UTILISING 360-DEGREE VIDEO AND 3D IMMERSIVE STREAMING TO IMPROVE SURGICAL TEACHING EXPERIENCE

TANER SHAKIR, MBCHB, BSC, MRCS; MOHAMED HASSOUNA; PETER SNOW, PHD; RUI LOUREIRO, PHD; DANAIL STOYANOV, PHD; MANISH CHAND, MBBS, BSC, FRCS, MBA, PHD

UNIVERSITY COLLEGE LONDON

INTRODUCTION

Our institution has pioneered a new Master's level course aimed at higher surgical trainees. Educational technology has gained huge strides in recent years and we have employed a series of cutting edge technologies, specifically virtual reality (VR) to provide a more immersive and realistic surgical experience. Despite VR becoming more established, limitations remain regarding user experience; mainly usability of the headset and transformation of materials from 2D to 3D. We have created a 3D stream which is displayed within the headset as a 3D video thus mimicking the view of the primary robotic surgeon.

METHODS

The core technology used to achieve this translation from in person to online involves extracting the 3D feed directly from the surgeon's console of the robotic surgical system. This can then be live streamed or viewed offline through a VR headset. The benefits of this are multifactorial. The fully immersive 3D, 360 degree views not only allows the end users to observe a surgical procedure as if they were in the surgeons console, but also in extremely high quality. A web platform facilitates the upload of these procedures that may be populated by an international cohort. This will allow end users to view procedures carried out by world leading surgeons in incredibly high definition, as if having a "surgeon's eye view".









RESULTS

Materials such as additional videos/text can be overlaid in the presentations to allow end users to receive more information whilst the video is playing. Moreover, this has significant ramifications for teaching/examinations. For example, structures may be identified by the user or the interface, in which question and answer style interactions can be added. Furthermore, the live stream aspect offers possibilities for telementoring. Experienced surgeons may be able to "dial in" to a live case, offering support or guidance on aspects such as surgical planes or technique. Additionally, remote access for students may enable participation in clinical surgery dissertation projects; this would signify the first time postgraduate students are given the opportunity to undertake high-quality clinical surgical research from the operating room. Telestration represents the concept of annotation over a video image. Through the utilisation of touchless technology whilst wearing the headset, this may serve as an additional educational adjunct.

CONCLUSIONS

The three dimensional view is an often underappreciated facet of the progression to robotics. Innovative technology allowing users to adapt to these views may be able improve the acclimatisation process. Further data is required for evaluation, however these advances may form part of a blended learning experience in the years to come.