

Why virtual reality won't replace cadavers in medical school

November 15 2016, by Michelle Moscova



Credit: AI-generated image ([disclaimer](#))

Virtual reality has been described as a game changer for medical education. [Some even predict](#) it will see an end to using cadavers to teach anatomy.

It's a big call but it doesn't reflect the actual reality of medicine and

medical training for a number of reasons.

Remember, we have overestimated the role of new technologies in the past. It seems hard to believe now, but in the 1990s we thought Microsoft's PowerPoint was cutting edge.

The fact is no technology or tool can compensate for bad instruction.

It is why virtual reality, by itself, is not a game changer for teaching medicine, but it can be a very useful tool if we understand how to use it effectively.

Virtual reality in the classroom

We already use digital technologies extensively in anatomy courses. We use [multimedia](#), [games](#), [3-D printing](#) and [medical imaging](#) to engage and teach [students](#) in ways research tells us are most effective.

Virtual reality is just the latest tool. Because it has so many uses beyond anatomy and has a "wow" factor that engages students, companies like Facebook and Microsoft are investing heavily in it.

Microsoft has partnered with universities and developers in the US to create virtual reality-like applications [to teach anatomy](#) and [to simulate medical examinations](#) with its headset HoloLens.

A recent independent application is an immersive 3-D anatomy atlas [Organon 3-D](#), developed in Australia for Facebook's headset Oculus Rift.

Then there are augmented reality applications, which bring virtual reality elements into the real world, like the one from [3D4 Medical](#), which is still in development.

While they are unlikely to entirely take over anatomy teaching, they can make an exciting and very useful addition.

Many tools to choose from

What is widely accepted is that [using multiple tools](#) to teach anatomy produces the best outcome for students. Virtual reality applications can help prepare students before they enter a cadaver laboratory and supplement traditional teaching. This is because they not only show the parts of the body but also clearly indicate spatial relationships.

Students can access virtual reality applications anytime, anywhere, which is particularly useful for distance learners who have limited access to [cadavers](#). It is also useful for senior medical students placed in regional and rural hospitals. It gives them an opportunity to review anatomical structures when they need it most but have little access to on campus university resources.

Virtual reality can also be used to teach students about rare pathologies that are not often seen in body donors.

Beyond all of these advantages, virtual reality is likely to improve the student experience - and this is not a small thing.

Virtual reality holds great promise, but like all new technologies, only time and robust research will tell us exactly where virtual reality best fits in medical programs. As it stands, there are very good reasons why cadavers will remain an important part of medical education.

Why cadavers matter

Anatomically we are all unique; even identical twins are not anatomically

identical. There are so many anatomical variations that encyclopaedias are devoted to them [in print](#) and [online](#).

These variations do not appear in many virtual reality applications, so it's in the cadaver laboratory that students explore these differences and it is here they begin to understand which are clinically relevant.

Students also learn how structures feel and look in reality. In a real body there are no artificial colours distinguishing veins from arteries but students can feel the difference through touch by rolling them between their fingers.

Surgeons use this same sense of touch to distinguish tumour edges from healthy tissues and to feel structures that must be preserved during surgery.

It's also an extraordinary and often profound experience when students hold a human brain in their hands for the first time.

These experiences in cadaver labs help students develop respect for patients. Cadavers are often their first experience with death. Cadavers are, in a way, their first patient.

Cadavers take medical education beyond pure anatomy, generating compassion for the body donor, respect for the gift they made to medical education and they teach students humanity. These are especially important for future doctors.

Teaching anatomy with cadavers works. After 500 years of medical teaching, teaching with cadavers remains the benchmark against which we measure the success of new teaching methods.

Cadavers are used in medical schools [around the world](#), even in countries

where body donation may be inappropriate for cultural or religious reasons.

Virtual reality, like other technologies that can enhance medical education, may one day become common. But I wouldn't want to be the first patient of a doctor whose only experience with anatomy was with virtual reality.

Virtual reality in medicine

While I am not aware of surgeons who trained exclusively using virtual reality, some use virtual reality to personalise surgery.

Surgeons have combined medical imaging with flight simulator technology to create 3-D images of a real patient's brain. They have then conducted virtual "fly throughs" to visualise tumours and nearby structures from all angles, like a "practice run" before [removing the brain tumour](#).

Technologies similar to virtual reality are improving [telemedicine](#) to allow specialist surgeons to assist in surgery performed many kilometres away. New research suggests virtual reality may even help [paraplegics regain some sensation and movement](#).

Clearly, in both medical education and the practice of medicine virtual reality will have a place. We are only just beginning to fully understand its potential. The real test of its value will only become clear over time after researchers evaluate where it is most useful and where its limitations lie.

Like all new technologies, the real test for [virtual reality](#) is how it can improve [medical education](#) and patient care.

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Provided by University of New South Wales

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