



Letter to the Editor

Should Virtual Reality Simulators be used in Undergraduate Ophthalmology?

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To the Editor:

The field of Ophthalmology is well suited to the implementation of Virtual Reality (VR) and Augmented Reality (AR) technologies, due to the fine microsurgical skills required. Most postgraduate Ophthalmology training programmes utilise VR stimulators, such as the EyeSi Surgicaland MicroVisTouch. The Eyesi Surgical is the most extensively assessed VR simulator in the literature for intraocular surgical training [1]. It consists of a mannequin head which contains a model eye connected to an operating microscope. Surgical instrument movement is tracked by internal sensors, and results in a virtual image which can be viewed in the microscope and separate screen. The developed software trains individuals through the steps of cataract and vitreoretinal surgeries, and provides feedback. MicroVisTouch differs from the EyeSi, as it has integrated tactile feedback [2]. Over the last decade, there have been rapid advancements in the technology underpinning VR, and the range of clinical and surgical applications in the specialty are now vast. For example, portable VR devices are being trialled in home environments, to monitor disease progression (e.g. glaucoma). VR based approaches are also being developed for use in the operating room, e.g. the Da Vinci surgical system which facilitates minimally invasive surgeries.

The literature on the use of VR in postgraduate medical education is vast, with numerous studies have specifically assessed the effectiveness of VR in Ophthalmology training. This has helped stimulate research and development into innovative approaches to drive postgraduate education forward. However, the state of virtual reality in undergraduate medical education is yet to be defined [3].

Ophthalmology teaching in medical schools faces a number of challenges, primarily the need for real life patients to practice clinical skills. This can be a major obstacle, and it is unsurprising that junior doctor's confidence in dealing with eye emergencies has been found to be low [4]. Similarly, over a half of senior medical students reported not feeling confident in their ophthalmology-related knowledge, and over three quarters thought their school's approach to teaching the subject to be below par [5]. It is a unfortunate to observe that whilst the specialty is renowned for its technological advancements, this has not translated into its undergraduate teaching.

We believe research is required into tailoring current VR technologies to incorporate them into undergraduate Ophthalmology teaching. Whilst simulators such as EyeSi would be of use to students with an interest in Ophthalmology, their benefit in relation to developing their knowledge and assessment of eye conditions would be limited. A recent study assessed the impact of a novel virtual reality ophthalmology training simulation on medical students, and found it to benefit their learning [6]. In particular theyfound it reduced teaching time from 2 hours to 10 minutes, and that 80% of students felt it improved their confidence in diagnosing eye conditions. VR based ophthalmology training should be on the agenda for medical schools, and close

collaboration with industry and clinicians will ensure medical education keeps pace with rapidly evolving technological advancements.

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