What is VR, AR, MR and XR.

VR is a computer-generated simulation of a 3-dimensional space where users or multiple users interact using specialised hardware and software. typically, this consists of VR goggles however also includes gloves or controllers and speakers or other audio equipment.

Augmented reality similar to VR use a 3D computer generated simulation however superimposes onto the user’s real-life environment. finally mixed reality combines the digital and real-world environment, allowing physical objects to be used interactively within the digital platform.

extended reality or XR is the umbrella term for all three of these simulation systems

Early development 2

Whilst the development of VR is not particularly new it's current and future applications are continually changing and companies from various fields are continually exploring new and innovative ways to use and develop XR.

Current uses

Most typically we think of gaming and other recreational activities when we discuss VR, however the training and educational applications are far more prolific. Here we can see an astronaut training for E.V.A. or a spacewalk using VR equipment that has been specifically designed to simulate that activity.

Use by militaries and other training organisations

whilst militaries have used interactive simulation systems to train combatants in near life like scenarios, VR continues to be developed as an additional training resource. The use of any computer generated simulation system provides the ability to review training and actions executed, due to the embedded recording software. Further, any key lessons learnt can be shared with other units.

The immediate benefit of conducting training using an XR platform is the reduction in cost and risk. In the case of combat training, militaries can train their personnel in life threating scenarios, simultaneously removing the risk to their lives. It also gives the trainee a more life like scenario, than previous simulation systems.

In another application, pilots are trained with significantly high flight simulation hours to allow for more training hours, while again reducing cost and risk. Further, the training scenario can be specified. For example, rather than wait for rainy or windy weather, instructors can upload the scenario for the student to practice.

due to the covid-19 pandemic, VR tours have become commonplace, So that people may explore museums, natural artefacts and environments whilst domestic and international travel has been restricted.

These virtual tours can either be created using real life images using specialised equipment to take 360-degree photos or by using computer generated graphics which may or may not be interactive.

Through these tours, students can explore places of interest domestically and internationally, without the cost and risk of travel. Further, these applications can be developed and analysed by students through the digital technologies.

Experience of the user

The feedback from video game users is also indicative of the feedback and preferences of students in the classroom. Many students and adults spend significant portions of their free time playing video games for recreation. Introducing this recreational activity into their space for learning will allow for greater engagement by students, therefore deeper understanding of the content.

Application in education

Through this style of immersion, users are able learn through multiple non-traditional methods that allow for deeper understanding based on their learning preference. Primarily, those that learn best through experiential methods, are likely to gain the greatest benefit, however, visual learners, that may have reading difficulties will also benefit through an alternate delivery style. Auditory learners will be able to maximise their learning through the audio component of the XR hardware.

Applications of XR in education can be through interactive lectures where students are able to interact with the teacher and other students, similar to how they would in a face-to-face classroom.

or through the design of AR games and applications with the phones that students already have access to. Further, these applications can be in any field or area of specialisation the student chooses.

History can take an interactive position, such as the Bombing of Darwin display at the Royal Flying Doctor Service Tourist Facility in Darwin. Where users view and experience flying in a Japanese Zero, swimming through the wreckage and witnessing the mateship of sailors in the water.

Students can use the technology to review game play of sports and other movement skills. Allowing for greater depth of analysis through Physical Education activities, rather than simple 2-d images or video.

XR can be to simulate laboratory experiments, allowing students a risk-free environment to conduct practicals, at their own pace and time, without the constraints and cost associated with expensive equipment. Applications such as Labster can also be taken home to conduct a reflection of the experiment, catchup on missed steps or try new or different techniques.

XR not only gives us access to areas restricted due to cost, but also those restricted due to accessibility, such as into the depths of the ocean or the exploration of Mars. As the role of digital technology increases into all aspects of education and the workplace to a critical point, students and teachers must also adapt to incorporate these new technologies into practice as they become available.

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