Editorial: New Virtual Reality and Spatial Computing Applications to Empower, Upskill and Reskill Medical Professionals in a Post-Pandemic Era

George Papagiannakis [1,2,3], Manos Kamarianakis [1,3,4]*, Thomas C. Sauter [5,6], Alan Chalmers [7], Joan Lasenby [8], Daniele Di Lernia [9,10] and Walter Greenleaf [11]

[1]Foundation of Research and Technology (FORTH)–Greece, Institute of Computer Science, Heraklion, Greece, [2]Department of Computer Science, University of Crete, Heraklion, Greece, [3]ORamaVR, Heraklion, Greece, [4]Department of Mathematics and Applied Mathematics, University of Crete, Heraklion, Greece, [5]Emergency Telemedicine, University of Bern, Bern, Switzerland, [6]University Emergency Department, Inselspital, Bern University Hospital, Bern, Switzerland, [7]WMG, University of Warwick, Coventry, United Kingdom, [8]Signal Processing and Communications Lab, CUED, Cambridge, United Kingdom, [9]Lab of Action and Body, Department of Psychology, Royal Holloway University of London, Egham, United Kingdom, [10]Humane Technology Lab, Università Cattolica del Sacro Cuore, Milano, Italy, [11]Distinguished Visiting Scholar at MediaX and Visiting Scholar the Virtual Human Interaction Lab, Stanford University, Stanford, CA, United States

Editorial on the Research Topic

New Virtual Reality and Spatial Computing Applications to Empower, Upskill and Reskill Medical Professionals in a Post-Pandemic Era

More than 1 billion jobs, almost one-third of all jobs worldwide, are likely to be transformed by technology in the next decade, according to OECD estimates. In addition, 5 billion people today lack access to proper surgical and anesthesia care and current training models cannot meet this demand. This growing need for continuous upskill and reskill becomes even more crucial in the post COVID-19 pandemic era. Virtual Reality (VR) and spatial computing technologies have the potential to be the next final Frontier regarding medical psychomotor/cognitive training, education and empowerment. VR can provide the means for remote qualitative education (knowledge) and training (skills), using affordable technology with personalized, on-demand and smooth learning curves. Five new key publications in this exciting novel field are presented here.

The first article (Herur-Raman et al.) is a review summarizing efforts regarding the adoption of Mixed Reality (XR) into medical education curricula and simulation labs to help trainees enhance their understanding of anatomy, practice empathetic communication, rehearse clinical procedures, and refine surgical skills. The authors overview the current state of the field of XR technologies relating to medical education and lay out their vision for the next generation of medical simulation labs using XR devices, summarizing the best practices from a Research Topic of experiences.

In (Zikas et al.), the authors present a VR simulation application, available publicly and free of charge, which can be used to train medical personnel and volunteers in properly performing Covid-19 swab testing and using protective measures. The learning procedure is carried out in a novel and gamified way that facilitates skill transfer from virtual to real world. The clinical trial results provided indicate that using VR as an educational tool can yield performance that matches and even exceeds traditional methods.

The enhanced pedagogical contribution that is gained from using VR is further highlighted in (Neuwirth and Ros). In this paper, the authors employ the use of 180° video VR head-mounted displays (HMDs) and a 3D video computer display to teach students stereotaxic surgery

procedures through the point of view of the neuroscientist conducting the procedure. As evidenced by the analysis of the students' reports, both of these two novel approaches increased their rate of learning, their retention of the material, and its translatability.

Apart from its pedagogical significance, VR can prove beneficial when used in creative ways. Such a case is presented in (Vayssiere et al.), where the authors conducted research amongst 161 patients to help them mentally "escape" from the context of hospitalization through complete immersion in VR. The results show improved pain reduction during hospitalization after neurosurgery, with positive effects in anxiety management, neurorehabilitation and psychotherapy.

Lastly, in (Lobachev et al.), the authors show that VR can be used as a mean to enhance productivity and enable new insights in medical sciences and especially microanatomical research. Their work focuses on an immersive visualization solution to quality control, when inspecting and analyzing 3D reconstructions that they perform from serial sections stained by immunohistological methods. The efficiency of visualizing the mesh data in the method they propose brings increased satisfaction to domain experts and helps promote research in this area.

Undeniably, the benefits that VR brings to the medical community, when used as an educational or a representational tool or in other creative ways, can significantly enhance the current state of the art, especially when employed in conjunction with traditional methods. As technology progresses, VR and XR tools will certainly gain more momentum as they become more widely adopted. This research topic aims to serve as a direction and inspiration as to how VR might help shape the post-pandemic world by providing the tools that will elevate medical training and enable more effective, user-tailored empowerment, upskilling and reskilling for the new era.

AUTHOR CONTRIBUTIONS

Conflict of Interest: GP and MK were employed by ORamaVR.

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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