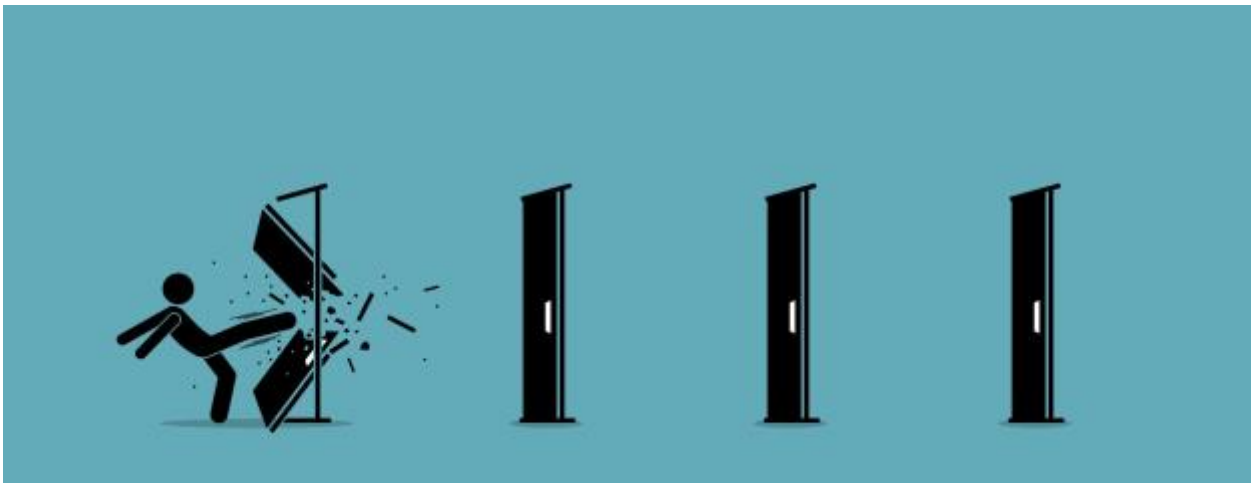
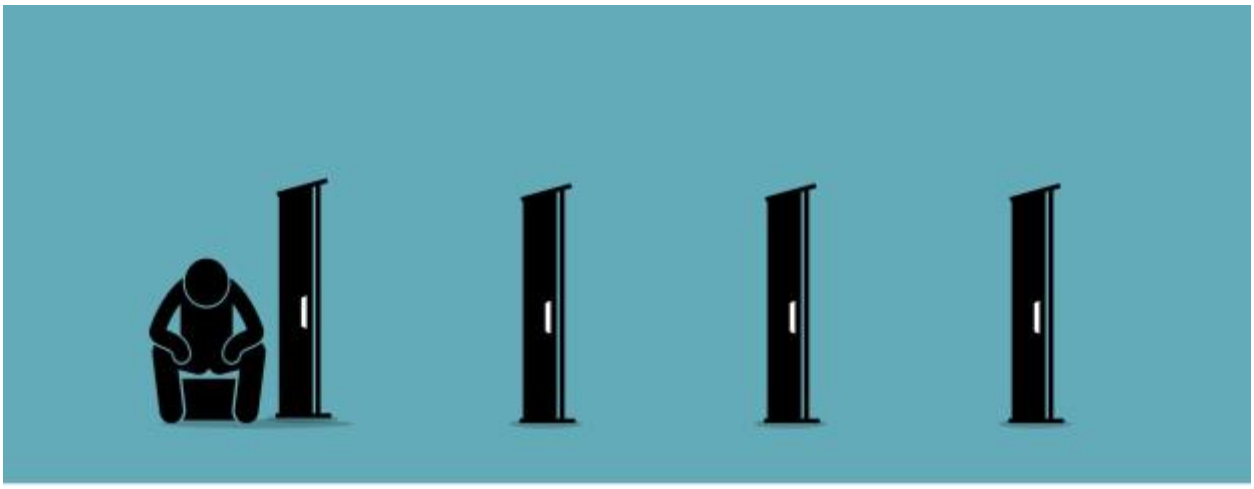


Breaking Barriers With Extended Reality (XR)

- *John Fairhall (j.r.fairhall@bradford.ac.uk)*
- *Application Development Team Leader*
- *Dabble with XR at the University (but do a lot outside of work)*
- *www.linkedin.com/in/john-fairhall/*

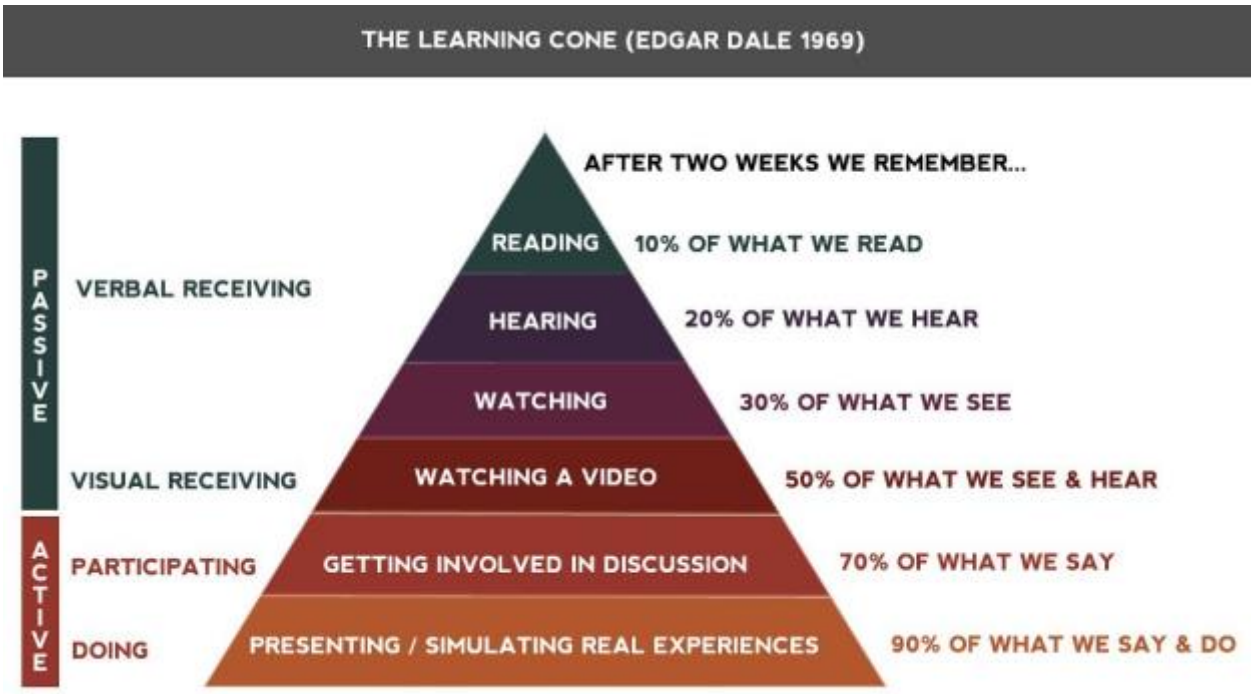
- *Techy / Geek - **NOT** a* chemist*, an* academic *or a* learning technologist!

What are barriers to learning?



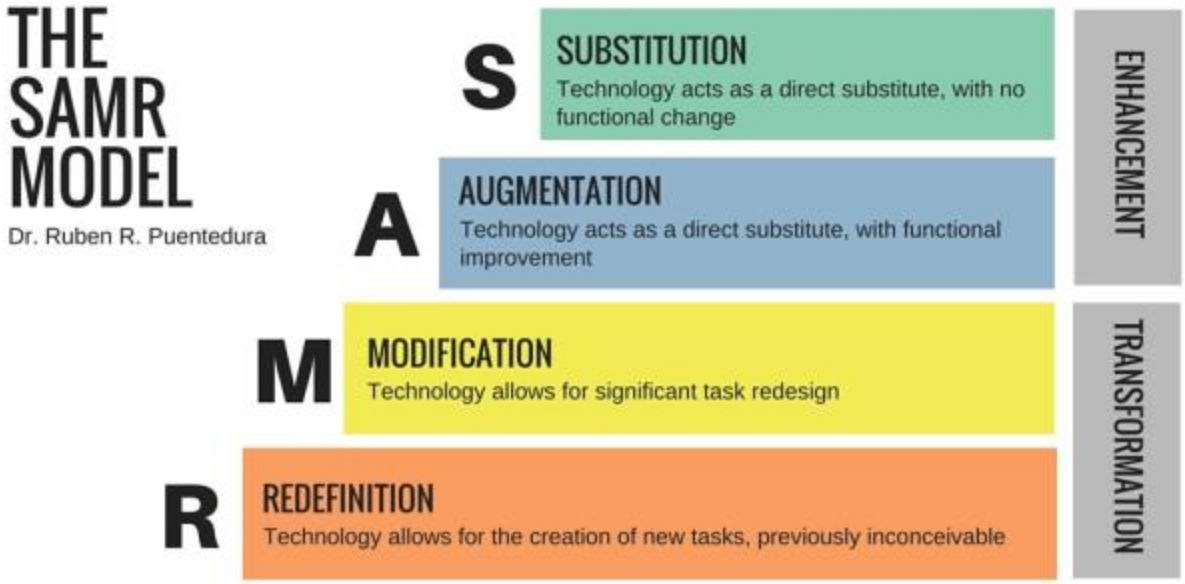
I've found the following to be barriers to my own learning:

- Cost
- Time
- Location
- Disability
- Motivation / priorities
- Environment / distractions

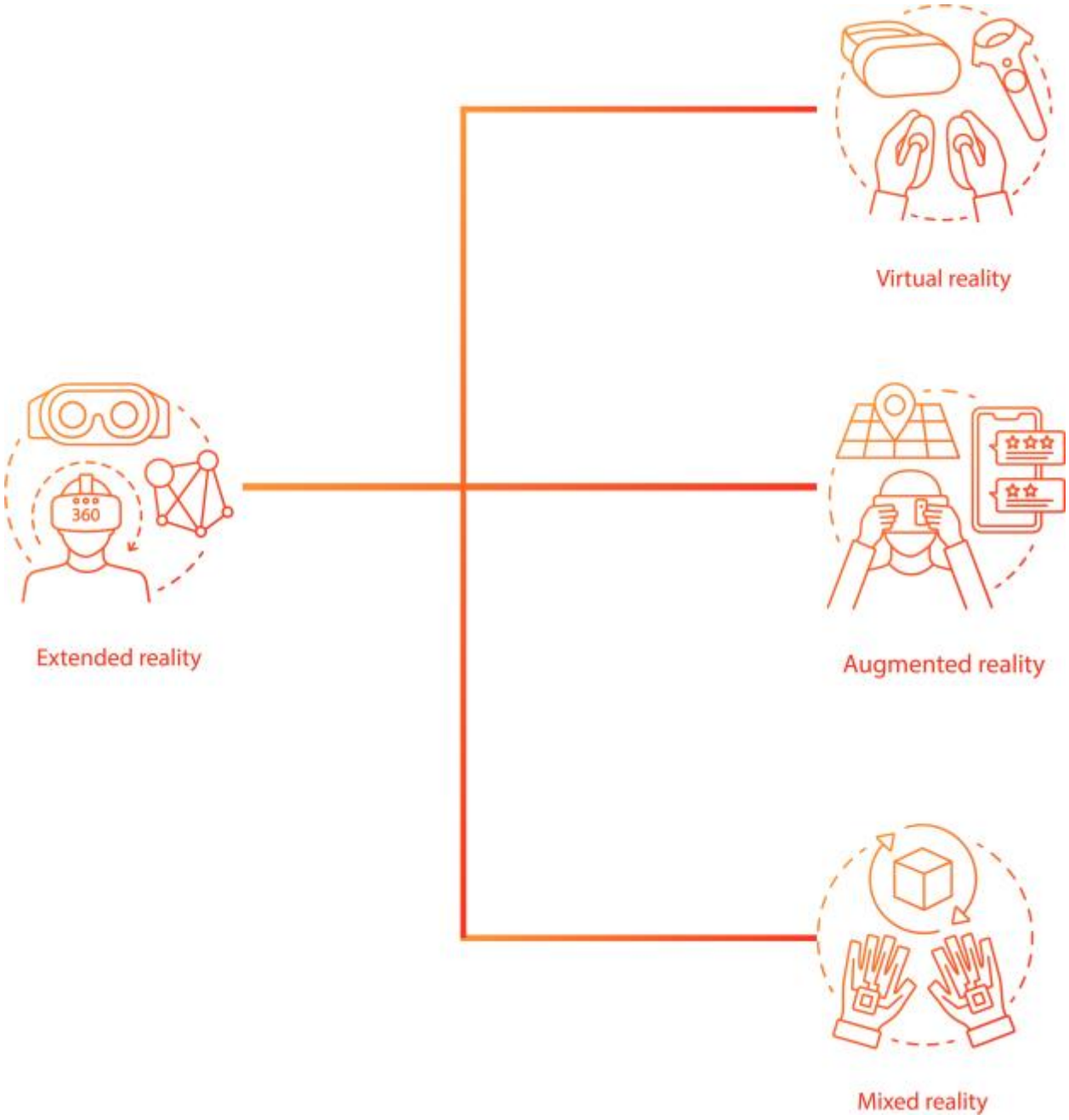


1 -

- *Resources - equipment, space, people, time to do*
- *Safety*
- *Location*
- *Time frame (too fast, different period, etc)*
- *Practicalities: can't be simulated - or the only way to simulate lacks fidelity*



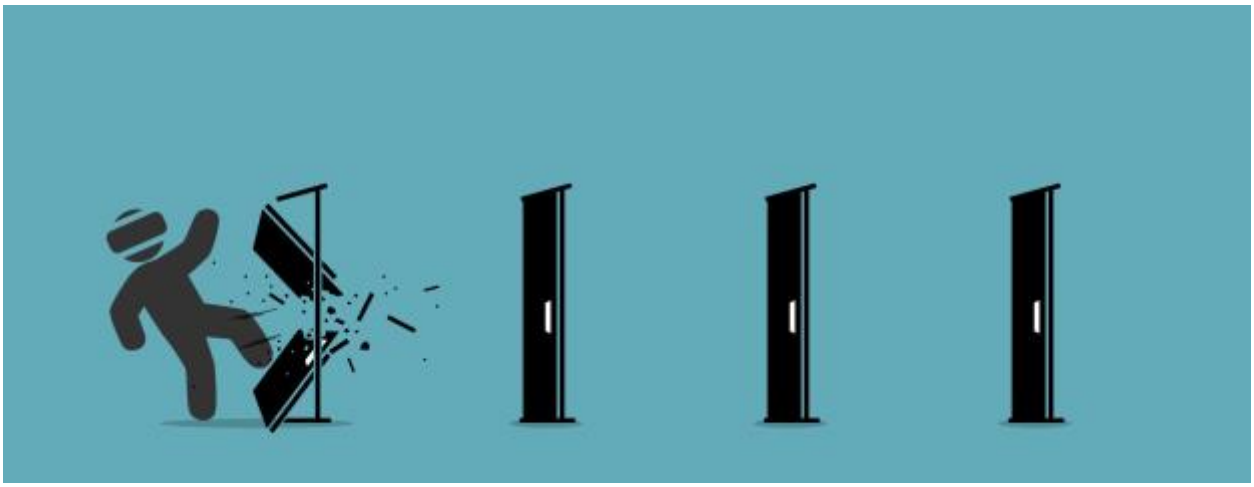
What is 'extended reality' (XR)?



2 - Extended Reality (XR) is an umbrella term for:

- *Virtual Reality - where users are immersed in a computer-generated virtual world*
- *Augmented Reality - computer graphics are overlaid on the real world, typical on the view from a mobile device - for example, Pokemon Go*
- *Mixed Reality - overlay of virtual objects in real-world where the 3D space is scanned so it can respond to the environment - for example, a moving hologram on a table which drops off when it gets to the edge*

Does XR overcome the barriers we talked about?



3 - [HoloLAB Champions](#) has a free academic license

Aimed at teens or high school level chemistry it gamifies lab basics such as learning to safely to use the equipment, measure, etc.

Overcomes barriers such as:

- *Motivation*
- *Safety*
- *Resources*

4 - Nanome is available for free for personal use and $199 per annum for Pro Academic license

- *In the SAMR model is this modifying or transforming a task?*
- *Is it a new way to simulate?*
- *Online collaboration overcomes barriers such as distance*

Accessibility depends upon the specific application

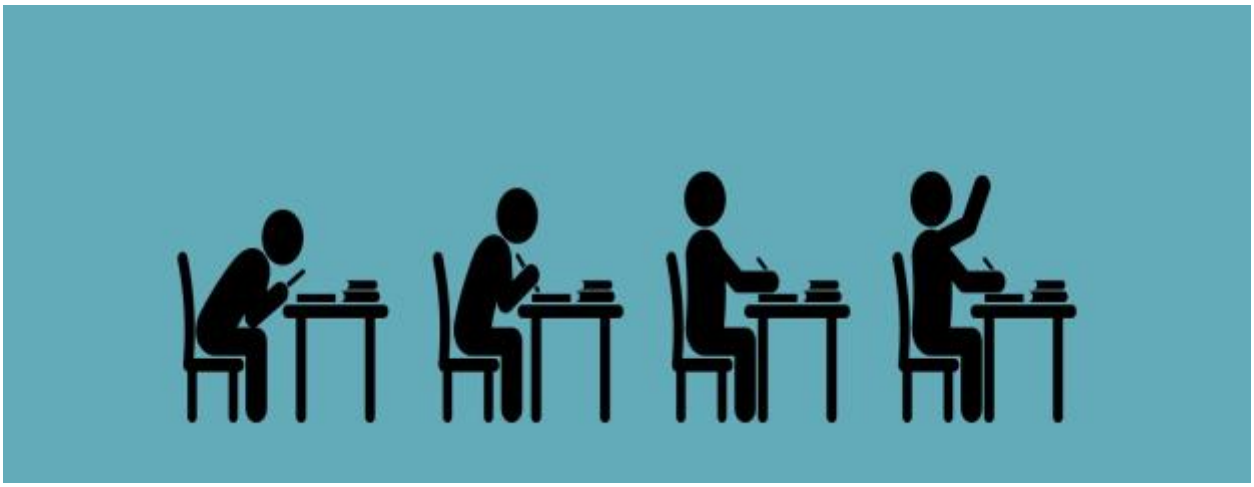
- *Most can be used seated or standing (room scale)*
- *Most have text and read aloud*
- *Virtual reality apps tend to need a degree of dexterity for the controllers*
- *Many Hololens mixed reality apps support voice recognition*

My thoughts:

- XR can introduce new barriers - for example, some people suffer from VR sickness

- Building your own XR applications is possible, but requires skill and time
- XR is a potential game changer if you can find the right services or off the shelf software for your purposes
- There is a lot of XR development happening in the education / training sector - I believe it's not 'if', but rather 'when'

Questions?



Afternoon Session - The Art of The

Health & Safety Essentials for XR:

- Do not use if you suffer from epilepsy, vertigo or other health condition which may put you at risk when using XR equipment
- Warn about VR sickness (like motion sickness)
- Warn about potential for eye strain
- Clean devices between usage with wipes to remove makeup and reduce transmission risk of diseases
- Ensure there is controlled flat space for users without trips hazards
- VR can be particularly isolating for users and it's important that they are in a safe space

Essentials for a VR Setup:

- A good PC with SSD, 16GB memory and a good graphics card. When picking a graphics card select based on what software you expect to be using i.e. many gaming graphics cards are as powerful professional graphics cards but cost a fraction of the price, but they are not compatible with all software! Example: Gaming PC £1K - £2K, Pro Graphics PC £2K - £5K
- VR headset with controllers - buy the brand based on compatibility with the software you want to use. Typically about £1K. HTC Vive Pro seems to be most commonly supported. If purchasing getting the Enterprise version with Advantage not the consumer version.

'Quality of life' VR enhancements:

- Docking station for controllers
- Lighthouse stands
- Stand for headset

VR Apps used today:

- HoloLAB Champions
- Nanome
- Firefox (WebVR) to view Sketchfab models in VR

Things to check out:

- https://gitlab.com/intangiblerealities - Interactive molecular simulation in virtual reality
- https://veer.tv/landing/experience - interactive (hotspot) 360° videos, with a hosting app for most VR solutions
- Nano SimBox https://research.nanosimbox.io/

Mixed Reality / Augmented reality setup:

- Many products available ranging in price
- Current leader is Microsoft Hololens
- Hololens 2 will be released shortly and expected to retail at approximately £3K

Hololens software from today:

- MyLab
- Holostudy

Other Hololens software

- Holocule
- HoloChemistry
- HOLOSChool - Chemistry

Most common solutions for building your own XR apps:

- Unity
- Open Space 3D

Useful services:

- Veer

- Sketchfab