The Future of Learning in Aviation: Are the IATA's Predictions for 2035 Already Visible?

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The aviation industry has always been surrounded by the latest developments in technology and there is far more yet to come. The Industry Affair Committee of the International Air Transport Association (IATA) recently published a report on the future of the aviation industry. The report presents interesting foresights regarding various changes that technology is expected to bring to the industry in less than two decades. The list includes areas of cybersecurity, expanding human potential, robotics and automation, 3D printing and manufacturing techniques, alternative fuels and energy sources, new aircraft designs, alternative modes of rapid transit, and geospatial technology. However, the report also mentions two more changes: Internet of things and virtual and augmented reality.

Training is one of the most important and critical areas for any aviation professional and it plays a non-negligible role in ensuring safety in the aviation industry. Today artificial intelligence and virtual reality have already begun to revolutionize the approach to training through new innovative methods and means, even prior to the predictions of the IATA for 2035. Training programs designed for cabin crews, flight crews, and air traffic controllers are among areas that most frequently use this new training technology. Apart from familiarizing themselves with the theoretical aspects of their profession, these aviation professionals engage in simulations which provide the most realistic reanimation of possible scenarios that could be encountered during on the job operations. While cabin crews are trained for any irregularity in the cabin, the flight crews are prepared for abnormal flight procedures and the air traffic controllers are confronted with various specific situations that they need to successfully negotiate and deal with.

Technology-integrated training is also available for ground crew as well. Ground handling personnel now have an opportunity to simulate and experience a full range of ground operations with the help of virtual reality, and this is a functional complement to theoretical knowledge. Consequently, technology has been an indispensable part of training for pilots, air traffic controllers, flight attendants, airplane technicians, and ground handling personnel.

The sky's the limit was once a perfect idiom for a slogan of any airline but today this slogan needs to be "slightly" modified along the lines of Technology's the limit. The reason for this is that now technology is embedded in civil aviation more than ever and technology is the right tool to go beyond the current limits in civil aviation in terms of ensuring safety. We are no longer limited to what we already know, rather we now have the opportunity to integrate artificial intelligence into our learning environments which allows students to apply their knowledge hands-on in a safe controlled simulated VR environment before actually taking a seat for a real-life flight operation. During any flight safety is not something that can be taken for granted in aviation, mostly because of the human factor, so flight training simulators seem to be the safest way to learn the basics of flying and, of course, getting familiar with a specific aircraft type in a less costly way. Any mistake an air cadet could make throughout the simulation needs only but a restart of the scenario which could have resulted in a fatal accident in real life. In that sense, technology takes pilots beyond the limits of the sky for educational purposes and it is certain its role will become more crucial for aviators in the future.

On the other hand, there are some other important components which make the wheel spin 24/7 in aviation. Flight attendants, for instance, are the ones who do their best to make our flying experience more comfortable. Furthermore, they are the heroes in unexpected circumstances including hijackings, giving birth in the air, unruly passengers, medical emergencies, ditching (emergency water landing), and so on. Although only a small portion of all flight attendants are faced with these situations in real-life, they all need to be well-trained and prepared for such scenarios beforehand. At this point, the required training can be provided with the help of virtual reality solutions. Currently many airlines make use of various VR software including those that provide familiarization with cabin, aircraft, and galley, pre-flight preparations, pre-boarding checks, evacuation, fire, crowd control, suspicious items, cabin security, and ditching. The experiences of prospective flight attendants with such VR-integrated software also has proven the

effectiveness of this type of training when compared to traditional training.

Air traffic controllers are important figures enabling safe flight operations, and they are the ones who always keep an eye on us. Yet, their workload is extremely high and hence their job is ranked among the five most stressful professions. Due to the nature of their profession, air traffic controllers need to be prepared for worst-case scenarios at all times. However, safety cannot be ensured without proper training before they take control of an airspace. So, air traffic control simulations offer great opportunities for prospective air traffic controllers to simulate sample cases which are difficult to replicate in real life and which can quickly turn into a fatal case if not handled properly. Such conditions may include unusual weather conditions, high intensity air traffic, varying runway

configurations, runway incursions, parallel runway operations, and so on. Getting to know the must-dos in such scenarios and demonstrating the necessary skills required to handle them can now be practiced with ease.

In a nutshell, the ways technology has contributed to the training needs of various components of the aviation industry are impressive. Technology, in this sense, does not only give aviation professionals the flexibility to get the proper training regardless of space and time but it also makes the replication of critical scenarios possible for learners. Still, there is much to uncover in terms of technology integration into one more learning environment for the aviation industry: learning Aviation English.

The outbreak of Covid-19 pandemic has had a devastating impact on the aviation industry. The capacity of seats offered

has already decreased by 45% in 2020 and is expected to be around -40% in the first quarter of 2021; the number of passengers flown has drastically decreased by 257m in 2020 and is expected to further decrease by 312m in the first quarter of 2021; and finally airline revenue losses have been recorded to be around $345bn in 2020 according to the latest (as of month) financial report published by the ICAO. When approached from a different perspective, the effects of Covid-19 are not limited to these statistics. Unfortunately, many aviation professionals including pilots and flight attendants have been laid off in the last eight months. Worse than that, the future of the aviation industry is still blurry. Two things are crucial: First of all, the preparedness of pilots and flight attendants for a possible increase in flight operations if the necessary preventive measures can

Trainee pilot is in flight simulator

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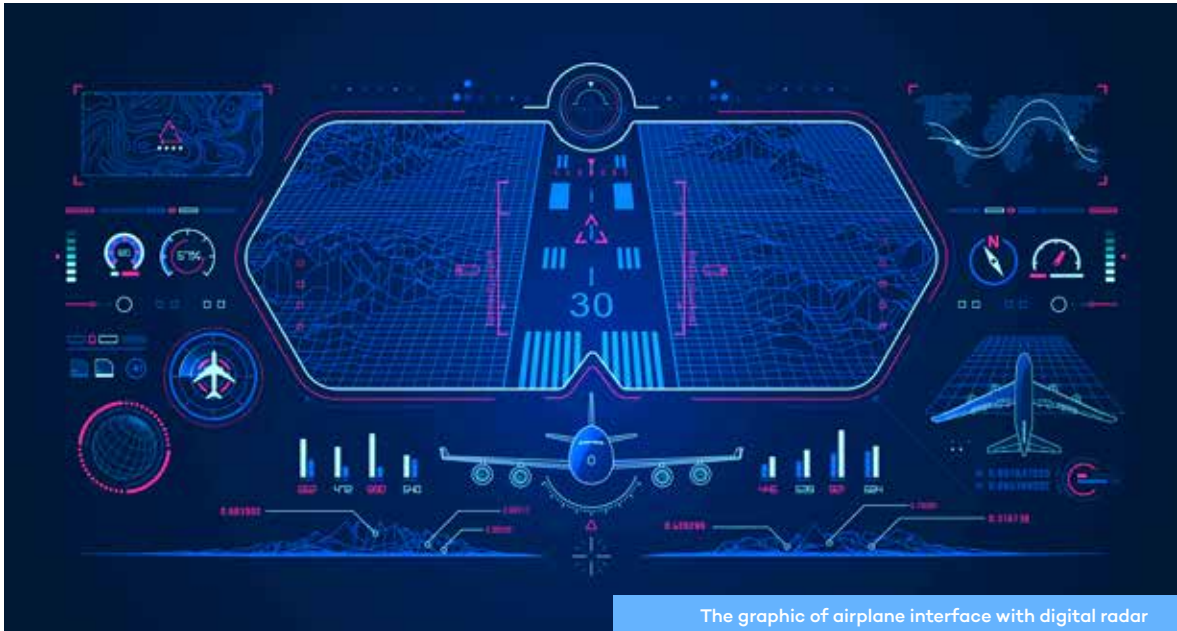
be taken, and secondly the issue of meeting the demand that will be placed on more pilots and flight attendants when flight operations return normal. To ensure the "fitness" of cabin and flight crews for such optimistic predictions for the aviation industry, training will play a key role. No matter when the Covid-19 pandemic will come to an end, once thing is for sure, nothing will remain the same and some transformations are underway in terms of learning environments for aviation professionals.

One change has already been seen clearly in education after the lockdown in various parts of the world. Although preparations for alternative learning environments such as distance education and flipped learning were already taking place before the Covid-19 pandemic outburst, this year it

became a necessity for institutions worldwide to pivot quickly to this remote approach and as a result the year 2020 has us well positioned for a worldwide implementation of such changes. However, what we have seen so far is just the tip of the iceberg. A better understanding of how technology can be further integrated into Aviation English learning/ teaching practices needs to be developed to be able to meet the training demands of prospective aviators in the safest way possible. To do so, two evolving aspects of education need to be discussed in detail: The 21st century learner profile and the latest opportunities that technology offers.

21st century learners are referred to as those having competencies such as digital literacy, collaboration, critical thinking, and problem-solving. These are pretty

much the must-haves for any prospective aviator as well. In this sense, any pilot training should be based on helping cadet pilots attain such competencies and to hone their English language proficiency. The focus of the rest of this article is on the latter. The ever-increasing number of new technologies and their integration into Aviation English teaching environments have made it possible for various groups of learners including pilots, flight attendants, air traffic controllers, airplane technicians, and ground handling personnel to develop their Aviation English proficiency comfortably.

What learners used to see in conventional classrooms such as blackboard and projectors have been replaced by interactive smart boards and VR software offering learners a more hands-on experience towards

attaining the outcomes of any language course. When the ICAO first implemented the new regulations for testing English Language Proficiency, the rating scale included six areas of competency, namely pronunciation, structure, vocabulary, fluency, comprehension, and interactions. The nature of communication by means of the English language requires all aviators to first utilize receptive skills (reading and listening) and then productive skills (speaking and writing). The rationale behind improving the overall quality of aviators' English language proficiency is to minimize the safety issues originating from communication problems. All flight operations undoubtedly require two foremost important skills: listening and speaking. As a result, the focus of Aviation English courses has shifted towards designing the

curricula to meet these types of learner needs.

Now, the number of distance education opportunities for learners of Aviation English has been clearly increased by course designers and language schools. No matter where you live, where you are, participation is now just one-click away, providing access to a variety of distance education learning environments. There are advantages to such changes. First of all, the lack of a native speaker had previously been one of the greatest concerns for learners for a long time. However, as English is now the lingua franca and similarly Aviation English is the lingua franca in aviation, there is no longer a need for a native-speaking Aviation English instructor. Now learners can now choose from many courses offered around the world without any extra cost for a native speaker. The nature of communication during international flight operations also requires the receptive skill to comprehend the air traffic controllers' messages and the number of those who are non-native-speaking ATCOs outnumbers the native-speaking ATCOs. In addition, distance education opportunities also give learners the chance to communicate with learners in the target language for the completion of any task. Existing software such as Microsoft Teams, Zoom, Adobe Connect, and Google Meet all offer great opportunities for

international learners to collaborate. They can either work on a task simultaneously or have a videoconference for the revision of the content; they can enjoy authentic material related to aviation and develop their pronunciation for mutual intelligibility during flight operations. The forced changes in the approach to education imposed by the Covid-19 pandemic have, to a great extent, paved the way for distance education and it has been the impetus for the release of new distance education software with numerous features to learn Aviation English.

However, future changes in teaching and/or learning Aviation English is not limited to distance education software. Apart from playing a major role in complementing theoretical knowledge, virtual reality will most definitely be the game changer in the future. For example, in a virtual shared cockpit, the pilot-in-command can develop his/her communication skill by simultaneously interacting with a co-pilot. Also, the interaction between flight crew and ATCOs can be further practiced in such virtual environments when artificial intelligence technologies are integrated into them. When compared to conventional classrooms where pilots used to listen to the recorded audio and fill-in the blanks to complete the missing information in a sample activity, the evolving technologies can now take such training further ahead

and provide learners with real-life experiences by enabling them to interact with hands-on situations.

It is important here to point out that one of the most significant struggles for cadet pilots or ATCOs is the lack of content knowledge. For instance, the ICAO mandates a standard use of aviation phraseology to avert the possibility of air traffic accidents, but it is not that easy for beginners to learn the phraseology all at once. So, what most of the training centers used to offer in to learn the standard phraseology was just limited to a coursebook and an airport diagram to practice it. However, the industry needed much more than that for safer airspaces with proficient pilots and ATCOs. At this point, technology really is saving the future of aviation with advances that are improving the overall training experience for aviation professionals. With the integration of speech recognition applications and other tools to practice Aviation English phraseology, it is always possible to improve your mental lexicon and your pronunciation regardless of time and place. Today, there are more than 250 applications for speech recognition and the number of applications to practice any set of vocabulary are even more numerous. For these reasons, we can no longer imagine a classroom setting with outdated learning technologies, and we won't imagine a physical classroom setting but rather it is

expected to include various Web 2.0 tools, virtual reality integration, artificial intelligence, and so on.Another significant change can be observed in the assessment process of prospective pilots and air traffic controllers. The most satisfying event for a pilot is most probably the experience of soloing which is traditionally followed by drenching him/her with water. Soloing is the indication that the student can fly without an instructor. From an educational perspective, it is a final assessment by the instructor to approve the competencies of a student to operate an airplane on their own. This often requires a series of training flights which are costly. Many flight schools or aviation academies now are equipped with flight simulators to make prospective pilots familiar with the flight operations and procedures, and to reduce the cost of training. Even the Federal Aviation Administration acknowledges the crucial role of flight simulators and categorizes them as full flight simulators (FFS), flight training devices (FTD), and aviation training devices (ATD). Although the time spent on simulators cannot be counted as flight time, it is most likely that developments in technology will pave the way for such implementations in the near future. More importantly, a further step that we can anticipate in aviation training is the integration of more developed simulators or other

International military-technical forum ARMY-2018. Visitors learn aviation simulator.

technological devices into the assessment process of cadet pilots.

Finally, the future of the aviation industry will be shaped by technology to a great extent as emerging technologies become inevitable components of evaluating the English language proficiency of future aviators. The initial reports presented to the ICAO after the first announcement of the upcoming language proficiency requirements for pilots and air traffic controllers shared the concerns of member states regarding the worldwide implementation of new regulations. Two things were crucial: First, it was not possible to reach so many pilots and air traffic controllers. Second, there was nowhere to accommodate these people for training and/or assessment purposes. Eventually, the ICAO Assembly adopted Resolution A38-8 stating that "any Member State

which finds it impracticable to comply in all respects with any international standard or procedure is obliged to give immediate notification to the ICAO". Hence, putting a new implementation into practice had become quite difficult for the ICAO and they could do nothing to help member states other than give each member state the flexibility to make preparations for the new implementation. However, the ICAO council was not aware of the opportunities that the latest technological developments could offer as a solution to all of these problems which necessitated a commonly shared practice for all parties that are included in the aviation industry.

Fortunately, the past is the best teacher and the industry still has more to learn from it. Amid the fatal consequences of the Covid-19 pandemic, what the ICAO should seriously take into consideration

is alternative ways of assessing the English language proficiency of test takers via online platforms. There are online assessment tools already available and they are being used in many areas of education. So, why not integrate them into ICAO English language proficiency tests? For instance, the Turkey Airline Pilots' Association (TALPA) is one of the accredited institutions in Turkey by the Directorate General of Civil Aviation to assess the language proficiency of pilots. Although these assessment tests last approximately half an hour, they still require the test takers to be physically present in the test center which can be easily replaced by online assessments, and this would give the test takers the opportunity to participate online. Also, the test consists of three parts: one-to-one interaction, audio comprehension, and vocabulary, structure and

pronunciation. These tasks can be easily adapted to online assessment environments and in doing so both the test centers and test takers can reap the benefits of technology to the fullest extent.

All in all, "the only thing that is constant is change" as Heraclitus stated. In a world where we are surrounded by all kinds of technology, change will always be a part of our lives and those who can keep pace with this constant change will flourish rather than just simply survive. What awaits us in the future in terms of new learning opportunities is only dictated by the limits of technology. Conventional methods are rapidly being replaced by innovative technological tools that will inevitably dominate almost all areas of our lives. This is an ideal time for all stakeholders in education, especially those working in the aviation industry, to start proactively integrating more technology into their Aviation English teaching/learning environments. What we have witnessed so far is just a precursor to a more dynamic and engaging future in aviation training if we take full advantage of modern technology in developing and learning platforms and resources. As an industry we had better be prepared for it now, let's not be doomed to fail, let's look towards the future as we equip future aviators with the necessary skills for safety and success 🔵