

"Game changing" medical training platform to deliver unique learning experience

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Credit: Heriot-Watt University

Why do people learn new skills at different speeds?

A revolutionary new medical training aid is addressing this question by blending cutting-edge sensory technology with psychological insight.

Dr. Mel McKendrick, Assistant Professor in Psychology from the School of Social Sciences at Heriot-Watt University in Edinburgh, has created a pioneering eye-tracking device known as Optimal Software, which aims to reduce learning times for [junior doctors](#), [medical students](#) and consultants whilst enhancing [patient care](#).

It works with specially designed glasses, fitted with in-built infrared sensors, capable of monitoring the eye gaze and eye movements of a trainee. This data is simultaneously streamed to an automated analysis software along with video recordings of the training procedure.

As a procedure is carried out, either virtually or in a controlled training setting, the software detects where the learner is looking to accurately determine their understanding of what they are

doing. It does this by carefully measuring where they are focussing and for how long, giving a detailed picture of their attention, their confidence levels and how this is linked to their overall performance.

The technology has been trialled with a team of junior doctors at the Centre for Anatomy and Human Identification, University of Dundee and Perth Royal Infirmary to identify moments when trainees are unsure of a procedure giving teachers immediate feedback.

Dr. McKendrick, explains: "What we want to do is make training accessible for people around the world in order to deliver a hands-on learning experience like no other.

"We have developed an eye-tracking analysis software that allows us to know what a junior doctor is focusing on while carrying out a training procedure within a real-world environment.

"This means we can tell if they are looking at the right areas and for the correct length of time, providing immediate feedback and an invaluable insight into a person's performance.

"This is a novel data driven approach to [medical education](#) that will lead to doctors of the future learning faster but with a greater understanding of what they need to do and help provide patients with an enhanced level of care."

The Heriot-Watt Medical Education Lab aims to create a remote platform that can measure range of sensory metrics to capture cognition and performance, which will be used to predict learning curves based on user profiles.

Professor Marc Desmulliez from the Medical Device Manufacturing Centre at Heriot-Watt University (www.mdmc.hw.ac.uk) describes the eye-tracking software as a 'game-changer' in medical

training.

He adds: "With the increased smartness and miniaturisation of sensors, it is now possible to enhance the learning capabilities of students in all walks of life, especially in critical applications such as those encountered in medical training."

Optimal Software has been developed through Dr. McKendrick's company, Optomize Ltd, and has received the support of medical professionals working in the NHS and cross discipline academics.

Professor Graeme McLeod, Consultant Anaesthetist, NHS Tayside said: "This new technology provides immediate feedback to regional anaesthetists that changes the way training is delivered on high-fidelity simulators and translates clinically to enhanced performance."

The technology has far-reaching potential capable of analysing a raft of different measurements including cognition, perception and performance across critical safety contexts and mental health.

Dr. McKendrick is now working alongside a multi-disciplinary team of scientists to use the technology to develop a hands-on, online learning platform for surgeons treating breast cancer in developing countries.

The project in collaboration with Dr. Ozge Akbulut of Sabanci University, Istanbul and Dr. Sue Down of the University of East Anglia was recently shortlisted for the prestigious Newton Prize, which recognises excellence in research and innovation.

Dr. McKendrick said: "It is a pleasure to be part of an immensely skilled cross disciplinary team working on such an important aspect of medical [training](#)."

"The need to widen accessibility and assess key aspects of skills acquisition is something that the Heriot-Watt Medical Education Lab and Optomize Ltd care deeply about and we hope that with our extensive experience in medical education and eye tracking we can help to make it a very successful programme."

Optimal Software is in the latter stages of development and is expected to be ready for use in the medical sector within the next two years.

Provided by Heriot-Watt University

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