CBTA, AQP, EBT
A Comparison of Pilot Training Methodologies

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Purpose

The different training methodologies within aviation today can sometimes be confusing. In an attempt to move away from rote training built on hours and events, regulatory bodies began to promote, and even require, methodologies focused on competency and proficiency. From this effort to modernize and improve training came an alphabet soup of terms. Here's an overview of the three major methodologies/frameworks promoted by the various regulatory bodies—Competency-Based Training and Assessment (CBTA), Advanced Qualification Program (AQP), and Evidence-Based Training (EBT).

All three methodologies fall under the larger umbrella of competency-based education, a system of education involving instructional design, training, and assessment built on a set of written competencies. The common goal is to develop a workforce capable of efficiently working together in the complex aviation environment. Each methodology provides emphasis on competency, or proficiency, in the operational environment, rather than simply the task or hour-based requirements of traditional training programs and requires crewmembers to demonstrate the combination of Knowledge, Skills, and Attitude (KSA) as defined in performance standards. Although essentially competency-based training methodologies, AQP and EBT offer significant variations to the methodology.

Improving your understanding of these varied training methodologies will empower you to choose the best path for training the aviation professionals in your organization.

Competency-Based Training and Assessment (CBTA)

Competency-Based Training and Assessment (CBTA) is an approach outlined by ICAO (ICAO PANS Training Doc 9868) and championed by the International Air Transport Association (IATA) aimed at ensuring that aviation training programs are focused on achieving specific, measurable competencies that are directly relevant to the operational requirements of the aviation industry.

Objective
The primary goal of CBTA is to ensure that aviation personnel, particularly pilots and crew, achieve and maintain the competencies required for safe and efficient operations in the aviation environment.

Methodology
CBTA centers around a framework of specific, written competencies. To achieve "competency" an individual must demonstrate a combination of skills, knowledge, and attitudes to perform a task to the prescribed standard. The written competencies are identified based on operational needs, safety requirements, and industry best practices. Training programs under CBTA do not rely on a prescribes number of hours or events but are tailored to the needs of the individual, allowing for different paths to competency based on the learner's existing skills, knowledge, and rate of progress.

Requirements

- Competency Framework Development:
  - Establishment of a comprehensive competency framework that clearly defines the skills, knowledge, and attitudes required for each role.
- Training Program Design:
  - Designing training programs that are directly aligned with the competency framework, ensuring that all activities are purposefully aimed at achieving the identified competencies.
- Assessment and Evaluation:
  - Implementing robust assessment strategies to objectively measure the attainment of competencies.
  - Regularly evaluating competency attainment through practical assessments, simulations, and other relevant methods.
- Instructor Qualification and Development:
  - Ensuring instructors and assessors are not only knowledgeable in their areas of expertise but are also trained in competency-based education techniques.
  - Continuous development programs for instructors to keep them up-to-date with the latest training methodologies and industry practices.
- Quality Assurance:
  - Establishing a quality assurance system to monitor the effectiveness and integrity of the CBTA program.
  - Regularly reviewing and updating the competency framework and training programs based on feedback, technological advancements, and changes in industry practices.
- Record Keeping and Documentation:
  - Maintaining detailed records of training activities, assessments, and competency achievement for all participants.
  - Ensuring that documentation supports the continuous monitoring and improvement of the training program.
- Regulatory Compliance and Alignment:
  - Aligning CBTA programs with the requirements and standards set by ICAO, national aviation authorities, and other relevant regulatory bodies.
  - Working with regulatory authorities to ensure that CBTA initiatives are recognized and endorsed as meeting or exceeding traditional training standards.

Core Competencies

Competency-Based Training (CBTA) is structured around specific competencies that aviation professionals must demonstrate to ensure they can perform their roles effectively and safely. These nine competencies are defined by regulatory bodies, airlines, and training organizations and are designed to cover the full spectrum of skills, knowledge, and attitudes required for the job. In addition to the core competencies for pilots, four additional competencies are outlined for instructors/evaluators.

1. **Application of Knowledge:** Demonstrating practical knowledge of aircraft systems, operating environment, and applicable legislation, and effectively applying this knowledge.
2. **Application of Procedures and Compliance with Regulations:** Identifying and applying appropriate procedures and regulations, following standard operating procedures (SOPs), and ensuring compliance.
3. **Communication:** Effective communication within the operational environment, including clarity, accuracy, active listening, and appropriate use of escalation.
4. **Aircraft Flight Path Management (Automation):** Managing the flight path using automation, monitoring for deviations, and maintaining operational performance.
5. **Aircraft Flight Path Management (Manual Control):** Manual control of the aircraft with precision, managing the flight path safely, and monitoring flight guidance systems.
6. **Leadership and Teamwork:** Encouraging team participation, engaging in planning, giving constructive feedback, and resolving conflicts.
7. **Problem Solving and Decision Making:** Identifying and mitigating threats and errors, making informed decisions, and adapting to unexpected events.
8. **Situation Awareness and Management of Information:** Monitoring and assessing the operation's state, anticipating its effects, and maintaining awareness of the operational environment.
9. **Workload Management:** Prioritizing and distributing tasks effectively, managing time efficiently, and maintaining workload capacity.

Instructor/Evaluator Competencies (additional):

1. **Management of the Learning Environment:** Ensuring safe and suitable conditions for training and evaluation.
2. **Instruction:** Delivering training that develops trainee competencies, using appropriate instructional methods, and sustaining operational relevance.
3. **Interaction with Trainees:** Supporting trainee learning and development, demonstrating exemplary behavior, and managing barriers to learning.
4. **Assessment and Evaluation:** Assessing trainee competencies, contributing to continuous training system improvement, and providing clear feedback.

Advance Qualification Program (AQP)

The FAA's Advanced Qualification Program (AQP) is a regulated methodology rooted in the concepts of competency-based education and supported by regulatory guidance. FAA Advisory Circular 120-54A provides comprehensive guidelines for the development and implementation of AQP by airlines.

Objective

The primary goal of AQP is to enhance the safety and efficiency of flight operations by allowing more flexible, performance-based, and tailored training and evaluation programs. The goal is to

provide training that will raise professional qualifications to a level beyond the present outlined standards.

Methodology

AQP focuses on performance-based training and evaluation, emphasizing the development of critical thinking, decision-making, and technical skills tailored to specific operational needs. The terms “proficiency” and “proficiency-based” are used instead of “competency” or “competency-based” in an effort to elevate the level of training beyond simple competence to professional proficiency.

Requirements

- Program Development and Approval Process:
  - Formal application to the FAA for approval.
  - Development of a comprehensive plan that outlines the program structure, objectives, curriculum, and evaluation methods.
- Curriculum Development:
  - Design of training curricula that focus on proficiency rather than merely meeting minimum hour requirements.
  - Integration of Crew Resource Management (CRM) training throughout the curriculum.
- Training and Evaluation Methods:
  - Use of advanced training devices and simulators.
  - Implementation of scenario-based training that reflects real-world challenges.
  - Continuous assessment of trainee performance with an emphasis on competency and proficiency.
- Qualification Standards:
  - Establishment of clear performance and proficiency standards for pilots, instructors, and evaluators.
  - Regular review and adjustment of these standards based on operational feedback and performance data.
- Instructor and Evaluator Training:
  - Specialized training for instructors and evaluators to ensure they are proficient in AQP methodologies and evaluation criteria.
- Program Management and Administration:
  - Appointment of a program manager responsible for the oversight and administration of the AQP.
  - Maintenance of records and documentation to support program validation and continuous improvement.
- Data Collection and Analysis:
  - Implementation of a data collection system to capture training and operational performance data.
  - Regular analysis of data to identify trends, areas for improvement, and effectiveness of the training program.

    - "The AQP Applicant must also acknowledge its responsibility to collect and analyze more data than required for submission to the FAA in order to adequately identify performance trends and requisite changes to factors that impact the performance."
- Quality Assurance:
    - Establishment of a quality assurance process to monitor the integrity and effectiveness of the AQP.
    - Regular internal audits and evaluations to ensure compliance with FAA standards and program objectives.
- Regulatory Compliance and Coordination:
    - Ensuring that all aspects of the AQP comply with FAA regulations and guidance.
    - Coordination with the FAA for program approvals, modifications, and reporting.

Competencies

AQP does not explicitly define a set of "core competencies" in the way that IATA's CBT or EBT frameworks do. Instead, AQP focuses on a proficiency-based approach to training and evaluation that is tailored to the specific operational needs and characteristics of an airline. Some of the key features of AQP regarding proficiencies:

1. **Proficiency-Based Training and Evaluation:** AQP emphasizes developing and assessing proficiency in skills and knowledge that are critical for safe and efficient operations specific to an airline's fleet and routes.
2. **Customized Training Objectives:** Rather than applying a standardized set of competencies, AQP allows airlines to define their own training objectives based on their unique operational environment, equipment, and procedures. This allows for the creation of specialized training programs that address the particular needs of the airline and its crew.
3. **Role-Specific Proficiency Requirements:** AQP encourages the definition of role-specific proficiencies for pilots, instructors, and evaluators, focusing on the specific responsibilities and tasks that individuals in these roles are expected to perform.
4. **Continuous Improvement and Feedback:** The program requires continuous monitoring and analysis of training effectiveness and the adjustment of training methods and content based on performance data and feedback. This adaptive approach ensures that training remains relevant and effective in enhancing operational safety and proficiency.
5. **Comprehensive Evaluation Strategies:** AQP mandates the use of various evaluation strategies, including line-oriented flight training (LOFT), line operational simulations (LOS), and other scenario-based assessments that are designed to evaluate operational proficiency in a realistic context.

While AQP doesn't define "core competencies" in a traditional sense, it is heavily focused on ensuring that all training is directly relevant to the operations of the airline and effectively enhances the proficiency of its flight crews. The program's structure allows for significant flexibility in defining what these proficiencies are, based on the airline's specific operational context, making it a highly customizable and dynamic training framework.

Evidence-Based Training (EBT)

Evidence-Based Training (EBT) is a competency-based, training paradigm promoted by the International Air Transport Association (IATA), and aligned with ICAO standards and recommended practices, with a focus on enhancing aviation safety through a data-driven approach to pilot training. It emphasizes training and assessment based on evidence and real-world experience rather than traditional, prescriptive methods.

Objective
The primary goal of EBT is to improve flight safety by focusing training on competencies that are critical for safe operations, identified through analysis of operational data, incident reports, and research.

Methodology
EBT relies empirical data to determine which pilot competencies need reinforcement, allowing training programs to dynamically adjust to the actual demands and risks identified through operational evidence. EBT aims to optimize training efficiency by focusing resources on areas that have the most impact on safety performance. It is primarily intended for recurrent training.

Requirements

- Competency Framework:
  - Development of a competency framework that identifies the key competencies pilots need to master, including technical skills, cognitive skills, and interpersonal behaviors.
- Data Collection and Analysis:
  - Systematic collection and analysis of operational data to identify training needs and areas for improvement.
  - Utilization of data from flight operations, training sessions, safety reports, and other relevant sources.
- Curriculum Design and Implementation:
  - Design of training curricula that are tailored to address the identified competencies and areas of risk.
  - Incorporation of scenario-based training that simulates real-life situations pilots may encounter.
- Assessment and Proficiency Checks:
  - Implementation of assessment methods that evaluate a pilot's proficiency in the identified competencies.
  - Use of continuous assessment and feedback mechanisms to monitor progress and adapt training as needed.
- Instructor Training and Development:
  - Training of instructors to ensure they are proficient in EBT methodologies and competent in assessing the defined competencies.

    - Continuous professional development of instructors to keep pace with changes in operational practices and training methodologies.
- Quality Assurance and Program Evaluation:
    - Establishment of a quality assurance process to ensure the effectiveness and integrity of the EBT program.
    - Regular evaluation of the program to assess its impact on safety and operational performance, with adjustments made based on feedback and analysis.
- Regulatory Alignment and Compliance:
    - Ensuring that EBT programs are developed in alignment with ICAO standards and recommended practices, as well as any applicable local aviation authority regulations.
    - Collaboration with regulatory bodies to gain approval and support for EBT initiatives.

Core Competencies

The International Air Transport Association (IATA) and the International Civil Aviation Organization (ICAO) have outlined eight core competencies in their Evidence-Based Training (EBT) framework. An additional four competencies have been identified for Instructors/Evaluators.

1. **Application of Procedures:** This competency focuses on the ability to correctly apply standard operating procedures (SOPs) and regulations. It includes understanding when and how to apply these procedures to ensure the safety and efficiency of flight operations.
2. **Communication:** This entails the effective exchange of information, both verbal and non-verbal, within the flight crew and with other parties involved in flight operations (such as air traffic control). It emphasizes clarity, conciseness, and comprehensibility to avoid misunderstandings and ensure operational integrity.
3. **Aircraft Flight Path Management, Manual Control:** This competency is about the ability to control the aircraft's flight path manually, without relying on automated systems. It includes maintaining accurate flight paths, altitudes, and airspeeds through proficient manual flying skills under various conditions.
4. **Aircraft Flight Path Management, Automation:** In contrast to manual control, this competency focuses on the effective use of automated systems to manage the aircraft's flight path. Pilots must understand and appropriately use automation to maintain efficiency and safety, including knowing when to switch to manual controls if necessary.
5. **Leadership and Teamwork:** This competency involves the ability to lead and work effectively within a team. It includes decision-making, supporting team members, conflict resolution, and maintaining a positive and professional team environment to ensure the successful outcome of flights.
6. **Problem Solving and Decision Making:** This involves the ability to quickly and accurately identify problems that may arise during flight operations and make informed decisions to resolve them. It includes assessing situations, considering options, and selecting the best course of action under pressure.

7. **Situational Awareness:** This competency entails maintaining an accurate understanding of the current and future states of the flight and its operational environment. It includes monitoring, processing information, and anticipating future events to avoid threats and errors.
8. **Workload Management:** This focuses on the ability to manage workload effectively, including prioritizing tasks, managing time efficiently, and maintaining situational awareness under different conditions. It also involves recognizing and mitigating overload situations to prevent performance decrements.

Instructor/Evaluator Competencies (additional):

1. **Management of the Learning Environment:** Ensuring safe and suitable conditions for training and evaluation.
2. **Instruction:** Delivering training that develops trainee competencies, using appropriate instructional methods, and sustaining operational relevance.
3. **Interaction with Trainees:** Supporting trainee learning and development, demonstrating exemplary behavior, and managing barriers to learning.
4. **Assessment and Evaluation:** Assessing trainee competencies, contributing to continuous training system improvement, and providing clear feedback.

These core competencies form the basis of the EBT framework, emphasizing the development of skills, knowledge, and attitudes necessary for safe and effective flight operations. However, the training to achieve these competencies is derived and informed by data.

Key Differences

Although similar in objective and method of employment, the three training methodologies have some key differences.

In terms of development for both initial training and continuing qualification:

- **CBTA**: This approach is versatile and can be adapted for use in both initial training and recurrent training, focusing on achieving and maintaining competencies throughout a pilot's career. CBTA guidance specifically includes guidance for Multi-Pilot License programs and ab-initio programs.
- **EBT**: This approach is often associated with recurrent training to address specific operational competencies. However, its principles can also be applied to initial training programs.
- **AQP**: This program is designed to be used for both initial and continuing qualification training. The program's flexibility allows for the development of curricula that meet the specific needs of an airline's operations.

In terms of regulatory support:

- CBTA is endorsed by ICAO as a framework and is being adopted into national regulations in a number of countries. However, the extent to which it is required by regulation can vary.

- AQP is fully supported by the FAA for use by airlines under its jurisdiction and requires FAA approval.
- EBT is not a regulatory requirement globally. However, EBT is recommended by IATA and ICAO and is gaining regulatory support in various countries as part of a move towards more performance-and competency-based training regulations that are data-informed.

In summary, all three methodologies can be used for developing both initial and continuing qualification training, although EBT is focused on continuation training. AQP is specific to the FAA, while EBT and CBTA are promoted by IATA and have a growing influence on global training standards as recommended by ICAO. The degree of regulatory support for EBT and CBTA varies worldwide but is an evolving landscape as aviation authorities move toward competency and evidence-based training paradigms.

All three methodologies strive to accomplish the same goal and provide tremendous improvements to the hours-and-events style training used in the past.

Instructional Design and Development—The ADDIE Model

A central feature of AQP is its emphasis on the ADDIE model for instructional development. ADDIE stands for Analysis, Design, Development, Implementation, and Evaluation, and serves as a framework to guide the creation and refinement of training programs.

- **Analysis:** In this phase, the specific needs of the airline and its pilots are assessed to identify gaps in skills, knowledge, or attitudes. This involves understanding the particular operations, equipment, and challenges faced by the airline. The goal is to tailor the training program to address these specific needs, rather than applying a one-size-fits-all approach.
- **Design:** Based on the needs analysis, a detailed plan for the training program is developed. This includes defining learning objectives, selecting appropriate training methodologies (such as simulator sessions, classroom instruction, or computer-based training), and determining how these components will be integrated into a coherent program. The design phase ensures that the training will be systematic and organized, with clear pathways for pilots to achieve the desired competencies.
- **Development:** In this stage, the actual training materials and resources are created. This might involve developing simulations, writing manuals or guides, and creating assessments. The development phase brings the design plan to life, producing tangible training tools that can be used in the implementation phase.
- **Implementation:** The training program is rolled out and conducted. Pilots undergo the training, using the materials and resources developed in the previous phase. Implementation also includes training the trainers, ensuring that instructors are fully prepared to deliver the program effectively.
- **Evaluation:** Finally, the effectiveness of the training program is assessed. This involves both formative evaluation (ongoing feedback during the program) and summative evaluation (assessment upon completion of the program). Evaluation looks at whether

the learning objectives were met and how the training has impacted pilot performance and safety. Based on this feedback, the training program can be revised and improved in a continuous cycle of enhancement.

The ADDIE model's iterative process is aligned with AQP's goals of promoting safety, efficiency, and effectiveness in pilot training. By emphasizing ADDIE, AQP ensures that training programs are not only customized to meet the unique needs of each airline but also subject to continuous improvement.

Although EBT and CBTA both emphasize data-driven and competency-based curriculum development respectively, the specific mention of the ADDIE model was not initially included in the guidance. However, the principles underlying the ADDIE model are broadly compatible with and often implicit in the structured approach to curriculum design and development advocated by both EBT and CBTA and are beginning to be included.

EBT and the ADDIE Model
EBT's focus on using evidence and data to inform training needs directly aligns with the "Analysis" phase of ADDIE. The design and development of EBT programs, tailored to address identified competencies based on real-world data, can be seen as part of the "Design" and "Development" phases. The implementation of EBT, including the use of scenario-based training and continuous assessment, corresponds to the "Implementation" phase. Finally, the emphasis on regular evaluation of the training program based on operational data and feedback fits well within the "Evaluation" phase of ADDIE.

CBTA and the ADDIE Model
CBTA's approach to identifying specific competencies required for job performance mirrors the "Analysis" phase, where training needs are assessed. The creation of training materials and activities focused on achieving these competencies falls under the "Design" and "Development" phases. The "Implementation" phase is reflected in the delivery of CBTA programs, tailored to individual learning needs and paces. The continuous assessment of learner progress and program effectiveness corresponds to the "Evaluation" phase of ADDIE.

The ADDIE model is best supported by a strong Instructional Systems Design team that understands the rigors required by the training methodology and that can effectively interface with the aviation training professionals.

The ADDIE model provides a comprehensive framework that can be effectively applied in all three methodologies for creating efficient, effective, and adaptive training programs in the aviation industry.

Integration of Crew Resource Management

The Federal Aviation Administration (FAA) outlines seven key skills or observable behaviors as part of Crew Resource Management (CRM) training aimed at improving safety in aviation

operations. These CRM skills are designed to enhance communication, decision-making, and teamwork among flight crew members. All of these key skills are intended to be integrated into CBTA, AQP, and EBT training programs.

- **Leadership/Followership:** Recognizes the appropriate time to lead and the time to support the leader. Effective leadership involves guiding the crew in achieving a common goal, while followership involves actively supporting the leader's directions and decisions.
- **Situational Awareness:** The ability to accurately perceive and comprehend the operational and environmental factors affecting the aircraft and its flight. This includes understanding the current situation, projecting future status, and recognizing changes in time to take appropriate action.
- **Communication:** Clear, concise, and assertive exchange of information among crew members and with ATC, maintenance, and other support personnel. This includes both verbal and non-verbal communication skills.
- **Decision Making:** The process of diagnosing a situation and reaching a judgment about the appropriate course of action. This involves generating options, selecting a course of action, and evaluating the outcome of that action.
- **Team Building and Maintenance:** The ability to create and sustain effective crew performance by developing teamwork and cooperation, setting clear goals, and resolving conflicts among crew members.
- **Workload Management:** Efficient management of duties and responsibilities to ensure that workload is balanced within the crew. This includes prioritizing tasks, ensuring time management, and maintaining the ability to manage high workload situations without degradation in performance.
- **Problem Solving and Critical Thinking:** Identifying problems correctly, generating solutions, and choosing the best course of action. This skill involves using logic and analysis to identify potential solutions and evaluating their effectiveness.

These CRM skills are fundamental to improving flight safety by focusing on the human factors that can lead to incidents and accidents. Effective CRM training aims to enhance these skills through various educational and practical exercises, preparing crew members to handle the wide range of situations they might encounter during flight operations.

Comparison Table—AQP, EBT, CBTA

	AQP	EBT	CBTA
Regulatory Body	FAA	IATA (aligned with ICAO standards)	IATA (aligned with ICAO standards)
Primary Objective	Enhance safety by achieving the highest possible standard of individual and crew performance	Improve flight safety by focusing on real-world operational needs and evidence	Ensure operational competence through specific, measurable competencies
Methodology	Proficiency-based training and evaluation	Data-driven curriculum development based on real-world evidence	Focus on achieving specific competencies identified based on operational needs
Curriculum Design	Flexible, based on operational needs with emphasis on proficiency and using the ADDIE model	Designed around evidence from operational data, emphasizing risk areas and pilot competencies	Tailored to individual learning paths, aligned with a competency framework
Employment of Instructional Systems Design Process	Mandated, with specific requirements for curriculum development, validation, and modification based on performance data	Recommended as a method for developing and updating training programs based on evidence and operational data	Utilized to ensure that training is systematically developed to meet specific competencies
Assessment Method	Continuous assessment based on proficiency and performance	Continuous, competency-based assessment informed by evidence and operational data	Objective measurement of competencies through practical assessments and simulations
Instructor/Evaluator Development	Specialized training in AQP methodologies and evaluation criteria	Trained in EBT methodologies, competent in assessing competencies	Trained in competency-based education techniques, continuous development

Quality Assurance	Mandatory quality assurance process for program integrity	Quality assurance process to ensure program effectiveness	Quality assurance system to monitor the effectiveness and integrity of the CBTA program
Regulatory Compliance	Must comply with FAA regulations, requires FAA approval and oversight	Aligns with ICAO standards, adapted to local regulations	Aligns with ICAO standards, adapted to local regulations
Usage of SMS (Safety Management System)	Integral, with a strong emphasis on integrating training with overall safety management	Encouraged as part of the holistic approach to training and operations	Encouraged, with competencies often including elements related to safety management principles
Usage of CRM (Crew Resource Management)	Required component, with CRM skills integrated into training scenarios	Core competency, with CRM skills assessed through evidence-based scenarios	Integral, with CRM considered a key competency for pilot performance
Data Collection & Analysis	Required for continuous improvement and FAA reporting	Used to inform training needs and improvements	May be used for adjusting training based on performance data
Regulatory Data Reporting	Mandatory, with AQP programs required to collect, report, and analyze performance data to the FAA	Encouraged, with EBT programs expected to use data to inform training needs and improvements	Encouraged, particularly for validating competencies and adjusting training as needed based on performance data

***Volant offers a proprietary risk-management model (Risk and Resource Management) and data-collection software (Integrated Data Collection and Analysis Tool) that can support AQP, EBT, and CBTA while integrating CRM principles, SMS, and data-reporting requirements in one cohesive package. Volantsystems.com*

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