Virtual ACS 2021 Surgeons and Engineers: A Dialogue on Surgical Simulation Meeting Challenges in Surgical Education

Use of Technology to Address Current Challenges in Surgical Education

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Background: Innovative application of technology into training curricula and instructional methods may enhance the ability of surgeons to provide effective education to their learners, especially in the era of restricted resident duty hours. Simulation is perhaps the most recognizable integration of technology into surgical education, but other solutions such as e-learning, virtual reality, and smart phone applications provide examples of technological application into surgical curricula. Despite the proliferation of technology use in surgical education, however, several challenges remain that may benefit from novel technological solutions.

Current Challenges: To identify current challenges in surgical education that could benefit from the incorporation of technology, we surveyed surgical educators and human factors engineers who work collaboratively in our institution. Participants were asked to provide their suggestions and ideas on challenges faced in education and education research that could potentially be addressed by using technology. Responses were analyzed and common themes identified.

Need of Innovation Introduction: Eight group members responded. Aspects of surgical education that were suggested which could benefit most from integration of technology included ways of streamlining the acquisition and sharing of performance assessment data from multiple domains of skill (technical, nontechnical, affective) particularly by adding automation in data acquisition, collation, and reporting for immediate performance feedback to learners and educators. Areas of education research in which respondents felt technology would help advance the field included creation of higher fidelity simulations, incorporation of augmented reality for improved simulation environments, and development of large databases with training and performance data that enable clinical performance to inform needs for simulator training and vice versa. Additional ideas explored the need for better methods of detecting high individual workload and interventions to monitor and improve trainees' non-technical skills. Identification of such needs for technological intervention can help set research agendas for integrated surgical and engineering research projects in the future.