

## Diabetes Care for Nursing Students Simulation Training at Bournemouth University

This month we're featuring one of our latest case studies on developing a simulation for teaching about in-patient diabetes care.

Bournemouth University was interested in "understanding the mechanisms of the effect of virtual technologies on learning"<sup>1</sup>. Daden were asked to develop a training exercise for nursing students on delivering care to deteriorating diabetic in-patient.



BU staff flow-charted the required exercise and then we used our Trainingscapes immersive 3D authoring and delivery platform to rapidly develop the simulation. Some assets were drawn from our existing inventories, and others were developed for the project but added to our generic hospital inventory for other projects.



On arrival in the room students can talk to the duty nurse for guidance, interact with the main items of equipment (including the glucose test kit and blood pressure meter), and also talk to the patient himself. A background audio helps to reinforce the idea of being in a busy hospital.

Research showed that students using the simulation performed "significantly better"<sup>1</sup> in post-testing that those in the control group who used the existing paper exercise. The VR group also had higher mean values for ENGAGEMENT, CONFIDENCE and KNOWLEDGE. The research found that it was "the 'engagement to immersion' pathway which was responsible for leading to higher knowledge scores in the VR group."<sup>1</sup>

The participants have reported that the VR exercise aided understanding of complex concepts, provided immediate feedback to them about their clinical decisions and provided more opportunities for safe practice.

A video walkthrough of the exercise is at <https://www.youtube.com/watch?v=03CAqjK718>.

This is just one of the projects we've done for Bournemouth in recent years and we'll feature other case studies from them in later newsletters – or you can read them now on our website.

<sup>1</sup>*Effect of non-immersive virtual reality simulation on diabetes care for nursing students: A randomised controlled trial. Singleton, H et al.*

"... It really does make you really focused on the situation and it makes it feel a lot more real."

"It is the reinforcement of that learning, and the real time feedback, safely... you can make lots of mistakes and you're not affecting anybody are you?"

"we don't normally get a chance to do that (link theory to practice) until we are in placement"

### Social VR and WebXR



Lockdown has certainly seen an increase in the use of virtual world environments (accessed by PC, mobile or VR headset) for conferences, arts events and socialising. One of my favourites so far has been the Burning Man festival in AltSpaceVR.

Whilst AltSpaceVR has a nice "Second Life" feel to it, potentially more interesting is Mozilla Hubs. This is WebXR based (see last issue), so it runs in a web browser and in a VR headset via its web browser. Authoring is also browser based and using the emerging glb/gltf standard for 3D models.



Whilst some of the avatar graphics might be simpler we've been impressed at what we can import in terms of 3D assets, and it has a good range of in-world tools like presentation screens, screen-share and even 3D writing. The only thing it lacks is scripting.

The key thing though is that accessibility – instant 3D/VR access from any device, no download or even sign-up.

So, if you've got a project which doesn't need any scripting then a Hubs-based solution may be the best way to rapidly reach a large audience and in a fun way – just give us a call if you'd like a demo.

# Immersive 3D/VR and the Training Mix

Method	Fidelity	Environment	Task	Interaction
Physical Training		Complete – if you are in the real environment	Complete – if you are doing the real task	Complete – if you are doing the real task with the real kit in the real way
		Low – if just in the classroom	Medium – if you can't do the whole task due to safety/cost/ethical issues	Medium – if using some sort of analogue, e.g. bananas for suturing/inserting cannulas
Video		High – you see what is in the real world, but you only see what the camera sees, and no real sense of visiting?	Medium/Low – You can see the tasks but only from one viewpoint and usually one path. You can do branched video to explore alternatives but that drives the costs right up	Low – You just see someone else doing it
Video Conferencing		High if a guided tour, but you only see what the camera sees, and no real sense of visiting? Low if from a classroom, lab, home-office etc	Medium/Low – as above, but more likely to be fixed to one viewpoint, but may be able to ask instructor to show you different options/methods – although some locations may make demo impracticable	Low – You just see someone else doing it
eLearning (2D)		Very Low – your PC screen. At most a static image of location with hotspots, or video as above	Medium – can do step by step and/or branching paths thru a task, but nature of UI tends to mean that choices are typically a) constrained and b) spelt out	Low – You just see someone else doing it in video, diagrams or animation
Immersive 3D/VR		High – You can walk around and explore a model of whatever level of fidelity is required. Not the same as actually being there but close. Beware diminishing returns or distraction-candy though!	High – Depending on the authoring you can explore a task in a number of ways. Ideally you have all the resources as you would do in the physical world and its up to you how you use them.	Low, but improving – Currently dominated by point-and-click, but developments in hand-tracking and haptics are beginning to improve on that – but at a £ and complexity cost.

Something we blogged about a [few months ago](#) was Prof. Bob Stone's three fidelities model (environment, task, interaction) and how this could map to video training and eLearning.

In getting ready for the Giant Health event (see right) we've done a bit more work on this and created the matrix above. This is a first stab at trying to map different methods of training/learning to how well they deliver on each of these fidelities. For each cell we've then tried to categorise each method against each fidelity, with High/Green showing it does it well, and Low/Red showing it does it badly.

Of course, the "gold standard" is physical training – but COVID notwithstanding it's not something that is always easily, financially, safely or even ethically delivered – let alone delivering 24/7 wherever and whenever the student/trainee wants. So how do the different methods map against the 3 fidelities (taking physical training as read):

- **Environment Fidelity** – Video is a good solution here, all the more so if you can tell the person recording it where to go (as in a mobile-phone walk-around). Pre-recorded video has the issue that you often want to look around the corner. Whilst Immersive 3D might lose some of the fidelity it does balance this by letting you look anywhere, from any place, and start to build virtual muscle memory. And remember that physical fidelity only counts if you are in the target space – doing it in a classroom doesn't help.
- **Task Fidelity** – This is where Immersive 3D really shines – letting you explore the steps in a task in your own way – without undue prompting and at zero risk and allow quick repetitions. It certainly provides a better approach than most of the other options – and even than the physical model when you can't do the training you need to do for cost, safety or ethical reasons.
- **Interaction Fidelity** – All of the approaches struggle here. Watching a video or slide show of someone doing a fine motor-skills task is not a substitute for doing it yourself. And current Immersive 3D/VR approaches still don't really have the haptics to make it *feel* like you're doing the manipulation – although its improving. A favourite observation was a medic telling me they used bananas to teach suturing as they bruised so easily – so perhaps lo-tech simulations may still be a better bet in the short term.

What's notable is that traditional eLearning and even video conferencing approaches score low for these types of fidelities. They may have their uses in other types of teaching but for skill-based learning people really ought to be considering Immersive 3D as part of their mix – supported by video – if they want to give students the best combination of approaches.

## This Quarter we've also ...

- Delivered the medical/pharmacy skills training exercise we mentioned last issue. It's already been used by two student courses and we'll try and get a case study out shortly. Here's just some of the medical props we now have in our virtual inventory ready for use in your exercises!.



- Completed the extension of another client's immersive training exercise to add some new options at the end to further test student decision making.
- Spoke at the Giant Health event on VR training – video available at [https://youtu.be/2jsUHz0\\_48Q?t=4528](https://youtu.be/2jsUHz0_48Q?t=4528)
- Experimented with some data visualisation in WebXR -read more at <https://dadenblog.blogspot.com/2021/01/immersive-3d-visual-analytics-in-webxr.html>



## Get in Touch!

If there is anything in this newsletter that has caught your interest and you'd like to discuss more just email [info@daden.co.uk](mailto:info@daden.co.uk) or call us on +44(0) 121 250 5678, or visit our website at [www.daden.co.uk](http://www.daden.co.uk). We look forward to talking to you.

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