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Letter to the Editor

Beyond the Operating Room: Expanding the Surgical Metaverse Through Collaboration, Regulation, and Patient Empowerment

Más allá del quirófano: Ampliar el metaverso quirúrgico mediante la colaboración, la regulación y la capacitación del paciente

Dear Editor,

We have read with great interest the article by Matwala et al., titled "The Surgical Metaverse" (*Cirugía Española*, 2024).[1] This study delves into the transformative potential of virtual reality (VR) and augmented reality (AR) in surgical practice. The authors provide valuable insights into how these technologies can revolutionize training, pre-operative planning, intra-operative decision-making, and patient care.

In this commentary, we aim to build upon the foundational work presented by Matwala et al., offering focused suggestions that enhance practical implementation and impact, ensuring benefits for both healthcare professionals and patients.

Enhancing practical implementation

Interdisciplinary Collaboration: Emphasize collaboration between medical professionals and experts from the fields of computer science, psychology and education.[2] Psychologists can design VR experiences supporting mental health during training or patient preparation, while educators can inform effective learning strategies leveraging the capabilities of VR.

Patient-Centered Applications: Expand discussions on patient experience, exploring VR applications in pre-operative education, intra-operative communication, and post-operative care. Preoperative VR tours may reduce anxiety, AR can improve surgical precision, and gamified interfaces can assist rehabilitation exercises monitored remotely.

Addressing challenges

Regulatory and Ethical Considerations: Examine the regulatory landscape, including data privacy laws like GDPR[3] or HIPAA,[4] as well as ethical implications around informed consent, remote proctoring, and digital divides based on technology access.

Infrastructure Needs and Accessibility: Discuss the infrastructure required for implementing VR/AR technologies, recognizing resource disparities. Strategies could include partnerships with tech companies, government grants, and community initiatives to ensure equitable access.

Maximizing benefits

Standardized Training Protocols: Establish guidelines for realistic scenarios, performance assessment, and safety measures. Standardization will maintain consistency across programs, enhancing credibility through a certification process.

Continuous Professional Development (CPD): Highlight the role of VR/AR in CPD,[5] offering updates on techniques without travel. Online CPD courses within the metaverse could feature live demonstrations and interactive sessions.

Feedback Loops and Iterative Design: Advocate for robust feedback mechanisms guiding iterative design processes, ensuring technology remains relevant and user-friendly.

Global Health Initiatives: Explore the potential of VR/AR in global health, extending high-quality education and care to underserved regions via telemedicine[6,7] and remote training.

By addressing these suggestions, we can better prepare for the future and maximize the benefits for all stakeholders.

Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this communication, the author(s) used Google Translate in order to polish the language. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

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