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Featured Article

Storyboard Development for Virtual Reality Simulation

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KEYWORDS

virtual reality
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Abstract

Background: Development of virtual reality simulations requires an interprofessional team, but effective communication is inhibited by a lack of structured methods for sharing information. A review of the literature found a paucity of tools available for virtual reality storyboard development. This paper's purpose is to provide an overview of the storyboard process developed by an interprofessional team of researchers studying Neonatal Intensive Care evacuation.

Method: Using Standards of Best Practices in Simulation and Jeffries model as framework, the researchers developed processes and templates for storyboarding.

Results: The outcomes provide a vehicle for simulation development based upon best practices.

Conclusions: The storyboard format that includes objectives, scenes, actions, challenges, redirection and opportunity to debrief, enabled the interprofessional team to build a virtual simulation that is reflective of best practices and the Neonatal Intensive Care evacuation scenario.

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Virtual reality simulation (VRS) has been used as a method of training for various education purposes including subject areas such as mathematics, social science, and health sciences (Freina & Ott, 2015). As an emerging teaching tool, the evolution of VRS offers opportunities for leveraging technology to meet training needs. A collaborative interprofessional team is needed to design and implement these simulations (Dunleavy & Dede, 2014). Although education, content, and technology experts work to develop virtual training scenarios, best practices for simulation must be used. With well-constructed virtual reality scenarios derived from best practices, a safe and controlled clinical setting to practice interprofessional communication and teamwork is created; thereby optimizing the delivery of coordinated high-quality care. The usage of a storyboard is one method of ensuring communication among the interprofessional development team (Van der Lelie, 2006). The purpose

Key Points

- When developing virtual reality simulations, the Standards of Best Practice in Simulation and NLN/Jefferies Simulation Framework should be followed during the storyboard development process.
- Participation of the interprofessional team is essential in designing realistic hospital based education scenarios.
- Pilot testing of the final virtual reality simulation is highly recommended and permits further refinement.

of this article is to describe the methods for VRS development using a storyboard.

Conceptual Framework

In 2005, Jeffries presented a framework for describing, implementing, and evaluating simulations designed as teaching strategies for nurses. The Jeffries (2016) framework has evolved to the NLN/Jefferies Simulation theory which identifies key design characteristics including: objectives, fidelity, problem solving, facilitator responses to participant's interventions, progression of activities, and briefing and debriefing strategies. The International Nursing Association for Clinical Simulation and Learning has also developed standards for best practices in simulation (INACSL Standards of Best Practice: SimulationSM, 2013) that incorporate: needs assessment, measurable objectives, format of simulation, clinical or case scenario, fidelity, facilitative approach, debriefing and/or feedback, evaluation, and participant preparation. These standards guide the development of effective simulations and serve as a guide to the development of our VRS storyboard.

Review of the Literature Related to Simulation Design

The PubMed, CINAHL, and Scopus databases were searched using the keywords of “storyboarding, simulation development, scenario development, scenario planning, and clinical simulation scenarios.” In the reviewed articles, although the importance of storyboarding to simulation development was emphasized, the specifics of how this is ideally accomplished were not well defined. Authors identified effective communication and participation of the staff involved as central to the success of storyboard (Cowperthwait et al., 2015; Harder, 2010; Tweed, 2005; Waxman, 2010).

According to Tweed (2005), storyboard thinking is divided into two phases: creative thinking and critical thinking. In the creative thinking phase the goal focuses on generating ideas that fit with overall simulation objectives, whereas in the critical thinking phase of storyboarding the ideas previously presented are discussed, prioritized, and duplication is eliminated. The result of this process is a finely developed plan of action that provides a framework. Waxman (2010) described an evidence-based clinical simulation scenario template consisting of nine elements: learning objectives, assessment plan and instruments, evidence base for objectives and assessment, prescenario learning activities, general debriefing plan, validation of the content through expert peer review, pilot testing of the targeted population, facilitator role during the scenario, and debriefing following the simulation.

More recently (Howard, 2014) indicated that scenario development for simulations designed for education and training purposes should include just three phases: phase 1: planning and prebriefing, phase 2: scenario implementation, phase 3: debriefing and evaluation. Encompassed in phase 1 are naming the simulation; development of educational objectives; level of fidelity (realism in the scenario) and the necessary supplies/equipment, patient information, embedded actors and roles; and script. During phase 2, the scenario is implemented, and in phase 3, as already described, the participants are debriefed and the educational experience is evaluated.

What is common in the three models is the importance of clearly stated and achievable learning objectives for the simulation combined with a detailed action plan of how this will be accomplished. For the two more recent models (Howard, 2014; Waxman, 2010), preassessment of participant knowledge, a clearly stated debriefing plan, simulation content validated by experts, and a well-described evaluation of the simulation learning experience are fundamental simulation design elements. Although the reviewed literature and the INACSL Standards of Best Practice: SimulationSM (2013) provide valuable information related to storyboard development, greater detail regarding

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