

Of all the emerging technologies currently gaining traction in the brave new world, VR is the one that most excites Colin Welch in the learning sector.

## VIRTUAL THINKING: REALITY OR INSANITY?

**A**lthough innovations from within the learning space are driving significant change throughout the sector – from xAPI to Open Badges to any number of next-generation LMSs – watching developments on the outside, and how they might influence our future, is also an essential part of the work we do.

Thanks to various convergent factors, one development has really caught the eye of us industry observers.

Indeed, Virtual Reality (VR) is approaching take-off point and is set to make a significant disruptive impact in the games market. The Oculus Rift, arguably the first viable consumer-grade VR headset, started life on Kickstarter in 2012 aiming to raise

\$250,000 in funding and went on to raise \$2.5m. Last year, Oculus was bought by Facebook for £2bn.

Samsung's Oculus-powered mobile headset Gear VR hit the market in December, and Oculus' own CV1 headset is rumoured to be set for release this April. Industry insiders are predicting things will snowball this spring.

A report published by advisory firm Sophic Capital in November predicts that by 2018 the VR games market will be worth \$7bn, split roughly 30:70 between hardware and software. The speed of adoption of VR

hardware is set to rival that of the iPhone. VR's gifted but misunderstood cousin Augmented Reality (AR) is also hot on its heels. Last year a group of investors led by



*Early concept art for the consumer version of the Oculus Rift – due spring 2015*

Google ploughed \$542m into Magic Leap, a somewhat mysterious technology believed to be a sort of Google-Glass-on-steroids which projects photorealistic 3D content in the real world within the user's field of vision.

Before we get too carried away with these promises – after all, VR was going to be huge in the '90s remember – it's worth noting that we're talking mainly about the consumer market right now, and while the Rift will soon be available in your local games store, the graphics hardware required to run good quality content is above and beyond what's available on the average office desktop.

It's likely to be a while before learners in corporate environments have the same level of access to this sort of technology as they do to smartphones. VR is sure to bring a whole new level of headache for organisations struggling to establish a BYOD culture!

That said, the fact that Samsung's GearVR has already come to market is testament to the processing power that can now be found in mobile technology and it's possible that mobile VR, which also has the benefit of being untethered, will be the initial distribution channel for a lot of content in the short term.

I'm very excited about the potential applications of VR and AR in learning. Forward thinking learning designers should definitely be looking at the possibilities now. That's exactly what we've been doing at Brightwave...

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#### THEORY AND APPLICATION

It's easy to get carried away with the flash and hype of new technologies and apply them where they're not appropriate, just for the sake of appearing innovative. So it's worth saying now that, even looking far ahead, VR is not going to be required for the majority of learning needs! However, immersive virtual environments can add value in at least these following key areas:

**Where a *sense of presence* is important...** If you've used an Oculus Rift you'll know it's a surprisingly lifelike experience. Once the headset is on, you immediately feel very detached from the real world. Add headphones and 3D sound that moves with the user's head movements and you really start to feel like you're *there*. This level of immersion can be incredibly effective where you need to put people under pressure in a simulated environment in a way that isn't possible with traditional online or face to face learning in groups.

Fire safety training is a good example. We've all experienced fire drills where everyone files calmly out of the office joking with colleagues along the way, or been through Health & Safety e-learning

courses telling us what we *should* do in an emergency. At Brightwave we've been experimenting with VR environments placing the learner inside a simulated burning building – which could be based on your actual office layout – with realistic sound and visibility inhibited by spreading smoke.

Learning impact and real behavioural change can be enhanced with good game design – challenge the learner to find the safest exit route with added time pressure, and add consequences for the wrong choices: if you get in the lift, you plummet to a fiery death!

Running lifelike simulations creates associative links – vivid memories – that are triggered when the VR scenario is re-run in real life. The stronger the sense of presence, the more deeply embedded in the memory these associations are. VR Sims are like the difference between merely learning your lines for a play, and actually rehearsing them on the stage.

**Where real environments for training are hard or dangerous to access...** For practical reasons, certain environments are simply not accessible for learning purposes, especially if you're asking people to learn by doing. Immediate examples would be a chemical plant or a nuclear power station. An excellent VR learning game challenges the learner to assemble a nuclear reactor against the clock – something obviously impossible to attempt in the real world. VR training is already being used to prepare military medics for frontline service.

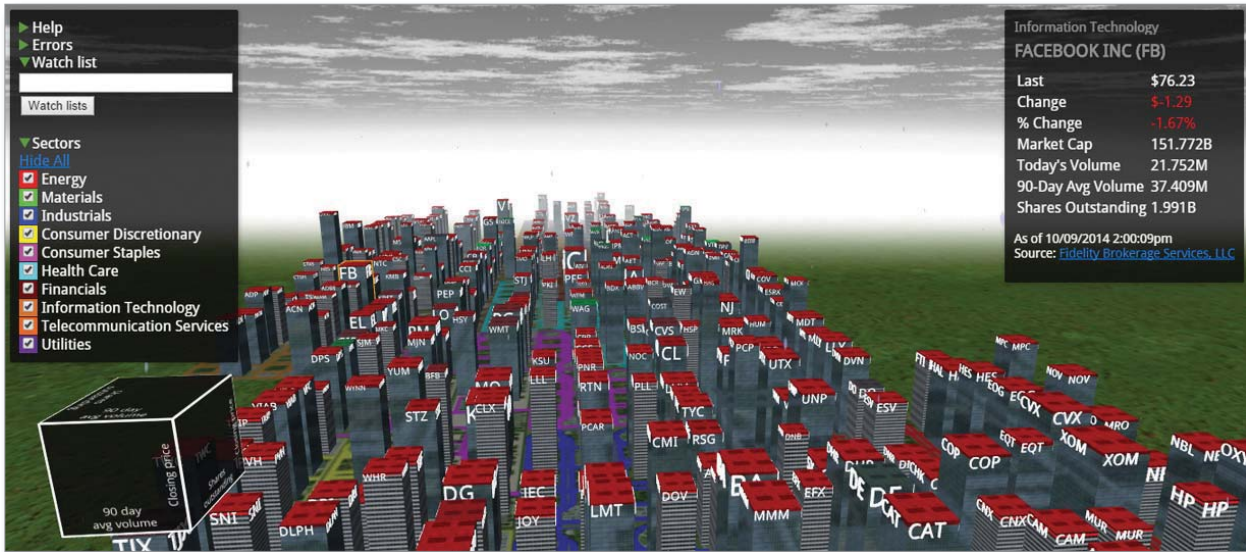
**Where real environments or products don't exist yet...** Virtual Reality is already used by architects to create virtualisations of buildings that don't yet exist. If a 3D model has already been created by the construction firm, it's not that hard to make a VR version for your client to walk around. If your staff need familiarisation with a new building (a factory, hospital or oil rig) on Day One, providing an immersive training experience in advance could drastically improve speed to competency.

The same applies to new machinery, or new products. Imagine if you could not only look at a product, but look inside it, take it apart piece by piece in front of you



Colin Welch explores Triangular Pixels' immersive dungeon puzzle game Smash Hit Plunder





A 'screen-grab' from Fidelity Investments' Oculus app prototype

with just a gesture. Pass-through cameras like the Leap Motion allow you to manipulate 3D models in virtual space with your own hands. The kind of 3D 'holographic' interfaces which are familiar to us from films such as *Iron Man* and *Minority Report* are eminently realisable – within a VR environment.

**BUT ISN'T THIS ALL REALLY EXPENSIVE?**

Well, not as expensive as you might think! While Facebook, Google and games industry heavyweights are throwing millions at high-end applications, there are an equal number of independent developers pushing the technology forward, with interests beyond the sale of games, apps or data. At grassroots level there's a burgeoning cottage-industry of developers sharing their VR experiences and innovations.

In December, Brightwave hosted the increasingly popular VR Brighton meet-up, a vibrant social learning community working on a staggering range of applications – from multiplayer racing games to architectural visualisations and immersive 3D video. This is all happening right now in the VR community, using Oculus development kits, before VR products are even on the mass market.

Thanks to this pioneer spirit, the skills, confidence and vision to implement amazing VR content will be remarkably mature by the time the hardware hits the mainstream.

The enthusiasm and ambition at work in this scene brings to mind the early days of the web itself. I expect the real advances to come from this sometimes wild experimentalism rather than the corporate

arena. Although, to its credit, big money is driving big leaps, especially in the way VR is reconceptualising our interaction with data, which will have huge effects on the way we approach learning design.

Fidelity Investments' prototype Oculus environment (see *screen-grab* above) represents an investor's stock portfolio as towering skyscrapers grouped together by sector, allowing users to survey and fly around a virtual city literally built out of their own money! The streets and structures change shape and size as trading volumes rise and fall.

Imagine walking around inside a spatial representation of your personal learning network, with all of the individual members' inter-connections, trust ratings and qualifications/badges there to see and touch.

**NUTS AND BOLTS**

Most of the VR content I've seen was developed in the Unity 3D games engine – inexpensive software with a large community of developers. The Oculus Unity plugin allows for content developed in Unity to be deployed as a virtual environments on the Rift, so while developers will need to learn the nuances of designing for VR (most notably preventing motion sickness), a lot of the core skills are already out there.

Developing VR is undoubtedly more expensive than developing a typical e-learning course right now. But the costs are only going to come down. And VR is already being used in learning. The World of Comenius project (Google it) has used VR to deliver science training to pupils at a progressive secondary school in the

Czech Republic, allowing students to manipulate atoms and human body parts in 3D space.

While widespread use of VR in learning might feel a long way off at the moment, it's worth remembering that we've only really been delivering learning content on smartphones for five years or so. And if VR hardware proliferates quickly and is as disruptive as the industry predicts, it will be part of the learning designer's arsenal sooner than we think.

Learning is, of course, only one area where VR could have an impact in the workplace. Imagine the possibilities for virtual meetings. Or even working at home in a virtual office environment with your colleagues represented by avatars!

OK, that might be going too far into an impersonal dystopian future, but it raises an interesting point of caution. All of the VR content I've experienced so far has been quite isolating. Because VR environments are so immersive, they also cut the user off from the real world. While that's sometimes beneficial to a learning experience, it's also at odds with the way people learn the majority of the time – informally, and by interacting with their peers.

Before we get carried away in a brave new world of virtualisations, we should be mindful to ensure that we only apply this amazing technology in spaces where it really adds value.

Colin Welch is Head of Production at Brightwave  
[www.brightwave.co.uk](http://www.brightwave.co.uk)  
 Twitter: @BrightTweet