

Gamification of a Virtual-Reality Simulation Curriculum in Endoscopy: A Randomized Controlled Trial

Michael Scaffidi ¹, Matthew Pearl ², Catharine M. Walsh ³, Peter Lin ⁴, Ruben Kalaichandran ², Rishad Khan ², Kathleen Winger ⁵, Abbas Ali Burkhari ², Claudia Pecoraro ⁶, Bianca Pivetta ⁷, Mandy Yuen ², Jenny Ma ⁸, Mirusha Ramaj ², Raman Kalaichandran ², Samir C. Grover ²

1. Department of Medicine, St. Michael's Hospital, University of Toronto 2. Division of Gastroenterology, St. Michael's Hospital 3. Division of Gastroenterology, Hepatology, and Nutrition, Learning Institute, and Research Institute, Hospital for Sick Children 4. Department of Gastroenterology, St. Michael's Hospital, University of Toronto 5. Gastroenterology, University of Toronto 6. Gastroenterology, St. Michael's Hospital 7. Gastroenterology, St. Michael's Hospital 8. Gastroenterology, St. Michael's Hospital, University of Toronto

✉ **Corresponding author:** Michael Scaffidi, michael.a.scaffidi@gmail.com

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Abstract

Background: Simulation-based training curricula for gastrointestinal endoscopy have been developed and have been shown to be effective. It is possible that these curricula may be further improved. Game-based learning, the application of game-design principles to non-game contexts, has been shown to improve learning and skill performance in medical education. In gastrointestinal endoscopy, however, no dedicated curricula have been developed using game-based learning.

Research Question: What is the impact of game-based learning curriculum using SBT in endoscopy on clinical performance?

Methods: Thirty-six novice endoscopists from the general surgery and gastroenterology programs at the University of Toronto were recruited. Participants were randomized into two groups: the *Conventional Training Curriculum (CTC) Group*, in which participants will receive 6 hours of training on a simulator augmented with expert feedback and interlaced with 4 hours of didactic training on the theory of colonoscopy; and the *Gamified Integrated Curriculum (GIC) Group*, in which participants will receive the same curriculum, using the following applications of game-based learning, including a game-board summarizing participant performance, game narrative, badges for achievement of training landmarks, and rewards for top performance per hour and per end of training. Participants started SBT from a low to high complexity simulators, starting with the bench-top model (1 hour) and then moving to the EndoVR[®] virtual reality (VR) gastroenterology simulator (5 hours). Performance will be assessed at three points: prior to training (pre-test), immediately after training (acquisition post-test) and 4-6 weeks after training (retention test). Assessment will take place on the simulator at all three time points and during two live colonoscopies at the retention test. The primary outcome measure is the difference in clinical colonoscopy performance between the two training groups, as assessed by the Joint Advisory Group for GI Endoscopy Direct Observation of Procedural Skills (JAG/DOPS). Secondary outcomes include

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Results: A preliminary analysis of our findings will be available in September 2017.

Conclusions: Game-based learning has the potential to improve existing curricula for training in colonoscopy. Moreover, the development of a gamified curriculum in procedural skills may have applicability to other specialties, such as general surgery and anesthesiology.

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