Innovating for a Safe Simulation Challenge During a Pandemic: An Avatar Simulation Concept

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Summary Statement: We present a new simulation-based challenge (Sim’Cup) concept, created in response to the COVID-19 pandemic. It took place in 2020, during the European Society of Emergency Medicine and the Société Française de Médecine d’Urgence (SFMU) conferences. Usually, during the conferences, a Sim’Cup is held with onsite participants who are involved in a consecutive series of “face-to-face” simulations organized in 2 qualifying rounds, followed by a final round. When congresses were transformed into online events, the Sim’Cup had to evolve into a virtual format as well. We developed the e-Sim’Cup concept as follows: participants staying safely at home, piloting the trainers, as if they were their own avatar, in a simulation room with a full-scale high-fidelity manikin (Gaumard, Laerdal) using real-time scenarios. Participants gave instructions to the avatars through a smartphone and via a website. Each team participated in 2 scenarios. At the end of each scenario, teams had to undergo a self-debriefing, followed by a short debriefing with the organizers. Twenty-seven participants divided into 9 teams participated in 1 of the 2 e-Sim’Cup events.

We evaluated the impact of this approach using the Educational Practices Questionnaire, and we also analyzed the participants’ perception of their satisfaction and their feelings of improvement with this virtual format. Moreover, we conducted qualitative analyses of the self-debriefings. Thirteen participants filled out the questionnaire, giving a combined high Educational Practices Questionnaire score [72 (66.5–77) of 80], which reflects the presence of educational best practices during the e-Sim’Cups. They appreciated the adjusted Sim’Cup format and believed that they were able to improve their communication, clinical skills, and self-confidence. The qualitative analysis suggested that the approach was perceived as immersive by the 27 participants, with some challenges due to technical problems but an overall feeling of improvement regarding their crisis resource management skills. The hybrid remote simulation concept satisfied the participants who believed that it improved important skills in emergency medicine. The increasing number of remote activities and conferences lead us to believe that our e-Sim’Cup concept can be easily reproducible in any simulation center, as it requires only the application of the educational concept and either the use of the website or the use of some widely available technical devices.

THE PROBLEM

Since 2013, 2 Sim’Cup events have taken place each year during European Society of Emergency Medicine (EUSEM) and Société Française de Médecine d’Urgence (SFMU) conferences. They provided an effective and relevant educational experience in training emergency teams who competed through simulation scenarios. Because of the COVID-19 pandemic, the conference moved to an online format. To maintain this educational and training opportunity, we developed a virtual remote simulation challenge: the e-Sim’Cup.

THE SOLUTION

The educational and technological solution was derived from the avatar concept (a graphical representation of a program user). The learning outcomes were centered on crisis resource management (CRM), focusing on team communication and prioritization. From their homes, the remote multiprofessional team (doctor, nurse, and paramedic) piloted an avatar team, played by the trainers who interacted closely with the manikin in a full-scale high-fidelity simulation scenario. Each remote team participant sent instructions to his dedicated avatar who read it aloud and provided feedback to the participants.

To accomplish this, we developed the https://www.ugts.fr website. The web platform was used to broadcast each simulation session live and enabled communication between participants and avatars. Four profile types were created:

1: Viewer (all). This profile allowed for remote observation of the avatars as they enacted the scenario, and also
displayed the remote team’s instructions and the avatars’ responses (see Figure, Supplemental Digital Content 1, which represents the screen, http://links.lww.com/SIH/A843).

2: Pilot. Remote participants with an onscreen interface to send instructions to their avatar. The 200 instructions available were divided in 5 categories (CRM, care, treatment, feedback, and patient outcome) and could be accessed via a search engine (see Video, Supplemental Digital Content 2, which shows UK remote team piloting avatar, http://links.lww.com/SIH/A844).

3: Avatar. Trainers who received the instructions and communicated with their pilot (see Video, Supplemental Digital Content 3, which shows the avatar team executing the remote participants’ instructions, http://links.lww.com/SIH/A845).

4: Administrator. Authorized to oversee and troubleshoot the pilot’s instructions to their avatars. The website is developed in a synchronic multilingual format, and every instruction is predefined and stored in a database to enable real-time translation into the participant’s language.

We evaluated the e-Sim’Cup educational impact using an English 16-item scale: the Educational Practices Questionnaire (EPQ), designed to measure the educational impact of “simulation programs that are just being established” through the participant’s perceptions. The questions (not initially designed to evaluate virtual simulations) were still pertinent and needed no modification, because they were dedicated to the educational aspects of the simulation. The questionnaire assesses 4 domains: active learning, collaboration, ways of learning and high expectations of the students (see Figure, Supplemental Digital Content 4, EPQ, http://links.lww.com/SIH/A846). For each item, participants rated their perceptions among 5 response options from “strongly disagree” to “strongly agree” (1–5). Total scores emerged from each respondent’s total. Higher score suggested recognition of educational best practices in simulation. Four more Likert questions addressed the e-Sim’Cup’s new format by assessing the participants’ feelings regarding the improvement of their communication skills, self-confidence, clinical practice skills, and satisfaction level of their participation (see Figure, Supplemental Digital Content 5, additional questions, http://links.lww.com/SIH/A847).

Data are expressed in median and interquartile ranges. Then, an inductive qualitative analysis of the autodebriefing contents was performed and 2 independent reviewers analyzed the data to detect common themes. We modified and extended the list of codes as part of the analysis process.

The First e-Sim’Cup: Description and Impact

Each team had to participate in a 1-hour training session with the trainers. Then, they competed in 2 simulation-based scenarios of 12 minutes each. We assessed each team’s performance by rating their instructions using a 35-item score called the PRISM (Performance assessment in Real time for Intensive Medicine: Scale Matrix), validated with 40 emergency teams, by analyzing its interrater reliability. It is divided in the same 5 categories than those used to give avatars’ instructions. The 2 best teams went through to the final. The briefing and scenario were conducted in the same format as traditional simulation sessions. Afterward, each team conducted a modified 25-minute self-debriefing session, followed by a 10-minute collective reflective debriefing together with the trainers. The self-debriefing questions followed the reactions, understanding, summary, take home message framework, and the participants responded using an online questionnaire.

The 2 e-Sim’Cup challenges took place in autumn 2020. During the 2 conferences, 5 countries (Belgium, France, Romania, the United Kingdom, Ukraine) and 4 emergency teams competed with 27 participants (15 EUSEM and 12 SFMU): 8 paramedics, 9 registered nurses, 9 emergency physicians, and 1 emergency resident. Each team completed self-debriefing immediately after their simulation-based scenarios. Thirteen participants (10 from the EUSEM and 3 from the SFMU events) completed the questionnaires (13/27). With the exception of one participant, they all had previous experience in training and/or teaching within a simulation-based practice. The participants’ median age was 30 (27–34).

Participants found the e-Sim’Cup to be a satisfying experience, rating it 5 (4–5) of 5. They also considered this format useful, with a perception of improvement in communication and clinical practice skills [rates of 4.5 (4–5)] and their self-confidence [rate of 4.5 (3.5–5)]. The overall EPQ score was 72 (66.5–77) of 80. All the items had a median score superior or equal to 4, except the material item, which had a score of 3.5 (3–4.25). The analysis of the self-debriefing highlighted 3 themes: (1) deep, stress-free immersion for all teams, (2) some issues due to technical problems (related to difficulties of finding instructions on their phone), and (3) the importance of CRM skills, because of the virtual nature of the challenge and the current impossibility of physically training technical skills in teams. Thus, participants perceived improvement in their team communication, organization, and prioritization thanks to this remote simulation.

LESSONS LEARNED

The innovative e-Sim’Cup facilitated a high-fidelity simulation experience with a high level of realism with participants being remote, safe, and far from a simulation center. Notwithstanding the low SFMU participants’ response rate, the competition seems to have had a positive educational impact. The qualitative analysis suggested strong participant immersion with perceived improvement of their CRM skills. The technical issues have been managed with the addition of a search engine. The concept can be used in 3 manners: deployed in simulation centers, which could adapt it using their own remote tools supervised by technicians and engineers; via our website creating an administrator profile with our agreement; or by asking us to conduct an educational event (as we recently did in a cardiology conference).