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Simulation Facilitator Competency: Validity and Reliability of a Self-Assessment Tool

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SIMULATION FACILITATOR COMPETENCY: VALIDITY AND RELIABILITY TESTING OF A SELF-ASSESSMENT TOOL

by

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ABSTRACT

SIMULATION FACILITATOR COMPETENCY: VALIDITY AND RELIABILITY TESTING OF A SELF-ASSESSMENT TOOL

by

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The use of simulation as a teaching and learning strategy continues to grow in nursing education. Standards of Best Practice, certification criteria, and simulation theory support the notion that facilitation of simulation requires a specialized skill set that differs from traditional classroom and clinical teaching. The discipline of nursing has already established valid and reliable tools for teachers within the classroom and clinical environments to complete self- and/or peer evaluation to inform teaching effectiveness. The National League for Nursing/Kellgren Simulation Facilitator (NLN/KSF) tool fills a gap in the literature by providing a valid and reliable tool to self-assess comprehensive facilitator skills in nursing education. The results of psychometric testing demonstrate reliability and validity of the NLN/KSF. (Scale content validity index = 0.95, known groups validity significance = .000 [p-value ≤ 0.05], Cronbach's alpha ranges from 0.720 – 0.870, test retest reliability = 0.84 [p-value ≤ 0.05]). The NLN/KSF has implications for use within education, practice, and policy, as well as potential implications within the larger simulation community.

To my dear daughters, Emma and Leah,

You’re the lights of my life.

Corey, my rock, my best friend.

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Chapter One

Introduction

Simulation is a learner-centered teaching strategy that has been gaining momentum in nursing education in the past several decades. According to a survey completed by the National Council of State Boards of Nursing, there are nearly 1,700 schools of nursing utilizing simulation within their curricula (Kardong-Edgren, Willhaus, Bennett, & Hayden, 2012). Fey and Jenkins (2014) reported that over 90% of nursing schools nationally who responded to their survey are using simulation within their programs. Taibi and Kardong-Edgren (2014) go so far as to say that "simulation is becoming ubiquitous in nursing education" (p. e47). Despite the prevalence of the use of this teaching strategy, there are no valid and reliable tools to assist educators in recognizing their own strengths and weaknesses in teaching with simulation.

Because of the rapidly changing practice environment, the education that was provided in nursing school even a decade ago is not sufficient for safe patient care today. The gap between education and practice is widening. Due in part to the high cost of orientation programs, employers are increasingly looking for graduates who are practice-ready (Jeffries, 2005), with the ability to immediately apply the skills learned in nursing school (Cant & Cooper, 2009). According to Berkow, Virkstis, Stewart, and Conway (2008), 90% of academic nurse educators believe that they are fully preparing nurses for delivery of safe and effective patient care. Their practice counterparts do not agree; only 10% of this population believes that new graduates are fully prepared to deliver safe and effective care. Jeffries (2005) stated that simulation, in conjunction with classroom and traditional clinical experiences, can be a valuable supplement to nursing education. Simulation adds the opportunity to apply classroom learning in a safe environment that mimics bedside practice. Just as in the classroom or clinical setting, the quality of the learning in simulation is highly dependent on the skill of the instructor.

Problem Statement

According to DeVellis, “measurement is a fundamental activity of science” (2017, p. 2). The process by which an observer collects information about a topic of interest requires some form of process to make sense of the data. Measurement is one way of collecting information and making sense of the information that is gathered. In this instance the topic of interest is self-evaluation of teaching with simulation.

As far back as the 1990’s, nursing faculty demonstrated interest in assessing and measuring teaching effectiveness in a scientific way. Kirschling et al. (1995) developed and tested a teaching effectiveness tool for students to assess the quality of their faculty’s classroom instruction. The Teaching Effectiveness Scale assesses a faculty member in five domains: knowledge and expertise, facilitative teaching methods, communication style, use of own experience, and feedback (Kirschling et al., 1995).

Knox and Mogan (1985) completed seminal work that connects effectiveness of the clinical instructor to the outcomes of the student. Better clinical teachers result in better student learning. As a follow up to this research, Knox and Mogan (1985) created the Nursing Clinical Teaching Effectiveness Inventory (NCTEI). If there is understanding that better clinical teachers facilitate better student learning, the next logical question is how to measure the effectiveness of that teacher. These measurements provide valid and reliable information for the clinical teacher to inform their abilities and give insight into strengths and areas for improvement. It is worth noting that there is no discussion related to the use of these tools as an establishment of competence in their specialty areas of teaching. Referenced use of the tools was limited to creation of an open dialogue between students and teachers in order to create a higher level of teaching effectiveness in nursing education (Kirschling, 1995). Knox and Mogan (1985) the difficulty in creating an absolutely valid tool to measure competency. Neither of these tools mentions achievement at a certain level on their respective tools is indicative of competency of teaching; no benchmarking has been completed to use this information in anything other than a formative manner.

These two examples are representative of the decades-old inclination for faculty to gain information related to their own performance in their environment of teaching. These two tools differ in their criteria because of the varying expectations and skills sets inherent to that particular type of teaching. Simulation presents yet another environment for teaching and another unique set of skills that contribute to the quality of the educational experience. Continuing the tradition of self-exploration and information-seeking, creation of tools to identify areas of strength and opportunities for improvement in facilitation of simulation will fill a gap in currently available tools in this specialty area. To date, there is but one instrument that has shown validity and reliability in relation to facilitator evaluation in simulation: The Facilitator Competence Rubric ([FCR]; Leighton, Mudra, & Gilbert, 2018). Description and critique of this tool are presented in chapter 2.

Theoretical Framework of Simulation

To effectively understand the philosophical underpinnings of simulation, it is necessary to separate simulation into two different categories: simulation used to practice, perfect, and assess competency of psychomotor skills, and simulation used to develop, highlight, or analyze thought processes and decision-making skills. Each of these two categories has a distinct and separate philosophy. The performance of psychomotor skills aligns with empiricism; the less concrete and nebulous analysis of thought processes aligns with constructivism (Bradley & Postlethwait, 2003).

Empiricism. The historical roots of simulation suggest that empiricism is the key philosophy driving the use of simulation when the focus is development and competency of psychomotor skills (Bradley & Postlethwaite, 2003; Parker & Myrick, 2009). Simulation first manifested in medical education through the development and use of task trainers (Bradley, 2006; Brigden & Dangerfield, 2008; Gaba, 2004; Issenberg, McGaghie, Petrusa, Gordon, & Scalese, 2005). Task trainers are replicas of different portions of the human body made with performance of a certain skill in mind. For example, the task trainer created to practice urinary catheter insertion includes a model of a partial torso with genitalia, a urethra, and perhaps a bladder. The trainer would not be a model of the full body. The first affordable and easily accessible task trainer was developed by Asmund Laerdal in the mid-twentieth century (Bradley, 2006). "Resusci-Anne" was designed as a portable trainer to help perfect the user's ability to perform cardiopulmonary resuscitation (CPR). This creation revolutionized simulation in medical applications. As task-trainers became more widely available, technology improved, and related costs have decreased, potential for simulation application has exploded. Full-body simulators are now available that accurately replicate body functions like heart and lung sounds, chest rise and fall, and blinking eyes, along with the ability to assess vital signs and palpate pulses. Simulator technology has become increasingly sophisticated over the last several decades.

Simulation has evolved over time from the use of task trainers and full body mannequins for skills practice to a method of testing competencies. Within typical medical educational programs, students must participate in objective structured clinical examinations (OSCEs). In essence, these examinations are a series of short simulations designed to provide opportunity for evaluation of a student's performance (Brigden & Dangerfield, 2008). While OSCEs may often have a communication component to them, the main focus is on the competent performance of the related task, often employing the use of these task trainers.

Parker and Myrick (2009) state that psychomotor skill performance has a behaviorist foundation and is therefore empiric. It is noted that in behaviorism, the only important factors are the items that are observable: the individual's actions. These actions are a rote memorization and demonstration of information passed to them from an instructor since assessment is without consideration for any internal processes. The long-revered practice of "see one, do one, teach one" is empiric in nature because the ultimate responsibility for the passing of wisdom and know-how falls on the teacher. The learner is passive.

However, the prevalent issue within the nursing practice profession has not been that novice nurses lack the ability to perform psychomotor skills but rather that many new nurses have been noted to lack critical thinking skills (Jeffries, 2005). A contrast can now be made with a shift in philosophy within simulation to meet these needs. This shift has come about because it was recognized that empiricism is an ineffective foundation when the aims of the exercise are beyond demonstration of psychomotor skills. Instead of empirically determining whether a learner can successfully perform CPR, the question has shifted to whether or not the learner has the ability to recognize when and why to begin CPR. These subsequent questions are constructivist in nature. These goals for simulation align with those found in aviation, government preparedness, and military applications in which the learner's thought processes and decision-making capabilities were of greatest interest (Albores & Shaw, 2008; Bradley, 2006; Hays, Jacobs, Prince, & Salas, 1992).

Constructivism. The basis of constructivism comes from the work of Piaget who proposed that learners come to understand their world through interaction (Bradley & Postlethwait, 2003). This new knowledge acquisition is not passive from teacher to learner, but instead is active and requires processing on the learner's part. The act of processing incorporates previous knowledge (sometimes knowledge that is apparently unrelated) to be used in a context that requires thought and decision-making, eventually culminating in a new understanding of a concept (Parker & Myrick, 2009). An added component to constructivism is the role of the instructor. Instead of acting as "the sage on the stage", the instructor instead acts as a guiding force in the education of the learner. A portion of this responsibility is to elicit information about learner's previous knowledge, and to ask pointed questions about how new information connects with the learner's previous worldview (Bradley & Postlethwait, 2003). This process mirrors the progression of simulation closely. In simulation, the facilitator presents the new information through introduction of the scenario, observes the learners' resulting actions, and then asks appropriate questions to assist the learner in accommodating this new information into their evolving worldview. These discussions typically take place during debriefing, which ideally occurs immediately after the simulation activity. Bradley and Postlethwait (2003) also state that a vital component of constructivism is the need for a safe learning environment. In order for true learning to take place, learners must feel comfortable to take risks without fear. This need for safety is also a foundational element of simulation (Bland Topping, & Wood, 2011; Bradley, 2006).

Criteria of Simulation

To date, there is only one mid-range theory that specifically focuses on simulation: The National League for Nursing Jeffries Simulation Theory (NLN/JST). During the evolution of the NLN/JST from a framework to a formal theory, extensive research was completed on each aspect of the framework (Jeffries, 2016). There are five individual components of the NLN/JST: facilitator, participant, educational practices, outcomes, and simulation design characteristics (Jeffries, 2016). The International Nursing Association for Clinical Simulation and Learning (INACSL) has published several iterations of their Standards of Best Practice: Simulation℠. They currently have published eight standards: simulation design, outcomes and objectives, facilitation, debriefing, participant evaluation, professional integrity, simulation-enhanced interprofessional education, and operations, along with a glossary (INACSL Standards Committee, 2016). These standards have also undergone periodic scholarly review resulting in revisions and additions to the standards. Together, these evidence-based resources not only represent educational best practice but simulation best practice. In order to advance the science of simulation, the educational and simulation best practices must be the foundation for quality simulation, as well as quality research about simulation.

Extrapolating concepts from within the NLN/JST and the INACSL Standards of Best Practice: Simulation℠ results in criteria that are crucial for a learning activity to be considered simulation. They are fidelity, a safe environment, interactivity, clear objectives, technology, scenario design and curriculum integration, and debriefing. Through discussion of these defining attributes of simulation, the complex role of the facilitator can be better understood. These definitions also allows the layperson to recognize foundational differences in skill sets of the simulation facilitator as opposed to the classroom or clinical instructor.

Fidelity

The first component that is necessary to deem an event as simulation is realism or fidelity (Bland, Topping & Wood, 2011; Bradley, 2006; Gaba, 2004; Jeffries, 2005; Leigh, 2008; Nickerson et al., 2011; Weaver, 2011). In order for simulation to be effective, the situation, props, make-up techniques, medications, and environment must mimic true clinical situations to the greatest degree possible. It is thought that if the situation is realistic, the likelihood of transference of skills to clinical practice would be greater. In addition to the physical fidelity, there is contextual fidelity (Bland et al., 2011). Contextual fidelity refers to the actual scenario the learner is immersed in. Bland et al. (2011) comment on the importance of having scenarios that are true and relevant to the learners' clinical practice. For example, if the context of a scenario was centered around a patient with a myocardial infarction, vital signs and physical assessment findings within the scenario should be consistent with what the learners would find in actual clinical practice. When the realism of these scenarios is true to the practice of the learner, it can increase the possibility of translation of knowledge to practice.

Safe Environment

Next is the creation of a safe environment for risk-taking and learning (Bland et al., 2011; Bradley, 2006). It is necessary to establish psychological safety for participants in order to give them permission to act to the best of their abilities, using their intuition and their judgment (Jeffries, 2016). Learners should be ensured that simulation is the place to make mistakes since there is no inherent risk of harm to themselves, patients, or equipment. These opportunities give learners the opportunity to improve by gaining experience and through trial and error (Bland et al., 2011).

Interactive

Simulation must be interactive (Bland et al., 2011; Gaba, 2004; Jeffries, 2005). It is a tenet of the constructivist learning theory, among others, that purport that the higher the level of engagement and immersion of the learner in an activity, the more perceived value and true learning benefit the learners obtain. According to Jeffries (2005), interactive learning "encourage(s) students to make connections between and among concepts" (p. 99).

Another aspect of interactivity is in regard to the relationship between the facilitator and the participant. During the simulation activity, the facilitator will interact with the participant in the form of cuing (Jeffries, 2016). Cues can be verbal or mechanical, but should be planned responses to the action of the simulation (Jeffries, 2016). Verbal cues could be predetermined answers to questions that the participant may ask during an assessment, for example. Mechanical cuing could be a change in vital signs as a result of participant actions or lack of action. An example might be increasing oxygen saturation readings after a participant applies a nasal cannula.

Clear Objectives

The simulation must have specific objectives (Bland et al., 2011; Jeffries, 2005). Rogers, Peterson, Ponce, White, and Porterfield (2015) note that the importance of linking the objectives of the simulation to broader learning outcomes. Ensuring that the simulation takes into account the participant's level of knowledge and designing the simulation to be challenging but not impossible are also important considerations (Rogers et al., 2015). Guaranteeing clear objectives for the simulation experience allow learners the opportunity to be mentally prepared for the simulation activity.

Technology

It is rare to conceptualize simulation without the inclusion of a technological aspect. Common applications of technology within simulation include the use of high-fidelity mannequins, virtual simulation programs, and technology related to video capture systems (Bland et al., 2005; Farina, 2007; Griffin-Sobel et al., 2010; Talcott et al., 2013). Industry reports that when simulation was young in nursing education, often the only training educators received was technology training from their simulator manufacturer (Thomas et al., 2015). Despite these early educational occurrences, the trend of continuing education in technology has not been the norm. Lane and Mitchell (2013) remark that in current health care workplaces, employees can be from four different generations. One of the defining differences between these generations, aside from values and attitudes, is comfort levels with technology (Lane & Mitchell. 2013). With an increase of technology in the workplace, as well as the expectation for the inclusion of technology in their educational programs, nursing students expect that their programs will help them master these tools (Lane & Mitchell, 2013). Educators need to be comfortable and educated in providing this support.

Scenario Design and Curriculum Integration

Ensuring that the appropriate simulation is chosen or developed for the student group is vital to the effectiveness of the simulation activity (Farina, 2007). Ensuring that the difficulty level, complexity, and learning objectives of the scenario are appropriate is the responsibility of the simulation educator. This requires the ability to envision the goals of the scenario within the course, the level, and the entire program. In that respect, scenario design and curriculum integration must be considered simultaneously. Issenberg et al. (2005) state that "simulation-based education should *not* be an *extra*-ordinary activity," (p. 23) but should instead be built into the entire educational program. Jones et al. (2014) note than within the role of the teacher in simulation is the need to know their students' characteristics and abilities, which contributes to choosing or creating appropriate simulations.

Debriefing

The final component necessary in simulation is that of debriefing. This is the period of intense reflection and discussion that occurs just after the simulation experience. Debriefing is considered by many simulation experts to be the heart of the activity, and the place where the significant learning takes place (Jeffries, 2005; Neill &Wotton, 2011). It is clear through the prevalence of this theme that reflection on action and time to consider the activity of the simulation is one of the defining factors of simulation. Despite the frequent statements related to the importance of debriefing, it is also widely and specifically stated that the skill of debriefing is an art that needs to be taught (Bland et al., 2011; Dieckmann et al., 2009; Issenberg et al., 2005; Neill et al., 2011; Paige et al., 2015; Thomas et al., 2015). Debriefing has been referred to as the single most important aspect of the simulation experience (Bland et al., 2005) and as such, is a vital component of faculty development in simulation.

Origins of Simulation

The impetus for incorporation of simulation into a way of training and teaching historically stems from cost and safety issues. According to Bradley (2006), when the financial or human risks are too high to test in real time, simulation has become the leading method for training. Such is the case in the aviation and aeronautics industries, and in recent years, medical education. Within nursing education, simulation has been touted as a methodology that increases learner confidence, provides opportunities for deliberate practice, and provides a platform for application of classroom knowledge in a safe learning environment, in addition to addressing cost and safety issues (Leigh, 2008).

Military

Bradley (2006) posits that chess is actually one of the earliest forms of simulation. The participants are challenged with simulating military strategy and troop movements to win the game. Another early form of simulation is jousting. This activity gives participants the opportunity to hone their combat skills of attacking an opponent with long spears while on horseback (Bradley, 2006). Both of these practice applications allow active engagement while improving decision-making skills without sacrificing lives while learning. In more recent times, the military's use of simulation has evolved to the use of lifelike drills to respond to fictional terrorist attacks (Albores & Shaw, 2007). The goals in this instance are to test decision-making procedures and response times of involved personnel, as well as identifying areas for process improvement. These quality improvement steps are taken after a comprehensive debriefing discussing the relevant points that occurred during the simulation exercise.

Aviation and the Space Program

Closely tied to the military applications of simulation is that of aviation training. Much of the research that has been done that demonstrates effectiveness of simulation in cockpit training was actually completed within military settings (Caro, Corely, Spears, & Blaiwes, 1984; Hays et al., 1990; Martin & Waag, 1978). These findings include the pros and cons of various aspects of simulation scenarios, the effectiveness of use of different types of equipment within the scenarios, and the context of the training design (Hays et al., 1992). Various aspects of training were addressed by research, including take-off, final approach, landing, and responses to unexpected events. This meta-analysis concluded that over 90% of the included articles favored the use of simulation in addition to aircraft training versus aircraft training alone (Hays et al., 1992).

The use of simulation in aviation diffuses seamlessly into aeronautics training. The same concepts apply in terms of practicing utilizing replicas of the true environment. Aeronautics has also latched onto the use of virtual reality simulation (Nugent, 1991). Virtual reality allows the participant to wear equipment that immerses them into a fictional situation that fools the senses into thinking that what they are seeing is real. The space program has utilized these techniques to train astronauts in flying shuttles, landing, and use of vehicles outside of the shuttles (Nugent, 1991). Training related to experiencing weightlessness also utilizes simulation techniques for astronauts by immersing them in special space suits and swimming pools to mimic the atmosphere in space (Charles, 2013).

Medicine

Simulation first manifested in medical education through the development and use of task trainers (Bradley, 2006; Brigden & Dangerfield, 2008; Gaba, 2004; Issenberg et al., 2005). This reflected the need of the time to increase proficiency of medical doctors or students in performing psychomotor skills (Bradley, 2006). In more recent times, as more technical equipment is introduced into the medical environment, the need for more advanced task trainers has grown (Issenberg et al., 2005). Laparoscopic surgeries and surgical suites with robotics capabilities are examples of the increasing need for simulation experiences. Another long-standing application of simulation within medical education has been through objective structured clinical examinations in which the learner must demonstrate adequate performance on certain psychomotor skills in order to be eligible to graduate (Brigden & Dangerfield, 2008).

Brigden and Dangerfield (2008) discuss challenges within medical education that closely resemble challenges within nursing education: increasing complexity of patients in the hospital setting, shorter lengths of stay for those patients, inability to control types and quantity of patients the medical student has access to, as well as general safety concerns about engaging in the learning process with real patients. Use of simulation to address these concerns has become common within medical education, especially in the arenas of anesthesiology and emergency room medicine (Dieckmann et al., 2009; Issenberg et al, 2005), as well as to address specialty situations, such as resuscitation and code maneuvers (Bradley, 2006).

Nursing

The use of simulation within nursing has increased due to a number of different factors. The shortage of practicing nurses, the shortage of nursing faculty, increasing competition for clinical sites, as well as demands for teaching excellence have all combined to create a singular situation in which simulation has been called upon to address.

Schools of nursing have relied on the traditional clinical experience to contribute significantly to growth and development of their nursing students. As we turn a critical eye to these traditional educational methods, shortcomings in the way we have always done things are becoming more apparent. There have also been ethical and safety concerns raised over student's opportunities to gain expertise in skills by practicing on patients (Alinier et al., 2006). As a result, many facilities have reduced students' roles to that of observation only in the clinical setting (Hayden et al., 2014) Simulation can also be used as a method for teaching topics that rarely occur in the clinical setting (Weaver, 2011).

Many schools of nursing are feeling pressure to increase enrollment due to the nursing shortage (Lasater, 2007). However, there are practical problems related to increased enrollment including the need to increase numbers of faculty in the midst of a well-documented shortage, as well as the need for proportional increases in clinical practicum sites to accommodate the larger numbers of students (Jeffries, 2008; Lasater, 2007; Schlairet & Pollack, 2010). One of the downfalls of traditional clinical learning is the variation in student experiences (Hayden et al., 2014). Simulation offers an opportunity to ensure that student experiences are standardized and consistent across the curriculum. In this way, faculty are determining which experiences all students should be exposed to during their curricula without exception and providing these learning opportunities through simulation.

In 2010, Benner, Sutphen, Leonard, and Day called for a different way of educating nurses; chief among them was the need for a concerted effort to draw connections between classroom learning and the practice aspects of the nursing discipline. This conclusion goes hand in hand with the voices from clinical practice who are requesting that graduates from nursing schools are better-prepared to function independently immediately upon hire, despite increasing complexities and acuities of patients within various care environments (Lasater, 2007). Simulation has been suggested as the teaching strategy that can address all of these complications that are occurring simultaneously within the discipline of nursing.

The Role of the Facilitator

The role of the facilitator in simulation is often oversimplified to consist solely of the role of the debriefer. Through examination of standards of best practice, existing faculty development programs in simulation, and certification criteria, the complexity of the role of the facilitator can be more fully understood.

Standards of Best Practice

The International Nursing Association for Clinical Simulation and Learning (INACSL) maintains a library of Standards of Best Practices: Simulation^{SM} specific to the teaching strategy of simulation. Currently, there are eight standards that the organization describes as "living documents". Regular revision of the standards, as well as additions and changes to the number and topics covered, are testament to the attitude of continuous commitment to quality.

One of the INACSL standards is devoted specifically to facilitation of simulation (INACSL Standards Committee, 2016). There are five criteria within the standard, along with required elements within each criterion. The criteria cover topics such as facilitator education, specific techniques for preparing learners for the activity, appropriate leveling of the experience based on the learners, and delivery of cues to assist learners to meet the objectives of the simulation activity. In addition, reference is made to skills necessary for the facilitator that are housed within other INACSL standards, such as "Debriefing" and "Simulation Design". The inclusion of multiple standards, as well as the multiple criteria within the standard of "Facilitation" delineate the complexity of the role of the facilitator within simulation, and certainly explain that the role of the facilitator goes beyond the role of debriefer. These standards served as the framework for the items developed for the NLN/KSF.

Faculty Development Programs

Formalized continuing education, certificate, and degree programs have become available, such as those at Boise State ("Healthcare Simulation Certificate," n.d.), Drexel University ("Certificate in Simulation," n.d.), and University of Southern Indiana ("Certificate Programs," n.d.). These programs vary greatly in length, learning objectives, and cost. From the year-long program at Boise State which costs approximately $6,000, to the week-long certificate program at Drexel that costs $1799, to the four-week program at University of Southern Indiana that costs $400, differences in these programs is apparent. Despite the differences in length and cost, there are commonalities in the curricula that provide insight into the role of the facilitator in simulation. Scenario design, technology considerations, standardized patient training, and history and teaching foundations of simulation, in addition to debriefing are all components of each of these programs.

The National League for Nursing, the oldest organization in country devoted to support, services and programming for nurse educators, offers fourteen online continuing education courses devoted to the myriad aspects related to simulation ("SIRC Courses", n.d.). These examples of continuing education offerings indicate the complexity of the role of the facilitator in simulation. The aspects covered in these offerings also provide the opportunity to compare and contrast with aspects typically associated with classroom and clinical teaching. The differences become apparent through this comparison, which supports the need for specialized evaluation tools to assess the competency of facilitator of simulation.

Certification in Simulation Education

The Society for Simulation in Healthcare (SSH) is an organization that provides certifications for educators and operators in simulation, as well as accreditation services for simulation centers (ssih.org, n.d.). Rationale for certification found on their website includes to demonstrate professional recognition, and to "demonstrate your skill and specialized knowledge", among others (https://www.ssih.org/Certification/CHSE, n.d.). Their Certified Healthcare Simulation Educator (CHSE) distinction is awarded through passage of an examination. The blueprint that is supplied to assist applicants in preparing for the exam consists of items in four knowledge domains and approximately forty specified topics within those domains. The depth of knowledge required to achieve certification is demonstrated through these requirements. Through review of the areas covered on the examination, readers gain an understanding of the specialized knowledge that simulation educators must possess to earn this distinction.

Purpose of Study

The National Council of State Boards of Nursing researched the efficacy of simulation as a replacement for traditional clinical on nursing students' success rates in course work, licensure exam results, and readiness for practice (Hayden et al., 2014). Hayden et al. (2014) concluded that simulation that replaces up to 50% of clinical time was statistically as effective as traditional clinical on their measured outcomes. However, for these results to be transferable, faculty who were charged with using simulation as a teaching pedagogy needed formal training and education (Hayden et al., 2014). Faculty preparation was of such importance to the researchers that the study team was required to attend three mandatory training sessions and provided ongoing evaluation of faculty members to ensure consistent adherence to simulation best practices (Hayden et al., 2014).

The National League for Nursing released their "Vision for Teaching with Simulation" which strongly advocates for preparation and ongoing education for simulation facilitators. Jeffries, an expert in the field of nursing simulation, spoke of the need for adequate faculty preparation in 2008. The INACSL Standards of Best Practice: Simulation^{SM} emphasize the need for facilitators to receive formal and ongoing continuing education to maintain competence in simulation (INACSL Board of Directors, 2017).

There are formal tools that have been validated to address various topics within simulation, such as debriefing. Two examples are Harvard's Center for Medical Simulation Debriefing Assessment for Simulation in Healthcare (DASH) tool (Simon, Rudolph, & Raemer, n.d.) and the Objective Structured Assessment of Debriefing (OSAD) which has its roots in the surgical field (Arora et al., 2012). Other tools that have been validated within simulation include the Simulation Effectiveness Tool (Elfrink-Cordi, Leighton, Ryan-Wenger, Doyle, & Ravert, 2012), which evaluates the simulation experience, the Lasater Clinical Judgement Rubric (Lasater, 2007), which evaluates the student's performance in simulation, the NLN's Educational Practices Questionnaire, which asks students to rank their experience in simulation in terms of best practices in education (NLN, 2004), and the NLN's Student Satisfaction and Self-Confidence in Learning (NLN, 2004), which requires the student to evaluate the simulation experience. There is only one tool that addresses comprehensive facilitator competence: The Facilitator Competency Rubric (Leighton, Mudra, & Gilbert, 2018). To address this gap, a quantitative analysis of the reliability and validity of the National League for Nursing/Kellgren Simulation Facilitator (NLN/KSF) tool will be completed. The ultimate goal is to have a tool that individuals can use to gauge their own knowledge levels and needs for further education, gain transparency about the components that make up the facilitator role, and considerations for simulation team-building to balance one another's strengths and areas for improvement.

Research Questions

1. What is the content validity index of the National League for Nursing/Kellgren Simulation Facilitator (NLN/KSF) tool?
2. Are average scores on the NLN/KSF different between novice and expert facilitators of simulation?

3. What is the test-retest reliability between NLN/KSF scores obtained from the same participants two weeks apart?
4. What is the internal consistency of the NLN/KSF scale and subscales?

Significance of Study

Practice partners have noted that new nursing graduates frequently lack the critical thinking skills needed to be successful in practice (Jeffries, 2005). One possible remedy is to allow these nursing learners to practice in simulated situations in which there is no inherent risk to patients. Simulation has a noted presence in the education, practice, and policy arenas. By demonstrating the relevance of simulation to the various aspects of nursing in general, it will become apparent how appropriate facilitator development in using simulation is of utmost importance.

Education

Due in part to the high cost of orientation programs, employers are increasingly looking for graduates who are practice-ready (Jeffries, 2005), with the ability to immediately apply the skills learned in nursing school (Cant & Cooper, 2009). Benner et al. (2010) noted that the traditional “sage on the stage” was not an effective method of teaching nursing for adults in a practice discipline. Adapting education to meet the expectations of our adult learners is vital to the success of our nursing curricula. Simulation is a learner-centered teaching strategy that adheres to principles of adult education, creating meaningful and applicable learning activities that are valuable to creation of competent practitioners.

Practice

Nickerson, Morrison, and Pollard (2011) completed a concept analysis of simulation related to nurses in practice. Simulation is cited as a method for continuing education in a rapidly-changing, increasingly complex clinical environment. In practice, simulation is used with several different outcomes in mind. “In situ” simulation is similar to traditional simulation except that the activity is staged in the actual settings in which professionals work. This method is commonly used in care settings when the objectives of the simulation are to educate current practitioners. In situ simulation is often utilized to enhance communication and teamwork in interprofessional situations within the setting in which practitioners are familiar (Nickerson et al., 2011). Simulation can also be used as a response to patient safety issues that have occurred, as well as high risk “near miss” situations.

Policy

As previously mentioned, the National Council of State Boards of Nursing study completed by Hayden et al. (2014) was a landmark randomized controlled trial that has already begun to elicit policy changes across the country. As a result of this study, guidelines for utilization of simulation in nursing curricula were published (Alexander et al., 2015). For simulation educators to expect to reach the same outcomes as the study sites, qualifiers were outlined by the team. These recommendations include the use of consistent, theory-based debriefing methods, educationally sound scenarios, and among others, educators who are formally prepared to facilitate simulation according to best practices.

In order to formalize these recommendations, many states around the country have begun to craft their own policies related to replacing traditional clinical with simulation through their boards of nursing. Although these formal rules vary from state to state, a common thread is the reference to the aforementioned guidelines. For example, in Minnesota, prior to the release of the study results, the board of nursing policy did not allow for any clinical time to be formally replaced with simulation. Since the publishing of the study results and subsequent guidelines, the language is now being updated and presented to the state legislature for revisions consistent with the guidelines. In Minnesota, the rules mention formal training for faculty, but are not prescriptive in terms of quantity or methods utilized. The Certified Healthcare Simulation Educator (CHSE) designation can be earned through a formal testing process after meeting minimum requirements. Another possible direction for policy related to simulation and facilitator development is to require that those facilitating simulation that replaces traditional clinical have this certification. Likely, these requirements will not be enforced if the simulation activities are augmenting the traditional clinical experiences instead of replacing them.

It is realistic to expect that if a nursing program elects to formally replace traditional clinical with simulation, proof of reasonably meeting the guidelines would become a formal part of the accreditation process and the associated self-study reports. As simulation gains traction in nursing programs in a formal way, it also seems reasonable that down the road, simulation could be used as a means of practical examination during the licensure process.

Summary

In order to keep pace with an ever-changing clinical environment, methods of teaching in nursing must evolve as well. Using teaching strategies that align with adult learning principles within a practice discipline is vital to the production of graduates of nursing programs that are well-prepared for practice. Simulation is a methodology that can meet these needs, as long as the facilitators of these activities are delivering high quality learning activities.

Through the use of the NLN/KSF, the facilitator's role in simulation will have greater clarity and transparency. In order to gain insight into strengths and areas for improvement within the specialized skill set of simulation facilitation, valid and reliable tools are necessary. With only one other tool available in this arena, the NLN/KSF will fill a gap in the current state of the science. By strengthening this component of simulation, an even stronger foundation is being supported through research. These foundational pieces can support research going forward that will further assist the preparation of competent novice nurses.

Chapter 2

State of the Science

Simulation facilitation is a specific niche within the science of simulation. To understand the role of the facilitator, not only should associated research be examined independently, but also considered within the larger picture of simulation as well. A review of the literature specific to facilitation will be discussed, in addition to a review of overall research within the discipline of simulation.

Literature Review: Tools to Evaluate Facilitators

When considering whether to create a tool, there must first be an evaluation of the current state of the science to establish that it would fill a gap in the literature. There is often a need for more than one tool to address a topic, but a full understanding of how these tools are similar and different from one another can strengthen justification for development.

Search Strategy

A literature search was conducted in order to compile a comprehensive list of valid and reliable tools or instruments that center on evaluation of facilitators in their many roles within simulation. A search of Cumulative Index to Nursing and Allied Health Literature (CINAHL), MEDLINE, and Educational Resources Information Center (ERIC), was completed using the search terms ‘simulation’, ‘faculty performance’, and ‘evaluation tool’. Journal articles were included if they were published in English since 2000. There were no geographical exclusions aside from the language of publication. An additional hand search was conducted using the bibliographies of articles found. The goal of this search was to discover the current state of the science related to facilitator evaluation in simulation.

Results

The search resulted in 110 articles. Forty-six of these articles related to evaluation of students in various forms through the use of simulation. Twenty-seven of the articles related to evaluation of the simulation scenario, equipment, or other technical aspect of the simulation. The remaining thirty-seven articles were excluded due to the topic irrelevancy. There were no articles that specifically related to comprehensive evaluation of simulation facilitators.

Additional Tools

Despite the lack of results utilizing the search terms as outlined, there is awareness within the discipline of three tools utilized to evaluate simulation faculty. The first two concentrate on the skill of the facilitator as debriefer. The first is Harvard's Center for Medical Simulation Debriefing Assessment for Simulation in Healthcare (DASH) tool (Simon, Rudolph, & Raemer, n.d.). There are multiple versions of the DASH that allow students to evaluate their facilitators, facilitators to self-evaluate, and trained raters to evaluate other facilitators. The results of the psychometric testing of these tools can be found directly on the Center for Medical Simulation website. The second debriefing tool is the Objective Structured Assessment of Debriefing (OSAD) which has its roots in the surgical field (Arora et al., 2012). These tools are widely used within healthcare simulation, but can be applied only to debriefing, which is but a single facet of facilitator performance and not a comprehensive reflection of overall competence.

The third tool was discovered through a posting on the Society for Simulation in Healthcare (SSH) Open Forum Digest webpage. After further investigation, it was found that the Facilitator Competence Rubric (FCR) is the only comprehensive facilitator evaluation instrument that currently exists (https://sites.google.com/view/evaluatinghealthcaresimulation/fcr). Since this discovery, the psychometric properties of the FCR have been published (Leighton, Mudra, & Gilbert, 2018). This tool was created for a rater to evaluate the performance of a facilitator while they are conducting a simulation activity.

The Facilitator Competency Rubric

Description. The FCR is a 29-item tool that instructs participants to evaluate a peer on five different categories of simulation facilitation: preparation, prebriefing, facilitation, debriefing, and evaluation (Leighton, Mudra, & Gilbert, 2018). Responses are recorded on a five-point Likert scale based on Benner's Novice to Expert model. The tool is intended to be used to assess a facilitator through peer observation, although the author does state that self-assessment is an option.

Critique. There are some challenges recognized with the FCR. Many of the items on the instrument occur in either periods of time prior to the simulation experience or after. This raises questions of how a peer elicits enough information to accurately gauge the level of the facilitator. It is likely that the rater makes assumptions to complete the tool or asks the facilitator themselves about their level of competence, which ultimately makes the tool one of self-evaluation. If reporting these items to one of their peers, this can promote a scenario in which the facilitator overstates their level of expertise to their peer.

Another critique of the FCR relates to the subjectivity of several of the items. For example, one item states "Uses the parts of a (debriefing) model or plan that are most useful for the current learning situation and participants". The results of this evaluation will likely depend on the rater who is completing the assessment and their determination of what the "most useful" parts of the plan are. Additionally, some items do not lend to being determined through observation. “Ascertains potential causes for both strengths and weaknesses” and “Analyzes whether level of preparation is sufficient to optimize learning” are two examples of items that would be very difficult to determine through observation. These examples add a decidedly subjective note to the rating of several items on the tool.

As mentioned, the FCR uses a five-point Likert scale. However, there are only three statements within each item from which the raters can choose; one statement that covers ‘novice’ and ‘advanced beginner’ levels, one statement that covers ‘intermediate’ level, and a third statement that covers ‘proficient’ and ‘expert’ levels. There is nothing on the tool that assists the raters in choosing between the two levels of competence when they are required to choose between ‘novice’ and ‘advanced beginner’ or ‘proficient’ and ‘expert’. Overall, the tool reflects the depths and complexities of the role of the facilitator in a way that has not previously been done. In itself, this is a massive step forward for facilitators of simulation who want to gain insight into their levels of expertise in teaching with simulation. The critiques also indicate that an additional tool within this specialty is warranted.

In terms of the psychometric testing of the FCR, there are some challenges as well. Since the tool was developed to aid a rater, the sample size was determined by number of observations using the tool, not any specific number of participants. The authors state that they were aiming for at least fifty uses of the FCR and ended with 107. However, all of the 107 observations were completed by only seven different individuals. This could negatively affect generalizability of the tool.

Development of the National League for Nursing/Kellgren Simulation Facilitator (NLN/KSF) Tool

In 2014, a group of six simulation educators (including the author) as part of the National League for Nursing (NLN) Leadership Program for Simulation Educators joined together to complete work related to faculty development in simulation. The consensus anecdotally was that as a new simulation facilitator, learning about simulation was frustrating. When seeking information about the methodology, there were many differing opinions on what needed to be learned and in what order. Different institutions were using different terminology, and it was difficult to determine through course descriptions if a given continuing education opportunity would meet individual needs.

Each member of the group had experience in teaching within nursing education in various environments. The members had knowledge of the link between effective clinical and classroom teaching to better achievement of learning outcomes for students (Sieh & Bell, 1994). There was also knowledge of tools that exist to measure teaching effectiveness. With respect to teaching within the nursing clinical environment, the Nursing Clinical Teaching Effectiveness Inventory (NCTEI) and the Clinical Nursing Faculty Competence Inventory (CNFCI) scale are two examples of these tools (Mogan & Knox, 1987; Hou, Zhu, & Zheng, 2010). As far back as 1995, educators were interested in creation of tools that demonstrate classroom effectiveness as well. The Oregon Health Sciences University School of Nursing developed a tool for just that purpose (Kirschling et al., 1995). This led this group to extend these expectations for simulation faculty as well.

The group began work on a three-pronged project. First was an application of Benner's Novice to Expert framework to the role of simulation facilitator in an attempt to define and operationalize stages of development for the simulation facilitator (Thomas & Kellgren, 2017). The second portion of the project was to identify facilitator resources and level them according to Benner's framework. An abridged version of this toolkit can be found on the National League for Nursing Simulation Innovation Resource Center (SIRC) website (http://sirc.nln.org/pluginfile.php/18733/mod_page/content/23/Faculty%20DevelopToolkitFINAL%2002-16.pdf). The third portion of the project was the creation of a self-assessment tool in simulation facilitation that could assist a user in identifying which resources would most closely match their needs based on the specific facilitation topic in combination with the level of their expertise in that area. For example, a simulation facilitator may complete the self-assessment tool and learn that technology is weaker area than others in simulation facilitation. Information in the toolkit can be used to determine appropriate continuing education opportunities in technology based on their results on the self-assessment tool.

The NLN purchased the intellectual property rights of the project while allowing group members to continue ongoing work and publications. Although the NLN did publish the abridged version of the toolkit as mentioned, determination of validity and reliability of the self-assessment tool is necessary prior to any formal dissemination or continuing use of this particular portion of the project. This work, and the continuing support of the NLN, led directly to the conceptualization of this doctoral dissertation. An article summarizing the process and results of this work is available for review (Thomas et al., 2015).

Research Within Simulation

Analyzing the topic of research within any discipline can be an overwhelming task. Identification of a framework with which to categorize research is one method or organization that can assist the reader in making sense of the knowledge that exists within a discipline. One such framework is Kirkpatrick's levels of evaluation. By using this framework to examine research within simulation as a whole, a deeper understanding of how research regarding the role of the facilitator fits into the larger picture.

Kirkpatrick's Levels of Evaluation

In the 1950's, Kirkpatrick introduced a series of steps that can be used to evaluate the effectiveness of training or teaching processes (Kirkpatrick, 1994). The four-step model begins with foundational evaluation that centers on reactions from the participants involved in the teaching exercise, moves to identification of learning that occurred as a result of the teaching, progresses to identification of behavior changes as a result of the teaching, and ends with the most complex type of evaluation, identification of tangible results from the teaching (Kirkpatrick, 1994). This progression has been mirrored in the progression of research into the effectiveness of simulation in nursing education.

Step one. A plethora of research in simulation has been completed that is aligned with step one of the Kirkpatrick model, which is concerned with learners' reactions to the learning activity. Analysis of student perceptions of satisfaction with simulation is a typical example (Kardong-Edgren, Starkweather, & Ward, 2008). There are tools in existence that measure this phenomenon, including the NLN Student Satisfaction and Self-Confidence in Learning Instrument (Description of Available Instruments, n.d.)

Step two. Step two of the Kirkpatrick model is demonstrated in studies related to self-efficacy (Leigh, 2008), identification of learning outcome achievement (Schlairet & Pollock, 2010), and changes in levels of nursing students' clinical judgment (Lasater, 2007). These examples all revolve around measurement of knowledge gained from the simulation experience.

Examples of currently available tools that measure learning are the Creighton Simulation Evaluation Instrument ([C-SEI], Todd, Manz, Hawkins, Parsons, & Hercinger, 2008), and the Lasater Clinical Judgment Rubric (Lasater, 2007), but can also be measured with multiple-choice examinations as well.

Step three. Step three, which indicates behavioral change, has proven to be more difficult to pinpoint within simulation. Meyer, Connors, Hou, and Gajewski (2012) completed research that evaluated blinded groups in the clinical setting. The tool used for measurement in this case was their standard clinical evaluation tool. The control group received no simulation; the experimental group replaced 25% of their clinical time with simulation. The experimental group received higher scores on their clinical evaluation tool at different points during the semester. When the lens is shifted to the evaluation of facilitator performance in simulation, the previously mentioned Facilitator Competency Rubric would be an example of a tool that measures changes in behavior, not in relation to participation in a simulation, but as a result of continuing education in simulation facilitation techniques. The NLN/KSF could also fit into this category if a person were to self-administer at various times in their professional progression.

In 2014, the National Council of State Boards of Nursing (NCSBN) published the results from a longitudinal randomized controlled trial regarding the efficacy of simulation as a replacement for traditional clinical. Measures include nursing students' success rates in course work, licensure exam results, and readiness for practice (Hayden et al., 2014). Varying levels of traditional clinical were replaced with simulation activities, with the highest level of replacement at 50%. Their conclusion was that simulation that replaces up to 50% of clinical time was statistically as effective as traditional clinical on their measured outcomes. This example spans more than one level with the Kirkpatrick framework, as it had outcomes measurements related to knowledge levels as well as behavior measurements.

Step four. The fourth and most complex stage of evaluation centers on achievement of tangible results. With respect to measurement due to a simulation intervention, patient outcomes are the natural focus. One example of positive results from simulation can be found in Draycott et al.(2008). They discuss positive results related to decreased numbers of shoulder dystocia after staff received training. However, there are some notable considerations in this example. First is that the simulation training was but one portion of a full-day training session. Therefore, the positive results cannot be solely a result of the simulation training. Secondly, the authors interestingly never use the term "simulation" in their article; they simply refer to a portion of the training as "practical training", and go on to describe contextual learning scenarios with a manikin. This example demonstrates the difficulty in tracing results directly to a simulation intervention, although it seems that at least partial credit can be given.

Theory

Integral to the evolution of the science of simulation is the development, testing, and validation of the first simulation-focused theory, the National League for Nursing/Jeffries Simulation Theory ([NLN/JST]; Jeffries, 2016). The theory includes concepts and explanations to assist readers in understanding the various components of simulation. They include fidelity, scenario design, educational practices, as well as the interaction between learner and facilitator as integral pieces to the simulation experience (Jeffries, 2016). The monograph that describes the evolution of the theory notes key changes in terminology and process that occurred over time. The previously published framework reflected a nursing lens for simulation, for example, and further research recommended that the terms "teacher" and "student" be replaced with the more inclusive terms of “facilitator” and “participant”. This inclusivity increases the ability for the theory to be applied to disciplines other than nursing, as well as environments other than academia. Recommendations such as these were made by subject matter experts who completed in depth literature reviews on each of the components of the theory. By completing this work, elevation of the framework to a formal theory was achieved.

Summary

It is widely accepted that a simulation experience, and all its associated outcomes, are only as good as the facilitator delivering the simulation. Conversely, there are many stories among practicing nurses about their negative associations with simulation because of their poorly facilitated experiences in school. Time and effort have been spent to develop necessary tools and instruments to assist facilitators in the evaluation of learners. It is now time to continue that evolution and turn that lens of evaluation onto ourselves. Outside of debriefing, there is only one comprehensive tool in the literature that evaluates the effectiveness of facilitators of simulation.

Simulation research continues to publish results that are higher in Kirkpatrick’s levels of evaluation. A key component to accomplishing these research goals is related to the role of facilitator. Through the linkage of facilitator competence to the quality of the learning experience, understanding the role, qualifications, and training needed for the facilitators will become apparent. Through the testing of the National League for Nursing/Kellgren Simulation Facilitator tool, one more evidence-based tool will be available to support this work.

Chapter Three

Methods

The purpose of this research was to take a two-phased approach to testing the NLN/KSF for validity and reliability. The first phase consisted of an in-depth scrutiny of the tool as it exists, conducted in cooperation with four to six subject matter experts (SMEs). As a result of this initial analysis, items on the tool were revised, deleted, or new items added. This iterative process concluded when the SMEs reached consensus regarding the relevance and completeness of the items on the NLN/KSF. The second phase consisted of dissemination of the tool to a larger audience with varying levels of simulation facilitation experience to obtain quantitative data for further analysis related to reliability and validity.

Research Questions

1. What is the content validity index of the National League for Nursing/Kellgren Simulation Facilitator (NLN/KSF) tool?
2. Are average scores on the NLN/KSF different between novice and expert facilitators of simulation?
3. What is the test retest reliability between NLN/KSF scores obtained from the same participants two weeks apart?
4. What is the internal consistency of the NLN/KSF scale and subscales?

Procedures

This study was a series of quantitative tests completed to establish validity and reliability for the NLN/ KSF. Content validity and known groups validity were addressed in the first two research questions. Test retest reliability and internal consistency reliability were addressed in research questions three and four. A tool such as the NLN/KSF fills a gap in currently available resources in order to increase facilitator self-awareness, direct continuing education, and bring attention to the myriad of components that make up the complex pedagogy of simulation. Before such a tool can be utilized further, establishment of validity and reliability is necessary.

A survey was created on the Qualtrics website to replicate each item on the NLN/KSF. Qualtrics has numerous safeguards in regards to both participant privacy as well as site and data security. Qualtrics is both FedRamp authorized and ISO 27001 certified, which indicate the high level of security within the site. More information can be found at https://www.qualtrics.com/privacy-statement/.

Sample

A recruitment of a convenience sample of participants occurred through two different avenues. The NLN keeps an active discussion forum on Google Groups for the alumni of the Leadership Program for Simulation Educators. These leaders in the discipline of simulation were the focus for recruitment for the SMEs in phase one of content validity testing. They were also tapped as testing moved into phase two. Despite their higher level of simulation expertise, the SMEs likely work with fellow faculty members with varying facilitation experience. Secondary recruitment occurred through the dissemination of the tool to the faculty members at their organizations for phase two of data collection. The other avenue available for recruitment for phase two was through the Society for Simulation in Healthcare listserv. Providing the link to the survey, along with an invitation to participate for readers and their colleagues contributed to reaching desired sample sizes. All participants required access to the internet and electronic mail, must have the ability to read in English, and experience with simulation facilitation as appropriate for the particular test.

There seem to be no hard and fast rules to determining sample size when developing scales (DeVellis, 2017). It is suggested that five to ten participants per item is sufficient. The NLN/KSF, prior to content validity testing, was thirty items, which would place the number of desired participants between 150 and 300.

Another method of determining sample size is to refer to power analyses completed in previous related research. In this case, the FCR is the only other published example of a scale developed to evaluate facilitators of simulation. Leighton, Mudra, and Gilbert (2018) mention similar difficulties in determination of sample size, and concluded that they would honor guidelines put forth by Nunnally and Bernstein (1994), leaving them with a sample size of greater than fifty. There is no reporting in their article of results of power analysis or effect size used in any calculations.

To provide yet another justification of sample size for the validation of the NLN/KSF, a power analysis was conducted on individual psychometric tests within the tool using the G*Power statistical analysis package. With $\alpha = .05$, effect size = 0.5, and power = 0.95, the ideal sample size was 176 participants with equal numbers in each of the two groups. According to Polit and Beck (2012), these are commonly used parameters for use in nursing research.

The National League for Nursing/Kellgren Simulation Facilitator Tool

Phase One. The NLN/KSF was the tool that is being used to investigate each of the research questions. The tool was accessed through an internet link to the Qualtrics site that was delivered via electronic mail. Initially, the SMEs that were involved with the content validity testing received the NLN/KSF in a format that provided the SME opportunity to rate each item on a relevancy scale. The NLN/KSF can be found in Appendix B, and the expert format NLN/KSF for the SMEs can be found in Appendix A. The SMEs completed the relevance ratings for each of the items on the NLN/KSF and were instructed to gather notes while they completed the form. The focus of these notes was related to the rationale for items that receive lower relevance ratings, content areas that the SME believes are not adequately covered by the tool, and items they would recommend deleting. A focus group of the SMEs was conducted using Zoom, an online videoconferencing host site, to have a group discussion about the ratings and recommendations. The focus groups were recorded and kept solely on the principal investigator's laptop computer that is password protected. Revisions to the NLN/KSF followed. The SMEs were then asked to review the tool once more to ensure accuracy and completeness.

Phase Two. The second phase of the data collection occurred after the tool items were finalized. A link to the revised tool was delivered via electronic mail to all participants. A demographic questionnaire preceded the administration of the NLN/KSF. These demographics included information regarding years of experience in simulation, certification, and publication and presentations regarding simulation, as well as memberships in professional simulation organizations.

Human Subjects Protection

Institutional review board approval was obtained from the University of Wisconsin – Milwaukee. Electronic consent was obtained from each participant through the online survey site. There was minimal predicted risk for participants. The only demographic information that was sourced during the course of the research is information about levels of experience in order to accurately group participants. Information provided through demographic survey and completion of the tools was transmitted through the password protected survey site, Qualtrics. The password information was only accessible to the research team. Data that was accessed was entered into the latest version of Statistical Package for Social Sciences (SPSS). Each research question required different statistical testing.

Data Analysis

Each research question required separate consideration of sample size and methods for data analysis, therefore each research question will be discussed separately.

Content Validity. The first research question aimed to determine content validity of the NLN/KSF. According to Polit and Beck (2012), content validity is the extent to which all aspects of a phenomenon are addressed within an instrument. Utilization of simulation experts was necessary to complete content validity investigations such as this. Only those who have a deep understanding of the topic should be recruited to provide the most accurate and appropriate critique to a developing survey.

Four to six simulation experts were purposefully recruited through the NLN Leadership Program for Simulation Educators Alumni Google group and asked to evaluate the items on the NLN/KSF on a four-point Likert scale of relevance to the construct. According to Polit and Beck (2012), to assess content validity, a minimum of three to five experts should be included in this phase of testing. The scale that was used is as follows: 1- not relevant, 2- somewhat relevant, 3- quite relevant, and 4- highly relevant. To compute the item content validity index (I-CVI), the number of experts rating the item at a 3 or 4 is divided by the total number of experts, to yield a numerical value (Polit & Beck, 2012). Acceptable I-CVI levels are 0.80 or higher. To determine validity of the scale on the whole, the scale content validity index (S-CVI) was measured. To complete this, each of the item CVI values are added together and then divided by the number of items on the scale, yielding a numerical value (Polit & Beck, 2012). Acceptable S-CVI values are 0.90 or higher.

In addition to the numerical data collected, participants were asked for comments related to the individual items as well as the scale as a whole. Input related to gaps, redundancies, and wording choices were solicited and revisions were made prior to dissemination of the tool to a wider audience. Another topic that was covered during the focus groups was to elicit information about any subgroupings of items within the tool that the SMEs may notice. For example, there are a number of items on the tool that concern debriefing. The SMEs noticed this and grouped these items together. This ultimately created a list of subtopics of simulation facilitation. When each participant completed the survey, a "score" was given on each of the subscales, as well as on the tool overall. This can further assist participants is identifying areas of strength and opportunities for improvement.

Known Groups Construct Validity. According to Polit and Beck (2012)**,** known groups testing can be completed when a prediction can be made that performance will vary between the groups. When there is reason to believe that scores on a tool should reflect statistically significant results, this is an appropriate method for testing construct validity.

There were two groups that were compared to one another: novices and experts. However, the level of expertise was measured and compared in a number of different ways based on demographic data that was collected. These comparisons included number of years' experience in simulation, whether or not the participant has achieved certification, whether or not the participant was a member of any professional organizations in simulation, and whether or not the participants have published or presented professionally about simulation-related topics. Initially, the distributions of each construct variable were analyzed using means and standard deviations. Descriptive statistics were used to summarize sample characteristics. Differences in values from the known groups were described. Two-tailed T-tests were performed to analyze the differences between the means of the two groups in each of the categories described above.

Test-Retest Reliability. Test-retest reliability is a relatively simple method for testing the consistency of results of a given tool. In this case, the same sample was selected to complete the tool on one date, and then complete the tool again two weeks later. The timeframe of two weeks is established in order to reduce the possibility of responses based solely on participant memory, while also reducing the potential for other confounding variables, such as actually improving one's skill in facilitation of simulation (Polit & Beck, 2012). Initially, the distributions of each construct variable were analyzed using means and standard deviations for each of the administrations of the NLN/KSF. Measures of variables with severely skewed distributions were transformed or analyzed with non-parametric tests. Descriptive statistics were used to summarize sample characteristics. Differences in values from the first administration to the second were described. Correlation coefficients were reported.

Internal Consistency Reliability. According to Polit and Beck (2012), internal consistency is the extent to which each of the individual items actually measure the phenomenon of interest. In the case of the NLN/KSF, there are numerous items within each of the variable headings. Internal consistency measured items as they relate to each of the subscales, as well as the scale on the whole. The same sample was used. Cronbach's alpha was analyzed, with a benchmark of 0.70.

Threats to Validity

Internal validity is the notion that the independent variable in a research study is the cause of the results, rather than some confounding influence (Polit & Beck, 2012). One possible threat to internal validity in this case is that of maturation. Maturation refers to the changes that can happen to a participant during the course of a research study that can affect the outcomes (Polit & Beck, 2012). The most likely victim of this threat would be the test-retest reliability analysis. The threat of maturation contributes to the determination of a two-week period between administrations of the NLN/KSF. However, maturation may not be a factor with a two-week period between administrations unless a participant engaged in some form of continuing education during that period. This data was not collected. This length of time was chosen to balance this threat with the likelihood of participants remembering responses from the first administration.

A second threat to internal validity was attrition. Whenever the researcher is relying on ongoing participation over a length of time, there is likelihood of attrition. According to Polit and Beck (2012), the longer the length of time between data collection points, the greater the risk of attrition. Again, with only a two-week window between data collection points, attrition was minimized.

The threat to external validity refers to the ability of the results of research to be generalizable to the population of interest (Polit & Beck, 2012). A primary method to address this is the ensure that the sample of participants is as representative of the population as possible. In this case, a probability sample was not used.

Summary

Testing the reliability and validity of the NLN/KSF spanned two distinct phases. Initial expert involvement to fine tune, edit, and revise the tool occurred prior to dissemination of the tool to the larger audience. This two-phased approach ensured that the analysis was completed on the finalized version of the NLN/KSF. Four different tests were completed to demonstrate various aspects of validity and reliability. At the conclusion of this process, the NLN/KSF was proven to be both valid and reliable, and the simulation community has one more tool at their fingertips to aid their quests to become better simulation facilitators.

Chapter 4

Results

The purpose of this dissertation was to undertake validity and reliability testing of the National League for Nursing/Kellgren Simulation Facilitator (NLN/KSF) tool. Data related to two types of validity testing and two types of reliability testing were collected via Qualtrics and analyzed using SPSS 23 and completed in two distinct phases. Results of these testing methods are presented in this chapter.

Phase 1

The National League for Nursing facilitates a fellowship program each year called the Leadership Program for Simulation Educators. The program began in 2010 and accepts up to twenty applicants in highly-competitive process. Those who are accepted are already highly knowledgeable about simulation; the focus of the program is on leadership development. The collective "alumni" of this program number approximately 160 individuals from across the United States. An invitation was sent to this group of people to participate as a subject matter expert (SME) for this dissertation work. The goal was to have four to six SMEs; eight individuals volunteered.

Demographic information was collected and quantified in order to select the final six SMEs. One point each was awarded for number of simulation-related publications, poster presentations, and podium presentations. One point was awarded for individuals who have obtained the Certified Healthcare Simulation Educator (CHSE) distinction, and two points for the Advanced certification (CHSE-A). The number of years' experience in simulation was also noted, however this did not influence the selection of SMEs because the amount of time does not necessarily equate to knowledge and use of simulation best practices. Scores ranged from 22 to

36 points. The six individuals with the highest point values were invited to participate as SMEs. Table 4.1 presents the demographic information of the SME volunteers.

Table 4.1

Subject Matter Expert Demographic Information

SME	CHSE-1 CHSE-A-2	PUBLICATIONS	POSTERS	PODIUM PRESENTATIONS	TOTAL
1	1	2	10	14	27
2	1	8	5	10	24
3	2	10	8	16	36
4	0	1	8	14	23
5	1	3	0	27	31
6	1	6	14	14	35
7	1	1	5	25	32
8	1	3	1	17	22

Content Validity. The intent of the first phase of research was to address the research question: What is the content validity index of the National League for Nursing/Kellgren Simulation Facilitator (NLN/KSF) tool? The NLN/KSF was created on Qualtrics along with a four-point relevancy scale: 4) highly relevant, 3) quite relevant, 2) somewhat relevant, and 1) not relevant. This version of the tool is shown in Appendix A. Using those ratings, content validity indices were computed. According to Polit & Beck (2012), items that rank greater than 0.80 are acceptable for inclusion in a new scale without revision. There were four items out of the thirty that fell below the threshold of 0.80. They were item numbers two, four, seventeen, and twenty-six.

Focus groups were conducted with the SMEs to discuss the items that fell below the ideal threshold of 0.80. Suggestions for revisions were made for three out of the four items in question. For item number two, “I am usually able to resolve technological challenges making the changes appear fluid”, the CVI was 0.67. The SMEs asked about the true intent of the item.

Questions arose about whether it was the ability of the facilitator to deal with technology or whether it was a matter of the facilitator's ability to still complete a scenario when technology creates problems. The intent of the item was related to the ability of the facilitator to salvage the learning experience to address objectives despite technological challenges that may arise. Wording was changed to "I am usually able to adapt the simulation activity when technology presents challenges in order to maintain the integrity of the scenario."

The next item that did not meet the threshold of acceptable CVI was item number four (CVI = 0.67), "I am usually able to develop new technologies to meet program outcomes." The conversation revolved around whether or not someone could be an expert facilitator of simulation without actually developing new technologies. The motivation for inclusion of this item was identified as the facilitator's ability to be creative in introducing methods of increasing fidelity for learners. The revised item was "I am usually able to implement creative solutions to enhance fidelity in scenarios (i.e. a functional chest tube)."

The third item that was discussed was item number seventeen (CVI = 0.50), "I am usually able to use formal assessment strategies to evaluate scenarios for achievement of learner outcomes." The initial discussion was centered around the use of the word "formal". Individuals had different perceptions of this word. Through further discourse, it was determined that the intent was to hone in whether or not the facilitator had a pre-planned, standardized process for completing evaluation. The conversation progressed to the "end in mind" for the evaluations. Since the goal of an individual scenario is to contribute to meeting course objectives, the wording was changed to reflect this. The newly worded item was "I am usually able to use a standardized process to evaluate scenarios for achievement of course objectives." This led to a minor wording change in item eighteen, although this item initially met the threshold CVI of

>0.80. It was determined that it was more effective to keep similar wording between items seventeen and eighteen. Ultimately item eighteen was changed from, “I am usually able to use formal assessment strategies to evaluate scenarios for achievement of program outcomes,” to “I am usually able to use a standardized process to evaluate scenarios for achievement of program outcomes.”

The fourth item that did not meet the CVI threshold of >0.80 was item twenty-six (CVI = 0.67), “I am usually able to maintain a standardized patient program to meet ongoing simulation center needs.” After discussion, it was determined that this was not an inherent function of an expert facilitator. It was recommended to remove this item from the NLN/KSF.

The next topic for the SMEs to consider during the focus groups was to identify if there were any topical gaps in the items covered within the NLN/KSF. It was discussed that learners’ success or failure to achieve objectives in a scenario can be fundamentally affected by their familiarity with the actual environment in which the scenario takes place. Is there an understanding of which equipment is functional and which is non-functional? Do the learners understand the capabilities of the mannequin being used? This conversation led to the recommendation to add the item, “I am usually able to provide a thorough orientation to the environment prior to simulation activities.”

The only other item on the tool that was addressed within the focus groups was item number eight, “I am usually able to pilot test each simulation.” After discussion, it was determined that the intent of the item was more accurately represented by rewording to “I am usually able to dry-run new simulations before I facilitate them.”

These newly revised items were then rated on the same four-point relevancy scale, with each reaching beyond the 0.80 benchmark. Table 4.2 shows the CVI of each of the thirty items.

Once the revisions were completed, the content validity index for the NLN/KSF (S-CVI) was calculated. This is done by adding the item content validity indices of each item on the scale and then dividing by the number of items, with the goal of >0.90 (Polit & Beck, 2012). The calculated S-CVI was 0.95.

Table 4.2

Content Validity of NLN/KSF Items After Revisions

Item Number	Content Validity Index	Item Number	Content Validity Index
1	0.83	**16**	1.00
2	1.00	**17**	1.00
3	0.83	**18**	0.83
4	1.00	**19**	1.00
5	1.00	**20**	1.00
6	1.00	**21**	1.00
7	1.00	**22**	0.83
8	1.00	**23**	1.00
9	1.00	**24**	1.00
10	1.00	**25**	0.83
11	1.00	**26**	0.83
12	0.83	**27**	1.00
13	0.83	**28**	1.00
14	1.00	**29**	0.83
15	0.83	**30**	1.00

The SMEs were asked to take the items on the survey and analyze them for themes, to name the themes they found, and determine which of the thirty survey items would belong in that grouping. There were six subscales identified within the scale: technology, prebriefing, scenario design, implementation, debriefing, and evaluation, with various numbers of items associated with each subcategory. Consensus was reached through a voting process.

Phase 2

The aim of the second phase of research was to disseminate the NLN/KSF to a wider audience in order to gather data about the three remaining research questions: 1) Are average scores on the NLN/KSF different between novice and expert facilitators of simulation? 2) What is the test retest reliability between NLN/KSF scores obtained from the same participants two weeks apart? 3) What is the internal consistency of the NLN/KSF scale and subscales? The methods used to address these research questions include known groups validity, test-retest reliability, and internal consistency. Two hundred twenty-six participants completed the questionnaire. Of these 226 participants, 118 participants completed the NLN/KSF a second time two weeks after the first. Demographic information for the participants is shown in Table 4.3. The ranges, means, and standard deviations were calculated for each of the thirty items and can be found in Appendix C.

Known groups. Known groups testing is completed when there is a predicted difference in groups' results based on previous knowledge (Polit & Beck, 2012). By demonstrating the predicted difference in results, construct validity of the NLN/KSF can be established. In this case, it could be predicted that there would be a significant difference in score on the NLN/KSF between novice and expert simulation facilitators. A logical discussion could then proceed about what characteristics define "expert" versus "novice". Demographic information related to possible differentiating characteristics was collected to test various possibilities: years of experience, simulation certification status, membership in a variety of professional simulation organizations, and whether the participants had participated in any professional presentations, including poster and podium presentations, and professional publications specifically related to simulation. Overall scores on the NLN/KSF were not normally distributed, so the Mann-Whitney U test was calculated on participants' first administration scores to determine if there were significant differences in scores between the novice and expert participants in each of the demographic categories. Experts were defined as having greater than 5 years' experience in simulation facilitation, earned certification in simulation education, one or more publication, podium presentation, or poster presentation about simulation, or one or more membership

Table 4.3

Demographic Characteristics of Participants (n=226)

Characteristic	***n***	**%**
Years of Simulation Experience		
0-2	27	11.9
3-5	47	20.8
6-10	91	40.3
>10	60	26.5
Certification		
None	128	56.6
Certified Healthcare Simulation Educator	89	39.4
Certified Healthcare Simulation Educator - Advanced	9	4.0
Simulation-Related Presentations		
Number of Publications		
0	130	57.5
1-5	65	28.8
6-10	19	8.4
>10	11	4.9
Number of Podium presentations		
0	86	38.1
1-5	79	35.0
6-10	15	6.6
>10	46	20.4
Number of Poster presentations		
0	90	39.8
1-5	89	39.4
6-10	23	10.2
>10	22	9.7
Membership in Simulation Organizations		
None	43	19.0
International Nursing Association for Clinical Simulation and Learning	116	51.3
Society for Simulation in Healthcare	121	53.5
National League for Nursing	141	62.4
Association for Standardized Patient Educators	12	5.3

in a professional organization. Facilitators with expert qualifications scored significantly higher on each of the six subscales than did the novice facilitators (p>.05). Results are shown in Table 4.4. Please note that in the area of membership organization, the percentage results add up to greater than 100% because individuals may belong to multiple organizations.

Table 4.4

Known Groups Mann-Whitney U Test Results (n=226)

Characteristic	Mean rank	U	sig
Years of experience	Expert= 128.28 Novice=81.82	7894.5	.000
Certification	Expert= 146.34 Novice= 88.36	9490.0	.000
Publications	Expert= 136.16 Novice= 96.08	8375.0	.000
Podium presentations	Expert= 135.24 Novice= 78.11	9063.5	.000
Poster presentations	Expert= 132.11 Novice= 83.31	8657.5	.000
Professional memberships	Expert= 121.51 Novice= 79.4	5401.0	.000

p-value ≤ .05.

Internal consistency. Internal consistency measures the degree to which all items on a scale measure the same construct (Cronk, 2012). The goal in scale construction in this regard is to have items that demonstrate strong levels of consistency without achieving nearly perfect consistency (DeVellis, 2017). If the alpha value is too close to 1.0, it could be concluded that the items are redundant instead of complementary. The Cronbach's alpha (α) was calculated for the six subscales of the NLN/KSF from data gathered from the participants' first administration scores only. They range from α=.720 for the implementation subscale to .870 for evaluation. According to DeVellis (2017), acceptable levels for newly-developed scales is .700 or above. All values are above acceptable levels of consistency and are reported in Table 4.5. All items in the NLN/KSF, along with their subscale groupings, are shown in Appendix B.

Table 4.5

Internal Consistency Cronbach's alpha Results

Subscale	*Number of items*	*α*
Technology	4	.741
Prebriefing	4	.793
Scenario design	10	.848
Implementation	3	.720
Debriefing	4	.832
Evaluation	5	.870

Test Retest Reliability. This method of testing is completed in order to demonstrate the stability of a scale over time (Polit & Beck, 2012). As participants completed the NLN/KSF initially, each person was assigned a randomly generated identification number associated with their email address. A link to complete the NLN/KSF a second time was automatically sent to participants two weeks after their first survey completion. The unique identification number was then associated with their second completion as they entered their email address again. With this method, tracking of first and second responses could be initiated in order to facilitate comparisons of first administration scores with second. One hundred sixteen participants completed the NLN/KSF twice. Spearman's rho was calculated to determine the correlations between scores on the six subscales between the two survey administrations. According to Cronk (2012), results <0.3 show weak correlation, between 0.3 and 0.7 show moderate correlation, and >0.7 show strong correlation. Complete results are shown in Table 4.6.

Table 4.6

Test Retest Reliability Results (n=116)

Subscale	**Spearman's rho**
Total Score	.84**
Debriefing	.71**
Technology	.82**
Evaluation	.70**
Scenario Design	.79**
Implementation	.69**
Prebriefing	.57**

**p-value $\leq$ .01 level (2-tailed)

Summary

Data was collected via Qualtrics and analyzed using SPSS 23 to answer four research questions regarding the validity and reliability of the NLN/KSF. Validity was established through content and scale validity indices that showed high levels of content validity, as well as known groups validity that confirmed significant differences in scores between novice and expert facilitators. Reliability was determined through the test retest method for which all results were either highly correlated or on the high end of moderately correlated. Additionally, internal consistency was above acceptable levels for newly-developed scales.

Chapter 5

Discussion

The purpose of this dissertation was to provide psychometric results of validity and reliability testing for a self-assessment tool for facilitators of simulation in nursing education. A series of four tests were completed; two tests of validity and two tests of reliability. Data were gathered from both experts in simulation facilitation as well as novices in the field as appropriate to answer each research question. This chapter discusses the results of this research as well as provide strengths and limitations of the study, possible effects on the discipline of nursing education, and suggestions for future research.

Synthesis of the Research

Nursing has a long history of self-reflection and evaluation. The discipline has valid and reliable tools to evaluate clinical and classroom teaching, using both self- and peer-evaluation tools. However, within simulation facilitation, this is not the case. The National League for Nursing/Kellgren Simulation Facilitator (NLN/KSF) tool was developed to address a gap in the literature related to availability of valid and reliable tools that address comprehensive facilitator effectiveness. Only one other tool has been deemed valid and reliable when this dissertation was completed: The Facilitator Competency Rubric (FCR) (Leighton et al., 2018). The FCR was created to serve as a method of peer review. The NLN/KSF was created to serve as a method of self-evaluation, which provides depth and complement to the area of facilitation in simulation.

The NLN/KSF was built upon the foundation of best practice; best practices in simulation from INACSL and best practices in education as reflected by the NLN/JST. The inclusion of this tool into the literature as a valid and reliable tool directly results from the strong foundation from which it was built. Through this advancement of the science of simulation, these evidence-based resources extend an iterative process of informing one another. Further research related to the INACSL Standards of Best Practice: Simulation^{SM} and the NLN/Jeffries Simulation Theory will undoubtedly inform further research of the NLN/KSF. It is also likely that further research of the NLN/KSF will inform standards and theory as research, knowledge, and new discoveries are extended.

Anticipated Uses

The first anticipated use of the NLN/KSF is to provide information for facilitators to inform future continuing education. As mentioned in chapter 2, there is a plethora of continuing education opportunities within simulation: conferences, online courses, workshops, degree and certificate programs. Having categorized information about your own strengths and opportunities for improvement can inform how a person chooses to spend their funds to address documented needs.

A second anticipated use of the NLN/KSF is related to simulation team-building. As simulation programs grow, the need to move from the "one-person show" to a simulation team model becomes more apparent. It may not be necessary for each person on the team to be an expert in each area of facilitation. One person may be the technology expert and function within that specialty on the simulation team; another may excel in implementation or debriefing. Through use of the tool, gaps on a simulation team can be identified with the intent of finding an individual to balance the group when additional members are added.

A third anticipated use of the tool is as a method of establishing transparency and clarity about the complex role of the facilitator in simulation. Unfortunately, it is often not fully understood that simulation facilitation requires a specialized skill set that differs greatly from the skill set of an excellent classroom or clinical instructor. Having a valid and reliable tool that outlines the aspects of simulation facilitation to be considered can be a useful tool in beginning the dialogue to help create a shared mental model of the skills and expectations of this complex role.

Implications of the Study

The purpose of conducting research in any form is to generate new knowledge in a discipline. Up to this point, simulation facilitators lacked the tools to be able to reliably assess their own performance, knowledge, and awareness related to the complexity of their work. The NLN/KSF can assist facilitators in these processes. Implications can be identified within education, practice, and policy arenas.

Nursing Education

There is recognition that current educational strategies are not preparing entry-level nurses effectively to meet needs of the current practice environment. As a result, there has been a call within nursing education to move beyond teaching as we were taught; to move from the “sage on the stage” to methods of guiding learning that are congruent with adult learning principles. Defining attributes of simulation, such as active learning, clear objectives, and opportunities for reflection during debriefing are consistent with constructivist learning theories, which engage our learners and provide context to the activities they are completing during their education. These methods have great potential to assist in closing the gap between education and practice. As we move forward in our quest for improving our teaching methods, it is vital to understand how effective we are as guiders of this learning. The NLN/KSF can be one tool for use as we embrace this relatively new way of teaching in order to assess our own ability to be effective.

Practice

Simulation in practice is often used as a mandate after sentinel events, as a result of accreditation needs, quality improvement processes, or rollout of new policies or procedures, to name a few. These outcomes differentiate simulation in practice from simulation in education. Despite the differences in goals, the ability of the facilitator to plan and implement these activities is the same as in education. The knowledge and skills of the facilitator that are addressed in the NLN/KSF are still vital to the success of the simulation activity, despite the difference in environment. Using the NLN/KSF can be a valuable tool to identify an individual's ability to provide quality simulation learning activities for the participants.

Policy

Research exists that supports replacement of up to 50% of clinical with simulation (Hayden et al., 2014). An outcome from this landmark study was for schools of nursing to ask the question, "How can we achieve these same results?" Guidelines have been set forth for educators and administrators to guide development of their simulation programs in order to attempt to replicate the conditions that were vital to the success of the research. These guidelines have been the basis for many state boards of nursing in their development of rules surrounding the use of simulation in nursing curricula. With the evolution of these state regulated rules, expectations from nursing program accreditors will evolve as well. As accreditors fine tune their expectations for rationalization of this ongoing faculty development, the NLN/KSF could be used as a method for determining the types and needs for this education that meet the needs of evidence-based decision-making.

Strengths of the Research

One of the strengths of the NLN/KSF is the theory-based nature of the tool development. By utilizing sources of published theory, Standards of Best Practice, and certification standards as the guiding framework to the development of the items on the tool itself. This method of development strengthens the foundation of the tool itself, as well as increasing the depth of resources available for facilitators in simulation.

Another strength is related to the participants that completed the survey. In phase one, all subject matter experts selected to contribute have earned certification in simulation education and have over fifty collective years of experience in simulation. Additionally, in phase two, participants ranged from no experience in simulation to over twenty years of experience, as well as variations in all other demographic criteria laid out to distinguish novices from experts. This breadth of qualifications lends itself to credibility of the results.

Five years ago, the National League for Nursing recognized the gap in the literature that supports the need for a tool like the NLN/KSF. It is likely that having the stamp of approval and support of the NLN increased participants willingness to contribute to the research process. This may have contributed to the quality of subject matter experts recruited, as well as the overall number of participants included in the sample.

Another strength of this study is the psychometric results themselves. The results of the testing showed consistent strength in the validity and reliability psychometrics at or above the accepted standards for new tool development. Each of the four psychometric tests completed within this dissertation support the inclusion of the NLN/KSF into the literature as another valid and reliable method of information-gathering and self-reflection for facilitators of simulation in nursing education.

Limitations of the Research

One limitation of the study is related to the wording choices within the items on the tool. Each of the items begins with the same stem, "I am usually able to…". Due to use of indefinite qualifiers, participants may feel comfortable rating themselves higher on the scale as compared to wording that is definitive. This may be a contributing factor to the negatively skewed score distribution. In the future, the recommendation would be to remove the word "usually" from the stem of each item.

Another limitation of the study was the uneven distribution of participants that completed the survey. In the "years of experience" demographic category, the experts outnumbered the novice facilitators. Traditionally, there is maximal value of statistical power when group sizes are equal. However, the notion that all groups must be equal may not apply in this situation, since this group distribution may more accurately reflect the general population.

The previously mentioned limitations are issues that could be addressed in future research. However, the very foundation of the NLN/KSF as a self-assessment tool brings its own set of considerations. With self-assessment, a participant may answer in ways they think they should, as opposed to truth. The quality of results is only as good as the honesty with which one completes the survey.

The participants in this research were limited to facilitators within nursing education. Although previous discussion included use of the NLN/KSF within other disciplines that use simulation, further testing to ensure generalizability of results to this population would be necessary before those implications could be responsibly realized.

Suggestions for Future Research

This validation of the NLN/KSF leads naturally to its use in further research, both to strengthen and extend the use of the tool itself, as well as applications in which the tool is used, but is not the focus of the research itself.

Further research that could be centered on the tool itself are varied. First, as already discussed, would be extension of testing of the NLN/KSF into other disciplines using simulation. The foundation of the tool itself is based on Standards of Best Practice, certification standards, and simulation theory that is not specifically based within nursing education adds strength to the argument that the NLN/KSF could be generalizable to other disciplines. Adding to the participant pool and collecting appropriate demographic information would be a likely next step.

Possible uses of the NLN/KSF were presented earlier in this chapter. Further qualitative research could include how facilitators are actually using the tool after is has been available in the community for a length of time. The visions of the researcher may turn out to be very different than the reality once the tool is freely available for use.

As programs increase use of participant evaluation using simulation, whether it be formative or summative, it would be interesting to determine if there was a relationship between the facilitator's score on the NLN/KSF and the quality of the participant's performance.

Summary

In this chapter, synthesis of the research study was presented, as well as strengths and limitations of the work that has been presented. Possible uses of the NLN/KSF were highlighted and ideas for future research related to the tool were identified. Implications for education, practice, and policy were presented.

Conclusion

The background presented shows the need for a comprehensive tool to measure simulation facilitator abilities. The inclusion of the National League for Nursing/Kellgren Simulation Facilitator tool into the literature as a valid and reliable tool for this purpose is supported by the results of the research study. This type of research is necessary in order to advance the science of simulation and to justify its use in nursing curricula.

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APPENDIX A

NATIONAL LEAGUE FOR NURSING/KELLGREN SIMULATION FACILITATOR TOOL – EXPERT REVIEW

Item	Not Relevant	Somewhat Relevant	Quite Relevant	Highly Relevant
1. I am usually able to troubleshoot technology while running simulation.	1	2	3	4
2. I am usually able to resolve technological challenges making the changes appear fluid.	1	2	3	4
3. I am usually able to integrate new technologies to meet learner needs (i.e. electronic medical record).	1	2	3	4
4. I am usually able to develop new technologies to meet program outcomes.	1	2	3	4
5. I am usually able to write measurable objectives for simulations.	1	2	3	4
6. I am usually able to incorporate prebrief, simulation, and debrief into each simulation activity.	1	2	3	4
7. I am usually able to perform a needs assessment in order to justify changes to the simulation curriculum.	1	2	3	4
8. I am usually able to pilot test each simulation.	1	2	3	4

9. I am usually able to review simulation scenarios to ensure accuracy to current practice.	1	2	3	4
10. I am usually able to communicate expectations of roles to the learners prior to the simulation exercise.	1	2	3	4
11. I am usually able to communicate the presence of a safe learning space in simulation, when applicable.	1	2	3	4
12. I am usually able to devote full attention to the simulation scenario prior to the debriefing session.	1	2	3	4
13. I am usually able to deliver quality debriefing questions as the discussion unfolds.	1	2	3	4
14. I am usually able to utilize theory-based debriefing methods.	1	2	3	4
15. I am usually able to ensure that simulation objectives are addressed during the debriefing.	1	2	3	4
16. I am usually able to assist learners to connect simulation outcomes to various clinical experiences (i.e. connect an adult asthma scenario to a pediatric asthma situation).	1	2	3	4
17. I am usually able to use formal assessment strategies to evaluate scenarios for achievement of learner outcomes.	1	2	3	4

18. I am usually able to use formal assessment strategies to evaluate scenarios for achievement of **program** outcomes.	1	2	3	4
19. I am usually able to communicate clearly with learners about the purpose of the simulation (i.e. formative learning, summative, or high stakes).	1	2	3	4
20. I am usually able to use evaluation data to recommend changes to the simulation curriculum.	1	2	3	4
21. I am usually able to use formal assessment strategies to assess facilitator performance.	1	2	3	4
22. I am usually able to use continuous quality improvement methods to ensure rigor of scenarios.	1	2	3	4
23. I am usually able to recognize scenarios appropriate for Standardized Patient utilization.	1	2	3	4
24. I am usually able to create appropriate cuing for Standardized Patients in order to facilitate scenario progression.	1	2	3	4
25. I am usually able to train Standardized Patients to contribute to meeting learner outcomes.	1	2	3	4

26. I am usually able to maintain a Standardized Patient program to meet ongoing simulation center needs.	1	2	3	4
27. I am usually able to incorporate appropriate moulage to increase physical realism of scenario (i.e. appropriate wound type and placement for scenario).	1	2	3	4
28. I am usually able to ensure that elements of the scenario contribute to conceptual reality (i.e. vital signs consistent with physiology of scenario).	1	2	3	4
29. I am usually able to alter the scenario as it unfolds based on learner action (i.e. change blood pressure after medication administration).	1	2	3	4
30. I am usually able to allow the simulation to unfold without facilitator intervention.	1	2	3	4

APPENDIX B

NATIONAL LEAGUE FOR NURSING/KELLGREN SIMULATION FACILITATOR TOOL

Item	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
Technology							
1. I can usually troubleshoot technology while running simulation	1	2	3	4	5	6	7
2. I am usually able to adapt the simulation activity when technology presents challenges in order to maintain the integrity of the scenario	1	2	3	4	5	6	7
3. I am usually able to integrate new technologies to meet learner needs (i.e. electronic medical record).	1	2	3	4	5	6	7
4. I am usually able to implement creative solutions to enhance fidelity in scenarios (i.e. a functional chest tube).	1	2	3	4	5	6	7
Prebriefing							
5. I am usually able to communicate expectations	1	2	3	4	5	6	7

of roles to the learners prior to the simulation exercise.							
6. I am usually able to communicate the presence of a safe learning space in simulation, when applicable.	1	2	3	4	5	6	7
7. I am usually able to communicate clearly with learners about the purpose of the simulation (i.e. formative learning, summative, or high stakes).	1	2	3	4	5	6	7
8. I am usually able to provide a thorough orientation to the environment prior to simulation activities.	1	2	3	4	5	6	7
Scenario Design							
9. I am usually able to write measurable objectives for simulations.	1	2	3	4	5	6	7
10. I am usually able to incorporate prebrief, simulation, and debrief into each simulation activity.	1	2	3	4	5	6	7

11. I am usually able to create appropriate cuing for Standardized Patients in order to facilitate scenario progression.	1	2	3	4	5	6	7
12. I am usually able to incorporate appropriate moulage to increase physical realism of scenario (i.e. appropriate wound type and placement for scenario).	1	2	3	4	5	6	7
13. I am usually able to ensure that elements of the scenario contribute to conceptual reality (i.e. vital signs consistent with physiology of scenario).	1	2	3	4	5	6	7
14. I am usually able to perform a needs assessment in order to justify changes to the simulation curriculum.	1	2	3	4	5	6	7
15. I am usually able to dry-run new simulations before I facilitate them.	1	2	3	4	5	6	7
16. I am usually able to review simulation scenarios to ensure accuracy to current practice.	1	2	3	4	5	6	7

17. I am usually able to recognize scenarios appropriate for Standardized Patient utilization.	1	2	3	4	5	6	7
18. I am usually able to train Standardized Patients to contribute to meeting learner outcomes.	1	2	3	4	5	6	7
Implementation							
19. I am usually able to devote full attention to the simulation scenario prior to the debriefing session.	1	2	3	4	5	6	7
20. I am usually able to alter the scenario as it unfolds based on learner action (i.e. change blood pressure after medication administration).	1	2	3	4	5	6	7
21. I am usually able to allow the simulation to unfold with appropriate facilitator intervention.	1	2	3	4	5	6	7
Debriefing							
22. I am usually able to deliver quality debriefing questions as the discussion unfolds.	1	2	3	4	5	6	7

23. I am usually able to utilize theory-based debriefing methods.	1	2	3	4	5	6	7
24. I am usually able to ensure that simulation objectives are addressed during the debriefing.	1	2	3	4	5	6	7
25. I am usually able to assist learners to connect simulation outcomes to various clinical experiences (i.e. connect an adult asthma scenario to a pediatric asthma situation).	1	2	3	4	5	6	7
Evaluation							
26. I am usually able to use a standardized process to evaluate scenarios for achievement of course objectives.	1	2	3	4	5	6	7
27. I am usually able to use a standardized process to evaluate scenarios for achievement of program outcomes.	1	2	3	4	5	6	7
28. I am usually able to use evaluation data to	1	2	3	4	5	6	7

recommend changes to the simulation curriculum.							
29. I am usually able to use formal assessment strategies to assess facilitator performance.	1	2	3	4	5	6	7
30. I am usually able to use continuous quality improvement methods to ensure rigor of scenarios.	1	2	3	4	5	6	7

Appendix C

Item Statistics (n=226)

Item Number	Minimum	Maximum	Mean	Standard Deviation
1	1	7	5.42	1.352
2	2	7	6.15	.849
3	3	7	6.00	1.031
4	1	7	5.88	1.131
5	5	7	6.74	.470
6	1	7	6.81	.545
7	1	7	6.76	.610
8	1	7	6.60	.801
9	3	7	6.33	.817
10	1	7	6.62	.815
11	1	7	6.06	1.155
12	1	7	5.80	1.328
13	1	7	6.46	.890
14	1	7	6.08	1.163
15	1	7	5.50	1.512
16	1	7	6.32	.927
17	1	7	6.04	1.203
18	1	7	5.48	1.497
19	1	7	6.28	1.087
20	1	7	6.58	.763
21	3	7	6.61	.617
22	2	7	6.50	.762
23	1	7	6.38	.996
24	1	7	6.48	.828
25	3	7	6.45	.805
26	1	7	5.98	1.039
27	1	7	5.64	1.436
28	1	7	6.07	1.135
29	1	7	5.20	1.655
30	1	7	5.61	1.395

CURRICULUM VITAE
MOLLY (MARY) KELLGREN

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Academic Degrees

PhD – Doctor of Philosophy, Nursing, projected graduation 2019
University of Wisconsin – Milwaukee, Milwaukee, Wisconsin
Research focus: Faculty development in simulation

MSN – Master of Science in Nursing, Nursing Education, 2011
Metropolitan State University, St. Paul, MN
Research foci: nursing residency programs, mentoring for new nursing faculty

BSN – Bachelor of Science in Nursing, 2011
Metropolitan State University, St. Paul, MN

ADN – Associate of Science in Nursing, 2005
Inver Hills Community College, Inver Grove Heights, MN, 2005

Professional Certifications

Registered Nurse License
R-168923-9, Minnesota Board of Nursing, St. Paul, MN

Certified Nurse Educator
National League for Nursing, Washington, D.C., District of Columbia

Certified Healthcare Simulation Educator
Society for Simulation in Healthcare, Washington D.C., District of Columbia

Professional Memberships

2011 – Present, National League for Nursing

2013 – Present, International Nursing Association for Clinical Simulation and Learning

2014 – Present, Society for Simulation in Healthcare

Awards and Honors

Jonas Center Nurse Leaders Scholar – 2016-2018

Sigma Theta Tau Nursing Honors Society Member - 2017

National League for Nursing (2014). *Leadership Program for Simulation Educators*.

Professional Experience

National League for Nursing, 01/2016 – Present
Manager, Center for Innovation in Simulation and Technology
Responsible for creation, testing, and implementation of a nursing curriculum aimed to improve readiness for practice in new graduates.

St. Catherine University, 08/2012 – 01/2016
Assistant Professor, Coordinator of the Nursing Applied Learning Lab
Coordination of simulation program in the ADP, ensured curricular integrity of all lab activities.

Inver Hills Community College, 08/2011 – 07/2012
Nursing Instructor
Provided instruction for ADP nursing students in the classroom, lab, and clinical sites.

Favorite Healthcare Staffing, 06/2014 – 09/2015
Registered Nurse, Intensive Care Unit
Bedside nursing.

United Hospital, 06/2005 – 06/2014
Registered Nurse, Intensive Care Unit, Medical-surgical telemetry step-down unit
Bedside nursing, preceptor for new hire nurses, charge nurse, and dialysis support nursing.

Consulting and Paid Service

National League for Nursing and Laerdal Medical, 11/2015 – 11/2016
Simulation Nurse Educator, Simulation Education Solutions for Nursing

Educating Nurses Across Borders, 3/2014 – 9/2015

Administrative responsibilities, curriculum development, and course facilitation of a nursing curriculum used for African populations.

Service

Institutional

Curriculum Committee Co-Chair (08/2012 – 01/2016)

Coordinator Committee Member (08/2012 – 01/2016)

Informatics Committee Member (08/2012 – 01/2016)

Administrative Leadership Committee Member (08/2012 – 01/2016)

Professional

Minnesota Simulation for Healthcare Education Partnerships (MnSHEP; 2015 – present)
Advisory board member

International Nursing Association for Clinical Simulation and Learning (2014, 2015)
Abstract reviewer for annual conference

National League for Nursing (2014, 2015)
Abstract reviewer for annual Technology conference

National League for Nursing (2014)
Representative to review INACSL Standards of Best Practice: Simulation

Publications

Journal Article

Kellgren, M. (2016). Preparing new nurses for practice with A2P. Nursing Education Perspectives, 37(5), 304.

Thomas, C. M., Sievers, L. D., Kellgren, M., Manning, S. J., Rojas, D. E., & Gamblian, V. C. (2015). Developing a theory-based simulation educator resource. *Nursing Education Perspectives, 36*(5), 340-342. doi: 10.5480/15-1673

Thomas, C., & Kellgren, M. (2017). Extrapolation of Benner's novice to expert model: An application for simulation facilitators. Nursing Science Quarterly, 30(3), 227-234.

Online Resources

Kellgren, M., Manning, S., Sievers, L.D., Gamblian, V., Thomas, C., & Rojas, D. (2016). Faculty development toolkit of simulation resources. NLN Simulation Innovation Resource Center: Tools & tips. http://sirc.nln.org/pluginfile.php/18733/mod_page/content/35/Faculty%20DevelopToolkit%20Final%20February%202016.pdf

Podium Presentations

Kellgren, M. (05/2015). *Faculty Development for Simulation Educators*. Regions Hospital Simulation Conference.

Kellgren, M., Sievers, L., Gamblian, V., & Manning, S. (06/2015). *Educating Sim Educators: A Toolkit for Simulation Educators.* International Nursing Association for Clinical Simulation and Learning.

Kellgren, M., Thomas, C., Rojas, D., & Gamblian, V. (10/2015). *Faculty Development: A Toolkit for Simulation Educators.* National League for Nursing Education Summit

Kellgren, M., & Morisette, S. (04/2016). *Creative Uses of Simulation in the Classroom.* Health Educators Conference, Bloomington, MN.

Forneris, S., & Kellgren, M. (05/2016). *Transition to Practice.* Simulation User Network (SUN) Conference, Atlantic City, NJ.

Forneris, S. & Kellgren, M. (05/2016). *Debriefing – Not Because I Said So.* SUN Conference, Atlantic City, NJ.

Forneris, S., Kellgren, M., & Tagliareni, E. (9/2016). *Transition to Practice.* National League for Nursing Education Summit, Orlando, FL.

Kellgren, M. (11/2016). *Accelerating to Practice.* Laerdal Mini-Sun Conference, Lufkin, TX.

Forneris, S., & Kellgren, M. (1/2017). *Transition to Practice.* International Meeting on Simulation in Healthcare (IMSH), Orlando, FL.

Kellgren, M. (11/2016). *Accelerating to Practice.* Laerdal Mini-Sun Conference, Dallas, TX.

Forneris, S. & Kellgren, M. (3/2017). *Transition to Practice.* Sigma Theta Tau International Biennial Convention, Indianapolis, IN.

Kellgren, M. (3/2017). *Achieving High Quality Simulation.* Laerdal Mini-SUN Conference, Houston, TX.

Kellgren, M. (4/2017). *Transition to Practice.* Simulation User Network (SUN) Conference, San Diego, CA.

Kellgren, M. (4/2017). *Debriefing – Not Because I Said So.* SUN Conference, San Diego, CA.

Kellgren, M. (5/2017). *Building High Quality Simulation Programs.* Laerdal Mini-SUN Conference, Baton Rouge, LA.

Kellgren, M., Raleigh, R., & Reid, Ca. (5/2017). *Designing Simulation.* Best Practices in Simulation Conference, Bloomington, MN.
Forneris, S., Kellgren, M., & Kline, A. (9/2017). *Transition to Practice.* National League for Nursing Education Summit, San Diego, CA.

Forneris, S., & Kellgren, M. (10/2017). *Transition to Practice.* Simulation User Network (SUN) Conference, San Antonio, TX.

Forneris, S., & Kellgren, M. (10/2017). *Debriefing – Not Because I Said So.* SUN Conference, San Antonio, TX.

Kellgren, M. (10/2017). *Transition to Practice.* HealthPartners Simulation Conference, St. Paul, MN.

Kellgren, M. & Kline, A. (1/2018). *Beyond Boundaries.* International Meeting on Simulation in Healthcare (IMSH), Los Angeles, CA.

Forneris, S., Kellgren, M., & Kline, A. (1/2018). *Transition to Practice.* International Meeting on Simulation in Healthcare (IMSH), Los Angeles, CA.

Kellgren, M. (4/2018). *Building a Simulation Curriculum for Practice.* Simulation User Network (SUN) Conference, Chicago, IL.

Kellgren, M. (4/2018). *Are You Ready for Simulation Evaluation?* Simulation User Network (SUN) Conference, Chicago, IL.

Kline, A., & Kellgren, M. (4/2018). *Debriefing.* Simulation User Network (SUN) Conference, Chicago, IL.

Patterson, B., Allard, P., Rodgers, M., & Kellgren, M. (9/2018). *Changing the Face of Capstone Courses: NLN's Accelerating to Practice.* NLN Education Summit, Chicago, IL.

Forneris, S., & Kellgren, M. (9/2018). *NLN Coaching Course: Critical Conversations for Preceptors.* NLN Education Summit, Chicago, IL.

Kellgren, M. (10/2018). *Building a Simulation Curriculum for Practice.* Simulation User Network (SUN) Conference, Orlando, FL.

Kellgren, M. (10/2018). *Are You Ready for Simulation Evaluation?* Simulation User Network (SUN) Conference, Orlando, FL.

Kellgren, M., Rizzolo, M. A., & Tagliareni, E. (11/2018). *Integrating Simulations for Vulnerable Populations into Nursing Curricula*. Organization for Associate Degree Nursing Conference, Philadelphia, PA.

Kellgren, M. (01/2019). *Transition to Practice*. International Meeting on Simulation in Healthcare (IMSH), San Antonio, TX.

Kellgren, M. (2/2019). *Assisting Novice Nurses to Find Their Voice*. Sigma Theta Tau Creating Healthy Work Environments, New Orleans, LA.

Poster Presentations

Kellgren, M., Blazovich, L., Bro, A. (06/2013). *Skills Validations: To Tape or Not to Tape.* International Nursing Association for Clinical Simulation and Learning conference

Kellgren, M., Thomas, C., Rojas, D., Sievers, L., Gamblian, V., & Manning, S. (10/2014). *Faculty Development: A Toolkit for Simulation Educators.* National League for Nursing Technology Conference.