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Creating a safe and secure world, together

3D VIRTUAL ENVIRONMENT ASTUTE CLASS SUBMARINE

At a glance

› The creation of a fully immersive synthetic environment fully integrated into an end to end training solution has prepared users to be future-ready

› The end result was a powerful learning environment that fully supported blended delivery. The walkthrough demonstrated real value, from the start of the course through to final assessment

Babcock was tasked with designing and delivering an end to end training solution for the Royal Navy for it's Astute Class Submarines.

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The shore based Submarine Qualifying Course (Dry) is the qualifying course that needs to equip trainees with the requisite skills and knowledge to be able to continue their submarine training at sea during the 'wet' phase in a safe, situation aware and competent manner.

The complex and safety critical nature of engineering and operational environments on a new platform can only be addressed by the provision of collective skills and experience. This requires a shift in the approach to training recognising the aspirations and the changing expectations of the individual learner.

The Solution

From the outset, working with the Royal Navy to fully understand the

training requirement was key. Babcock's experienced training design and media development teams began the creation and integration of an ambitious and highly effective 3D walkthrough of the entire Astute Class submarine. Importantly, the appropriateness of the media was shaped by the training requirements, not the other way around; this approach transformed training delivery across the full spectrum of learning styles.

Developed from Computer Aided Design (CAD) data from the submarine build programme, the learning environment quickly gave the trainees a detailed familiarisation of the submarine. The ability to move around the entire submarine and interact with the systems, both instructor led and user driven, ensured the walkthrough formed an engaging tool for learning that could reduce skill-fade.

Hot spots and key learning points are highlighted, with embedded media and interactive scenarios on how to operate specific equipment further enhancing the experience. Scenario modes recreated virtual emergency

situations ensuring trainees instinctively understood operating procedures. A 'Ghost Mode' allowed users to trace and locate complex systems and their components behind panels and through bulkheads which would be impossible in the physical world.

The Conclusion

The creation of a fully immersive synthetic environment fully integrated into an end to end training solution has prepared users to be future-ready. This was achieved by building in the right technology and media mix together with exploiting current pedagogies including adaptive teaching, incidental learning, context-based learning and assessment.

The end result was a powerful learning environment that fully supported blended delivery. The walkthrough demonstrated real value from the start of the course through to final assessment. Described as best in class by the Royal Navy and external auditors, the synthetic approach was, and remains cost effective with tangible operational benefits. The depth of understanding and increased

knowledge retention levels gained ashore now means the time taken for Astute Class Submarine Qualification at sea has been halved by Babcock.

Following the success of the Astute Class 3D walkthrough the attention switched to the development of a walkthrough for the Vanguard Class and Trafalgar Class submarines; encouraging further innovation and continuous improvement in the Astute Class 3D model.

Full gamification of the current VR environments is currently underway. This includes greater use of learning analytics, full stereoscopic support, adaptive layering, and mobile device deployment.

The combination of learning analytics and gamification creates user-tailored learning where single-user and multi-user scenarios can respond dynamically to each user's strengths and weaknesses identified through analytics.

Learners participating in online activities and virtual environments leave a clear trail of analytics data that can be used for learning and behavioural analysis. As the field of learning analytics matures the information will enable continuous improvement of learning outcomes using new sources of data for personalising the learning experience and for performance measurement.

The Strategy

Predicting change in training and education will always be speculative

in nature but changing trends in technology can already be observed. As the physical world increasingly merges with the virtual world, it will be imperative that students have secure and constant access to both the Internet and mobile learning devices.

Babcock's strategy looks at developing and emerging technologies over a timeline out to 2040 and identifies a series of technology enablers. In terms of where technology and media is taking us, fully immersive virtual reality could be achievable within the 2040 timeline. Based on the progressive innovation over the timeline, the virtual space could be so authentic as to be indistinguishable from the real world.

The reality of developing a training strategy is the focus must remain on the full requirement lifecycle. Although technology will play an increasing role in driving the need for and shaping the training we deliver during the 2040 timeline the strategy must still focus on the learning and training outcomes.

Investment in people that are sufficient, capable and motivated, is

essential and will require a shift in the approach to training recognising the expectations of the students and the changing world they live in. Individual and collective training that replicates the full complexity of the operational environment will have a growing role in meeting future training requirements. Virtual and fully immersive training environments could become the only effective and engaging way to build the required emotional quotient and team behaviours allowing trainees to perform effectively in real environments.