

SHAPING MODERN AVIATORS: FROM TECHNICAL MASTERY TO ETHICAL LEADERSHIP

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In aviation, the flight instructor has a central role in the pilot training process, going beyond the mere transmission of technical and fundamental knowledge to the point of engaging in shaping character, attitudes, and safety culture. In this process, the instructor has to be involved in every aspect of the pupils' development. Therefore, this article explores the complexity of the instructor's roles, such as mentor, leader, teacher, moral evaluator, coach, psychologist, innovator, and risk manager, analyzing how each contributes to the development of modern pilots.

Based on specialized literature and current needs, we propose a hierarchical conceptual model that integrates all these roles and offers a different perspective on training. By writing this article, we aim to synthesize a theoretical and practical framework for an optimal model of a flight instructor, capable of meeting current demands of global aviation.

Keywords: flight instructor; aviation; students; pilot; leader;

INTRODUCTION

The professional training of a pilot in modern times is a complex process that goes beyond the mere accumulation of theoretical and practical technical knowledge. Contemporary aviation is defined by extensive automation, integrated flight management systems, rigorous safety measures and a constant need for adaptability to unpredictable operational scenarios. In this context, the flight instructor becomes not just a transmitter of technical knowledge, but also developer of non-technical competencies, a promoter of critical thinking, and a strong advocate for safety culture. Their role is fundamental in bridging theory and real-world practice, forming a link between necessary skills required to operate an aircraft and the behaviors and attitudes essential in a complex and dynamic environment. This is also the reason why, within our scientific approach to highlighting this role, we relied predominantly, as research methods, on theoretical analysis and the comparative study of existing specialized works in the aviation field, with impact within the study of pilot training.

According to International Civil Aviation Organization – ICAO (ICAO 2013, I-3-8), the quality of training, both in the initial and recurrent phase, determines an individual's level of performance and operational resilience. ICAO doc 9995 emphasizes that pilot training should be competency-centered (Competency-Based Training and Assessment – CBTA), focusing on development of cognitive, emotional and decision-making competencies. European Union Aviation Safety Agency – EASA and Federal Aviation Administration – FAA, uphold the same standards, arguing that the mere transmission of knowledge or the reproducing standard procedures is no longer effective and sufficient. Instructor must encourage critical thinking, analyze errors and behavior adaptability in different complex and unforeseen scenarios (EASA, Easy Access Rules for Flight Crew Licencing 2020, pp. 882-884; FAA, Aviation's Instructor Handbook - FAA-H-8083-9B 2020, Ch.7, pp. 4-8).

An important aspect frequently addressed in the literature is the non-technical element of pilot training. Studies such as those by Salas et al. (Salas, Tannenbaum, et al. 2012, pp. 84-87) show that abilities like CRM (Crew Resource Management), situational awareness and stress management are responsible for more than 70% of operational success in aeronautical activities. These abilities cannot be developed

exclusively through individual study, rather, they require guidance, mentoring and continuous feedback from an experienced instructor. Therefore, the flight instructor becomes an essential part in shaping the attitude and behavior of the trainees, serving as the student pilot's first real example in handling pressure, communication and operational safety management.

Furthermore, there is a cultural dimension that directly influences the relationship between instructor and student. Research based on the Hofstede cultural model (Hofstede, 1984, pp. 72-78), reveals that countries with low trust in governments, such as parts of Eastern Asia, students tend to be less likely to ask questions or provide objective feedback. On the other hand, in Western cultures, where the approach is more participative, the instructor is often seen as a partner in the learning process, and, most importantly, communication is bidirectional. Thus, the instructor needs to be flexible and adaptable to each situation, recognize these cultural differences and change their teaching style to maintain the desired efficiency in training.

In addition, new technologies and innovative methods used in pilot training, are reshaping the role of the instructor. Modern programs, such as Evidence-Based Training – EBT (Hwang, Kim, 2023, pp. 88-95) and Line-Oriented Flight Training – LOFT (Dismukes et al., 1997, pp. 3-7), encourage instructors to act as facilitators and evaluators of complex performance, focusing on developing adaptive thinking and preparing students for atypical, critical scenarios. According to EASA (2020, pp. 216-218), instructors involved in EBT must be capable to create dynamic situations, evaluate students' skills in a holistic framework and provide detailed feedback aimed at identifying the fundamental causes for errors.

On the same idea, there is a growing awareness of the importance of developing coaching and counseling skills, as an extension of traditional teaching methods. FAA (2020, Ch.7, pp. 4-8) recommends that instructors adopt *learner-centered teaching*, by including constructive feedback, self-reflection and in-depth post-flight debriefing. These practices are necessary to help students develop the abilities to understand and correct their own errors. Research has shown that such an approach benefits not only the technical performance, but also student's self-trust and motivation (Seung et al., 2024, pp. 237-239).

Next, we will go through various roles that an instructor pilot must fulfill in order to meet the current requirements for preparing the best student pilots in the field of aviation.

FLIGHT INSTRUCTOR'S ROLES

The roles of the instructor pilot have evolved significantly over the last two decades, as aviation requirements have become more rigorous. The evolution of international safety standards, the increasing complexity of flight operations, and the integration of non-technical competencies have determined the aviation academies worldwide, such as CAE Global Academy, Lufthansa Aviation Training, Oxford Aviation Academy or Emirates Aviation University to adopt a multidimensional approach to pilot training (Salas et al., 2012, pp. 76-86).

The traditional model centered on the unidirectional relationship between instructor and student has extended to the point where the instructor becomes at the same time a facilitator for learning, coaching, behavior evaluator or mentor. Beyond the ability to pass flying techniques to others, the focus has grown more and more on the development of the non-technical skills, such as communications, decision-making process, stress management, team work and safety culture, essential elements for reducing human errors and enhancing crew performance (Flin, O'Connor, 2008, pp. 27-45).

Mentor

Nowadays, mentorship is recognized as one of the most influential learning methods in high responsibility scenarios, and aviation is a great domain in this sense. The flight instructor acts more and more as a mentor - a quality that drives him to guide students not only in the operational procedures learning process, but also in the development of their professional identity, a healthy attitude towards risk management, responsibility and decision-making process. This role is complex, as it implies cognitive, emotional and social elements altogether, its efficiency being well documented in aviation studies and in organizational literature.

In pilot training, mentorship surpasses the traditional instructor role, becoming an essential mechanism for professional and personal growth for pilots. The instructor-mentor provides not only technical guidance, but also support in shaping values, attitudes and psychological resilience. According to FAA (2020), mentorship contributes to the development of a trustworthy learning climate, in which students feel encouraged to ask questions, make mistakes and reflect on their actions. Based on Kram's model (Kram, 1985, pp. 32-38), mentorship can be divided into two dimensions: instrumental support (guidance, feedback, career planning) and psychological support (emotional encouragement, behavior modeling).

Researchers like Clutterbuck (Clutterbuck, 2004, pp. 47-53) and Goleman (Goleman, 1998, pp. 92-97) emphasize that effective mentors exhibit not only technical expertise, but also empathy, emotional intelligence and reflective abilities, enabling them to build a peer-to-peer relationship with student. Additionally, reflective debrief sessions (Brookfield, 1995, pp. 66-72) contribute substantially to the learning process, stimulating critical thinking and awareness of decision-making process during flight.

Also, many studies conducted by different researchers (Helmreich, Merritt, 2001, pp. 85-90; Reason, 1990, pp. 173-178) shows that active mentorship helps reduce flying operational errors and enforces safety culture.

Leader

In the context of pilot training, the flight instructor inevitably fulfills the role of a leader, not only through operational authority but, more importantly through their impact on organizational culture, student behavior and the development of non-technical competencies. The leadership demonstrated by the instructor directly influences students' attitudes towards responsibility, communication, risk management and safety (Kanki et al., 2019, pp. 70-75, 94-102). Recent research emphasizes that efficient leadership in aviation education involves a relational form of authority, based on emotional intelligence, adaptability and positive influence (Goleman et al., 2013, pp. 34-41; Yukl, Gardner, 2019, pp. 268-273). Also, instructors who demonstrate empathy, active listening and the capacity to build trust, abilities which are specific to a servant leadership approach to development, facilitate not only technical learning but also development of pilots who are aware of their role within a crew, capable to act promptly in both collaborative and autonomous ways.

Studies in the aviation domain consistently show that authoritarian leadership, which is still present in some educational environments, may negatively affect crew communication and inhibit student initiative, which may lead to a growth in the risk of errors (Salas et al., 2012, pp. 76-78), (Helmreich, Merritt, 2001, pp. 79-89). On the other hand, transformational leadership, focused on values, vision and personal development, is associated with superior operational performances and a strong safety culture (Bass & Riggio, 2006, pp. 42-48). This approach is increasingly applied in aviation academies worldwide, where instructors are prepared to be involved in adaptive leadership, team communication and human factors dynamics. Additionally, instructors' leadership skills becomes essential in moments

of uncertainty when stress and error might occur. The FAA Instructor's Handbook (2020, Ch.7, pp. 6-8) highlights that the way an instructor reacts to a mistake or a critical situation, determines the student's attitude towards risk, accountability and reflexive learning in the long term. Thus, adaptive leadership, capable to integrate cultural diversity and cognitive style differences, becomes a strategic component of the modern instructor.

Teacher

The flight instructor, in his role as teacher, does more than simply transmitting knowledge to students. He is responsible for teaching them how to learn and eventually create an applied, reflective and competency-centered approach to learning. Nowadays, the evolution of learning strategies such as CBTA and EBT help instructors to become facilitators of cognitive and operational development, not just followers of a predetermined curriculum (ICAO 2013, pp. I-3-1 - I-3-3; Biggs, Tang, 2011, pp. 97-102).

The teaching process in aviation involves critical thinking stimulation and understanding of flight principles. According to Merrill (2020, pp. 9-13) effective learning must address questions such as *"what?"*, *"how?"* and, most importantly, *"why?"*, in order to help students apply knowledge in complex scenarios. The teacher should adapt instructional strategies to each learner's profile, including cognitive style and experience level, ensuring coherence between learning objectives and specific activities to reach those objectives. Also, the instructor needs to adapt and develop pedagogical skills, which according to Salas et al. (2012, pp. 84-86), are closely correlated with student's performance and evolution. The teacher's role is to find that sensitive link between curriculum objectives and the learning activities and assessments that students need to use to shape their professional judgement for developing the safety culture through every lesson.

Moral evaluator

This role focuses more on cultivating a strong ethical framework that guides students in the decision-making process. The instructor must serve as a model of professional integrity, directly influencing how students perceive and apply safety standards, regulations, as well as their sense of responsibility regarding both crew and passengers (ICAO 2018, Ch.2, pp. 10-14). Besides technical and non-technical knowledge delivered to students; moral evaluation refers to the instructor's ability to identify and correct risky behaviors or attitudes that could undermine safety culture. Even though students manifest a satisfactory technical performance, their behaviors must reflect the safety culture standards.

According to Flin and O'Connor (Flin, O'Connor 2008, pp. 31-45), non-technical skills such as stress management, open communication and ethical decision-making, are required to prevent negative situations in aviation operations. CBTA and EBT frameworks contain ethical attitudes as integral elements, giving instructors the opportunity to provide clear feedback when students show a tendency to compromise safety to the detriment of operational efficiency. This process should lead to the development of moral situational awareness, ability to recognize not only what is operationally possible, but most importantly what is ethically correct.

Coach

Another important role of the instructor is to be a coach for the student. This role represents the motivational dimension through which the instructor supports both learner's professional and personal growth, mostly through guidance towards self-learning process. Coaching emphasizes dialogue, clear objectives, and concise feedback, aiming to shape the learner from a passive performer into an autonomous professional, aware of their own resources (Whitmore, 2017, pp. 9-22). This approach strengthens critical thinking in complex situations, making it easier for the students to go through decision-making process. Studies show that when instructors apply coaching principles, such as guided discovery (finding solutions by going through a scenario by themselves) or post-flight guided reflection, learners improve their ability to correct errors in a timely manner and make better decisions in the future (Salas et al., 2012, pp. 92-95; ICAO 2013, Ch.2, pp. 2-4).

For example, Emirates Flight Training Academy or CAE (Computer-Aided Engineering) are institutions where flight instructors use personalized scenarios for each individual in order to challenge students to find solutions, minimizing direct intervention. This method stimulates personal responsibility and improves self-confidence. Such adaptability to each individual's psychological and cultural profile, complements the role of teacher and leader, adding the dimension of developing professional autonomy and resilience.

Psychologist

In pilot training, the role of psychologist is automatically implied. Besides technical and soft skills, the instructor has to pay attention to the student's mental, emotional and behavioral states. Given the high cognitive and operational stress demand, specific to aviation, the management of these factors needs to be approached as early as the training phase (Salas et al., 2013, pp. 34-40). The instructor-psychologist must be able to identify stress level, anxiety, fatigue or cognitive workload in order

to adjust the pace and complexity of instruction. According to Helmreich and Merritt (2001, pp. 120-124), early recognition of these factors can prevent critical errors and drops in performance. Moreover, the instructor has a responsibility to cultivate psychological resilience, enabling trainees to return quickly to an optimal level of functioning after stressful events (Robertson et al., 2015, pp. 534-536).

This role also requires empathic communication and active listening skills, elements that reduce psychological barriers and encourage students to be open whenever they encounter difficulties (Goleman et al., 2013, pp. 58-77). Emotional expression and stress perception become essential for the success of the training process. While the instructor-psychologist does not replace a clinic specialist, they apply necessary performance and organizational psychology principles in order to observe, interpret and manage critical human factors during flight operations. This role complements both technical and non-technical skills, supporting the emotional and mental balance for a smooth progression of the entire instructional process.

Innovator

One of the most important roles that the instructor has in the flight training is that of innovator, as it reflects the ability to continuously adapt and integrate new technologies, pedagogical methods, and training strategies in response to lessons learned from the past and also the industry's rapid changes. If the leader inspires, the mentor fosters values, and the teacher imparts knowledge, the innovator is the one that uses the necessary tools and approaches to transform the learning process. When we think about innovation, we mostly refer to technology, but the instructor-innovator goes beyond that, by rethinking how training and assessment are designed, adopting active methods such as problem-based learning or adaptive learning (Bellotti et al., 2013, pp. 2-4).

Although technology is not the main pillar, it does support the learning process. The instructor continuously tests hybrid training methods by combining state-of-the-art simulators with collaborative online scenarios to enhance learning efficiency and knowledge retention. In this context, the instructor-innovator plays a double role: first, influencing the student performance, and second, adapting and redefining organizational standards.

When put together, innovation supports leadership by providing up-to-date decision-making tools, enhances mentorship through interactive resources, helps teaching with dynamic modern methods and assists the psychologist role by enabling technologies that can monitor emotional factors in real time.

Risk manager

Lastly, the risk manager is the one role that anticipates, evaluates and controls the variables that might affect safety and performance. By applying the principles of Safety Management System and Threat and Error Management, recognized by ICAO and EASA, as fundamental to diminishing operational risks (ICAO, 2018, pp. 7-14, Ch.2), the instructor must encourage students to continuously be aware of potential risks, contributing to a strong safety culture.

For this reason, after depicting the basic maneuvers of the aircraft, the instructor focuses on engaging students to solve emergency scenarios from simple to more complex situations. Their role is to guide the trainees to rapidly recognize warning signals, make informed decisions, and implement specific measures in real time (FAA, Aviation's Instructor Handbook - FAA-H-8083-9B 2020, pp. 8-12). The risk manager role is applied throughout all phases of training, from pre-flight briefings (identifying potential risks) to post-simulation debriefings (discussing what could have happened), as well as through the use of adapted checklists, hazard analyses and open discussions regarding errors. The risk manager role is not isolated, but functions as a protective layer that reinforces and optimizes effectively all other functions of the flight instructor.

After understanding the eight roles an instructor pilot must fulfill, it becomes clear that each role has its own contribution to future pilots' professional and personal development. Even though their purposes are different, the roles are interdependent and complement to each other, creating a complex yet adaptable educational framework. In order to synthesize and highlight both specific and common elements, the following table presents the key dimensions of each role (*Table 1*).

Table 1: Roles of instructor

Role	Primary Objective	Essential functions	Applicable Methods	Key-moments in training	Necessary competencies
Mentor	Shaping professional values and attitudes	Personalized guidance, behavior shaping	One-on-one discussions, professional storytelling	Early training phases and later when needed	Empathy, practical experience, communication

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Role	Primary Objective	Essential functions	Applicable Methods	Key-moments in training	Necessary competencies
Leader	Inspiring towards safety and performance	Clear vision, resource management	Transformative leadership, LOFT	Complex situations, emergencies, team work	Emotional intelligence, decision-making abilities
Teacher	Knowledge sharing	Structured teaching, adapting content	Theoretical lessons, simulation, practical demonstrations	All phases of training	Pedagogy, clarity, feedback
Moral Evaluator	Maintaining ethical standards	Behavior evaluation, correcting deviations	Ethical conversations, feedback	Moral situation through all training	Integrity, impartiality
Coach	Autonomy development, individual performance growth	Motivation, goals setting	Guided reflection, progress planning	Towards the end of training	Active listening, positive communication
Psychologist	Maintaining emotional and cognitive balance	Identifying stress, emotional support	Psychological evaluation	High intensity scenarios, repeated failures	Empathy, emotional intelligence
Innovator	Introducing new methods	Adaptability to changes, testing and implementing innovative solutions	Simulators, adaptive learning	All phases of training, periodic updates	Creativity, adaptability, technological competencies
Risk Manager	Anticipating, mitigating risks	Hazard analysis, error correction	Emergency simulations	Any phase where risk can appear	Critical analysis, under pressure decision-making

INSTRUCTOR PROFILE

From the analysis of the eight roles of the flight instructor: mentor, leader, teacher, moral evaluator, coach, psychologist, innovator and risk manager; we are able to outline a complex and multidimensional instructor profile, which goes beyond the traditional scope of technical training. Each role contributes to drawing the broader picture of pilot development, starting from the technical and operational skills to non-technical competencies, and cumulating in the consolidation of safety culture, flying performance, resilience and professional ethics. For the instructor, this role diversity offers major benefits, allowing them to adapt and refine teaching methods, address the individual needs of students and further to grow their own professional expertise.

The ideal flight instructor, in our opinion, is a professional who exceeds the boundaries of technical training, by combining mastery of flying skills with the capacity to instill values, shape professional ethics and be able to develop resilience, decision-making under pressure and clear communication. Given that pilot training is divided in multiple training phases due to the complexity of flying programs, these roles can be distributed accordingly, depending on the necessities. Therefore, it can be identified a natural distribution across four proposed instructional levels (Figure 1):



Figure 1: The roles distributed on training phases levels

- 1. Foundation building:** This level corresponds to the initial stage of pilot training, where the focus is on building a solid foundation of theoretical knowledge, basic practical skills and safe attitudes. The dominant roles for this stage are the **mentor, teacher** and **moral evaluator**. While the mentor helps creating a trust-based relationship and supports the students' adaptation to aviation environment, the teacher ensures a clear and updated transmission of fundamental principles. The moral evaluator works on ethical standards and safety culture in early interactions with the trainees. This level allows a smooth transition to aviation and gives students the opportunity to adapt as easy as possible. Also, the mistakes are corrected immediately whilst the feedback is more informative than applied, creating strong pillars for the remainder of the training process.
- 2. Intermediate development:** At this level, the student is already familiarized with the environment, possesses basic knowledge and begins to develop operational autonomy. Central roles of the instructor are those of **coach, teacher** and **psychologist**. The first one guides the student towards self-assessment and continuous improvement, the second one introduces more complex scenarios and situations where the critical thinking gets involved, and the last one manages the stress and pressure associated with more challenging operations. Unlike the first stage, where interaction was preponderantly one-way, the second level allows for more collaboration, stimulating student's capacity to make clear, independent decisions.
- 3. Advanced consolidation:** The student is more comfortable with the environment at this level and is ready to test their limits and ability to respond to increasingly complex scenarios. The main roles that apply to this phase are those of **leader, risk manager** and **psychologist**. The leader creates specific contexts and puts students in situations that require a prompt decision-making process and effective team coordination, the risk manager introduces procedures and advanced techniques to prevent incidents, and the psychologist focuses more and more on maintaining a high performance as the stress levels increase. This stage goes beyond basic elements and involves the full integration of technical and non-technical skills, giving the student the confidence and competences for complex real situations.
- 4. Refinement and leadership:** The highest level marks the transition from trainee to professional status, capable of managing aircraft performance, coordinating with the crew, and most importantly, sustaining personal

performance. The key roles in this case for the instructor are those of **innovator, leader** and **risk manager**. The innovator uses new technologies and methods to optimize and adapt performance to the latest standards, the risk manager goes a step higher into refining the pilot's capacity to anticipate, analyze and manage safety threats, whilst the leader manages to cultivate a strong safety culture and a vision oriented to excellence. This stage of training transforms the pilot into a professional ready to be proactive in creating and maintaining a safe and efficient flying environment.

This four-level distributed structure ensures that by the end of the training process, the student is not only technically proficient but also strategically minded, ethically grounded and capable of thriving the multiple challenges that modern aviation encounters.

CONCLUSIONS

This article brings a conceptual contribution to the aviation literature regarding pilot training, by presenting an integrated approach of the instructor pilot roles in correlation with the developmental phases of trainee, the student pilots. Beyond the descriptive analysis of the eight identified roles: leader, mentor, teacher, moral evaluator, coach, psychologist, risk manager and innovator, the article proposes a four-stage logical structure that encompasses the path the instructor must follow in order to support the student pilots to progress in their educational journey. This perspective redefines pilot training, transitioning from a traditional, one-dimensional view of the instructor (as a mere technical expert or procedural trainer) toward a holistic, well-structured, and contextualized vision that integrates both theoretical and practical training. It is very important to understand that the eight roles presented in the article are present in all stages of the training, except that, and it was specified in the text above, for some levels only a few roles are dominant. Rigorous training could only be achieved if these 8 roles are fully present at every moment. The way in which they are applied depends very much on the skill of the flight instructor.

First, in the existing literature, the flight instructor's role is often reduced to a set of pedagogical and technical responsibilities, without a clear structure regarding the professional progress of the student. This study fulfills this gap by integrating professional education theories (Biggs, Tang, 2011; Brookfield, 1995), educational leadership (Clutterbuck, 2004; Goleman, 1998), and operational risk management (Reason, 1990; ICAO 2013) into a coherent framework for phased application.

This framework allows instructors to differentiate where they need to intervene or not, based on task complexity, decision-making level and the student's degree of autonomy.

Second, the article highlights the need of an equilibrium between the cognitive and emotional elements necessary in aviation training. Incorporating the roles of mentor, psychologist and moral evaluator roles alongside operational and technical ones reflects an understanding of aviation as a domain where safety is dependent on technical skills, but more importantly on human interaction quality and decision-making process. Pilot training must include the development of self-reflective capacity, stress management, leadership and adaptive learning, elements that must align with the progressive involvement of the instructor.

This article, also, creates a new research direction on the relationship between roles of instructor and student performance across diverse cultural contexts. As multicultural aspects gain more attention, the four-staged model, proposed in this article, allows flexibility to adjust methods and approaches according to students' cultural expectations, promoting an inclusive and flexible perspective.

Another possible future direction of research is that of studying the impact in terms of the progress of the initial development of piloting skills in military students at the "*Henri Coandă*" Air Force Academy, the higher military education institution responsible for training, among others, military pilots serving the national defense system. The flight training internships, carried out annually during the four years of schooling, are essential stages for shaping them into exceptional pilots, and the way in which the roles played by the instructor are reflected within the specific levels of the training stages is certainly essential in achieving this goal. The modern aircraft currently in the Romanian Air Force, but also the hope of being equipped with state-of-the-art ones, make us look with confidence and hope that what we have presented in this article will constitute that essential element that will help in a much easier transition from school/training aircraft to modern combat aircraft.

In conclusion, modern pilot training requires multiple and adaptive approaches that can help students meet the current standards of aviation regulations and also to enforce a more rigid safety culture. By aligning the eight identified roles with the four progressive levels of instruction, this article bridges technical mastery with non-technical competencies, ensuring that trainees develop not only operational proficiency, but also resilience, ethical judgment and emotional awareness. Ultimately, it positions the flight instructor as a strong element in preparing the most competent, confident and safety-oriented pilots and also updating the organizational environment to the most recent standards.

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