Serious Games Could Be Integrated Into Surgical Training Subject to Validation

Serious gaming can be used to enhance surgical skills, but games developed or used to train medical professionals need to be validated before they are integrated into teaching methods, according to a paper in the October issue of the surgical journal *BJS*.

Researchers from The Netherlands reviewed 25 research studies covering 30 serious games published between 1995 and 2012.

"Many medical professionals may still have a rather out-dated view of the average gamer as being someone who is too young to vote, afraid of daylight and busy killing mystical dwarves in their parent's basement" says co-author Dr Marlies Schijven from the Department of Surgery at the Academic Medical Centre in Amsterdam.

"However, the reality is that the average game player is 37 years-old and there are almost three times as many women using games as boys aged 17 years or younger.

"Although game-based learning is becoming a new form of healthcare education, scientific research on its effectiveness is limited. The aim of this review was to identify the value of serious games for training professionals in medicine and, in particular, surgery."

Nineteen articles discussing 17 serious games specifically developed for educational purposes were identified by Dr Schijven and co-author Dr Maurits Graafland. Many of these covered team training in acute and critical care and dealing with mass casualty incidents, including nuclear events and hazardous materials. Others covered more specific areas of healthcare, such as training for coronary artery bypasses and knee joint surgery and assessing and resuscitating patients with burns.

Six studies assessed 13 commercially available games associated with, but not specifically developed for, improving skills relevant to the medical profession. They included sports, action, adventure and shooting games and were used to help surgeons improve their laparoscopic psychomotor skills.

The authors have made a number of observations as a result of their review. These include:

- Serious games form an innovative approach towards the education of medical professionals and surgical specialities are eager to apply them for a

range of training purposes.
- Further research should define valid performance parameters and formally validate programmes before serious games can be seen as fully fledged teaching instruments for medical and surgical professionals.
- Although a serious game does not necessarily have to be developed for an educational purpose to be an educational tool, such games cannot be seen as fully completed training resources.
- Serious games allow multiple professionals to train simultaneously on one case and allow one professional to train multiple cases simultaneously. These skills are recognised as critical in reducing medical errors in dynamic high-risk environments, such as the operating room or emergency department.
- Serious games can provide crisis resource training, with a large variety of cases, in a relatively cheap, readily available environment that provides a viable alternative to expensive simulators. Serious games also provide training environments for disaster situations and mass casualty incidents, including combat care.
- Games need to be designed to fit into residency teaching programmes if they are to be used as a way of preventing medical errors.
- Simulation and serious gaming represent ideal teaching methods to optimise the knowledge and skill of residents before they are entrusted with procedures in real patients. Educators and games designers should develop serious games that train professionals in order to maximise patient safety.
- Although the cost of developing serious games can run into millions, this investment can be justified in terms of delivering better patient care and preventing errors and insurance companies could play a key role.

"Our review clearly shows that serious games can be used to provide surgeons with training in both technical and non-technical skills" says Dr Schijven. "However, games developed or used to train medical professionals need to be validated before they are integrated into surgical teaching programmes."

The paper can be read free online at:
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