

New Training Realities

How emerging training technologies could help MRO workforce recovery post-pandemic

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When the novel coronavirus crisis came to a head in mid-March, aviation maintenance technician schools (AMTS) scrambled to transition their lecture-based coursework online as quickly as possible to keep students learning. Some schools with existing infrastructure for remote learning handled this adroitly, working with regulators to make sure coursework met requirements while ramping up its usage. Momentum and morale remained as high as could be expected for a while, but as the pandemic dragged on, “Zoom fatigue” began to kick in.

“The students are revolting” was a

plea delivered from multiple schools to Fulcrum Labs, which provides an artificial-intelligence-driven adaptive learning platform. “People were just trying to shoehorn what they were doing in person into Zoom, which doesn’t really work,” says Craig Joiner, senior vice president for brand experience at Fulcrum Labs. “You can’t just throw something out there. You need a platform that’s going to live up to expectations.”

Joiner notes that studies have shown that students will stay engaged longer if given some choice over their learning experience—even with material they find boring. The concept

behind Fulcrum Labs’ Adaptive 3.0 learning platform, says Joiner, is similar to a video game or a trainer in the gym, where the platform adjusts content based on a learner’s behaviors and performance to produce “optimal challenge.” If the process is too difficult, a student will get frustrated and give up, but if it is too easy they lose confidence that the process is worth their time at all.

“The idea is it’s this learning sweet spot that really keeps people engaged and is pushing and motivating them,” says Joiner. The platform breaks content up into smaller chunks and gives people a choice of how they want to

learn—whether reading, watching a piece of multimedia content or jumping into a practice area to assess their skills. If a student is not performing well in the practice area, the platform nudges them back to content areas in which they are weaker to build up better mastery and confidence.

The idea of building confidence was behind Fulcrum Labs’ existing partnership with the Aviation Institute of Maintenance (AIM) at all of its 13 campuses to prepare students for FAA certification exams. AIM says leveraging Fulcrum’s Adaptive 3.0 learning platform increased the number of graduates sitting for the FAA exams by 25% and consistently improved pass rates to more than 95% over the last three years.

In response to COVID-19, AIM began offering its Adaptive 3.0 learning platform-based airframe and powerplant (A&P) courses to the entire student population to keep them engaged.

“Within the context of the pandemic, the online course has allowed us to spread exam preparation throughout the program for students and allowed them to continue in their program uninterrupted through distance education,” says Joe English, executive vice president at AIM. “What was originally envisioned as a supplement for exam preparation has been adapted to provide full online education for our students.”

Joiner says that for AMTS newly delving into remote coursework, the platform helps instructors keep better track of student performance through actionable dashboards that include data on which students are struggling, where they are struggling and why. “It really provides instructors tools to keep people moving and validate, and with FAA, too, obviously there are a lot of requirements around time tracking,” says Joiner, noting that the platform also tracks how long students are engaged with content.

TAILORED LEARNING

Integra Aerospace, a UK-based blended learning organization founded by a former aircraft engineer and technical instructor, believes tailored content is the key to keeping online learning engaging. Sam Lee, managing director at Integra Aerospace, says most negative

perceptions of e-learning assume it is impersonal and poorly designed as a “quick tick-in-the-box form of complying with regulations.” He notes that while e-learning can be good on its own for things such as exam practice courses, it falls short when students need to apply that knowledge in real-world scenarios.

In a well-designed blended learning course, Lee says foundational level knowledge is delivered in a virtual learning environment before skills-based activities take place in the classroom—whether it is physical or virtual. “Students thoroughly enjoy this type of course, as they can study content before arriving at class. In class, they can engage quicker and better in skill-based activities, rather than sitting and listening to an instructor for hours on end,” says Lee, noting that theory-based lectures delivered via platforms like Zoom are not ideal for keeping students engaged.

Integra Aerospace works with customers to develop tailored blended learning content built into a virtual learning environment, which includes interactive multimedia content such as how-to videos filmed with technicians in the field showing the steps of various maintenance processes. Like Fulcrum Labs’ adaptive learning platform, a major component of Integra Aerospace’s blended learning courses is to enable struggling students to study at their own pace so they can show up prepared, whether it is for a classroom activity or an exam.

Preparing trainees before they set foot in a hangar or touch expensive equipment is a major idea behind the use of augmented, virtual and mixed reality technologies for training. Avatar Partners, which specializes in simplifying complex systems with extended reality (XR) tools such as its Augmented Reality Maintenance Aid (ARMA), has gained traction in the defense industry as a trainer of MRO personnel.

Marlo Brooke, CEO of Avatar Partners, admits that augmented reality (AR) can be expensive and is not always ideal for all training, but it is a perfect fit for tasks with high complexity or high criticality or those that are infrequently performed. Avatar works with customers and their subject matter experts to develop XR train-

ing programs that capture “nuggets of wisdom” from processes that may not even be documented anywhere. Brooke says the company’s products have helped customers reduce training time by an average of 81%

For example, Avatar developed an AR program for engine maintenance, which was tested with a novice technician who had only been on the job for two months and had never encountered the engine type before. “He basically, without ever even seeing this engine before, put on the HoloLens glasses, turned on our AR application and actually went through the entire procedure that normally a Level 7 technician would have to fly in and do,” says Brooke. The system was able to recognize his errors in real time so he could circle back and complete those parts of the task correctly, and he was able to successfully perform the engine maintenance procedure on his first attempt.

“Out the gate, there’s instant return on investment when you’re looking at that kind of performance enhancement,” says Brooke. “What we’ve seen is through these systems we’re actually changing the operational procedures of a company. When you can have a novice do something that an expert would normally have to be flown in to do, that changes the landscape completely.”

RETRAINING POST-PANDEMIC

These types of technologies may prove crucial to the aviation industry once recovery begins, since training disruption is not only affecting students enrolled in A&P programs. With furloughs looming—or already occurring—at aviation maintenance providers during the COVID-19 crisis, workers will need reskilling before coming back on the job.

A recent report by McKinsey & Co. suggests that workers will need to be reskilled to perform their jobs more digitally for the “distance economy” in the post-pandemic era. Joiner notes that COVID-19 also requires retraining workers to perform their jobs safely to prevent the spread of disease. Fulcrum Labs is working with a partner at the University of Utah on a training course that meets Occupational Safety and Health Administration guidelines around reopening safely.

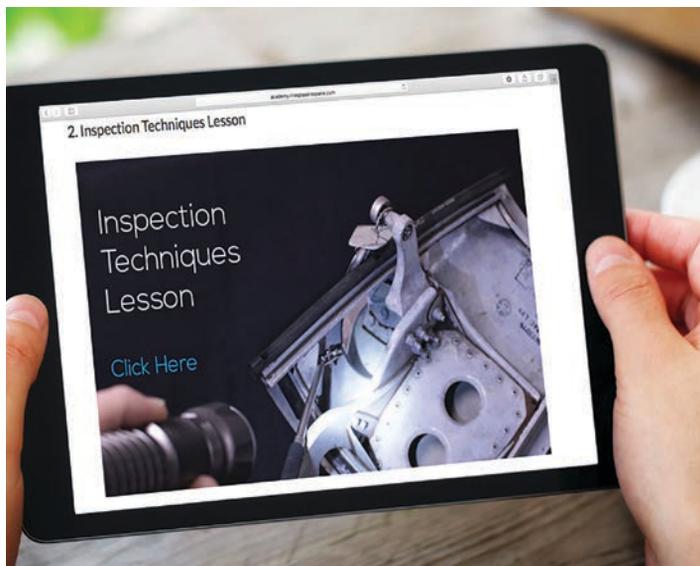


Avatar Partners says augmented reality could reduce training time by more than 81%.

AVATAR PARTNERS

Brooke points out that with so many skilled maintainers retiring during the coronavirus crisis, resulting in a younger workforce that expects to learn differently, augmented and mixed reality provide benefits for both learning new procedures and refreshing existing knowledge. She says technicians using the technology can either operate in a “real-world” mode, where they have a physical asset in front of them and use AR guidance to perform complicated tasks, or in an “open-space” mode, where an aircraft or component is virtualized.

In open-space mode, an aircraft “can be scaled down to their kitchen table,” and technicians can walk through a maintenance procedure and refresh their memory. “That makes the reskilling and retraining process much, much faster,” says Brooke. She says Avatar Partners has been talking with airlines that are gathering research on training technologies, “because they know that once things come back to the new normal in a better way, they’re going to jump on these systems because they’re going to need to save money to keep



INTEGRA AEROSPACE

Blended learning seeks to prepare students before they even set foot in a classroom.

their workforce and business thriving.”

Lee suggests the blended learning approach also would help to address the challenge of retraining technicians as MRO workplaces start getting back to normal. He sees organizations deploying short, competency-based courses involving an element of independent study prior to going back into the classroom or hangar to refresh skills and gauge a worker’s understanding.

Integra Aerospace also offers a digital tool called AMT Logbook (AMTL) that mechanics or students use to log

their maintenance experience, which can be used to monitor their competence as they go through their career. AMTL records training and approvals and pushes suggested training courses to technicians based on their experience and currently assigned tasks. In addition to helping MRO managers monitor the progress and compliance of their teams while determining the best technicians for various tasks, data from AMTL can be packaged and used by individual workers when applying for jobs.

Meanwhile, Joiner expects a technology boom within AMTS post-coronavirus. “What you’re going to see in the future is kind of what we’ve seen during COVID, which was that a lot of these AMTS had a digital component on their road map, but it was sort of on the backburner. What you’re seeing now is an acceleration,” says Joiner. Schools in the U.S. that used funding from the CARES Act to develop remote learning programs will be at an advantage, he notes, particularly because they will no longer be limited to targeting potential students based on their geographic location.