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# How to Embrace Artificial Intelligence in Aviation Education?

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Artificial intelligence (AI) has recently made significant advancements in the field of writing. It is now being used in academia to improve writing skills, generate research papers, and automate various skills such as critical thinking and problem-solving. This research allows aviation education professionals to understand the use of AI as a writing tool and the different options available in the market, how to incorporate and encourage AI content in the classroom and learn ways of staying ethical.

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The advent of technological advancements has instigated apprehension within various educational domains. Educators have adeptly devised strategies to integrate tools such as calculators, Wikipedia, Grammarly, and similar resources into andragogical practices, enhancing the overall educational experience. Rather than perceiving artificial intelligence (AI) as a problem to be solved, it is prudent to think of AI as the vanguard of learning, demanding high comprehension, incorporation into curricula, and active engagement within the classroom milieu. In this perspective, AI emerges as a novel educational asset that students should be encouraged to scrutinize critically and employ judiciously, ushering in a progressive paradigm for education.

### **Evolution of Aviation Education**

The evolution of aviation education has undergone a significant transformation over the years, driven by advances in technology and a growing reliance on technological tools within the field. This evolution encompasses traditional teaching methods, the increasing dependency on technology, and the crucial balance between human expertise and technological integration. Brady et al. (2001) concluded that aviation students perceive aviation education as "a means of solving problems that occur in the course of life, and learn better in discussion groups than in lecture" (p. 8). Nevertheless, aviation education has traditionally relied heavily on classroom-based instruction and hands-on training. Traditionally, instructors deliver lectures and facilitate group discussions, and students learn through textbooks, flight simulators, and practical flight training. These methods provide a strong foundation in aviation fundamentals, safety protocols, and aeronautical knowledge. In addition, these methods allow students to achieve the required aviation skills required to succeed in flight training (Albelo et al., 2022).

In recent decades, there has been a substantial shift toward technology-driven education in aviation and flight training (Dincer, 2023). For example, the shift has been propelled mainly by incorporating virtual reality as a mode of flight instruction (Thomas et al., 2021; Thomas et al., 2022) and advanced computer systems in modern aircraft (Baral, 2013). Aviation students now need to master complex flight deck interfaces, navigation systems, and flight management computers. Consequently, aviation education has integrated technology-rich tools and platforms to train students effectively. Therefore, maintaining an optimal balance between human expertise and technology is paramount in aviation education. While technology enhances safety and efficiency, it does not replace the need for skilled pilots and aviation professionals. The instructor must emphasize the importance of fundamental airmanship, decision-making skills, and technological proficiency.

### **Current Challenges Related to AI**

The incorporation of AI into aviation education is accompanied by intricate challenges encompassing several domains. These challenges can be categorized into three overarching areas: integration, pedagogical considerations, and expectations management.

Regarding integration, the adoption of AI in aviation education necessitates fostering critical thinking through the strategic use of technologies that combine innovative teaching methods. AI could be used to enhance flight simulators and scenario-based learning in the curriculum. These simulations can expose students to a wide range of challenging scenarios, encouraging them to think critically and problem-solve in real time. It is important to emphasize

that AI is a tool to support decision-making, not a replacement for human expertise (Jarrahi, 2018). Encourage students to evaluate AI recommendations critically, understand their limitations, and exercise human judgment.

In terms of pedagogical considerations, redesigning curricula to incorporate AI elements is multifaceted. Educators face the intricate task of balancing integrating AI-driven content with conventional aviation training methodologies. To optimize learning outcomes, faculty members may necessitate supplementary training to effectively teach AI-related topics and proficiently employ AI tools in their teaching practices (Rivers & Holland, 2022). Moreover, the customization of educational content to suit the individualized needs of students presents an ongoing challenge. AI's potential for facilitating personalized learning experiences demands careful consideration and adaptation of andragogical approaches (Rivers & Holland, 2022).

When it comes to managing expectations, it is imperative to establish realistic outlooks regarding AI's capabilities within aviation education. Discerning the limits of AI while establishing attainable educational objectives is paramount (Zhang et al., 2023). Furthermore, ethical considerations become salient as AI plays an increasingly pivotal role in training, mainly when deployed for critical decision-making exercises and student performance assessments (Zhang et al., 2023). The alignment of the education provided with the evolving requirements of the aviation industry is another dimension of expectation management. Ensuring that graduates possess the requisite skills and knowledge employers demand is a pivotal objective.

### **Key Takeaways**

First, the instructor is responsible for setting the context in which AI can and would be used in the classroom. One aspect of emphasizing the context in which AI could be used is to help the students understand its limitations. While AI is a powerful tool, it can still provide incorrect information and may not always be readily accessible. Conversely, setting the context of AI usage in aviation education emphasizes that students will likely encounter these tools (e.g., ChatGPT) in their professional careers and will be expected to harness them effectively. Therefore, students should learn how to leverage AI as one of their many academic tools, preparing them for future professions where AI technologies are increasingly prevalent. Lastly, the final aspect highlights the risks associated with using AI plagiarism checkers. It warns against the unfair accusation of plagiarism, mainly when content may have been generated by AI, and emphasizes the importance of maintaining a positive instructor-student rapport by not overemphasizing plagiarism detection.

Second, in the quest to promote academic integrity in aviation education, there is a pressing need to reconceive assignments with careful consideration for the integration of AI tools while maintaining academic rigor and ethical standards. For example, AI should be leveraged as a professional tool. Students should be encouraged to assess AI-generated responses for correctness critically. This approach reinforces the importance of independent thinking and empowers students to identify potential inaccuracies in AI-generated content. Instructors should primarily assign tasks requiring students to edit AI-generated responses for correctness. This activity will promote the constructive use of AI by refining the information provided, ensuring students engage actively with AI-generated content.

Moreover, assignments should be crafted beyond AI capabilities. Challenge students to submit assignments in formats that extend beyond the capabilities of text-based AI. For instance, request short video submissions where students visually demonstrate their problem-solving skills, fostering creativity and deep engagement with the subject matter. Alternatively, instructors could also assign tasks that involve the creation of infographics or visual projects. These assignments promote visual literacy and require students to synthesize information visually compellingly.

Lastly, instructors could practice localizing their assignments. Instructors could develop assignment prompts that incorporate local context or real-world applications, areas where AI often struggles due to its generalized knowledge. This practice makes assignments more relevant and encourages critical thinking as students must adapt AI-generated content to specific scenarios. Furthermore, instructors could adapt assignment prompts to align with topics covered in course discussions. This connection ensures that assignments are directly related to the course material and promotes a deeper understanding of the subject matter.

### **Conclusion**

Overall, the paper underscores the pivotal role of AI in reshaping aviation education and highlights the imperative need for a balanced and strategic integration of AI tools into the curriculum. The evolution of aviation education, from traditional methods to technology-driven approaches, has accentuated the significance of maintaining a delicate equilibrium between human expertise and technological advancements. As the aviation industry continues to rely on cutting-edge technology, aviation education must adapt to provide students with the skills and knowledge required to excel in this dynamic field. This transition is accompanied by a set of challenges related to AI integration, pedagogy, and managing expectations. Educators must foster critical thinking, ensure the judicious use of AI as a supportive tool rather than a replacement for human judgment, and address the need for faculty training and personalized learning experiences.

Moreover, this paper emphasizes the responsibility of instructors to set the context for AI usage and educate students about its limitations. Encouraging students to harness AI effectively as a part of their academic toolkit prepares them for future professions where AI technologies are increasingly prevalent. In pursuing academic integrity, the authors suggest a thoughtful preconception of assignments, encouraging students to assess AI-generated content and engage actively with it critically. Assignments should extend beyond AI capabilities, challenging students to demonstrate problem-solving skills through various formats and fostering creativity and visual literacy. Localizing assignments and aligning them with course topics enhances their relevance and encourages critical thinking.

In the ever-evolving landscape of aviation education, embracing AI offers a promising path toward preparing students for the demands of the aviation industry while maintaining a focus on human expertise, creativity, and critical thinking. It is crucial for educators, institutions, and the aviation industry to collaborate and adapt to ensure that AI complements, rather than supplants, the core principles of aviation education. In doing so, one can usher in a

progressive paradigm for aviation education that combines the best of human skill with the power of artificial intelligence.

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