

## ACS 2026 Surgeons and Engineers: A Dialogue on Surgical Simulation

O-03

### Research In-Progress

#### Leveraging Scrum Framework for Innovative Simulation-Based Surgical Education: A Retrospective Methods Study

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**Introduction:** Scrum, an agile framework formalized in the mid-1990s, organizes complex product development into short, iterative sprints led by cross-functional teams and widely adopted in software engineering. Simulation development in surgery has typically relied on slow, outsourced workflows. In 2022, our institute embedded a lead software engineer and adopted Scrum to foster continuous, bidirectional collaboration among clinicians, educators, and developers. We describe the structure, processes, and early experiences of this model.

**Methods:** We conducted a retrospective qualitative review (2022-2025) of three flagship virtual reality projects: Emergency front of neck access, Tube thoracostomy, and Anaphylaxis management. Data sources included product and sprint backlogs, burndown charts, sprint retrospectives, and artefact audits. Ongoing data collection includes semi-structured interviews and surveys of surgeons, residents, simulation educators, and the software team. Inductive thematic analysis is applied to artefacts and transcripts to identify facilitators, barriers, and perceived educational impact. Descriptive comparisons are being made with pre-2022 outsourced development practices.

**Preliminary Results:** Artefact review shows a consistent two-week sprint cadence, transparent backlog reprioritization, and progressive user story refinement. Early interviews highlight three provisional themes: (1) co-location removes translation gaps between clinical intent and software implementation; (2) rapid sprint reviews enable real-time alignment of technical tasks with educational objectives; (3) shared ownership of deliverables supports iterative innovation, such as immediate incorporation of anatomical feedback into 3D printed prototypes. Quantitative metrics such as time from concept to prototype are being compiled for historical comparison.

**Next Steps:** We will complete interview coding, triangulate survey data, and finalize comparative timeline and cost analyses. Findings will inform a replicable Scrum implementation toolkit defining roles, meeting templates, and sample artefacts for simulation centers. By aligning healthcare educators with agile principles, we aim to shorten innovation cycles, enhance training fidelity, and support more responsive, learner centered surgical education.



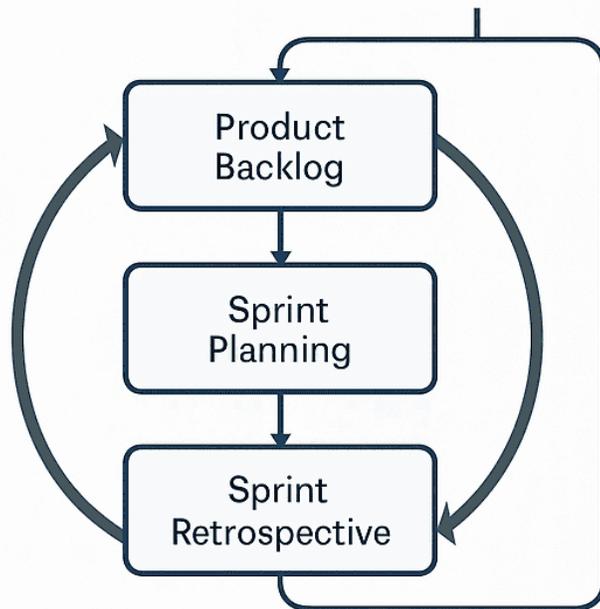
Clinicians



Educator



Software Engineer\*



- Immediate Outputs**
- User Stories Refined
  - Tasks Prioritized
  - Prototypes Developed

**Provisional Themes**



Co-Location =  
No 'Translation Gaps'



Rapid Sprint Reviews =  
Real-Time Alignment



Shared Ownership =  
Faster Innovation