

Computer game helps eye specialists treat disease in children

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(PhysOrg.com) -- An eye consultant has drawn on his teenage passion for computer programming to create a special test to check the vision of children as young as four, in a way that can flag up problems caused by glaucoma, drug side-effects, brain tumours and other conditions.

Mr Tariq Aslam, a consultant at Manchester Royal Eye Hospital and senior lecturer at The University of Manchester, found that it was very difficult getting children to sit still and concentrate while machines designed for adults measured what they could see at the edge of their vision. Crucial information could not be obtained because the children often moved their eyes wrongly or did not respond correctly. This was having an impact on the child's diagnosis and [treatment options](#).

He realised that the ideal way to overcome a short attention span and lack of cooperation was to get children involved in playing a [computer game](#), which would automatically measure their [peripheral vision](#) depending on exactly how they played.

Mr Aslam drew on his teenage passion for programming and electronics to write the software himself to achieve this, after researching [game theory](#) and [psychology](#) as well as taking the advice of children who tried each version. He also designed and built an electronically controlled apparatus which encourages the children to position themselves correctly as part of the whole game experience. The 'Crazy Castle' apparatus that resulted was assessed with the help of colleagues Waheeda Rahman and Peng Tee Khaw at Moorfields Eye Hospital in London, plus University

of Manchester colleague David Henson.

The game console has now been piloted with young patients at Moorfields and proved very popular with the patients and their siblings, as well as achieving measurements that seem accurate.

"We built a large toy castle roughly a metre high," explained Mr Aslam. "A pair of magic glasses is set into the front wall, and when the child looks right through them we know they are in the right position and so a drawbridge in the castle wall electronically opens to allow the child to see and play a game on a screen within. The aim of the game is to track a wizard inside the castle, and press a button to help him squash rogue tomatoes. While concentrating on the wizard in the centre of the screen, they then press a different button if they spot a ghost appearing at the corners. Their reactions are recorded automatically by the software using a laptop attached to the game screen.

"Parents do sometimes worry about their children spending too much time looking at computer screens, but in this case it could potentially help to save a child's sight or give valuable information to help treat their medical condition."

Seventeen children aged four to 14 have tried the test, and given Mr Aslam's team plenty of feedback to help improve the game. Parents have also been very supportive, particularly when the test confirms the extent of their child's visual impairment, so they can help the child manage daily life to avoid accidents and falls.

Mr Aslam added: "The game system has shown great promise in this feasibility study to provide clinically useful information in a way that is accessible and enjoyable for the child with no discomfort or potential for harm. Based on this pilot, we aim to develop the software program and the hardware and to prove it has a greater diagnostic precision and

sensitivity to identify visual field loss than existing tests. Our test would be quicker and more reliable and therefore require fewer hospital resources, as well as being more fun for the children.

“‘Crazy Castle’ does not require expensive equipment, so it could be adopted by most hospitals in the UK, and it is affordable for use in developing countries too. The game-based approach could also be adapted to carry out other eye tests such as checking contrast sensitivity and the sharpness of a child's vision.”

The pilot study was funded by the National Institute for Health Research (NIHR) Biomedical Research Centre for Ophthalmology based at Moorfields Eye Hospital and UCL Institute of Ophthalmology, and the Special Trustees of Moorfields Eye Hospital, and supported by the NIHR Manchester Biomedical Research Centre. The findings have just been published by the British Journal of Ophthalmology, bjo.bmj.com/

Professor Peng Tee Khaw and Professor Graeme Black, the directors of the two biomedical research centres involved, welcomed the results of the research project. “This is a good example of an innovation that will directly benefit patients, which arose as a result of collaboration between two NIHR biomedical research centres,” they said.

Provided by University of Manchester

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