Bridging the Gap Between Real and Artificial Worlds: The Next Generation Classroom

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Students today represent a new generation of learner which requires us to look beyond our tradition training methods. Augmented Reality (AR) has already shown great promise of transforming the way interact with students in any technically driven education such as aviation.

The operation and maintenance of modern aircraft requires an understanding of several interrelated human and machine components requiring practice and immersion. The immersive experience can be enhanced with augmented reality (AR) and virtual reality (VR). Relevant to the task at hand, they both have the ability to alter our perception of the world, give real-time feedback, improve the efficiency of skills transfer and increased knowledge retention. Where they differ, is the perception of our presence.

AR Technologies are currently widely used in the medical and automotive community and have recently been adapted by aerospace industry companies such as Lockheed Martin, Pratt & Whitney, Bell Helicopter, Air New Zealand, TAE Aerospace, Air France, Japan Airlines, Boeing and Airbus.

However, the use of virtual reality VR and AR in the training of pilots is a recent innovation and little research has been published on its efficacy compared to conventional training methods. To evaluate possible benefits for NGAP training, Western Michigan University (WMU), College of Aviation (USA) has integrated an application created by WMU researchers called JetXplore with the Microsoft HoloLens.

The application was developed for operation and procedures training for the CRJ-200 regional jet, B787, A380 and SR20 aircraft which will be compared to traditional training to bridge the gap between the classroom and flight simulation. The interactive JetXplore HoloLens application includes customized scenarios, turbofan engines and 360 degree interactive cockpit to teach aircraft systems, procedures, flows, checklists and malfunctions. Beyond customizing the JetXplore application for the virtual environment a significant goal of this project is to explore subjective task performance to reduce the gap between expensive simulators and the classroom.

The pedagogical material development has been extended to outreach activities and integrate AR micro-simulations in the classroom as interactive 3D knowledge objects. Using Bloom’s Taxonomy in the cognitive domain, 3D learning objectives can be refined to create more meaningful student outcomes and mapped to reflect expected assessment and student proficiency in technology driven training environments.

Companies that rely on engineers and technicians in their workforce stand to benefit greatly from the immersive potential of Augmented Reality and HoloLens. As this potential becomes more and more realized, engineers both operationally and from a training perspective will see their entire industries transformed by Mixed Reality.

Where the traditional learning model leans heavily on memorization and discipline to create uniform, self-reliant students, the educational system must shift the focus from what students learn to how well students can apply knowledge to break barriers, chart their own paths and ignite their own career passions and interests. As we redefine the education environment through technology and innovative learning styles, we can prepare students to meet changing workplace expectations by teaching them how to learn, think and lead.