials for competency-based courses according to ICAO's TRAINAIR PLUS program. The DOC also provides an ISD methodology and a further systematic approach to carry out TRAINAIR PLUS procedures to develop what is known as Standardized Training Packages [STPs] for competency-based courses according to the TRAINAIR PLUS Operations Manual [TPOM] (ICAO, 2013). The study also used the ICAO DOC 9841 AN/456, 2nd edition - Manual on the Approval of Flight Crew Training Organizations. According to the ICAO (2012), the DOC focuses on "the provision of information and guidance to licensing authorities and training organizations on the implementation of Annex 13 and other Annex Standards related to the approval of training organizations". Despite the theme of the study, the DOC carries relevant information about the approved training organization [ATO] approval process, competency-based course delivery, and authority approval issues.

In parallel with all the international organisms' literature reviews, the study also considered various scientific papers related to competency-based education in general and aviation training. The papers also stated the associated benefits of the methodology in subsequent subjects related to the pilot's performance enhancement – which commonly covers the application of human factors, threat, error management and other specific approaches and concepts used on the pilot's qualification. The initiative ratified the research's efforts as aligned with what is considered the forefront of the study's theme and both methodologies used. The results of the literature review and content analysis appeared in the following sections of this paper.

Competency-Based Training and Assessment Concepts

Components of a Competency-Based Training and Assessment Programme (ICAO, 2016)

1) A training specification describes the purpose of training, the task list and the requirements that shall be fulfilled when designing the training.

2) An adapted competency model is a group of competencies with their associated

description and performance criteria adapted from an organization's competency framework to develop competency-based training and assessment for a given role.

3) An assessment plan provides the process and tools for gathering valid and reliable evidence at different stages during training.

4) A training plan describes the training required to achieve the competencies. It includes but is not limited to a syllabus (including knowledge, skills, and attitudes (KSA), milestones, lesson plans and schedules). See 1.2.10 for a description of KSA.

5) Training and assessment materials and resources (i.e. human, material, and organizational resources) include everything needed to implement training and assessment plans.
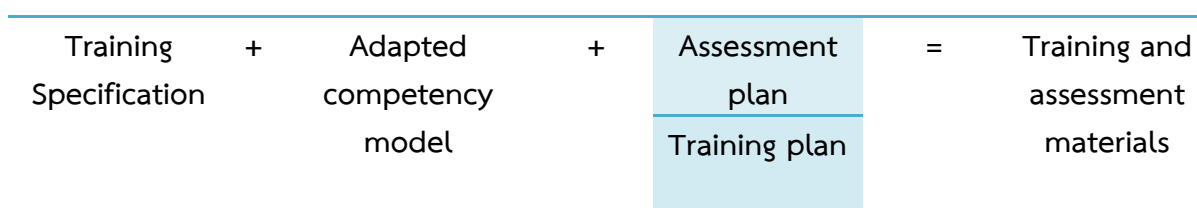
Training + Specification	Adapted + competency model	Assessment plan	=	Training and assessment materials
		Training plan		

Figure 1: illustrates the components needed to build a competency-based training and assessment program.

Competency Framework for Aeroplane Pilots

With advancements in aircraft technology and growing demands for more effective pilot evaluation methods, the International Commercial Aviation Organization (ICAO) has, since 2020, introduced a competency-based training and assessment approach. A competency combines knowledge, skills, and attitudes required to perform a task to the prescribed standard (ICAO 2018). The ICAO has defined 9 competencies as follows:

Competency Description

Competency	Description
1. Application of Procedures (PRO)	Identifies and applies appropriate procedures following published operating instructions and applicable regulations
2. Communication (COM)	Communicates through appropriate means in the operational environment, in both normal and non-normal situations

Competency	Description
3. Flight Path Management, Automation (FPA)	Controls the flight path through automation
4. Flight Path Management, Manual (FPM)	Controls the flight path through manual control
5. Leadership & Teamwork (LTW)	Influences others to contribute to a shared purpose. Collaborates to accomplish the goals of the team
6. Problem Solving & Decision Making (PSD)	Identifies precursors, mitigates problems, and makes decisions
7. Situation Awareness (SAW)	Perceives, comprehends and manages information and anticipates its effect on the operation
8. Workload Management (WLM)	Perceives, comprehends and manages information and anticipates its effect on the operation
9. Application of Knowledge (KNO).	Maintains available workload capacity by prioritising and distributing tasks using appropriate resources

Competency-based training aims to ensure pilots develop required competencies to carry out their assigned duties and responsibilities safely, efficiently, and effectively at the workplace Defalque 2017). In competency-based training, each task is associated with specific competencies, typically three. Rather than grading individual tasks, instructors assess each competency based on the pilot's overall performance during the training session. This method allows aviation employers to construct assessments under the ICAO competency framework, ensuring the content is relevant to the job's requirements. Furthermore, it optimizes the utilization of training tools and methodologies, leading to a more holistic and applicable assessment of pilot abilities.

Challenges of the CBTA Implementation for Thai Pilots

Training Challenges

Access to affordable training and the sufficiency of training ability are pivotal factors shaping the panorama of CBTA implementation for Thai pilots. Thailand's geographical, financial, and infrastructural realities contribute to the complexity of these demanding situations. Thailand's diverse topography and the distribution of pilot training facilities pose challenges for aspiring aviators living in remote or economically deprived regions. The fees associated with the journey, accommodation, and training costs are prohibitive. This lack of accessibility perpetuates socio-monetary disparities, hindering talented people from pursuing an aviation career. According to Ziakkas et al. (2022), by following the lean process, businesses

can eliminate excessive training costs and underutilize talent in order to increase the overall efficiency of the business process. To cope with this, stakeholders must strategies on decentralizing training centers, setting up scholarship programs, and leveraging generation for far-off mastering.

The demand for pilot training in Thailand exceeds the availability of training, creating a situation where current systems may struggle to accommodate an influx of aspiring pilots. This imbalance results in long waiting times and complications in the talent process, hindering the airline industry's growth. Meeting this challenge requires better planning, such as expanding and upgrading existing training facilities. According to Ziakkas et al. (2022), to increase a business's overall efficiency, using the lean process can reduce wasteful operations such as training, underutilized training, and training costs. Collaborative efforts with international training organizations can also reduce capacity. Furthermore, a forecasting approach to anticipate future demand and enhance training capacity is essential to ensure sustainable and robust growth of the airline sector in Thailand. Effectively addressing these capacity challenges is necessary to meet prospective pilots' growing demands and develop a resilient regional airline.

Skills, Knowledge, and Attitude

Navigating skills improvement within the Competency-Based Training and Assessment (CBTA) framework affords multifaceted demanding situations for Thai pilots. CBTA places a premium on practical, hands-on skills, necessitating access to modern simulation technologies and real-international situations. A skill, as described by ICAO, is the ability of a person to perform an activity or action (ICAO, 2019). Moreover, skills also involve motor abilities and cognitive competencies (Knez et al., 2022). Ensuring Thai pilots have access to modern training facilities will become vital for fostering the skill sets demanded using CBTA. The integration of state of affairs-primarily based mastering, where pilots confront diverse and challenging situations, needs a curriculum and training methodologies recalibration. Continuous tracking mechanisms for talent progression and focused comment loops are crucial components in the adventure to supply relatively professional and adaptable aviators in the CBTA framework.

Knowledge

The acquisition of theoretical competence, the cornerstone of CBTA, faces challenges in Thai aviation. As defined by Knez and colleagues, knowledge is an understanding of a concept(s) (Knez et al., 2022). The CBTA requires a curriculum that reflects the latest aviation technology and law developments. Ensuring that training materials are also relevant to today's aviation environment will be necessary. (ICAO, 2019). Continuous professional development programs, partnerships with industry experts, and integration of e-learning platforms are essential for knowledge acquisition.

Furthermore, language skills need to be addressed. If a multilingual approach to language is adopted, diversity can improve learning outcomes in the CBTA program. As Thai pilots navigate these challenges, they can emerge technically competent and gain a comprehensive understanding of the dynamic aviation environment.

Attitude and Proficiency

CBTA underscores the importance of cultivating the proper mindset and proficiency ranges in pilots, emphasizing trends including selection-making, teamwork, and flexibility. However, instilling these traits within the cultural context of Thai aviation poses challenges. Tailoring training programs to comprise cultural nuances will become pivotal for instilling the desired attitudes. Fostering a robust, safe way of life embedded in the training material is essential for cultivating the right attitude (Knez et al., 2022). Integrating mentorship packages that draw upon experts in the Thai aviation network can further contribute to developing well-rounded aviators. Regular assessments and reviews that move past technical proficiency end up integral additives in the CBTA framework, ensuring Thai pilots not only meet but exceed the requirements of mindset and skill demanded with the support of contemporary aviation.

Conclusions and Discussion

Guiding airline stakeholders in addressing the challenges of implementing a Competency-Based Training and Assessment Program (CBTA) for Thai pilots is needed. First, stakeholders should consider providing training areas of deployment that have increased and have increased progress in response to training challenges. A scholarship program could reduce budget constraints and encourage a more diverse pool of aspiring pilots. Also, using technology for distance learning, according to Giaccas et al. (2022), can increase efficiency and reduce costs in the training process. Adopting a lean process approach can help businesses eliminate excessive training costs and improve talent utilization, contributing to the system's overall efficiency.

In addressing the capacity challenge, industries should prioritize expanding and developing existing training. Working with international training organizations can complement capacity, providing innovation and knowledge. Ziakkas et al. (2022) proposed that adopting the lean process can streamline operations, reduce wasteful practices, and contribute to overall efficiency. Forecasting methods to anticipate future demand and active training capacity are essential to sustain the growth of the airline sector in Thailand. In addition to these recommendations, focusing on knowledge, skills, and attitude training (KSA) is essential. KSA training ensures a holistic approach to competency, including technical skills and knowledge and the attitudes and behaviors necessary for effective performance in flight (Knez

et al., 2022). Integrating KSA training into the CBTA program will help harmonize the comprehensive development of Thai pilots with the CBTA program's comprehensive nature and enhance the airline's overall efficiency.

A comprehensive method is necessary regarding abilities, expertise, and attitude-demanding situations. Investing in contemporary simulation technology and real-world eventualities is vital to foster the practical, hands-on capabilities demanded via CBTA. Continuous monitoring mechanisms for talent progression and targeted remarks loops can ensure the manufacturing of tremendously skilled and adaptable aviators (de Montalk, 2008). Continuous expert development applications, partnerships with enterprise professionals, and integration of e-learning platforms are encouraged for knowledge acquisition. A multilingual approach to language can decorate diversity and improve knowledge of the effects of the CBTA program.

Furthermore, cultivating the proper attitude and proficiency ranges calls for tailoring training applications to incorporate cultural nuances precise to the Thai aviation context. Fostering a solid safety culture in training materials and integrating mentorship packages with professionals from the Thai aviation network can contribute to developing well-rounded aviators. Regular assessments beyond technical ability are vital additives of the CBTA framework, ensuring that Thai pilots no longer meet but exceed the mindset and ability requirements demanded with the aid of contemporary aviation.

Implementing the Competency-Based Training and Assessment (CBTA) framework for Thai pilots is a transformative yet complicated endeavor. While CBTA gives a paradigm shift in raising the standards of pilot education, the demanding situations embedded in the Thai operational landscape and cultural context necessitate a comprehensive and adaptive technique. Addressing capability-demanding situations, each in training accessibility and application scalability, calls for strategically orchestrating assets and collaboration with training entities. The integration of generation can play a pivotal function in enhancing performance and decreasing barriers to access. Additionally, the guidelines emphasize the importance of Knowledge, Skills, and Attitude (KSA) training, ensuring a holistic development that aligns with the nuanced demands of CBTA.

Furthermore, the businesses' dedication to addressing skills, understanding, and mindset challenges is paramount. Investments in modern simulation technologies, continuous tracking of ability progression, and tailor-made education programs considering cultural nuances are vital for producing well-rounded and adaptable aviators. The multilingual method of language and the integration of mentorship applications contribute to a robust aviation ecosystem. As the aviation industry in Thailand navigates these challenges, a collaborative and forward-thinking technique, informed by using the concepts of CBTA, is essential for

fostering a resilient and proficient cadre of Thai pilots able to meet the dynamic needs of the aviation landscape.

References

CAAT (2021). Guidance Material for Competency-Based Training and Assessment (CBTA). https://www.caat.or.th/wp-content/uploads/2021/10/CAAT-GM-PEL-CBTA-Issue-01-Rev.00-CBTA.pdf

de Montalk, R. J. (2008). Developing proficiency in air transport pilots: the case for the introduction of non- technical skills in basic pilot training programs. MRO. https://mro.massey.ac.nz/.

IATA. (2015). Guidance Material and Best Practices for MPL Implementation, International Air Transport Association, Montreal, Canada.

IATA. (2018). Guidance Material for Instructor and Evaluator Training International Air Transport Association, Montreal, Canada.

IATA. (2021). Competency Assessment and Evaluation for Pilots, Instructors and Evaluators - Guidance Material. https://www.iata.org/en/programs/ops-infra/training-licensing/

ICAO (2019). Annex 1 – Personnel licensing, International Civil Aviation Organization, Montreal, Canada.

ICAO. (2018). ANNEX 6 to the Convention on International Civil Aviation - Operation of Aircraft, Part I and II (10th ed., Issue July).

ICAO. (2011). Training Development Guide Competency-Based Training Methodology - DOC 9941 AN/478 (1st. ed.).

International Civil Aviation Organization. (2012a). Manual on the Approval of Training Organizations - Doc 9841 AN/456 (2nd ed.).

ICAO. (2012b). Safety Management Manual (SMM) - DOC 9859 (3rd ed.).

ICAO. (2013). Trainair Plus Operations Manual (TPOM) - DOC 9941 (2nd ed.).

ICAO. (2020). PROCEDURES FOR AIR NAVIGATION SERVICES - TRAINING - DOC 9868 (3rd. ed., Issue November).

ICAO. (2021). SARPs - Standards and Recommended Practices. International Civil Aviation Organization, Montreal, Canada.

Knez, S., Podbregar, I., & Graham, N. (2022). Challenges and development of training in the aviation industry. 41 St International Conference on Organizational Science Development. https://doi.org/10.18690/um.fov.3.2022.30.

Ziakkas, D., Michael, W. S., & Pechlivanis, K. (2022). The implementation of competency-based training and assessment (CBTA) framework in aviation manpower planning.

Transportation Research Procedia, 66, 226–239. https://doi.org/10.1016/j.trpro.2022.12.023.