

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

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### Research Abstracts

#### Climbing the Prototype Fidelity Ladder: Unveiling Expert Insights on Central Venous Catheterization Simulator Utility

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**Introduction:** In the past decade, simulation has become the standard in surgical education for complex medical procedures. One medical procedure that has benefited from integrating simulation into training is Central Venous Catheterization (CVC). While the standard CVC training is static manikin trainers that provide practice in a safe environment, they do not teach all the CVC steps or allow surgical residents to practice using all required medical tools. To improve upon standard training, a whole procedural simulator for CVC has followed an iterative prototyping design process, including low-, medium-, and high-fidelity prototypes, as defined by the functionality of the system. The purpose of this study was to determine if the fidelity of the prototype throughout the design process impacts experts perceived utility of the simulator.

**Methods:** Twenty-eight experts (N=28) were recruited from two different medical centers to interact with a low (N<sub>l</sub>=10), medium (N<sub>m</sub>=6), high alpha (N<sub>h1</sub>=6), and high beta -fidelity prototype (N<sub>h2</sub>=6). After the demonstration of the prototype, experts answered an eleven-question, 5-point Likert scale survey ranging from 1 (strongly disagree) to 5 (strongly agree) on their feelings and perceptions on how the simulator would train residents compared to standard methods.

**Results:** A Kruskal-Wallis test showed that there were no significant differences in perceived utility between levels of fidelity for any of the 11 questions on the survey. Across all levels of fidelity, experts' median answer to "You would encourage residents to practice on this simulator" was 5 (std = .685), and the median answer for "This simulator is an improvement over current CVC training methods" was 5 (std = .690).

**Conclusions:** Prototype fidelity did not significantly impact the perceived utility of the CVC simulator. Experts reported that all levels of the prototype would be beneficial over existing training methods.