

Using Technology to Improve Process and System Modality in High-Fidelity Manikin-Based Simulation

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1 Introduction

Using simulation in medical education can improve clinical practice significantly [1]. High-fidelity patient simulators use advanced manikins that are programmed based on complex human physiology and pharmacology mathematical models to create a realistic simulation [2]. A simulation session includes "pre-briefing, simulation scenario, and debriefing" [3]. Integrating technology into medical education is evolving learning methods and pedagogy. However, due to the limitations of current technology, educators usually require clarification about which technologies are helpful based on their needs and how effectively they can integrate them into the learning environment [4]. Studies also highlighted the importance of instructors' role in simulation training, such as developing and managing scenarios and providing feedback and guidance. However, the limited availability of instructors can be a significant challenge [5]. In the PhD project we are working on starting July 2022, we aim to improve processes and help educators manage simulation sessions better using technologies such as proactive systems, automated software, and digital quizzes.

2 Methods

In this project, after investigating previous research, we started simulation sessions of the basic life support (BLS) scenario with undergraduate students in medicine at the University of Luxembourg. We use a high-fidelity manikin, Leonardo, manufactured by MedVision Group¹. After our first experience, we organized the research into four phases: designing scenarios, pre-briefing, simulation, and debriefing. This way, we also try adhering to INCSL standards [6].

3 Results

In the first results [7], we identified the challenges and requirements faced by trainers and students in the initial use of high-fidelity manikins and recommended improvements. We also suggested the necessary steps and framework for developing valid and reliable scenarios. For the project's second phase [8], we focused on pre-briefing. We conducted it using digital quizzes and videos and used INACSL criteria to evaluate and improve the method. In The next phase [9], we

¹ <https://www.medvisiongroup.com/>

explored the requirements for feedback to students in BLS simulation and developed the automated software that

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generates customized and detailed reports of students' actions. Also, considering the limited time and resources in the debriefing session, we had a solution to facilitate self-debriefing by integrating the automated feedback report with video recordings.

4 Future work

Future work will focus on evaluating user satisfaction with the feedback software report and selfdebriefing. Afterward, We will proceed to the most important and last phase of the project, which is working on using proactive systems[10] during simulation sessions to reflect on student actions.

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