2021-10-29

Facilitating Reflection-in-Action During High-Fidelity Simulation

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Facilitating Reflection-in-Action During High-Fidelity Simulation

by

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A THESIS

SUBMITED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULLFILLMENT OF THE REQUIREMENTS FOR THE

DEGREE OF MASTER OF NURSING

GRADUATE PROGRAM IN NURSING

CALGARY, ALBERTA

OCTOBER, 2021

Abstract

Background: High-fidelity simulation has become common practice in undergraduate nursing education and highly skilled educators are needed to facilitate these complex learning opportunities. Reflective practice is considered an essential step to learning in simulation, starting with reflection-before-action through prebriefing, and ending with reflection-on-action, through debriefing. However, reflection-in-action may be the hallmark of artistry or mastery of a subject. Therefore, undergraduate nursing simulation facilitators need to develop skills to identify and support learners to reflect-in-action.

Methods: I conducted a concept analysis to develop an understanding of the phenomena of reflection-in-action during high-fidelity simulation. I then conducted a descriptive phenomenology study with 11 undergraduate nursing simulation facilitators from eight colleges and universities across Alberta. Participants underwent a semi-structured interview, and Colazzi's seven step process for analysis was utilized to understand the phenomenon of reflection-in-action as experienced by undergraduate nursing simulation facilitators during high-fidelity simulation.

Results: Through the concept analysis, I identified four defining attributes of reflection-in-action: (a) reflection-in-action occurs during simulation scenarios; (b) a critical learning juncture occurs and is identified by the learners; (c) a pause in student action occurs; and (d) knowledge sharing through discussion. The experiences of the participants aligned with the findings from the concept analysis. Participants in the study were experienced simulation facilitators. Despite this, they had little formal training regarding reflection-in-action. Participants were able to identify reflection-in-action during high-fidelity simulation when students paused, collaborated, shared their thinking aloud, and changed their course of action. Barriers to reflection-in-action

included learner fear and anxiety, poor simulation design, and inadequate preparation. Participants supported reflection-in-action through prebriefing, remaining curious, and providing cues, prompts, or facilitated paused. The benefits of reflection-in-action include collaborative learning, building confidence, critical thinking, and embedding reflection into practice.

Conclusions: Phenomenological exploration of experiences of participants was able to add insights to enhance understanding of a poorly defined subject. The insights from this work may enhance simulation facilitator's ability to effectively support reflection-in-action within high-fidelity simulation. These findings may contribute to theory development, checklists, and decision trees to support the facilitation of reflection-in-action during high-fidelity simulation.

Keywords: nursing, education, simulation, reflection, reflection-in-action

Preface

This master's thesis is a combination of published manuscripts and original works to explore current understanding of reflection-in-action during high-fidelity simulation and the lived experience of undergraduate nursing simulation educators use of reflection-in-action during high-fidelity simulation. Chapter 2 has been published as, Mulli, J. Nowell, L., & Lind, C. (2021). Reflection-in-action during high fidelity simulation: A concept analysis. *Nurse Education Today, 97*, 1-7. http://doi.org/10.1016/j.nedt.2020.104709. Appendix A includes an email of permission from *Nurse Education Today* and from the co-authors Dr. Lorelli Nowell and Dr. Candace Lind for inclusion in this thesis. Chapter 4 has been submitted for publication to *Nurse Education Today*.

This research is covered by ethics certificate #REB20-2085, issued by the University of Calgary Conjoint Health Ethics Board for the project "Facilitating Reflection-In-Action During High-Fidelity Simulation" on January 26, 2021 (See Appendix B). Furthermore, this research is funded by the Western Region Canadian Association of Schools of Nursing (WNRCASN) 2021 Graduate Student Grant (see Appendix C).

Acknowledgements

Firstly, I would like to express my sincere gratitude to my supervisor and mentor, Dr. Lorelli Nowell. It was my lucky day that I was seated at the same table as you at a teaching and learning conference. Dr. Nowell, when you became my thesis supervisor, I was given a gift that changed the direction of my thesis work. You gave me confidence that I could complete my thesis, supported me through the publication process, worked with me to present at numerous conferences, and aided me in applying from grants and scholarships. Thank you for your unwavering support and confidence in me. Everyone should have a mentor like you.

I would also like to thank my committee members, Dr. Andrew Estefan, and Dr. Ruth Swart. Your expertise, feedback, and input helped to shape and grow my thesis into what it is today. You added different perspectives creating well rounded work. I am forever grateful to you for your guidance in my first research endeavour.

Thank you to Dr. Candace Lind, you saw potential in my classwork and helped encourage me to publish my first manuscript and concept analysis. Becoming a published author in a journal was something I never dreamed of until your class.

Finally, I would like to thank my family. Many believe that children are more technologically savvy than their parents. My mother, Sheila Boisson, is the exception to this rule. Thank you for teaching me how to use word and teaching me how to create a table of contents and format this thesis. A big thank you to the husband, Trio Mulli. You are my biggest supporter. Thank you for all the love and support at home and single nights with the children so I could complete this work.

Dedication

This thesis is dedicated to my children, Hendrix and Lennon. Without you I would have finished my masters work much, much sooner. But without you, I would have never begun. I hope that my educational journey inspires you to dream big and be whoever you want to be when you grow up.

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Chapter 1 Introduction

Simulation is believed to be an effective teaching method as it creates an active hands-on experience in a risk-free environment while promoting teamwork, communication, and the development of critical thinking skills (Maran & Galvin, 2003; Mayville, 2011). Despite simulation being utilized for hands-on experiences, experience alone does not result in learning. Learning often happens through reflection (Sawyer et al., 2016). Boyd and Fales (1983) defined reflection as "the process of creating and clarifying the meaning of experience (present or past) in terms of self" (p. 101). Schön (1987) further studied the area of reflective practice, discussing the importance of reflection-before-action, reflection-in-action, and reflection-on-action, which can be simplified into reflecting on actions in the future, present, and past, respectively. Schön (1987) understood the value of prebriefing to prepare learners before an experience and debriefing as a retrospective process to gain benefit from the learning experience and increase the learner's self-awareness and thinking. However, he believed the hallmark of artistry or mastery of a subject depended upon an individual's ability to reflect in the moment (reflect-in-action). In this process, knowing moves beyond what is tacit, and individuals can make changes to their actions during the event.

While many simulation facilitators are taught to never stop a simulation and are encouraged to leave students to succeed or struggle by their own merits, these moments of struggle present opportunities to support students to reflect-in-action and deepen their learning. (Clapper & Leighton, 2019; Kihlgren et al., 2015; Kron et al., 2016; Kuusisaari, 2014; McMullen et al., 2016; van den Heuvel et al., 2014). Novice learners should not be expected to perform at a mastery level independently and leaving learners to independently reflect-in-action may set them

up for failure. Simulation facilitators can develop skills in supporting learners to engage in facilitated reflection-in-action when needed, to help learners develop the artistry and mastery of nursing.

Significance of Research Project

Educating reflective practitioners is a goal of nursing education (Kwan & Leung, 2006). Every interaction with students provides an opportunity for students to form knowledge and develop reflective practice (Bloom, 1971; Kwan & Leung, 2006). Simulation has become a widely utilized teaching modality across disciplines as an effective approach for improving performance, fostering critical thinking, and developing reflective practitioners (Anderson et al., 2008). Reflection during simulation education is an emerging area of simulation research, with a focus on reflection-on-action and learning after the practice event through the process of debriefing or the practice of reflective journaling (Clark et al., 2019; Kang & Yu, 2018; Ha, 2020; Hüsebo et al., 2015; Zhang et al., 2020).

To date, little research has been conducted on reflection-in-action within simulation in comparison with prebriefing and debriefing. For this thesis, I have chosen to adopt the definition of reflection-in-action as the reflective form of knowing-in-action, which is demonstrated through the ability to show what you know during a surprise event with improvisation and competence (Schön, 1987). Simulation facilitators can identify and support students' ability to think and reflect during simulation, with self-awareness and adaptability. Learning should "spark clinical imagination… [and] continually [encourage students to] seek new approaches, question status quo, and integrate new evidence" (Sherwood & Horton-Deutsch, 2012, p. 14). When students are supported to reflect-in-action, they can respond appropriately in situations, not just act as if on

"autopilot"; demonstrating both the art and science of nursing (Armstrong & Sherwood, 2012; Sherwood & Horton-Deutsch, 2012). While evidence supports the need for reflection-in-action to deepen students learning, little is known about how reflection-in-action is defined and how undergraduate nursing simulation facilitators can identify and support reflection-in-action during high-fidelity simulation.

Project Purpose and Research Question

Currently there is a shortage of undergraduate nursing faculty, clinical placements, and due to the current covid-19 pandemic there has been an increasing number of nursing students displaced from the clinical settings across Canada (Gazza, 2019; McPherson, 2019). To overcome these barriers, undergraduate nursing programs will need to rely more on simulation as a teaching modality (National Council of State Boards of Nursing, 2012). This will require trained simulation facilitators within undergraduate nursing programs. Simulation training and research tends to focus on prebriefing and debriefing, rather than on reflection-in-action during simulation (Anderson et al., 2008). This means there is a significant gap in the knowledge of those who are trained to facilitate simulation learning with nursing students. Research is therefore needed to explore the concept of reflection-in-action during high-fidelity simulation. Understanding this concept more fully will indicate ways it may be more meaningfully embedded in training for simulation facilitators, and purposefully integrated into high-fidelity simulations for nursing students. Understanding how simulation facilitators identify and support reflection-in-action within high-fidelity simulation is essential to supporting students in the reflective process. The findings from this study may be used to create guidelines for simulation facilitators that could be integrated within simulation design to identify reflection-in-action within simulation. These guidelines could then aid facilitators in supporting students to reflect-

in-action. As such, this research thesis reports a descriptive phenomenology undertaken to explore the experience of undergraduate simulation facilitators' use of reflection-in-action during high-fidelity simulation. The overarching research question that guided this study is: *what are the lived experiences of undergraduate nursing simulation facilitators with learning about and facilitating reflection-in-action during high fidelity simulation?*

Thesis Chapter Overview

In this chapter, I introduced the overarching research question and the significance of this work. In chapter two, I present a background literature review in the form of a Walker and Avant (2011) concept analysis on reflection-in-action during high-fidelity simulation. Through this concept analysis the four defining attributes of *reflection-in-action* were identified: (1) it must occur during simulation and cannot be captured through debriefing; (2) a critical learning juncture must occur and be identified by the learners; (3) a pause in student action must occur during the simulation; and (4) knowledge sharing must occur through out-loud discussion. Antecedents, consequences, and empirical referents were also identified and clarified using case studies.

In chapter three, I describe and defend descriptive phenomenology as a suitable methodology to address the research question. In this chapter, I also detail the theoretical underpinning to the research, the National league of nursing (NLN)/Jeffries simulation framework. Participant recruitment, bracketing, interviewing, and transcription processes are explained as essential components to conducting descriptive phenomenology. Lastly, Colaizzi's (1978) process of the analysis of descriptive phenomenology is outlined as the method of analysis for the research findings.

In chapter four, I present the findings from the descriptive phenomenology study focused on identifying the essence of the phenomenon of reflection in action as experienced by undergraduate nursing simulation facilitators during high-fidelity simulation. Four themes emerged from this study including how undergraduate nursing simulation facilitators identify reflection-in-action may be occurring, the barriers to reflection-in-action, how reflection-in-action is supported, and the perceived benefits to reflection-in-action.

Finally, in chapter five, I discuss the implications and application of the findings from this research into practice. This chapter concludes with recommendations for further research to understand the phenomenon of reflection in action as experienced by undergraduate nursing simulation facilitators during high-fidelity simulation.

Chapter 2

Manuscript #1: Reflection-in-Action During High-Fidelity Simulation: A Concept Analysis

Mulli, J.

Nowell, L.

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Mulli, J., Nowell, L., & Lind, C. (2021). Facilitating reflection-in-action during high fidelity simulation: A concept analysis. *Nurse Education Today*. *97*. 1-7.

http://doi.org/10.1016/j.nedt.2020.104709

Introduction

High-fidelity simulation is a widely used teaching modality in healthcare, aviation, nuclear power, business, military, education, and police training (McMullen et al., 2016; Rutherford-Hemming, 2012; van den Heuvel et al., 2014). This broad utilization of high-fidelity simulation may be attributed to its effectiveness in promoting learning through active hands-on experience in a risk-free environment; while promoting teamwork, communication, and the development of critical thinking skills (Maran & Galvin, 2003; Mayville, 2011). Despite high-fidelity simulation being utilized for hands-on experiences, experience alone does not result in learning. Rather, learning happens through reflection. Ideally simulation educators, who use high-fidelity simulation, have adequate training and knowledge to support students in reflective practice (Sawyer et al., 2016).

Boyd and Fales (1983) defined reflection as "the process of creating and clarifying the meaning of experience (present or past) in terms of self" (p. 101). Schön (1987) further studied the area of reflective practice, discussing the importance of "reflection-before-action…reflection-in-action…and reflection-on-action" (p. 34), which can be simplified into reflecting on actions in the future, present, and past, respectively. Debriefing is considered the essential step to learning in high-fidelity simulation, therefore the literature on high-fidelity simulation focuses heavily on the later reflection-on-action through debriefing (Kang & Yu, 2018; Ha, 2020; Zhang et al., 2020). However, the literature is starting to shift to include a focus on reflection-before-action, and the importance of prebriefing in high-fidelity simulation (Chamberlin, 2017; Page-Cutrara, 2014; Page-Cutrara & Turk, 2017). Although Schön (1987) believed in the importance of reflection-before-action and reflection-on-action, he thought the hallmark of mastery or artistry of a subject depended upon an individual's ability to reflect in the moment (reflect-in-action). In

this process, knowing moves beyond what is tacit, and individuals can make changes to their actions during the event. Educators can support students to engage in reflection-in-action to help them develop the mastery and artistry of nursing.

Our purpose in writing this paper is to provide an in-depth analysis of reflection-in-action during high-fidelity simulation-based learning. We sought to identify what is currently known about the topic and establish a strong foundation or building blocks for theory development regarding cultivating reflection-in-action during high-fidelity simulation. In this paper, we define the concept of reflection-in-action and identify the key attributes, antecedents, consequences, cases, and empirical referents of this concept, using Walker and Avant's (2011) framework.

Methods

Walker and Avant's (2011) approach to concept analysis is a well-used framework in nursing literature on high-fidelity simulation (Bland et al., 2011; Cohen & Boni, 2018; Sabei et al., 2016; Turner & Harder, 2018), and is often used to guide comprehensive concept development and clarify ill-defined concepts. This framework consists of an eight-step approach: 1) selecting the concept; 2) determining the purpose of the analysis; 3) discovering all uses of the concept; 4) determining the defining attributes; 5) identifying a model case; 6) identifying borderline, related, and contrary cases; 7) identifying antecedents and consequences; and 8) defining empirical referents (Walker & Avant, 2011).

We conducted a literature search in the electronic databases: PubMed, Eric, PsychInfo, ABI/Business Premium Collection, and the CINHAL using key terms "reflection-in-action" AND "simulation". In addition, we hand-searched reference lists of the journals Simulation in

Healthcare, Simulation and Gaming, and Advances in Simulation. Only English language articles focused on high-fidelity simulation were considered. No limitations were placed on date of publication or discipline, as reflection-in-action and high-fidelity simulation are not specific to nursing. Articles were excluded if they did not focus on high-fidelity simulation, or reflection-in-action. Data were analyzed, compared, and then extrapolated into a matrix table to identify defining attributes, antecedents and consequences, and empirical referents of reflection-in-action during high-fidelity simulation.

Results

Our search yielded 296 articles, spanning 1998-2019. The abstracts were reviewed; articles that did not focus on high-fidelity simulation or reflection-in-action, and duplicate articles were removed. This left 117 articles that were reviewed in full text for potential inclusion. After excluding articles that did not focus on high-fidelity simulation, or reflection-in-action, we were left with 22 articles that met our inclusion criteria. Table 1 provides an overview of the results

Table 2.1 Overview of Included Studies

Authors (year)	Defining Attributes					Antecedents			Consequences					Empirical Referents		
	Within the Simulation	Critical Learning Juncture	Pause (Student Initiated)	Pause (Facilitated)	Knowledge Sharing/Out loud Discussion	Prior Experience/Knowledge	Surprise Event	Psychologically Safe Environment	New action	Adapt to Change/Improvise	Gaining Skills	Gain Understanding	Self-Confidence	Pause Followed by Silence	Questioning Behaviour	Comparing Simulation Events to Past Experiences
Anderson et al. (2008)	X								X	X		X				
Andrade et al. (2018)			X			X								X		X
Bruce (2001)	X		X	X					X			X				
Burbach et al. (2015)	X		X		X				X							
Clapper et al. (2019)	X	X	X	X	X	X	X	X	X			X				X
Edwards (2017)	X		X	X				X								X
Fraser et al. (2018)			X		X				X	X		X				
Fryer & Boot (2016)	X		X		X	X			X	X		X				X
Geithner et al. (2016)									X							
Gililand et al. (2017)					X	X				X					X	
Hughes et al. (2015)	X				X	X			X			X	X			
Hüsebo et al. (2015)								X					X			
Kihlgren et al. (2014)		X	X		X				X		X	X				
Kron et al. (2017)	X	X			X	X										X
McMullen et al. (2016)	X	X	X	X	X			X	X		X	X				
Motavalli et al. (2016)	X	X	X		X	X	X									
Morineau et al. (2017)	X		X	X		X	X									X
Padden-Denmead et al. (2016)				X		X	X		X	X	X					X
Poikela et al. (2015)					X	X		X								X
Rosenorn et al. (1998)						X		X				X				
Söderström et al. (2014)	X		X	X	X			X	X		X	X				
van den Heuvel (2014)	X	X	X		X	X	X		X	X		X				X

Defining reflection

The English word for reflection comes from the Latin word reflexion which refers to the act of bending something backwards ("Reflection", n.d.a). Webster's dictionary includes multiple definitions of reflection, "the instance of reflecting" such as when light reflects off a surface, or when an image is reproduced by reflection or off a reflective surface such as a reflection in a mirror. Reflection may also be viewed as a result of meditation, such as a careful thought, idea, or opinion; or based on a consideration of a subject matter. Synonyms for reflection based on reflection as a way of thinking include, "consideration, contemplation, meditation, rumination, and pondering" ("Reflection", n.d.b., para 1).

Defining action

Action is derived from the Latin word āctiōn-, or āctiō which refers to an "activity, act or legal process" or "to drive, cause, to move, or to do" ("Action", n.d.a., para. 1). Action is defined as a deed, accomplishment, behaviour or initiative, and it may be something that a "person or group does to achieve a particular purpose" ("Action", n.d.a., para. 1). When referring to action as something being done, common synonyms may include, "activity, deal, force, life, movement, operation, plan process, reaction or response" ("Action", n.d.b., para. 1).

Defining simulation

Simulation is "something that is made to look, feel, or behave like something else especially so that it can be studied or used to train people" ("Simulation", n.d.a., para. 1). Simulation is the act or process of simulating and can be referred to as a sham, counterfeit, or "the imitative representation of the functioning of one system or process by means of the

functioning of another a computer simulation of an industrial process" ("Simulation", n.d.a., para. 1). Controlled by a simulation facilitator, high-fidelity simulation involves the use of a mannequin, whose clinical status can replicate real experiences and realistic clinical situations (Lee et al., 2015).

Considering the aforementioned, we therefore define reflection to be the "result of meditation such as a careful thought, idea or opinion; as based on a contemplation of a subject matter" ("Reflection", n.d.a., para. 1). Additionally, reflection is something that a "person or group does to achieve a particular purpose" ("Action", n.d.a, para. 1). Lastly, simulation is "something that is made to look, feel, or behave like something else especially so that it can be studied or used to train people" ("Simulation", n.d.a., para. 1) within the context of high-fidelity simulation. These definitions and uses of the concepts of reflection, action, and simulation will be adopted for our case presentations.

Defining attributes of reflection-in-action

Table 1 highlights the common defining attributes of reflection-in-action during high-fidelity simulation that were identified in the literature. The first defining attribute is that reflection-in-action must occur during the high-fidelity simulation scenario and cannot be captured within post-simulation debriefing methods (Clapper & Leighton, 2019; Fryer & Boot, 2016; Kron et al., 2017). This is significant as high-fidelity simulation literature tends to focus on engaging in reflective practice through post-simulation debriefing (Kang & Yu, 2018; Ha, 2020; Zhang et al., 2020). Without a focus on identifying reflection during high-fidelity simulation, this important component of the reflective process may not be captured.

The second defining attribute is that a critical learning juncture must occur and be identified by the learners (Clapper & Leighton, 2019; Kron et al., 2017; McMullen et al., 2016). High-fidelity simulations should progress to a point at which the students are challenged in deciding the next steps to take. At this point the third defining attribute emerges, a pause in student action during the high-fidelity simulation (Clapper & Leighton, 2019; Fryer & Boot, 2016). Ideally the students within the high-fidelity simulation initiate the pause, however this pause may be instead initiated by the nursing educator (Clapper & Leighton, 2019; McMullen et al., 2016). A student-initiated pause may arise from an independent recognition of a critical learning juncture; whereas a facilitated pause may occur when the educator asks the students to take a time out to consider various components of the high-fidelity simulation that would be important to understand in a critical learning juncture (Bruce, 2001; Clapper & Leighton, 2019; Motavalli & Nestel, 2016; Poikela et al., 2015).

Once a critical learning juncture has occurred and the students pause, the fourth defining attribute transpires, which is knowledge sharing through out-loud discussion (Burbach et al., 2015; Clapper & Leighton, 2019; Edwards, 2017; Poikela et al., 2015). This out-loud discussion and sharing of knowledge must be student driven. Although the pause may be initiated by the nurse educator, reflection-in-action cannot occur if the discussion is led by the educator (McMullen et al., 2016). Reflection-in-action and pauses cannot be equated with "in-simulation debriefing". In Van Heukelom's et al., (2010) study, students were given a 30 second timeframe to perform the correct action; if it was not performed the educator would pause the simulation, inform the students of the error, correct the action, and inform the students of the consequences. Although this method of debriefing may encourage deliberate practice (Eppich et al., 2015), it decreases clinical and emotional realism (Van Heukelom et al., 2010), and decreases the

retention of clinical knowledge and skills (Xeroulis et al., 2007). Students prefer post-simulation debriefing as opposed to in-simulation debriefing (Van Heukelom et al., 2010) because true reflection-in-action discussions are driven by the learner, and not based on the expertise of the educator (McMullen et al., 2016).

Antecedents and consequences

Antecedents are the events that must occur beforehand, that facilitate the occurrence of a concept (Walker & Avant, 2011). For the concept of reflection-in-action, educators must understand and foster the antecedents, to promote reflection-in-action and potential positive consequences. Not fostering the antecedents could prevent reflection-in-action from occurring. The first antecedent is that students must have prior knowledge or experience regarding the events in the high-fidelity simulation; knowledge could be experiential from the lab or clinical setting, or from didactic learning in the classroom (Hughes & Scholtz et al., 2015; Hüsebo, et al., 2015; Rosenorn & Kofoed, 1998). Without this prior knowledge, there is an inability to recall and reflect on it. Secondly, in order to reflect-in-action, the automated processes of action (such as checking vital signs), must be challenged in a surprise event (Clapper & Leighton, 2019; Morineau et al., 2017; Padden-Denmead et al., 2016). This surprise requires students to think and reflect on their actions, rather than perform rote skills. The final antecedent is of great consequence: students must have a psychologically safe environment to learn (Clapper & Leighton, 2019; Hüsebo, et al., 2015; Rosenorn & Kofoed, 1998). Psychological safety refers to the perception of an individual regarding the safety of an environment (Roussin et al., 2017). Safety depends on an individual's own perceptions regarding their ability to make mistakes, speak out, or try new things without the fear of judgment, ridicule, or punishment (Roussin et al.,

2017). The safety of the environment is a contributing factor in a student's decision to voice their opinion, discuss errors, or seek clarification (Roussin et al., 2017). For high-fidelity simulation to be used as an effective teaching tool for the formation of knowledge and the development of reflection-in-action, an evaluative component should be avoided. Educators should prioritize creating a safe environment to enhance learning (Bloom, 1971; Roussin et al., 2017).

An understanding of the consequences or outcomes of reflection-in-action during high-fidelity simulation is important to promote and cultivate reflection-in-action for students. Through reflection-in-action during high-fidelity simulation, new action occurs and the learners within the simulation are able to respond to their assessment findings correctly and intervene appropriately (Clapper & Leighton, 2019; Fraser et al., 2018; Geithner, & Menzel, 2016). The ability to perform a new action also manifests in an increased ability to adapt to change and improvise when things are unexpected (Anderson et al., 2008; Kilhlgren et al., 2014; Padden-Denmead et al., 2016). Student-identified outcomes of reflection-in-action during high-fidelity simulation include gaining skills, understanding or new knowledge, and increasing self-confidence (Clapper & Leighton, 2019; Hüsebo, et al., 2015; Söderström et al., 2014). These are beneficial to students' formative learning and development of mastery of the art of nursing and should be actively encouraged and cultivated in nursing students during high-fidelity simulation (Bloom, 1971; Schön, 1987).

Identifying case examples

Walker and Avant (2011) recommend using cases to enhance understanding of the concept. The following fictional model, borderline, related, and contrary cases will be used to showcase the concept of reflection-in-action.

Model case

A team of three undergraduate nursing students are working together in a high-fidelity simulation with a six-year-old female admitted for a fever not yet diagnosed. The students are prebriefed and given time to prepare with the chart and review the laboratory results. Upon entering the high-fidelity simulation, the students accurately perform a head to toe assessment, vital signs assessment, and communicate with the patient. At this point the students become confused as in past high-fidelity simulations something dramatic usually occurs - a seizure, loss of pulse or consciousness, or a severe hemorrhage. The students can see nothing of significance happening, and a student asks that the group step into the safe zone and discuss their assessment findings. After a few minutes of discussion, the students note that the patient is hypotensive with a wide pulse pressure, tachycardic, hypoxic, and has a mottled looking skin tone with delayed capillary refill time. The students continue to muse about what could be occurring, and one student asks the group "do you think she is in shock?" At this point the students recall their lecture and modules completed on shock and recognize the presence of shock in their patient. The students are then able to take appropriate action and call the nurse educator (who is posing as the charge nurse), give report, and implement effective interventions such as a fluid bolus and placing the patient in Trendelenburg position.

This is a model case as all the attributes of reflection-in-action are present and is exemplary in its demonstration of reflection-in-action during high-fidelity simulation (Walker & Avant, 2011). Initially, the students are proficient at their assessment skills and their ability to perform as a team, however within the high-fidelity simulation a critical learning juncture occurs when the patient does not present in a way expected by the students. A pause is initiated as one

of the students question what they are seeing with the patient and what they are missing. The students step into the safe zone and knowledge sharing through out-loud discussion with questioning occurs as a group. Through reflection on past experiences and learning opportunities, the students recognize the meaning behind their assessment and new action occurs in calling the charge nurse and intervening with a fluid bolus.

Borderline case

Consider this borderline case of reflection-in-action during high-fidelity simulation. Three undergraduate nursing students are working together to care for two patients, a mother who is two days postpartum and her newborn baby. The students are given report and time to review the chart, lab values, and to make their plan of care. The students begin the high-fidelity simulation and are accurately able to check the patient's vital signs and perform a head-to-toe assessment. The students note that the mother is hypertensive, complains of a headache, and is seeing spots. Unsure of what the assessment findings mean, a student requests the group pause and go into the safe zone for discussion. One student determines the mother should receive Tylenol as the headache is the most important assessment finding and proceeds to administer Tylenol to the mother. The baby begins to cry, and the same student states the baby must be hungry and proceeds to give the baby to the mother and requests that she begin to breastfeed the baby. When the mother responds she is too sick to feed the baby, the same student takes the baby away from the mother and instructs their colleagues to bottle feed the baby. At this point the mother has a seizure, and the students respond appropriately with seizure care. In debriefing, one student wonders why the mother had a seizure.

This is an example of a borderline case, as some elements of reflection-in-action are present, but not all (Walker & Avant, 2011). Initially, the students are proficient in their assessment skills and their ability to perform as a team, however within the high-fidelity simulation a critical learning juncture occurs when the patient reports headache, spots in their eyes, and is hypertensive. At this point a pause occurs as one student questions what the assessment findings mean. Despite out-loud communication, there is no knowledge sharing within the group, as one student dictates the plan. As there is no knowledge sharing the students fail to identify preeclampsia in the patient and are unable to perform the correct action, resulting in the patient seizing.

Related case

Consider this related case of reflection-on-action during debriefing after high-fidelity simulation. A team of four undergraduate nursing students are caring for a teenage male patient with a diagnosis of asthma. They are given a prebriefing, and time to prepare with the chart and lab values, as well as plan their care. The students enter the high-fidelity simulation, accurately perform a head-to-toe assessment and vital signs assessment. Upon assessment the patient is hypoxic, and the lungs sounds are decreased with coarse crackles, and a wet cough. One student grabs the salbutamol and administers ten puffs of salbutamol via a metered dose inhaler and another student places the patient on oxygen. In debriefing, the students discuss their assessment and actions. The student who administered the salbutamol comments on how they now believe the patient may have had pneumonia and not an asthma exacerbation. The students discuss their understanding regarding the presentation on asthma and pneumonia, concluding the patient may have exhibited more signs of pneumonia such as crackles, wet cough, and decreased lung

sounds, than asthma. The students reflect on how they assumed the case would be asthma exacerbation due to the patient's past medical history and had gone into the high-fidelity simulation with the plan to administer salbutamol. At this point, the students believe the correct course of action would have been to apply oxygen, request a chest x-ray, and potentially administer antibiotics.

This is an example of a related case, although it contains some of the attributes of reflection-in-action, it is reflection-on-action. A critical learning juncture occurred when the students identified the patient's hypoxic state, crackles and decreased lung sounds, and a wet cough. A pause did not occur, as the students assumed the correct course of action was to treat the patient for an asthma exacerbation and there was no knowledge sharing through out-loud discussion. The students were able to respond appropriately to an asthma exacerbation, but not pneumonia as the high-fidelity simulation intended. However, after the high-fidelity simulation the students began to reflect on the action they took and their thought processes. They paused and thought aloud on their assessment findings and interventions in post-simulation debriefing. By reflecting-on-action, the students were able to correctly interpret their assessment findings and articulate the correct interventions.

Contrary case

Consider this contrary case of reflection-in-action during high-fidelity simulation in which none of the defining features are present. A group of four undergraduate nursing students enter a high-fidelity simulation in which an older adult male has been given morphine for his right hip pain one day post arthroplasty. The students assess the patient as responsive with marked confusion. Approximately five minutes into the high-fidelity simulation, the students

note the patient is no longer responding to their voice. At this point, the students fail to reassess the patient for a pulse or respiratory rate and begin cardiopulmonary resuscitation (CPR). The nurse educator allows CPR to continue for a few minutes before coming into the high-fidelity simulation to stop the actions of the students. The educator then begins to lecture students on the importance of checking a pulse prior to starting CPR. Once the educator leaves, the students recheck the pulse and respiratory rate and administer naloxone for central nervous system depression (as instructed by the educator).

This is a contrary case as within the high-fidelity simulation a critical learning juncture occurred but was not identified by the students. No pause happened, and the students jumped into action, performing CPR. A few minutes later the educator initiated a full stop to the high-fidelity simulation, and not merely a pause; lecturing the students on the outcomes of their actions. Although there is a new action in result to the educator's intervention, there was no knowledge sharing through out-loud discussion between the students.

Empirical referents

The final step in Walker and Avant's (2011) concept analysis process is defining empirical referents. Empirical referents are phenomena that demonstrate the concept is occurring but are not the concept itself. The defining attributes and empirical referents, however, may be identical. In the case of the concept of reflection-in-action during high-fidelity simulation the defining attributes include a critical learning juncture, a pause, and knowledge sharing through out-loud discussion – these may be considered some of the empirical referents, but not all. Andrade et al., (2018) stated that following the critical learning juncture and pause, there must be a period of silence prior to the discussion and knowledge sharing. This period of silence may

indicate that reflection-in-action is occurring as this is a moment of thought for the students. Additional empirical referents may include a questioning behaviour (Gilliland & Wainwright, 2017) or comparing the high-fidelity simulation events to the learners' past experiences, which could be from hands on experiences or didactic learning opportunities (Andrade et al., 2018; Poikela et al., 2015; van den Heuvel et al., 2014). Understanding empirical referents can help high-fidelity simulation educators identify when reflection-in-action is occurring, whether the high-fidelity simulation is challenging, and the type of learning that is occurring for the students.

Discussion

Educating reflective practitioners is a goal of higher education. Every interaction with students must be considered an opportunity to form knowledge and develop reflective practitioners (Bloom, 1971; Kwan & Leung, 2006). This concept analysis of reflection-in-action during high-fidelity simulation education provides valuable insights for nursing educators and researchers. The defining attributes, antecedents, and consequences as well as the case examples may guide nursing educators to effectively incorporate reflection-in-action opportunities within their high-fidelity simulation facilitation. For researchers, this concept analysis provides a strong foundation and possible research directions to further develop these building blocks for a theory regarding cultivating reflection-in-action during high-fidelity simulation.

High-fidelity simulation has become a widely utilized teaching modality across disciplines as it is effective in improving performance, critical thinking, and developing reflective practitioners (Anderson et al., 2008). Reflection-in-action during high-fidelity simulation is an emerging area of nursing education research. However, little research has been conducted on the full continuum of reflection: planning, acting, and debriefing. In this paper we

highlighted the need for simulation educators to identify and support students' ability to think and reflect during high-fidelity simulation, with self-awareness and adaptability. Learning should "spark clinical imagination… [and] continually [encourage students to] seek new approaches, question status quo, and integrate new evidence" (Sherwood & Horton-Deutsch, 2012, p. 14). When students are supported to reflect-in-action, they are able to respond appropriately in situations, not just act as if on "autopilot"; demonstrating both the art and science of nursing (Armstrong & Sherwood, 2012; Sherwood & Horton-Deutsch, 2012). In this concept analysis we highlight a significant gap in the literature as high-fidelity simulation research tends to focus on prebriefing and debriefing, rather than on reflection-in-action during high-fidelity simulation (Anderson et al., 2008). A nursing knowledge deficit is further highlighted as only three of the articles were from nursing literature. High-fidelity simulation research has tended to focus on reflection-on-action and learning after the practice event through the process of debriefing or the practice of reflective journaling (Clark et al., 2019; Kang & Yu, 2018; Ha, 2020; Hüsebo et al., 2015; Zhang et al., 2020). Further research is needed to understand how nursing educators identify, communicate expectations to students, and support students in the process of reflection-in-action during high-fidelity simulation.

Some have argued the complexities of professional practice do not allow for simultaneous learning and practice; however, we counter that being able to learn while practicing is a critical component of nursing. Nursing educators should consider implementing reflection-in-action within their high-fidelity simulation facilitation practice because this promotes deeper learning as students gain new understanding and clinical skills, leading to increased self-confidence. This may promote students' ability to recognize when assistance is needed, seek appropriate help, monitor and modify their practice, become open-minded to alternative views,

increase self-responsibility, and whole-heartedly evaluate and create meaningful organizational and personal change (Densten & Gray, 2001; Hallett, 1997). Nursing educators can promote reflection-in-action by creating and supporting a psychologically safe environment for student learners. This may be done through ensuring students and faculty understand the purpose of formative learning, identifying when students are struggling within high-fidelity simulation, pausing, and allowing students space to discuss their thoughts and understanding of a situation (beyond knee-jerk reactions) (O'Haver Day & McNelis, 2012).

Conclusion

In this paper we define the concept of reflection-in-action during high-fidelity simulation as the moment within high-fidelity simulation in which students are challenged to demonstrate their knowledge and skills beyond mechanical action. It is the point at which students bridge didactic learning and clinical practice, gaining understanding, new skills, flexibility, speed, and self-confidence. Simulation educators should have a strong understanding of how to identify when and encourage students to reflect-in-action. This concept analysis has helped to establish a foundation for theory development and strategies for reflection-in-action during high-fidelity simulation. Future research should focus on (a) how educators identify and support reflection-in-action; (b) students' perception of learning, psychological safety, and self-confidence when educators utilize reflection-in-action strategies; and (c) on the long-term benefits of students developing reflection-in-action practices as they transition into the role of a registered nurse.

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Chapter 3 Methods

As a graduate student conducting research, I have carefully considered study design and allowed the research questions to guide selecting of a methodological approach (Horn et al., 2009). This has helped to ensure that my ontological and epistemological views aligned with the methodology so that the study is rigorous (Polit & Beck, 2017). I aimed to explore the experience of undergraduate simulation facilitators with reflection-in-action during high-fidelity simulation. The overarching research question was: *what are the lived experiences of undergraduate nursing simulation facilitators with learning about and facilitating reflection-in-action during high fidelity simulation?*

Research Design: Descriptive Phenomenology

To address the research question, descriptive phenomenology was chosen as a methodology to guide the study design. The NLN/Jeffries framework describes simulation as a phenomenon (Jefferies et al., 2015). Descriptive phenomenology addresses experiences of phenomenon (Husserl, 2004; Dukes 1984; Girorgi, 1992), making it a fit for studying the phenomenon of reflection-in-action as experienced by undergraduate nursing simulation facilitators during high-fidelity simulation. Husserl's descriptive phenomenology focuses on the ontological question "what is" as phenomena are believed to be understandable. Actions are believed to be motivated by the perception of what is real by those experiencing a phenomenon and therefore, phenomena can be described and known in a productive way (Converse, 2012; Lopez & Willis, 2004; Todres, 2005). Having phenomenon known in a productive way means that the understanding becomes pragmatic and can move from theoretical to practical (Converse, 2012; Lopez & Willis, 2004; Todres, 2005). The purpose of phenomenological research is not to

explain or predict, but rather to understand meaning (Sorrell & Redmond, 1995). Phenomenological inquiry is an appropriate method for exploring and developing understanding of the lived experiences and phenomena of nursing.

Methodological Assumptions

Traditionally, phenomenological researchers begin with two assumptions regarding the phenomena of interest. The first assumption is that all lived human experience is logical and makes sense to those who experience it. This logical understanding comes without research or interpretation (Dukes, 1984). Second, the understanding of individual knowledge belongs to those who experience the phenomenon and meaning cannot be constructed by outside observers (Dukes, 1984). Given these two assumptions, the phenomenological researcher seeks to "draw up a scheme of the foundations of pure logic" to understand the essence of a human experience and articulate this logic authentically (Dukes, 1984; Husserl, 2004, p. 77; Giorgi, 1992). Descriptive phenomenologists are outside observers and seek only to describe and not explain. This is due to the belief that they cannot create meaning from the experience held by others (Husserl, 2004; Dukes 1984; Girorgi, 1992). Lastly, descriptive phenomenologists believe that assumptions and misunderstandings can arise based on presumed values and beliefs, which are eliminated through the process of bracketing (Platt, 1981). Bracketing demonstrates Husserl's assumption that phenomenologists can take a reflexive stance in the phenomena by putting aside their pre-understanding and acting non-judgementally. Some believe that a limitation of bracketing is that it is an impossible expectation in our research communities (Gregory, 2019). Requiring a theoretical framework and the literature review means that the researcher must have some prior knowledge regarding the phenomena of interest, and it may be unrealistic to expect a researcher to put aside that knowledge (Gregory, 2019). For my research, having done a concept

analysis and through utilizing the National League of Nursing (NLN)/Jeffries simulation framework, I sought to fill a potential gap in the knowledge. For example, the NLN/Jeffries framework states that learning takes place in a dynamic interaction between facilitator and learner, but it does not specifically mention reflection-in-action. Through this research, I aimed to understand the experience of undergraduate nursing simulation facilitators and reflection-in-action. Using the Walker & Avant (2011) concept analysis and the NLN/Jeffries simulation framework, I found a gap in our current knowledge regarding reflection-in-action during high-fidelity simulation. During the research process, I sought to put aside my experience and knowledge from the concept analysis and the NLN/Jeffries simulation framework through bracketing. Strategies I employed included keeping a reflexive journal, critical examination of myself, and the use of a semi-structured interview guide. Additionally, during data analysis, each round of coding was confirmed my supervisor and then my thesis committee to ensure that coding was accurate and logical. And finally, my findings were returned to the participants for confirmation that had had indeed captured their experience of facilitating reflection-in-action during high-fidelity simulation. Through this process of bracketing, if successful, preconception is removed that may colour the research findings to obtain a perspective of certainty of the experience of the phenomenon as described by participants (Husserl, 2004).

Theoretical Framework

Nursing knowledge is commonly articulated within theories and conceptual frameworks (Cook, 2012). Therefore, my research question and methodology of descriptive phenomenology, are aligned with the NLN/Jeffries Simulation Framework. I have chosen this framework to underpin my study because, currently it is the most widely used and accepted theoretical framework in nursing simulation. Furthermore, the NLN/Jeffries framework has been rigorously

tested and shown to accurately describe simulation phenomena (Bortolato-Major et al., 2019; Morrow, 2018).

The NLN/Jeffries framework is based on a dynamic interaction between seven essential components within simulation: context, background, design, experience, facilitator and educational experience, participant, and outcomes (Cowperthwait, 2020; Hallmark et al., 2014; Jeffries et al., 2015). The NLN/Jeffries framework is applicable to my research because it was specifically created to inform best practice in simulation design, implementation, and evaluation. Additionally, the seven core concepts (context, background, design, experience, facilitator and educational experience, participant, and the outcomes) describe direct relationship to each other making the theory testable and concrete (Cowperthwait, 2020; Hallmark et al., 2014; Jeffries et al., 2015; LaFond & Vinecent, 2012). Philosophically, the NLN/Jeffries framework has underpinnings of constructivism, sociocultural, and learner-centered philosophies, which aligns with my research and educational beliefs about how meaning and understanding is constructed by the facilitator and the learner together within high-fidelity simulation.

My research explores the experiences of undergraduate simulation facilitators with learning about and facilitating reflection-in-action during high-fidelity simulation. The objectives of this research arose from my training in simulation that reinforced the belief that facilitators were to never stop a simulation and to allow students to struggle and succeed based on their own merit. I believe that this training is in direct contrast with the NLN/Jeffries framework as a dynamic interaction between the facilitator and the learner can support positive learning outcomes. If educational best practices are followed, the NLN/Jeffries framework is predictive of positive learning outcomes resulting from the facilitator's educational practices and interaction with the participants (LaFond & Vincent, 2012). Students have identified feedback as the most

important educational practice to their learning, which is supported by Bloom's taxonomy and beliefs regarding formative evaluation (Bloom, 1971; Butler et al., 2009; Childs & Sepples, 2006; Kardong-Edgren et al., 2008). Students desire faculty collaboration and support as they learn and make critical decisions (Parsh, 2010). The moment of making a critical decision may be the ideal time for simulation facilitators to support students to reflect-in-action (Clapper & Leighton, 2019; Kihlgren et al., 2015; Kron et al., 2016; McMullen et al., 2016; van den Heuvel et al., 2014). My research also aims to fill a gap in the NLN/Jeffries simulation framework research by exploring how facilitator and student interaction through using reflection-in-action during simulation is perceived to affect student performance and confidence (Hallmark et al., 2014).

Sampling Strategy

To answer my research questions, I recruited 11 simulation facilitators who utilize high-fidelity simulation with undergraduate nursing students. Participants recruited from the publicly accessible Canadian Alliance of Nurse Educators Using Simulation (CAN-SIM) list of simulation educators in Alberta. All individuals on the CAN-SIM list who self-identified as an undergraduate nursing simulation facilitator received an electronic invitation to participate in my study. This electronic invitation included a description of the research proposal, the purpose of the study, and a follow-up opportunity to share study findings with the participant. Convenience sampling was utilized and those first responding were added to the study in order of confirmation and consent. Snowball sampling followed and two of the 11 participants were recruited through snowball sampling. Sample size was determined based on the number of participants it took to reach data saturation plus two additional participants (Holloway & Galvin, 2017). My inclusion criteria encompassed any simulation facilitator who uses high-fidelity simulation in an

undergraduate nursing program within an academic setting within Alberta. Exclusion criteria comprised simulation instructors who do not utilize high-fidelity simulation, those who do not work with undergraduate nursing students in an academic setting, such as those who work in a hospital or clinical setting, and those who do not work within Alberta. Table 4.2 outlines the characteristics of individuals in the study. I chose to focus on undergraduate nursing simulation facilitators as my literature review could only incorporate three articles from nursing literature, highlighting a significant gap in nursing knowledge surrounding reflection-in-action during high fidelity simulation. Furthermore, the shortage of nursing faculty, clinical placements, and the current covid-19 crisis displacing nursing students from the clinical setting in Alberta, will mean simulation will be increasingly important to undergraduate nursing training in the future (Gazza, 2019; McPherson, 2019; National Council of State Boards of Nursing, 2012).

Ethical Considerations

This research proposal was submitted to the University of Calgary Ethics Board for approval REB20-2085. Confidentiality and anonymity were maintained by removing identifiable information including names, programs, and institutions from individual files. I stored my research on a secure encrypted research drive housed at the University of Calgary.

Some participants in the study were colleagues of mine. There are some advantages to interviewing colleagues, such as shared knowledge and language which may enhance understanding (Platt, 1981). However, colleague interviews highlight the importance of bracketing as assumptions and misunderstandings can arise based on presumed values and beliefs (Platt, 1981). I was able to ensure that there was no coercion to participation by my colleagues as only one participant on the CAN-SIM list contacted was a colleague, over whom I

have no authority. Any other participants who were colleagues were recruited through snowball sampling from an email from the original colleague. All participants were informed that they were able to withdraw from the study at any time. Written consent was obtained using the standard University of Calgary consent form and verbal consent was obtained at the beginning of each interview (Appendix C). Those who responded with a willingness to participate were then contacted by me to arrange interview specifics. As the participants were all from a community of undergraduate simulation nurse educations, there was a potential risk of participants being able to identify each other. To mitigate this risk, identifiable information was removed from transcripts and participants were given a number instead of a name. Participant names were only accessible on the master participant list accessible only to me. Furthermore, affiliations were removed from list and only age, credentials, and years of teaching and simulation were included. There are additional considerations of the interview process when I interviewed my peers. First, there are some advantages to interviewing peers, such as shared knowledge and language which may enhance understanding (Platt, 1981). However, peer interviews highlight the importance of bracketing as assumptions and misunderstandings can arise based on presumed values and beliefs (Platt, 1981). There are some studies that show interviewing peers may be viewed as a test of professional knowledge, and so sensitivity in interviewing was observed to increase comfort of the interviewee (Coar & Sim, 2006; Dempsey et al., 2016). I believe that my chosen methodology of descriptive phenomenology helped my participants feel at ease as there was no interpretation, observation, or evaluation of their knowledge, only a description of how they experience reflection-in-action during high-fidelity simulation.

Data collection

I used a semi-structed interview guide, based on Bevan's (2014) phenomenological interviewing method, and conducted one-to-one semi-structured interviews with nursing simulation facilitators. Interviews focused on their experiences with reflection-in-action during high-fidelity simulation and not on theoretical questions (see Appendix C). I chose this interview method for my data collection as interviews provide the ability to obtain a description of simulation facilitators' perspectives of the reflection-in-action phenomena in undergraduate nursing programs (Sorrell & Redmond, 1995; Holloway & Galvin, 2017). I chose a semi-structured interview method to ensure that similar data was collected from all participants, to safeguard natural flow, reduce presumptions, and allow for exploration of meaning as needed (Sorrell & Redmond, 1995; Holloway & Galvin, 2017). Practically, due to the constraints of physical distancing due to COVID-19, all interviews took place via zoom and lasted 30-60 minutes in length. The audio from the interviews was digitally recorded and transcribed verbatim.

Data Analysis

I reviewed the transcriptions and digital recordings and analyzed the data using Colaizzi's (1978) process. My supervisory committee double-checked my analysis through each stage of the process to establish trustworthiness and ensure my line of thinking and interpretation was clear to the readers and true to the data. In the first step, I transcribed the interviews then read the entire data sets to obtain a feeling for the data. In the second step, I returned to each transcript and identified and extracted the significant statements that pertained to the phenomena of reflection-in-action. Once the significant statements were identified, I began to formulate the

meaning of each significant statement. In the fourth step, I clustered all meanings together into themes and validated the themes through comparison of the original descriptions. If there were any themes that had discrepancy or were contradictory to the original descriptions, I noted these, ensuring not to ignore them as a source of potential bias. In the fifth step, I integrated the themes and findings into an "exhaustive description", that clearly described the phenomenon of reflection-in-action as experienced by undergraduate nursing simulation facilitators during high-fidelity simulation.. In the sixth step, I reviewed the exhaustive description of the phenomenon and identified the fundamental structure or essence of the experience. In the last step, I validated the findings by returning to the participants for confirmation of the findings or essence (Colaizzi, 1978, as cited in Holloway & Galvin, 2017, p. 234).

Rigour

Husserl believed that to protect scientific rigour a phenomenologist must suspend preconceptions and prior knowledge through the process of bracketing, phenomenological reduction, or *epoche* (2004, p. 27; LeVasseur, 2003). As I am a simulation facilitator who works within an undergraduate nursing program, the concept of bracketing is essential to my ability to describe the phenomenon of reflection-in-action as experience by undergraduate nursing simulation facilitators during high-fidelity simulation. My knowledge and experience in simulation are a potential source of bias. A critical self-awareness and questioning of my beliefs and knowledge were important to prevent bias from being present in the research, which is why I chose descriptive phenomenology as my research methodology (Bevan, 2014). One strategy that I implemented to aid in bracketing and to limit potential bias is the use of a reflexive journal in which I wrote down my thoughts, feelings, and beliefs and re-examined myself (Chan et al., 2013). A second strategy I employed regarding bracketing included honest evaluation of myself

to ensure I was open to hearing other perspectives and experiences (Chan et al., 2013). This critical examination of myself was important to ensure that I was willing to hear and accept experiences that were different than my own or what I anticipated. A third strategy I implemented was using a semi-structured interview guide, so that I could probe areas of interest and let the conversation flow naturally and maintain curiosity instead of assuming I knew what questions to ask (Chan et al., 2013).

Confirmability in the data analysis was supported by presenting the rounds of coding to my supervisor and committee to ensure the coding was accurate and reflected the true meanings of the statements made by participants. I sought to ensure dependability by ensuring that the research process was logical and clearly documented through the use of record keeping, using a semi-structured interview guide, using NVIVO for coding, and by organizing findings of themes and subthemes into a chart. At the end of the study, confirmability was pursued through emailing participants with the study findings to ensure that the findings, interpretation, and recommendation reflected what they believed the essence of their experience of reflection-in-action is. I believe by staying true to the transcribed text and the descriptions provided by my participants, without interpretation, I was successful at eliminating bias and presenting rigorous findings (Chan et al., 2013; Bevan, 2014).

Strengths and Limitations of Descriptive Phenomenology

A goal of descriptive phenomenological research is to understand peoples' specific lived experiences and identify the essence of a phenomena (Holloway & Galvin, 2017). Unlike a hermeneutic approach, there is no interpretation involved in data analysis, rather, a rich description is obtained. This provides several strengths and advantages to using a descriptive

phenomenological approach. Primarily, through descriptive phenomenology researchers can gain a detailed understanding of a specific phenomenon from a variety of perspectives (Holloway & Galvin, 2017; Jackson et al., 2018). As there is no interpretation, descriptive phenomenology is appropriate to my question. Utilizing this approach, I obtained a rich and exhaustive description of the participants' experience. Exploring how undergraduate nursing simulation facilitators describe their training, knowledge, and experience of facilitating simulation can offer a greater understanding of the essence of reflection-in-action.

There are two limitations to this study. First, due to personal previous knowledge and experience regarding simulation and reflection-in-action, bracketing had to be strictly adhered to, to prevent bias and subjectivity in this research (Holloway & Galvin, 2017). Although I took steps to bracket my existing knowledge and experience, I may not have been aware of all my existing knowledge and assumptions that shaped how I worked participants and data (Greogory, 2019). Being unaware of all my existing knowledge and assumptions may have led to me asking leading questions which may have swayed the data in a particular direction. Additionally, due to small sample sizes and homogeneity of the sample population, findings from these studies may be difficult to generalize outside of undergraduate nursing simulation facilitators or to those with less experience and training than the participants in this study.

Summary

Experiences are logically understood best by the individual with the experience. Descriptive phenomenology allows for understanding of the essence of a phenomena. Therefore, I utilized a semi-structured interview guide and Colazzi's seven step analysis process to explore undergraduate nursing simulation facilitators' experience with learning about and facilitating

reflection-in-action during high fidelity simulation. In Chapter four of this thesis, I outline the results from this study.

Chapter 4

Manuscript #2: Undergraduate nursing simulation facilitators lived experience of facilitating reflection-in-action during high-fidelity simulation: a phenomenological study

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Submitted to Nurse Education Today

Introduction

Currently there is a shortage of undergraduate nursing faculty and clinical placements, and due to the current covid-19 pandemic, there has been an increasing number of nursing students displaced from the clinical setting (Gazza, 2019; McPherson, 2019). To overcome these barriers, undergraduate nursing programs are relying more on simulation as a teaching modality (National Council of State Boards of Nursing, 2012) and require highly trained simulation facilitators. Currently there are recognized simulation facilitator training programs through organizations such as the International Nursing Association for Clinical Simulation and Learning (INACSL); and simulation certification through the Society for Simulation in Healthcare (SSH) and the Canadian Association of the Schools of Nursing (CASN). However, there is no standardized minimum required training to become a simulation facilitator, and no known training to teach simulation facilitators how to support reflection-in-action.

Facilitator supported reflection is widely considered the essential step to facilitating learning in high-fidelity simulation education (Sawyer et al., 2016). Reflection-before-action, reflection-in-action, and reflection-on-action are often identified as the timepoints at which students are actively working through the reflective process (Schön, 1987). These processes can be simplified as reflecting on actions in the future, present, and past. Currently, the literature focuses heavily on reflection-on-action through debriefing, with a recent shift to reflection-before-action through prebriefing (Ha, 2020; Kang & Yu, 2018; Sawyer et al., 2016; Zhang, et al., 2020). However, some believe that the hallmark of artistry or mastery of a subject depends upon an individual's ability to reflect in the moment (reflect-in-action) (Schön, 1987). Despite this belief, little is known about the lived experience of undergraduate nursing simulation facilitators' use of reflection-in-action during high-fidelity simulation.

Background

Simulation is considered an effective teaching method where simulation facilitators create an active hands-on experience in a relatively risk-free environment while promoting teamwork, communication, and the development of critical thinking skills (Maran & Galvin, 2003). Despite simulation being utilized for hands-on experiences, experience alone does not result in learning. Rather, learning often happens through reflection (Sawyer et al., 2016). Boyd and Fales (1983) defined reflection as "the process of creating and clarifying the meaning of experience (present or past) in terms of self" (p. 101). In simulation education, debriefing is often considered the essential step to learning as simulation facilitators guide students through a retrospective reflective process and reflect on the actions that occurred (Kang & Yu, 2018; Ha, 2020; & Zhang et al., 2020). Further studies have demonstrated the benefit of the prebriefing process and reflecting-before-action to prepare learners to reflect before the simulation for optimal learning (Chamberlin, 2017; Chmil, 2016). Currently, there is emerging literature regarding the importance of supporting students to reflect-in-action (Kang & Yu, 2018; Mulli et al., 2021; Zhang et al., 2020).

Reflection-in-action may be the most challenging form of reflection to capture because it is difficult to know what a learner is thinking in the moment; therefore, the reflective process is often left to be uncovered in debriefing (Kang & Yu, 2018; Ha, 2020; Zhang et al., 2020). However, reflection-in-action should be caught during the simulation or the true reflective process may be lost (Clapper & Leighton, 2019; Mulli et al., 2021). Being able to reflect in the middle of a situation has been suggested to be a critical skill for nursing practice, therefore, undergraduate nursing simulation facilitators need to be able to identify and support students to reflect-in-action (Mulli et al., 2021). Benefits to reflection-in-action include learners performing

new actions; being able to adapt and improvise; gaining understanding or new knowledge; feeling secure; and increased self-confidence (Clapper & Leighton, 2019; Hughes & Scholtz, 2015; Kihlgren et al., 2014; McMullen et al., 2016). Despite this, there has been little research on how undergraduate nursing simulation facilitators identify and support reflection-in-action during high-fidelity simulation. Therefore, the aim of this study is to explore and describe the lived experience of undergraduate nursing simulation facilitators' use of reflection-in-action during high-fidelity simulation.

Methods

Design

The purpose of this study was to create a description and understanding of simulation facilitators' experiences with reflection-in-action during high-fidelity simulation. We used a descriptive phenomenological research design, guided by Collaizi's (1978) method to conduct this study. Phenomenological researchers seek to describe experience as the individual experiences it and not to explain (Bevan, 2014; Duke, 1984). Semi-structured interviews were conducted and analyzed to identify the essence of the experience of undergraduate nursing simulation facilitators and reflection-in-action during high-fidelity simulation.

Participant Recruitment

We recruited simulation facilitators who utilize high-fidelity simulation with undergraduate nursing students from eight colleges and universities across a Western Canadian province. Participants were recruited via the publicly accessible CAN-SIM email listserv and encouraged to recruit other simulation facilitators from their institutions. To be included,

simulation facilitators had to use high-fidelity simulation in an undergraduate nursing program within an academic setting. Simulation facilitators who did not utilize high-fidelity simulation, or worked in settings outside of academia, such as those who work in a hospital or clinical setting or did not reside in the Western Canadian province were excluded.

Data Collection

Data were collected using a semi-structured interview guide using Bevan's (2014) phenomenological interviewing method (Table 1). A semi-structured interview allows for the exploration of meaning with participants as needed and allows for natural responses while safeguarding flow by reducing the presumption that we knew what would be said and the meaning of the responses (Sorrell & Redmond, 1995; Holloway & Galvin, 2017). Each participant was involved in one formal interview, and each interview lasted between 30 minutes and two hours, with most lasting approximately 45 minutes. All interviews took place via zoom and were only audio-recorded. Data saturation occurred after eight participants were interviewed and three additional participants were interviewed to ensure no new concepts emerged.

Table 4.1 Semi-Structured Interview Guide

Semi-Structured Interview Guide

Focus	Questions
Participant Information	• How many years teaching experience do you have? • How many years' experience do you have using high-fidelity simulation as a teaching modality? • Highest degree obtained? • Do you have any certifications regarding SIM? • Can you describe about how you became involved in using high-fidelity simulation as a teaching modality? • Can you describe your experience regarding any high-fidelity simulation training you have received? • Anything specific your training has focused on? • Where there any barriers to completing training?
Thinking Within High-Fidelity Simulation	• Can you describe how you know students are thinking within the simulation? • Can you describe how you support students thinking processes within high-fidelity simulation? How did you develop these strategies? • If you are in a sim that the students are struggling and not meeting learning objectives, can you describe how you, or if you, modify simulations to suit students learning needs? • In your experience, what are the barriers to students thinking within high-fidelity simulation?
Definition of Reflection-In-Action Provided	Reflection-in-action is the reflective form of knowing-in-action, which is demonstrated through the ability to show what you know during a surprise event with improvisation and competence.
Reflection-In-Action Within High-Fidelity Simulation	• In your experience, what does reflection-in-action mean? • What is your experience, if any, regarding high-fidelity simulation and reflection? • Have you received any training regarding reflection-in-action? • Can you describe how you recognize that students are reflecting in action? • Can you describe how you support students to reflect-in-action during simulation? • In your experience what are the barriers to student's reflecting-in-action? • In your experience what are the benefits of students reflecting in action? • Does the concept of reflection or reflection-in-action elicit any personal response or feelings for you? Can you describe them?

Data Analysis

We utilized Collazi's (1978) seven step process of analysis as depicted in Figure 1.

Figure 1 Colaizzi's Process

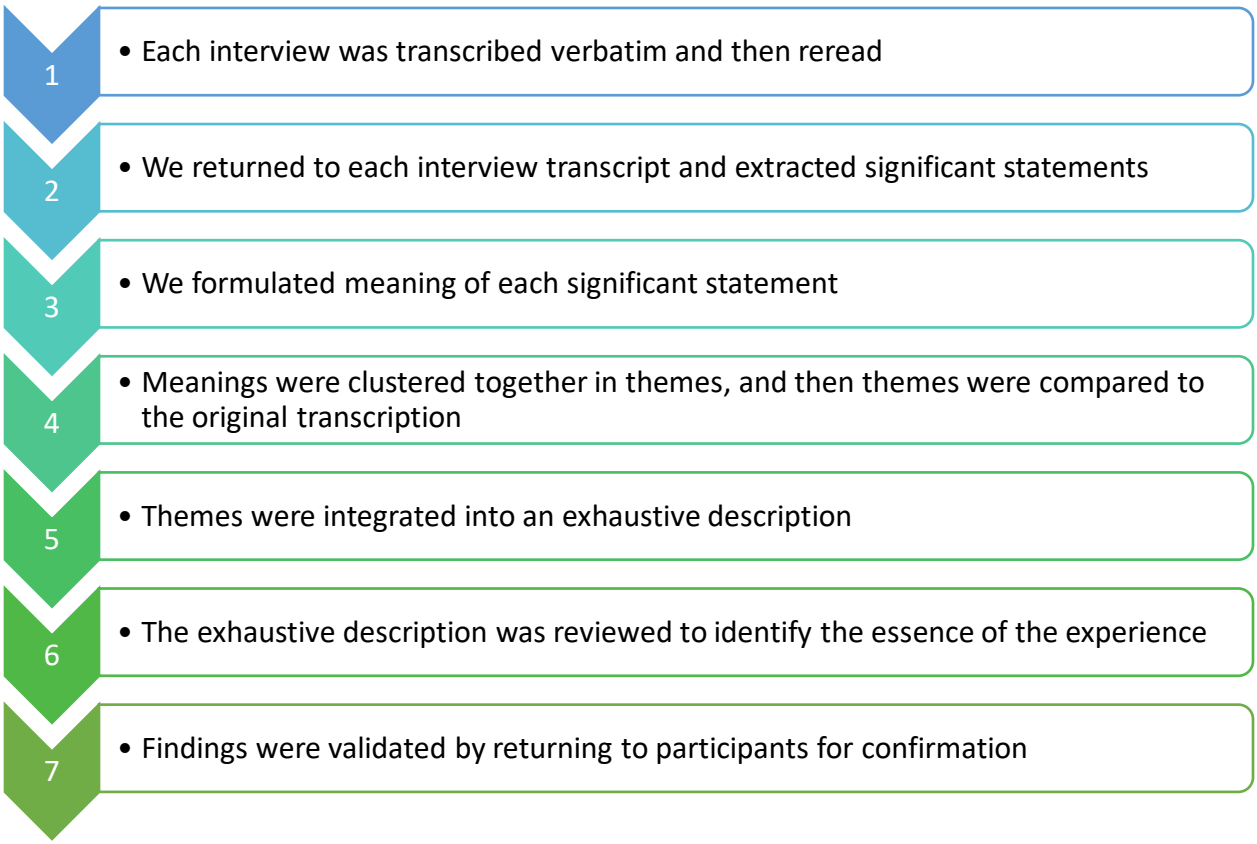

Figure 1
Colaizzi's Process (Colaizzi, 1978, as cited in Holloway & Galvin, 2017, p. 234).

Ethical Considerations

Ethical approval was obtained from the local research ethics board (REB20-2085). Written and verbal consent was obtained prior to each interview and unique identifiers were established to maintain participant anonymity.

Rigour

To ensure rigour we used a semi-structured interview guide to ensure consistency in our questioning and to provide space for participants to further speak about aspects that resonated with them. These interviews were then transcribed verbatim without interpretation. The primary author bracketed her own understanding of reflection-in-action by maintaining a reflexive journal and by meeting frequently with the research team to debrief and question interpretation of the data to reduce bias.

Results

Eleven undergraduate nursing simulation facilitators were interviewed regarding their experience of facilitating reflection-in-action during high-fidelity simulation and their demographics are displayed in Table 2. All participants identified as female, were over 36 years of age, and had a minimum master's degree as their highest level of education. The participants in this study had significant experience, six participants had simulation certification, and all but one participant had greater than 10 years teaching experience, and at least three years simulation experience. Four themes and 14 subthemes emerged during our analysis. Table 3 provides an overview of the themes and subthemes with exemplary quotes to demonstrate the participants' experiences.

Table 4.2 Participant Demographics

Participant Number	Gender	Age	Highest Degree Obtained	Simulation Certification	Years as a Nurse Educator	Years as a Simulation Facilitator
1	Female	46	MN	CCSNE*	13.5	10
2	Female	48	MN	CCSNE	15	6
3	Female	57	PhD	CCSNE	18	16
4	Female	57	MN	CHSE**	34	24
5	Female	66	MN		30	3
6	Female	40	MN	CHSE	14	7
7	Female	36	MN			5
8	Female	41	MEd	CHSE	16	7
9	Female	49	MN		2.5	3 Months
10	Female	49	MN		13	12
11	Female	>50	PhD		30	14

*Canadian Certified Simulation Nurse Educator (CCSNE) from the Canadian Association of the Schools of Nursing (CASN)

** Certified Health and Simulation Educator (CHSE) from the Society for Simulation in Healthcare (SSH)

Table 4.3

Summary of Themes, Subthemes, and Exemplar Quotes

Theme	**Subtheme**	**Exemplar Quote**
Identification of Reflection-In-Action	Learners Pause	*I see them take pauses, maybe speak slowly. They take their timeouts and go to their safe space, the red space.* -Participant 9
	Learners Collaborate	*If they're thinking and they're there in the simulation room with the simulator and they're really trying to put the information together, they may be talking to their partner, I think that's why it's valuable to have a partner there. Somebody you can just bounce ideas off of.* -Participant 3
	Learners Think-Out-Loud	*I can't actually visibly see the frames that they're using to come up with the actions that they're doing. When they're working together as a team, communication, I would say, is a big way that we can pull what they're thinking. If they can speak out loud, we encourage them to talk out loud in the room with their team members. That would probably be the only way that I could pick up that objective piece of information of what I'm seeing, what they're thinking. Other than that, I can only watch their actions and can't really pick up those frames until afterwards when we get into the debrief room together.* – Participant 7
	Learners Change the Course of Their Actions	*It's almost like a pause… followed by change in action. Like if they're going through a head-to-toe assessment, for example, and they hit that abnormal value, it's a shift. Instead of continuing with the head to toe, it's like going into the other, following another train of thought or different action.* – Participant 10
Barriers to Reflection-In-Action	Learner Anxiety and Fear of Being Vulnerable	*I think … of the psychological safety, even though we definitely try to make it a safe place to learn. And I think it's just their own expectations often in their own anxiety sometimes that impedes that, despite even we talk a lot about [how] it's a safe place, we're going to celebrate these mistakes and that they still struggle a bit with that, I find."* – Participant 2
	Simulation Design	*Cognitive load theory will certainly explain a lot of the barriers that we see in SIM, all of that extraneous load, all of that noise...It's a challenge for them. And the fact that we actually only put them in that simulated setting for maybe 15 to 20 minutes and we ask them to address so many*

		learning objectives, all of that extraneous load is something that I have noted that it impacts the way that they learn or think about certain situations. – Participant 6
	Learner and Facilitator Preparation	*Sometimes it's just a matter of being unfamiliar with the technology, or with the equipment, or with the supplies that they're being asked to use. And so, unfamiliarity with the environment is also really big piece. Students will get really upset if you throw them into a room and don't explain anything to them about how it's supposed to work. If you don't set them up to be super successful by empowering them with all of the knowledge and information that they're going to need to do well, that can also be a huge impediment to them not being able to fully engaged.* – Participant 4 *I have a role in sim, but it's actually off the side of my desk. All the stuff I do with other faculty, designing, integrating, writing zones, working with facilitating with other teams, all that happens off the side of the desk. It's a full-time role, but I'm doing it off the side of the desk, outside of the normal teaching.* -Participant 10
Supporting Reflection-In-Action	Prebriefing	*Back in the day, when educators first started to work with simulation and especially with undergraduate populations. It had been preceded by working with post-licensure groups who are, I would say, more ready to just pounce, not necessarily having had the need to pre-brief students, or think about the psychological impact of a given scenario and how it might affect the learners or the learning. ...I would say that we've gone from very little preparation and attention to how best to prepare students for being their absolute best in a simulation to now... We have a standard for prebriefing now.* -Participant 4
	Facilitator Curiosity	*What I find in students is depending on what frames. So, if they had a previous experience with death in their personal life, or they work in health care at all or what they've learned, or their emotions, feelings, et cetera, could be cultural, spiritual, all of that comes into play. So, there's so many different variables that impacts their decisions.* -Participant 8
	Cues, Prompts, and Facilitated Pauses	*So definitely cues, like whether it may be a charge nurse, perhaps if they're struggling with*

		something, asking for an update and then maybe offering a little bit more in that regard or perhaps even having the tech run in, say with some lab work from the unit clerk or something to support them. So, a lot of cues depending on where the students are at. -Participant 2
Benefits of Reflection-In-Action	Assists Collaborative Learning	*Well, I think it not only impacts the one that's maybe doing the intervention, but that whole group. And a lot of our sims we do, students in the sim lab are broadcasting to another room and the other part of the group is watching. That's just for everyone to learn.* -Participant 1
	Builds Confidence	*I think one of the biggest benefits is it gives the students confidence that they do have the knowledge and the background, that they can do it. They may surprise themselves and shrug their shoulders and say, "I didn't even know I knew that. How did I get that right?" And so I think that really builds on their confidence so that they can take that forward to care for the patient in the hospital.* -Participant 5
	Demonstrates and Builds Critical Thinking	*The benefit of reflecting in action, is that it has a cascading effect. When they know that they're on the wrong path and a wrong rabbit hole, then they don't continue to pursue that path. It's a lot easier to correct, incorrect ... It's a lot easier to correct misconceptions when you point it out right away, as opposed to in the debrief, to say ... As opposed to leaving it until debriefing, where people's memory can be quite faulty because of how they remember things.*- Participant 6
	Embeds Reflection in Learners' Practice	*I like to think I reflect that I don't just go through the day checking off the list, that I am reflective in the whole day and think back about, oh, I wonder if that could have been done differently or those kinds of things. So, I think the important aspect of a nursing practice and patient care that we're reflective and think about what we're doing and why we're doing it so that we make better decisions.* -Participant 11

Identification of Reflection-In-Action

Learners Pause

When participants noticed learners pause within simulation, they believed the learners were reflecting about their experience and working through the scenario to try and problem solve. As participant ten described:

> *It's the pause. Like they're going along doing whatever it is they're doing. And then it's a very visual, that you see them stop what they're doing…*

This pause in action could occur at the bedside or a designated zone within simulation rooms for time outs and structured pauses in the simulation. Often participants felt that the pause was accompanied by a change in the facial expressions of the learner, either staring fixated into space or a quizzical look on their face.

Learners Collaborate

Participants viewed simulation as a group activity and believed reflection-in-action happened as a collective. When learners worked together as a team and collaborated, participants were able to identify reflection-in-action. Participant one described:

> *They're with other students, so they're collaborating with each other, asking each other questions. Sometimes ... We have a whiteboard in the sim lab, so they'll be writing things out and trying to determine what information is important and what's not important.*

Collaboration is viewed as a strength by the participants. Through collaboration learners can work together, reflect, and solve the problem. Participants believed that collaboration can be seen through discussion, by writing out findings, or by working together on tasks.

Learners Think-out-loud

Participants agreed that it was challenging to identify reflection-in-action because it is difficult to know what a learner is thinking in the moment. Participants believed that when learners utilize think-out-loud strategies it gives insight into the learner's process of reflection-in-action in real time. Participant four explained:

> *Sometimes when, especially when you have more novice learner, they tend to be more verbal, when they're learning. And they will, for example, if they are engaged in doing a task, they might even talk through the steps out loud. And so, you can actually hear them thinking.*

Without utilizing think-out-loud strategies, participants felt that reflection-in-action discussions had to occur in post-simulation debriefing moments.

Learners Change Their Course of Action

Participants thought that reflection-in-action occurred within simulation when learners recognized a change in the scenario or an abnormal finding. Participant nine described reflection-in-action as acting by using their critical thinking in these moments of change:

> *It's when the students recognize, identify, verbalize when something has changed in the situation and then they take action accordingly and use their critical thinking to act.*

Although a change in action may identify reflection-in-action is occurring, verbalization at the time of action was viewed as essential to knowing if students had the correct rationale behind their actions and that the learner was conscious of their competence.

Barriers to Reflection-In-Action

Learner Anxiety and Fear of Being Vulnerable

Participants viewed learner anxiety and fear of being vulnerable as one of the biggest barriers to reflection-in-action. Learner anxiety may result from observation by facilitators and peers or the fear of making a mistake under this observation. As participant five described:

> *I think one of the biggest barriers is, students get really nervous because they're being watched or they're working with their peers and they're worried about what somebody else might be thinking.*

Participants felt it was important to establish psychological safety for learners; however, despite their attempts to create a safe learning environment, participants believed reflection-in-action was hindered if learners lacked experience in simulation or when learners had previous negative experiences in simulation.

Simulation Design

From the participants perspective, simulations that are not appropriately designed for the learner's experience and knowledge, may overwhelm learners, negatively impacting their ability to reflect-in-action. Participant 11 explained:

> *Unfortunately, I've been in a situation where we misleveled a scenario and all of a sudden, the students are standing there and looking overwhelmed and you realize that, oh, some of the content in the scenario was actually in the next class they were taking, not in the class that they took before. So really making sure that the scenarios are well-suited to the level of student and what you expect that they can demonstrate. And that way, they're set up well.*

Furthermore, participants expressed concerns that simulation is a challenging learning environment, and simulation design may create extraneous cognitive load, or overwhelm students with too many learning objectives and time constraints, preventing reflection-in-action from occurring.

Learner and Facilitator Preparation

Preparation for simulation was viewed as being key to reflection-in-action during simulation, and that this was a shared responsibility between learners and facilitators. Participant one stated:

> *I would maybe say lack of preparation or inadequate preparation and that's not always placed onto the student, but possibly the facilitator didn't prep them enough ahead of time to be well-prepared.*

Participants felt that the diversity in their teaching role could hinder their ability to adequately prepare for simulation. They also shared that it was their responsibility to ensure students were prepared by providing time for them to become familiar with the technology and equipment. Participants also thought that students needed to take simulation seriously and prepare by doing their prereadings and assigned activities ahead of simulation time.

Supporting Reflection-In-Action

Prebriefing

Prebriefing was seen as one of the most important strategies simulation facilitators could implement to support reflection-in-action, helping prepare learners for success in the simulation environment and to reflect-in-action. Participant four described:

> *If you don't set them up to be super successful by empowering them with all of the knowledge and information that they're going to need to do well, that can also be a huge impediment to them not being able to be fully engaged.*

Adequate prebriefing was seen to be particularly important for learners in the undergraduate population as they may not have the knowledge and experience to back their decisions or reflective processes that post-licensure groups have. Participants argued that prebriefing should follow a standardized guide that starts with student reading or activities prior to simulation, and

includes the creation of a psychologically safe space, and time to gain familiarity with the equipment and technology used in the simulation environment.

Facilitator Curiosity

Participants acknowledged that learners come into simulation with personal frames. Frames are based on individual experiences, knowledge, thoughts, and feelings through which individuals interpret experiences to make decisions (Lioce et al., 2020). Learners' actions are directed by these frames, and participants believed that remaining curious, identifying, and understanding these frames was a great way to support reflection-in-action. Participant seven described:

> *I just really want to set the groundwork that they're in that safe learning environment, have them go into the room and then pull those frames... So that kind of advocacy inquiry, knowing that they're coming into the room and walking through the simulations with frames that they carry up their own really kind of getting to the root of why they did what they did, pulling those things out of them, hopefully more on their own instead of me having to first kind of make the objective observations.*

Participants expressed that through remaining curious, they were able to determine the motivation behind actions and understand the reflection-in-action from the learner's point of view. Some participants expressed the idea of the competence ladder, and that right action is not always preceded by right thought, and incorrect action may be preceded by correct thought (Webber & Aretz, 2012). Only through remaining curious could correct action and thought be identified in the moment as reflection-in-action.

Cues, Prompts, and Facilitated Pauses

Participants felt that they were able to support reflection-in-action during simulation through the appropriate utilization of cues, prompts, and facilitated pauses. Participant six described their actions as:

> *So, I will be the voice from the ceiling with some of that data that the mannequin can't portray. There's once in a while, I'll do a cue over the ceiling, if they're fumbling or cue them to say, "Do you want to take a minute and think about that? The other thing too, is within our simulation suite, we have this area and it's marked by a red space on the floor and what we call that space, is their timeout space. If students are in the middle of a simulation and they're having a really hard time understanding what's happening, if they recognize within themselves that they are confused and they don't know what's going on, we encourage them to use a time-out and say, "Okay, step into this red space. Talk about what's happening. Why is your plan working? Why is it not working? And what are you going to do differently after this pause?"*

Participants described using the mannequin, becoming the charge nurse or another confederate, or being the voice from the ceiling to support students to reflect-in-action. The use of cues, prompts and facilitated pauses was necessary to support students to reflect-in-action, particularly for junior students, and as they advanced, this technique was implemented less often.

Benefits of Reflection-In-Action

Assists Collaborative Learning

Participants viewed a benefit of reflection-in-action as assisting in collaborative learning. This collaboration among learners, in conjunction with think-out-loud strategies, was described by participant 10 as a way for learners to solicit information from one another to come to correct conclusions:

> *…just think out loud, even if they don't know the answer and the problem solving out loud and soliciting input from their peers. That's a pretty good win in the mind if they're*

> *willing to do that. Because the chances are, once they start collaborating with everybody, they're going to come to what they need to come to.*

Collaborative learning was viewed as beneficial even if a learner was not directly involved in a particular skill or aspect of skill. Being able to share the reflective process, bounce ideas off each other, and share knowledge, was seen to help learners work as a group, make correct decisions, and may help to develop safe nursing practice.

Builds Confidence

Reflection-in-action was viewed by participants to build confidence in learners. Within simulation, learners are more independent, they are making decisions together and not with a nursing instructor or preceptor. As described by participant nine, this helps learners to solidify learning and feel confident in clinical decision making:

> *They can develop self-confidence and feel good about the decisions they've made as a nurse independent of having to check everything with their preceptor, with their nursing instructor or with their buddy nurse. So it develops some more critical and independent thinking when it's successful and even when it's not successful, it's also maybe helped solidify learning and helps them to make better decisions when such clinical situation rises again.*

Reflecting-in-action is the reflective form of knowing-in-action. Therefore, reflection-in-action is an important piece to this development of confidence because learners must depend on their own experiences and knowledge to work as a group to make decisions. Whether or not learners are successful or correct in their thinking, being able to reflect-in-action allows them to make better decisions and builds confidence for the future.

Demonstrates and Builds Critical Thinking

Participants viewed reflection-in-action as the time when didactic learning and clinical knowledge connect. This connection was seen to demonstrate and increase critical thinking within learners. As described by participant eight:

> *I think this is where they really start to learn, connect those dots, put theory into practice, develop those clinical reasoning and judgment, those critical thinking skills, which will ultimately help increase their confidence and their ability to do so.*

This time of reflection-in-action and connecting didactic learning and clinical knowledge was viewed as one of the greatest challenges for learners. However, participants believed that being able to reflect-in-action on both correct and incorrect actions and thinking enables learners to develop the ability to make better clinical decisions in the future, resulting in safe and ethical nursing care.

Embeds Reflection in Learners' Practice

Participants viewed reflection as a deeply important component of nursing, and that being able to utilize reflection-in-action embeds the reflective process into future practice. As described by participant six:

> *Reflection, reflective practice, the capacity to think about what you're doing and justify why you're doing what you're doing is essentially what we do as nurses and as educators. Anytime that we can promote reflection and point out to students what knowledge they're taking for granted…that's the responsibility as an educator.*

Participants understood their ultimate responsibility was to help learners embed reflection in their own personal practice to prevent their reliance on route memorization and checklists. When learners utilize reflection-in-action in their daily practice, they connect their knowledge and

skills, can identify changes in the clinical situation, collaborate, and change the course of their actions.

Discussion

The aim of this study was to explore and describe the lived experience of undergraduate nursing simulation facilitators use of reflection-in-action during high-fidelity simulation. Participants in this study had many years experience and training regarding high-fidelity simulation, however, participants identified a lack of formal training and knowledge regarding reflection-in-action during high-fidelity simulation. Undergraduate nursing simulation facilitators receive training and understand the importance of reflection-before-action through prebriefing, and reflection-on-action through debriefing. However, despite a lack of formal training regarding reflection-in-action, this knowledge is obtained "off the side of their desk". Participants believed they were able to identify when reflection-in-action may be occurring, recognize barriers to reflection-in-action, develop strategies to overcome these barriers, and articulate the benefits to learners being able to reflect-in-action.

Participants could identify when reflection-in-action may be occurring when learners pause, think-out-loud, collaborate, and/or change the course of their actions. A pause is often cited in the literature as one of the identifying features of reflection-in-action (Clapper & Leighton, 2019). Sometimes this pause is followed by silence (Andrade et al., 2018). But the pause and silence are followed by discussion and knowledge sharing, and then new action (Clapper & Leighton, 2019; Gililand et al., 2017). The literature also finds that reflection-in-action may be facilitated (Clapper & Leighton, 2019; Edwards, 2017). This is important because knowing that reflection-in-action can be facilitated may lead to different educational approaches

such as facilitated pauses and encouraging think-out-loud strategies (Clapper & Leighton, 2019). Without the use of think-out-loud strategies, facilitators must wait until post-conference debriefing to attempt to understand the thought processes within simulation which may be faulty.

Second, the participants of this study understood barriers to reflection-in-action to include learner anxiety and fear of being vulnerable, simulation design, and learner and facilitator preparation. Currently barriers to reflection-in-action have not been made explicit in the literature; however, antecedents to reflection-in-action including a psychologically safe environment, a surprise event, past experiences, and an emotional investment have been identified (Mulli et. al., 2021). It is crucial to understand the barriers to reflection-in-action so that strategies can be developed to overcome them. Participants in this study overcame barriers to reflection-in-action through adequate prebriefing, facilitator curiosity, and by using cues, prompts, and facilitated pauses. Other strategies could be implemented such as changing simulation design. For instance, more research may be needed to understand how increasing the time within simulation might help aid in reflection-in-action. Effort may be needed regarding direct observation to change the belief and culture that this is a negative or unwanted experience.

Lastly, participants identified a number of benefits to students reflecting-in-action, specifically, that it assists in collaborative learning, builds confidence, demonstrates and builds critical thinking skills, and embeds reflection into everyday practice. The literature finds that when students can reflect-in-action they gain new knowledge (McMullen et al., 2016; Mulli et al., 2021); are able to improvise and adapt (Kihlgren et al., 2014; Mulli et al., 2021); and perform new actions (Hughes & Scholtz, 2015; Mulli et al., 2021). These learners feel certain, secure, and have a sense of self-improvement (Mulli et al., 2021). Being a reflective practitioner was viewed as an essential nursing skill by participants as it helps nurses provide safe and ethical care.

Knowledge, flexibility, confidence, and reflective practice are arguably important skills for nursing practice. Having a clear understanding of the benefits of reflection-in-action may help reflection-in-action to be included in simulation training. More research is needed to understand the long-term impacts of these strategies being used in simulation.

Implications of this study

Correct action does not equate to correct thought processes. Capturing reflection-in-action during the high-fidelity simulation is one method to understand a learner's thought process behind their actions. Through this study participants identified ways to recognise and support reflection-in-action during high fidelity simulation. Their experiences could lead to the creation of a checklist to help undergraduate nursing simulation facilitators understand when reflection-in-action may be occurring, and how to support learners to reflect-in-action during simulation. Furthermore, this study could lead to the recognition of the importance of including reflection-in-action training for simulation facilitators. This checklist and training could lead to a better learning environment resulting in increased confidence, skills, and critical thinking amongst learners.

Limitations of this study

The participants in this study were all female undergraduate nursing simulation facilitators from colleges and universities in a western Canadian province. The participants all held a master's degree or PhD and, except for one participant, had been involved heavily in simulation for years. Due to these factors and small sample size, this study is minimally generalizable. The study was strengthened by including participants from 11 different colleges and universities with a variety of experience, background and training. Future research should include cross country

recruitment, male facilitators, facilitators from faculties outside of nursing, and a larger sample size.

Conclusion

High-fidelity simulation has become a norm in undergraduate nursing programs. To obtain maximum benefit from these learning opportunities simulation facilitators need the time and training to know how best to support student learning. If a goal of higher education is to train reflective practitioners, an understanding of reflection-in-action is needed to achieve this goal. Currently more research is needed to create guidelines and strategies to help simulation facilitators identify and support reflection-in-action during high-fidelity simulation. Standardizing these strategies and training of simulation facilitators is one step in this process. Further research is also needed with undergraduate nursing students to gain their perspective on how these reflection-in-action strategies support their learning.

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Chapter 5 Discussion

The overarching aims in conducting this research included the need to define the poorly understood concept of reflection-in-action through a Walker and Avant (2011) concept analysis. Through the concept analysis, I found that reflection-in-action must occur within the simulation itself and not within post-simulation debriefing. Reflection-in-action occurs at a critical learning juncture, followed by a pause, and out-loud discussion and knowledge sharing. From this point, I aimed to provide an in-depth analysis of reflection-in-action during high-fidelity simulation-based learning and explore the lived experience of undergraduate nursing simulation facilitators use of reflection-in-action. Through this study I found that undergraduate nursing simulation facilitators receive very little training regarding reflection-in-action during high-fidelity simulation. Despite this, four themes emerged, and participants believed that they could identify reflection-in-action during high fidelity simulation, recognize the barriers to reflection-in-action during high-fidelity simulation, support students to reflect-in-action, and understand the benefits of reflection-in-action. The benefits of reflection-in-action occurred because of facilitator and learner interaction before and during the simulation itself.

Simulation Facilitation Standards

According to the International Nursing Association for Clinical Simulation and Learning (INACSL) simulation facilitation standards of best practice, simulation facilitators are responsible for managing the entire simulation experience to ensure that learners meet the stated objectives (INACSL Standards Committee, 2016b). If a desired outcome of high-fidelity simulation is to develop reflective practitioners, promote collaborative learning, and build confidence and critical thinking among learners, then incorporating reflection-in-action strategies

is a key component to best practice in simulation facilitation. Of note, INACSL currently holds standards of best practice for preparation and prebriefing (reflection-before-action) and debriefing (reflection-on-action), which are explicit in the reflective process (INACSL Standards Committee, 2016a; INACSL, 2016b). The facilitation standards include many strategies that the participants in our study use to support reflection-in-action such as the appropriate use of cues and prompts (INACSL Standards Committee, 2016b). However, current standards of facilitation encourage no disruption in simulation flow, where participants in our study believed that pauses may encourage and support reflection-in-action (Clapper & Leighton, 2019). Clearly, a balance between simulation flow and needed pauses should be found to facilitate the time needed for learners to reflect-in-action. In conjunction with the NLN/Jeffries simulation framework, this use of cues, prompts, and facilitated pauses is supported as a dynamic interaction between facilitator and learner to meet stated objectives (Cowperthwait, 2020; Hallmark et al., 2014; Jeffries et al., 2015). Lastly, simulation facilitation standards do not include the process of seeking out to know and understand the learner's frames or ways of knowing (INACSL Standards Committee, 2016a; INACSL Standards Committee, 2016b). This is left as a key component of debriefing. However, participants in this study believed that facilitator curiosity within the simulation itself and wondering about student frames in the moment of simulation was a key component to supporting reflection-in-action. Although facilitator curiosity and seeking out frames will remain essential in debriefing, memory may be faulty and new knowledge may have been obtained between the event and debriefing, leading to reflection-in-action not being truly captured. Facilitation standards should include frame discovery and strategies to promote think-out-loud thinking to discover reflection-in-action in the moment (Burbach et al., 2015; Clapper & Leighton, 2019; Fraser et al., 2018).

Implications

This study has implications for changes to best practice for simulation design, training, and facilitation. Knowledge from this study could be used to incorporate reflection-in-action strategies into simulation design such as leveling simulation appropriately, building in more time for reflection-in-action during simulation, and honoring the need for appropriate cues, prompts, and pauses whether they are learner or facilitator initiated. Training for undergraduate nursing simulation facilitators should include knowledge of not only reflection-before-action and reflection-on-action, but reflection-in-action, the barriers, benefits, and how facilitators can best support students throughout the whole reflective process.

Future Research

The NLN/Jeffries simulation framework has an assumption that learning within simulation happens through a dynamic interaction between the learner and the facilitator. This study focused on the facilitator's experience of reflection-in-action during high-fidelity simulation and the facilitator's experience of identifying and supporting reflection-in-action, and perceived barriers and benefits to reflection-in-action. Future research could expand on the phenomenological study by recruiting nursing simulation facilitators across Canada or internationally and of different genders to understand their experience of reflection-in-action during high-fidelity simulation. This study could also be repeated with simulation facilitators of learners from different disciplines that use high-fidelity simulation such as medicine, paramedicine, respiratory therapy, and social work. Further research is needed to explore the lived experience of learners and reflection-in-action, and the dynamic relationship between the facilitator and learner when reflection-in-action is occurring. Through studying both sides of this

relationship and the relationship itself, a full understanding of reflection-in-action may be obtained. This could be expanded to quantitative or mixed method studies regarding meeting learning outcomes, increased confidence, and skill acquisition among learners who are supported to reflect-in-action during high-fidelity simulation. Additional research is also needed to understand how developing reflection-in-action skills among student nurses impacts their transition into a role of a registered nurse and their future reflective practice. Reflection-in-action is a hallmark of artistry or mastery of a subject. As this study explores the experience of undergraduate nursing educators facilitating reflection-in-action with novices, research could be directed towards understanding reflection-in-action during high-fidelity simulation with experienced nurse learners in hospital and community settings to see how reflection-in-action develops as nurses gain expertise.

Conclusion

Reflection-in-action occurs when individuals move beyond rote memorization and automated actions to being able to identify critical moments, reflect, and change actions appropriately. This is a desirable trait of nursing students and nurses. Undergraduate nursing simulation facilitators are in a unique position to help develop this skill amongst learners. Through clarifying this poorly developed concept of reflection-in-action and better understanding the experience of undergraduate nursing simulation facilitators in identifying and supporting reflection-in-action through high-fidelity simulation, learners can be better supported to become reflective and safe practitioners.

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Appendix A: Permissions

Permission from Nurse Education Today and Co-Authors

Amanda Kenny <A.Kenny@latrobe.edu.au>
Mon 21/12/2020 03:15
To: Jessica Mulli
[△EXTERNAL]

Hi Jessica
I am Editor in Chief of Nurse Education Today. Congratulations on the accepted manuscript. There is no problems using this paper in your thesis. Please take this email as the approval. If you need this in a different format please just let me know as I can write you a letter if you need it.
Well done again !!!

Kind regards

Emeritus Professor Amanda Kenny PhD
La Trobe Rural Health School, College of Science, Health and Engineering La Trobe University
PO Box 199 Bendigo M: 0408512973 | E: a.kenny@latrobe.edu.au

Editor in Chief Nurse Education Today

Google Scholar: **https://scholar.google.com.au/citations?user=77F92owAAAAJ&hl=en**
Twitter: @AJKenny20

Dear Dr. Candace Lind,

I am writing to request permission to include one manuscript that I co-authored with you as part of my MN thesis. My thesis will be added to the institutional repository at the University of Calgary and the Library Archives Canada.

University of Calgary Theses Repository- The Vault http://theses.ucalgary.ca/

Library and Archives Canada http://collectionscanada.gc.ca/obj/s4/f2/frm-nl59-2-e.pdf

The manuscript I am requesting to include is:

Mulli, J., Nowell, L., & Lind, C. (2021). Facilitating reflection-in-action during high fidelity simulation: A concept analysis. *Nurse Education Today. 97.* 1-7. http://doi.org/10.1016/j.nedt.2020.104709

Your signature below will indicate that you agree to these manuscripts being reproduced in their entirety as part of Jessica Mulli's MN Thesis titled *Facilitating Reflection-In-Action During High Fidelity Simulation.*

Candace Lind
_____

Co-authors signature

Candace Lind

_____

Co-authors printed name

May 27, 2021

_____

Date

Appendix B: Certificate of Ethics Approval

Conjoint Health Research Ethics Board
Research Services Office
2500 University Drive, NW
Calgary AB T2N 1N4
Telephone: (403) 220-2297
chreb@ucalgary.ca

CERTIFICATION OF INSTITUTIONAL ETHICS APPROVAL

The Conjoint Health Research Ethics Board (CHREB), University of Calgary has reviewed and approved the following research protocol:

Ethics ID:	REB20-2085
Principal Investigator:	Lorelli Nowell
Co-Investigator(s):	
Student Co-Investigator(s):	Jessica Mulli
Study Title:	Facilitating Reflection-in-Action During High-Fidelity Simulation
Sponsor:	Western Region Canadian Association of Schools of Nursing

Effective: 26-Jan-2021 **Expires:** 26-Jan-2022

The following documents have been approved for use:

- Participant Recruitment Email, 3, January 25, 2021
- Participant Consent Form, 2, January 25, 2021
- Semi-Structured Interview Guide, 2, December 7, 2020
- Research Proposal, 1, December 6, 2020
- Budget Reflection-in-Action During High-Fidelity Simualtion, 2, January 25, 2021

The CHREB is constituted and operates in accordance with the current version of the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* (TCPS); International Conference on Harmonization E6: Good Clinical Practice Guidelines (ICH-GCP); Part C, Division 5 of the Food and Drug regulations, Part 4 of the Natural Health Product Regulations and the Medical Device Regulations of Health Canada; Alberta's Health Information Act, RSA 2000 cH-5; and US Federal Regulations 45 CFR part 46, 21 CFR part 50 and 56.

You and your co-investigators are not members of the CHREB and did not participate in review or voting on this study.

Appendix C: Notice of Funding

Western North-Western Region Canadian Association of Schools of Nursing
La region ouest, nord ouest de l'association canadienne des écoles de sciences infirmières

Jessica Mulli RN BN CCNE
University of Calgary MN Student
Clinical Nursing Instructor
Faculty of Nursing, University of Calgary
2500 University Dr. NW
Calgary AB, T2N 1N4

January 18, 2021

Supervisor Lorelli Nowell PhD

RE: WNRCASN 2021 Graduate Student Research Grant

Dear Jessica,

Congratulations! Your proposal, "*Facilitating Reflection-in-Action During High-Fidelity Simulation*," has been selected by the Review Committee as the recipient of the 2021 WNRCASN Graduate Research Grant of $2500.

In addition to the grant requirements stated on the WNRCASN website, please be advised of the following WNRCASN grant policies pertaining to this disbursement:

- Grant award term is one calendar year from the time the grant has been disbursed. An extension may be requested by emailing: President@WNRCASN.ca
- Research funds must be deposited into a research account with the successful candidate's educational institution, usually under the supervisor's name. If the study cannot be completed as intended, all grant monies must be returned to WNRCASN. At the completion of the grant term, all remaining monies must be returned to WNRCASN.
- Budget allocation of funds may be used for personnel and materials expenses only, conference expenses will not be covered. Overhead and operating costs are not permitted expenses for this grant. Approximately 10% of the budget allowance may be moved from one line item to another, as long as an explanation is provided.
- Funds will be sent to the successful candidate once the ethics approval certificate has been submitted to your research office and WNRCASN Secretary.
- *Please provide instructions from the research office at your university for sending the grant monies to you.

Best wishes for your research.

Warm Regards,
Sherri Melrose PhD, WNRCASN President
Dawn Mercer-Riselli MN, WNRCASN Secretary/Treasurer

Appendix D: Participant Consent Form

UNIVERSITY OF CALGARY

CONSENT TO PARTICIPATE IN RESEARCH

TITLE: Facilitating Reflection-In-Action During Simulation

SPONSOR: University of Calgary

FUNDER: WNRCASN Graduate Student Research Grant

INVESTIGATORS:

Dr. Lorelli Nowell (Principle Investigator) 403-620-9822

Jessica Mulli (Co-Investigator) 403-464-4075

INTRODUCTION

Lorelli Nowell and Jessica Mulli from the Faculty of Nursing at the University of Calgary are conducting a research study. This study is funded by the Western Region Canadian Association of Schools of Nursing (WNRCASN) 2021 Graduate Student Grant.

This consent form is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. Please ask for more details on any information mentioned or not included here. Take the time to read this carefully and to understand any accompanying information. You will receive a copy of this form for your records.

You were identified as a possible participant in this study because you were identified as a high-fidelity simulation facilitator for undergraduate nursing students in Alberta as a member of CAN-SIM public records. Your participation in this research study is voluntary.

WHY IS THIS STUDY BEING DONE?

Currently there is a shortage of undergraduate nursing faculty, clinical placements, and due to the current covid-19 crisis there has been an increasing amount of nursing students displaced from the clinical setting. To overcome these barriers, undergraduate nursing programs will need to

rely more on high-fidelity simulation as teaching modality. This will require highly trained simulation facilitators within undergraduate nursing programs. This study aims to explore the question: *what are the lived experiences of undergraduate nursing simulation facilitators with learning about and facilitating reflection-in-action during high fidelity simulation?* The findings from this study may be used to create guidelines for simulation facilitators that could be integrated within simulation design to identify reflection-in-action within simulation.

HOW MANY PEOPLE WILL TAKE PART IN THIS STUDY?

6-12 people, who are undergraduate nursing simulation facilitators within Alberta as identified by their public membership of CAN-SIM, will take part in this study.

WHAT WILL HAPPEN IF I TAKE PART IN THIS STUDY?

If you are interested to take part in the research, you will be invited to take part in a semi-structured interview that will take approximately 30-45 minutes. The interviews will be conducted by the co-investigator and will be recorded and transcribed for further analysis and research purposes.

All the interviews will be conducted via phone interview or zoom due to the COVID-19 Pandemic.

HOW LONG WILL I BE IN THIS STUDY?

Participation in this study will need a total of about 30-45 minutes.

ARE THERE ANY POTENTIAL RISKS OR DISCOMFORTS THAT I CAN EXPECT FROM THIS STUDY?

There are no risks associated with this study.

ARE THERE ANY POTENTIAL BENEFITS IF I PARTICIPATE?

There are no direct personal benefits from participating in this study. However, the results from this study be used to create guidelines for simulation facilitators that could be integrated within simulation design to identify reflection-in-action within simulation. These guidelines could then aid facilitators in supporting students to reflect-in-action.

WHAT OTHER CHOICES DO I HAVE IF I CHOOSE NOT TO PARTICIPATE?

You are free to choose not to participate in the study. If you decide not to take part in this study, there will be no penalty to you. You may inform the interviewer (co-investigator) about your decision to withdraw from participation in the study and it will not affect you in any way.

CAN I STOP BEING IN THE STUDY?

Yes. You can decide to stop at any time. Tell the researchers if you are thinking about stopping or decide to stop.

WITHDRAWAL OF STUDY DATA

Participants are free to withdraw from the study at any point without consequence. If a participant decides to withdraw during an interview, participants will be thanked for their time and the interview will end.

The last point at which data withdrawal will be possible is before the analysis and write up of the findings for up to 2 months after the interview. This is to avoid having to reanalyze the data, which would take a significant amount of extra time. If the participants decide to end their involvement in the study, the information they have provided will not be retained or used in any way.

WILL I BE PAID FOR PARTICIPATING, OR DO I HAVE TO PAY FOR ANYTHING?

You will not be paid for your participation in this research study. You are not expected to incur or be reimbursed for any out-of-pocket expenses, such as parking or transportation fees.

WILL INFORMATION ABOUT ME AND THE PARTICIPATION BE KEPT CONFIDENTIAL?

The researchers will do their best to make sure that your private information is kept confidential. All the information will be handled with confidentiality, but there is always the potential for an unintended breach of privacy. The research team will handle data according the Data Management Plan as outlined below:

All information obtained during the study will be kept private and will only be accessed by the study team. Any identifying information will be kept separate from other study materials and all information will be stored in a secured office/password protected computer. Only the interviewer/co-investigator will have access to the list of participants and their respective identifiers (email address). All the data will be de-identified before being shared with the PI ensure complete confidentiality.

Your name will not be included in the audio file name, nor included on the interview transcripts. Transcriptionists will have access to recordings and identifiable information. Transcriptionists will be required to sign and maintain privacy and confidentiality. Once transcription is complete, they will no longer have access to identifiable information. No information that discloses your identity will be released or published. Every effort will be made to maintain participant anonymity. After the study is completed, the recording will be deleted, and any hard copy data will be shredded. The transcripts will be stored electronically, on a password-protected-site, for a period of five years. Individual results will not be directly identifiable as results will be aggregated when reported.

HOW LONG WILL INFORMATION FROM THE STUDY BE KEPT?

All data will be deleted from the network drive or shredded permanently after 5 years.

WHOM MAY I CONTACT IF I HAVE QUESTIONS ABOUT THIS STUDY?

The Research Team:

You may contact Jessica Mulli at 403-464-4075 with any questions or concerns about the research or your participation in this study.

Conjoint Health Research Ethics Board (CHREB):

If you have any questions about your rights as a possible participant in this research, please contact the Chair, Conjoint Health Research Ethics Board, University of Calgary at 403-220-7990.

HOW CAN I FIND OUT ABOUT THE STUDY RESULTS?

A summary of the study results will be made available to the participants on request.

WHAT ARE THE RIGHTS IF I TAKE PART IN THIS STUDY?

Taking part in this study is your choice. You can choose whether or not you want to participate. Whatever decision you make, there will be no penalty to you.

You have a right to have all your questions answered before deciding whether to take part.

If you decide to take part, you may leave the study at any time

HOW DO I INDICATE THE AGREEMENT TO PARTICIPATE?

Your signature on this form indicates that you have understood to your satisfaction the information about your participation in the research project and agree to take part in the study. In no way does this waive your legal rights nor release the investigators or involved institutions from their legal and professional responsibilities.

SIGNATURE OF STUDY PARTICIPANT

_____

Name of Participant

_____ _____

Signature of Participant Date

SIGNATURE OF PERSON OBTAINING CONSENT

_____ _____

Name of Person Obtaining Consent Contact Number

_____ _____

Signature of Person Obtaining Consent Date

SIGNATURE OF THE WITNESS

_____

Name of Witness

_____ _____

Signature of Witness Date

A signed copy of this consent form has been given to you to keep for your records and reference.

Appendix E: Preliminary Semi-Structured Interview Guide

Prior to beginning each interview, the researcher will review the consent form with the study participant to ensure informed consent. The script below will serve as an interview guide, however, as this is a semi-structured interview, additional points may be covered or probed as they arise.

Thank you for agreeing to this interview. The name is Jessica Mulli, and we are going to be talking about your experiences and perceptions of your training as an undergraduate nursing simulation facilitator. We will also be talking about your experiences and perceptions of identifying and supporting students to reflect-in-action during high-fidelity simulation. This interview should take approximately 30-45 minutes.
With your permission, I will be recording our conversation, but your name, demographic information, and any identifying responses will be kept anonymous. This recording and the written transcripts of this interview will not be accessible to anyone except me. The contents of this interview will be de-identified before being shared with other members of the research team. The PI and the Co-I's will only have access to written transcripts to maintain the confidentiality of the study. At any point during the interview, or after the interview is conducted, you may withdraw from this study. If you decide to terminate your involvement in this study, the information you have provided will not be retained or used in any way. You should be aware that it may not be possible to withdraw comments you have made once the results of this research have been published or otherwise disseminated.

Before we begin, I would like to collect some demographic information from you for contact purposes, if necessary, and for descriptive statistics.

1. What is your full name? (Surname and first name)
2. What is the best method to contact you? (telephone, email)
3. What is your age?
4. What institution are you employed at?
5. How many years teaching experience do you have? How many years experience do you have using high-fidelity simulation as a teaching modality?

I have a few questions I want to ask you, but if, at any point, you want to add anything, or you feel something is relevant that I have not brought up please feel free to do so. Are you ready to begin?

1. Can you describe about how you became involved in using high-fidelity simulation as a teaching modality? How long have you been a high-fidelity simulation facilitator?

2. Can you describe your experience regarding any high-fidelity simulation facilitation training you have received?
3. Can you describe how you know students are thinking within the simulation?
4. Can you describe how you support students thinking processes within high-fidelity simulation?
5. In your experience, what are the barriers to students thinking within high-fidelity simulation?
6. Can you describe how you modify simulations to suit students learning needs?

Based on a literature review conducted, we will be using Donald Schön's definition of reflection-in-action. Reflection-in-action is the reflective form of knowing-in-action, which is demonstrated through the ability to show what you know during a surprise event with improvisation and competence.
Based on this definition can you tell me:

7. In your experience, what does reflection-in-action mean?
8. What is your experience, if any, regarding high-fidelity simulation and reflection? Can you describe how you recognize that students are reflecting in action?
9. Can you describe how you support students to reflect in action during simulation?
10. In your experience what are the barriers to student's reflecting-in-action?

That was the last question. Thank you very much for your time. Is there anything else you would like to add? If you have any further questions or comments, please do not hesitate to contact me, or other members of the research team.