

New system allows trainee doctors to use virtual reality to learn eye examination diagnoses

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Academics have created a new virtual reality tool which allows medical students to replicate eye examinations and learn first-hand how to diagnose hard-to-spot conditions which may otherwise go unnoticed.

The two Birmingham City University academics have been working alongside clinicians at Birmingham City Hospital to create a unique training system, which allows trainee doctors to use a [virtual reality](#) to experience which symptoms indicate health problems.

The new application uses a [mobile phone](#) and a [virtual reality headset](#) to show enhanced, close-up and moveable images of an eye's interior to allow users to learn how to perform the correct diagnostic procedures when performing routine [eye examinations](#).

Eye examinations are one of the early methods used to diagnose underlying conditions such as haemorrhages, diabetes or raised [intracranial pressure](#).

They require a doctor to shine a light directly into the eyes of a patient to look for irregularities in blood vessels or tissue in the back of the eye.

It can be difficult for trainees to find patients with the right ailments for practice examinations, making it hard to learn what key indicators of health issues look like. Examinations over longer periods can also cause

discomfort for patients.

The new virtual reality system will eliminate these issues and allow doctors to use a mobile phone and virtual reality headset to view an array of conditions, spend time over their diagnoses and test themselves on which conditions are present.

It also provides the opportunity to use moving images and 360 views which replicate the conditions of a real-world examination instead of still photographs.

Dr. Andrew Wilson, Associate Professor at Birmingham City University worked alongside Birmingham City Hospital to create the new system. He said: "After speaking with City Hospital, one of their lead clinicians explained the challenges facing trainee doctors around their training for eye examinations.

"The difficulties often come down to the fact that whilst learning how to perform examinations, practice patients can find themselves put through a level of discomfort.

"Those chosen to practice on are also often healthy colleagues which makes it impossible to replicate the conditions needed to identify illnesses.

"Given that identifying key abnormalities in the eyes is also difficult to learn, this can make the process very challenging.

"By creating this system we can give trainee doctors as much time as they need to familiarise themselves with how to perform the appropriate systematic processes, identify which signs indicate [conditions](#) like diabetes or raised intracranial pressure, and eliminate the need for stand-in patients."

The system was produced by Dr. Wilson and Jake O'Connor, coders at Birmingham City University's School of Computing and Digital Technology, in collaboration with Professor David Carruthers, Medical Director at Sandwell and West Birmingham Hospitals Trust.

The project forms part of the work of the Socio-Technical Group in Birmingham City University's Faculty of Computing, Engineering and the Built Environment.

Currently the app is routinely used to support medical education at Sandwell and West Birmingham Hospitals Trust and medical professionals across Europe and as far as South America are already making use of the application too.

A demonstration version is available from Google Play.

Professor David Carruthers, Medical Director at Sandwell and West Birmingham Hospitals Trust, said: "This collaboration has helped develop novel approaches to medical education that is popular amongst students. It allows them to simulate the process of ophthalmoscopic examination of the back of the eye in a systematic way.

"Common pathological changes are also demonstrated which will help with recognition of abnormalities in real patients in their future practice. Future developments may allow simulated examination of other organ systems to support traditional medical training."

Provided by Birmingham City University

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