

ACS 2024 Surgeons and Engineers: A Dialogue on Surgical Simulation Meeting

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Promoting Technology and Collaboration

Leveling Up Surgical Education: Exploring Collaborations with the Gaming Industry for Innovative Training

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Background: Traditionally, surgical education has relied on didactic methods supplemented by clinical experience. Modern healthcare demands innovative approaches that meld cutting-edge technology with collaborative frameworks. The intersection of the gaming industry and surgical education has recently garnered significant attention.

Technology Overview: The gaming industry's advancements in virtual/augmented reality (VR/AR), simulation platforms, and haptic feedback systems offer unique platforms for surgical education that enhance skill acquisition, decision-making, and teamwork. Leading VR/AR devices like the Oculus-Rift and PlayStationVR offer realistic, immersive environments for trainees to practice complex procedures and overcome the limitations of traditional methods in a risk-free environment. Games also follow an instructional framework with deeply embedded concepts learned by completing tasks. AI advancements allow games to adapt to the player's actions and respond, making tasks more challenging. This was observed in games like "The Last of Us" and "Red-Dead Redemption." For example, the creation of increasingly complex NPCs led to more life-like interactions that tested a user's morals and decision-making.

Potential Application in Surgical Simulation and Education: Surgeons can refine their skills in a controlled manner, accelerating their progression, while developers collect feedback. VR/AR can also expand training to geographically remote areas. Competitive challenges/rewards would engage learners and maintain their motivation, driving continuous improvement. Gaming-based simulations can also replicate challenging cases, helping surgeons develop critical decision-making skills under pressure. Furthermore, precision is vital in surgery. Gaming controllers with haptic feedback can refine fine motor skills. Lastly, advancements in realistic graphics can enhance the authenticity of scenarios.

Potential Opportunities to Collaborate: Game developers can contribute their expertise in creating captivating and interactive platforms, while educators can guide the integration of accurate anatomical and procedural content. Medtronic and NVIDIA's recent collaboration for an AI medical device platform (March 2023) highlights this cross-industry potential, setting a positive precedent for cooperation between these industries.