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The Development and Content Validity of an Assessment Instrument in Simulation for Advanced Practice Provider Fellowship Programs: An Exploratory Study

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THE DEVELOPMENT AND CONTENT VALIDITY OF AN ASSESSMENT INSTRUMENT IN SIMULATION FOR ADVANCED PRACTICE PROVIDER FELLOWSHIP PROGRAMS: AN EXPLORATORY STUDY

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ABSTRACT

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Advanced practice provider (APP) fellowship programs are comprehensive programs designed for physician assistants (PAs) and nurse practitioners (NPs) to acquire the necessary knowledge and skills to deliver safe, high-quality care in their specialized areas of practice (Advanced Practice Provider Fellowship Accreditation ™, 2023). An APP fellowship program's mission is to guide the APP fellow to an expected level of confidence in meeting core competencies within a specific specialty (Klimpl et al., 2019; Reville & Foxwell, 2021). The assessment of competence is often a complex process. Simulation has become a learning modality across the globe in medical, nursing, and pharmacy in undergraduate, graduate, and post-graduate training to manage the most complex clinical situations (Padilha et al., 2018; Seybert et al., 2019; Weersink et al., 2019). As APP fellowship programs germinate, there is a growing need to provide a valid instrument to measure competence within simulation. Advanced practice provider fellowship programs utilize structured simulation as an assessment methodology of clinical competence. Faculty of these programs must have access to a valid instrument to provide both formative and summative assessments to APP fellows.

The International Nursing Association for Clinical and Simulation Learning (2021) provided standards of best practice for patient simulation training including evaluation of learning and performance with the utility of a valid, reliable instrument. The purpose of this exploratory study was to design, develop, and assess the content validity index of a modified

Advanced Practice Provider Queen's Simulation Assessment Tool (APP-QSAT) based on best evidence and resources available for the assessment of a simulation activity for APPs within a fellowship program.

This research study had the opportunity to review data from nine content experts within the field of simulation. The exploratory nature was appropriate due to no published instrument that specifically addressed the population of APPs within an acute care setting could be discovered. The APP-QSAT consists of the following domains: primary assessment, diagnostic actions, therapeutic actions, communication, and overall performance. Thirty items were analyzed by nine content experts on a 4-point Likert scale from 1—*Not at all relevant*/*clear* to 4—*Very relevant/clear* on the content validity index tool. After two rounds of content validation with the nine content experts, the APP-QSAT demonstrated having excellent content validity with an item-level content validity index of 1.00. A modified kappa of 1.00 was also analyzed to exclude chance agreement among the content experts.

The APP-QSAT is a modifiable template designed to measure competence for APPs in acute care settings, particularly within APP fellowships. The APP-QSAT aims to capture the full spectrum of clinical competence including not only technical skills but also critical thinking, decision-making, communication, and interprofessional collaboration. Limitations of the study reflected the lack of reliability studies performed on the APP-QSAT and was a small sample population of content experts. Despite the limitations, this study provided a valid instrument to provide formative and summative assessments for learners.

ACKNOWLEDGEMENTS

As I deconstruct the history of my earlier years, my formative experiences have evolved into my current existence. I have had the honor to have so many strangers, colleagues, and family members be influential in my life. The word influential also carries with it experiences of other people who have exhibited behaviors that I have chosen to eschew or embrace. Many individuals have influenced me since my childhood, I intuitively casted a wide net to draw in a support system. From a young age I worked in our family-owned business, a pizzeria, where the regular customers created my own encapsulated community. Leslie Terrace, a name coined from his delivery address, was an elderly gentleman who was a permanent fixture there. Starting from grammar school, I often did my schoolwork at a table in the pizzeria. He made it known that questions are beautiful. This was also mentally a starting point where I realized I wanted more in my life. School brought stability, books, freedom, and wonderment. I was never a great writer but still managed to get into AP English. Mrs. Sullivan had us read *A Doll's House* and it opened me up. Nora, the main character was a mother and wife, still in a search for self-discovery. That play has stayed with me, not for the literal meaning, but for the potential it posed to my very self.

In one of my first nursing positions, I met Ron Bagley, a trauma nurse, scrubs were cleaned and pressed every shift. He was respected and revered, everything was possible with Ron. Systems could change. Nurses made a difference on the ground level, but he also believed that they could make a difference on a larger scale--collectively make an impact by advocating for patients. I advocate for critical inquiry and curiosity more than ever now, ask beautiful questions. I encourage and provide support to not just my patients but to my colleagues. Through

experiences where behavior was hurtful or unkind, I thank you, it has provided a drive to empower a culture of support, mentorship, and civility. I hope to be a difference maker.

I want to truly thank my committee for providing such insight into my research that it has left an indelible mark on how I will continue to support anyone who comes to me for help. Without their knowledge and abilities, I would not be completing this research. My research advisor, Dr. Dunemn, was my champion, she called upon colleagues for assistance, she gave me research knowledge but she also gave me pep talks, she shared her life experiences, and how to navigate life. I also want to thank Dr. Miley, a mentor and a former colleague, for her continued willingness to share her knowledge and encourage me. My colleague, Al Aguilar, your passion is like a fire starter for my vision in this world. To Cindy for being such a protector of good and show me anything is possible. And to my Ciocci Lorrie, your gift of words and unyielding support have carried me through this program. I hope to make all of you proud.

And now to my biggest supporter, my husband, my part-time lover, my partner in crime and in life. Thank you for every minute, every day of listening and encouraging me. You have carried me and our children through life these past few years. Thank you for loving all of the pieces of me that I have called back. Thank you for talking me off ledges when fear and depression consumed me. And thank you for letting me believe that I can fulfill my vision with all of me; that I can be authentic, quirky, possess a potty mouth at times, and still be in any c-suite that is willing to see things in an innovative, collaborative way… upholding real values. You are a giver, a therapist, a teacher, and a healer.

Thank you Jack Dewey, the master of encouraging monologues, you give the best inspirational speeches. Thank you Addy, you are the teacher and healer of our family. You have

allowed me to transform myself with grace and compassion. I hope you both learn to be givers in this world, be influential to others, and make a difference.

TABLE OF CONTENTS

LIST OF TABLES

Table

LIST OF FIGURES

Figure

CHAPTER I

INTRODUCTION TO THE STUDY

The assessment of competence is a complex process. As advanced practice provider (APP) fellowship programs germinate, there is a growing need to provide an instrument that is valid to measure competence. Advanced practice provider clinical competence uses structured simulation as an assessment methodology. An advanced practice provider fellowship program's mission is to guide the APP fellow to an expected level of confidence in meeting core competencies within a specific specialty (Klimpl et al., 2019; Reville & Foxwell, 2021). Planned assessment of competence can provide feedback to learners, improve teaching and learning processes, and navigate APP fellows to the desired outcomes of the program (Billings & Halstead, 2016). Faculty of these programs must have access to a valid instrument to provide both formative and summative assessments to APP fellows. The proposed research presented here will be an exploration into the development and evaluation of content validity of an evidence-based instrument for the assessment of clinical competence in simulation for APP fellowship programs. Based on a literature review of validated instruments for the assessment of clinical competence, Hall et al.'s (2015) Queen's Simulation Assessment Tool (QSAT) was found to be in alignment with the practices of APPs functioning in acute care settings (see Appendix A). Permission to use the QSAT was granted by the publisher (see Appendix B). A modified instrument, the APP-QSAT (see Appendix C) was developed for both formative and summative assessment of APPs in simulation. Appendix D provides permission from Hall et al.

to modify the QSAT. This chapter provides a background of the study, the significance of the study, the problem statement, research questions, and definition of terms.

Background of the Study

Advanced practice provider fellowship programs are comprehensive programs designed for physician assistants (PAs) and nurse practitioners (NPs) to acquire the necessary knowledge and skills to deliver safe, high-quality care in their specialized areas of practice (Advanced Practice Provider Fellowship Accreditation™ [APPFA], 2023). Upon graduation, NPs and PAs function as fully capable practitioners, often assuming a workload similar to that of their physician colleagues, particularly in underserved regions (Glicken & Miller, 2013; Morgan et al., 2012; National Council of State Boards of Nursing, 2022). Nurse practitioners and PAs typically hold at least a master's degree and can also possess a doctorate (American Association of Nurse Practitioners, 2020; Valentin, 2019). In hospitals, the term ‘APP’ is commonly used to refer to both NPs and PAs as their job descriptions and roles might be identical.

An APP fellowship program serves as a transition-to-practice model, offering an intensive clinical immersion. Fellowship programs range from 50-70 hours of weekly clinical practice along with ongoing didactic sessions; this structured platform aims to provide advanced [critical care] knowledge and skills (Grabenkort et al., 2019). The fellowship includes rotations through various specialty and subspecialties, supported by protected didactic days that may incorporate simulation activities. The duration of an APP fellowship program can range from 9 to 18 months, and it is a precepted program with dedicated practicum and didactic components (APPFA, 2023). Direct clinical practice is a central focus of fellowships. In addition to the required attainment of competencies at the graduate level, fellowships offer additional clinical hours in complex specialty settings and multidisciplinary didactics. These programs have shown

to enhance critical thinking, competency, and retention among advanced practice nurses (White et al., 2021). The Institute of Medicine (2011) *Future of Nursing* report recommends the expansion of NP fellowship programs to facilitate the transition into practice. Didactic days within fellowships provide an opportunity for reflection, connection with other professionals, and the extension of communication, confidence, and critical thinking competencies (Popkess & Frey, 2016). Simulation activities play a significant role in the didactic portion of these programs.

An APP fellowship program is a postgraduate training, often interchangeable with residency. As recommended by the Institute of Medicine (2011), enhancing clinical education requires sophisticated clinical faculty, curricula, and training sites (Mundinger & Carter, 2019, p. 61). Currently, academic institutions and healthcare organizations worldwide are implementing APP fellowship programs. “Healthcare professions, such as medicine, pharmacy, podiatry, and optometry, have long recognized the importance of a training period under the guidance of experienced clinical experts for novice clinicians” (Furze et al., 2016, p. 950).

Simulation, particularly objective structured clinical examinations (OSCEs), has been instrumental in evaluating learners in medical schools, serving as both formative and summative assessments of procedural and clinical skills (Akhigbe, 2018). Graduation from medical education often requires a passing OSCE and APP fellowships can align with this benchmark (Chisnall et al., 2015). The proposed APP-QSAT assessment instrument aimed to employ a similar method of formative and summative assessment for clinical competence of APP fellows. As Akhigbe (2018) emphasized, it is not enough to possess knowledge; the application of that knowledge is key. Accrediting bodies of these programs uphold high standards of best practices, and the proposed tool underwent a content validation assessment.

Significance of the Study

Traditionally and formerly, the development of psychomotor skills has been mastered by the old adage ‘see one, do one, teach one’ (Al-Elq, 2010). This apprenticeship-style of learning is no longer acceptable regarding the quality care and safety of patients (Al-Elq, 2010; Reardon, 2019). Simulation-based learning enhances psychomotor skills and helps develop cognitive skills with opportunity to reflect on their attitudes, thus leading to greater safety for patients (dos Santos Almeida et al., 2018). Advanced practice provider programs are similar to many medical and pharmacy fellowships as multiple assessments are collected of learners’ work with more than one process that can demonstrate learner competence (Nousiainen et al., 2016; Premalatha, 2019). Assessment refers to gathering of data to determine progress and provide guidance toward attaining the desired outcomes (Billings & Halstead, 2016). There remains ongoing debate about the effectiveness of testing utilizing multiple choice questions, short answers, and essay formats (Hift, 2014; Puthiaparampil & Rahman, 2020; Sam et al., 2018).

Simulation-based assessments have gained momentum as educators see the potential to assess areas of learning through a platform where learners demonstrate their translation of knowledge in a practice setting (Everett et al., 2013; Ryall et al., 2016). Simulation is one accepted avenue for the assessment for a learner. This study explored the development and content validity of an instrument to capture formative and summative assessments of learners within a simulation scenario. The development and validity of an instrument might also aid APP fellowship programs for accreditation standards. Simulation has become a learning modality across the globe in medical, nursing, and pharmacy in both undergraduate, graduate, and post-graduate training to manage the most complex clinical situations (Padilha et al., 2018; Seybert et al., 2019; Weersink et al., 2019). An available valid and reliable assessment instrument to

standardize simulation in APP fellowship programs could not be located (Hagel et al., 2016; Hall et al., 2015; Weersink et al., 2019).

The Problem Statement

Assessment encompasses a variety of techniques including tests, ratings, and observations designed to assign a score that represents the degree of a predefined trait an individual possesses (McDonald, 2018). Simulation is based on objectives and important features include fidelity, problem solving, student support, and debriefing to guarantee the planning, implementation, and assessment of the entire simulation process (dos Santos Almeida et al., 2018; Jeffries et al., 2015). “A measurement instrument is objective only if it is confined to assigning a number or a rating to a learner's characteristics based on predefined objective evidence” (McDonald, 2018, p. 10). There is no valid, reliable instrument to assess competence within simulation for APPs. With simulation, assessment instruments for a learner’s competency are especially important for a hands-on profession. As APP fellowships are post graduate training, it is necessary to utilize an instrument in simulation that goes beyond the graduate level of computer knowledge-based licensing examination (Shinnick & Woo, 2020). A comprehensive, valid assessment instrument could help provide an assessment instrument to standardize APP fellowship programs that incorporate simulation.

Purpose of the Study

The purpose of this exploratory study was to design, develop, and assess the content validity index of the developed instrument based on best evidence and resources available for the assessment of a simulation activity for APPs within a fellowship program.

Research Questions

The following research questions were explored in this study:

Q1 What should be the essential components of the developed APP-QSAT for the assessment of competence in simulation for APPs within a fellowship program?

Q2 What is the content validity index (CVI) for the developed APP-QSAT calculated for the completed instrument as rated by the content experts?

Definition of Terms

Advanced Practice Providers. Interdisciplinary advanced practice professionals who are trained at the graduate level and certified by national organizations. This umbrella term includes both a nurse practitioner and a physician assistant (Sarzynski & Barry, 2019).

Advanced Practice Provider Fellowship. A post graduate training program for APPs with a focus on varied specialties provided by hospital-based institutions. These programs might vary from nine months to one year (APPFA, 2023).

Assessment. Gathering of data to determine progress and provide guidance toward attaining the desired outcomes (Billings & Halstead, 2016).

Augmented Reality. Technology that combines real-world environment with the human senses and virtual imagery information.

Competence. Competence "entails more than the possession of knowledge, skills and attitudes; it requires the ability to apply these in the clinical environment to achieve optimal results" (Ten Cate et al., 2010, p. 669).

Competency-Based Education. "… inherently anchored to the outputs of an educational experience versus the inputs of the educational environment and system" (American Association of Colleges of Nursing, 2021, p. 4).

Content Validity Index. "The content validity score calculated for the complete instrument" (Gray et al., 2017, pp. 466 467).

Evaluation. A process of "gathering and appraising data or placing a value on data gathered through one or more measurements" (Billings & Halstead, 2016, p. 385). It is often performed at the end of an activity, course, or program; usually results with a final grade (Billings & Halstead, 2016).

Face Validity. "Refers to whether the instrument looks like it is measuring the target content" (Polit & Beck, 2021, p. 322).

Medical Professionals. A term of reference for any member of the medical community including, pharmacists, physicians, nurse practitioners, physician assistants, emergency medicine technicians, paramedics, and nurses.

Novice Advanced Practice Provider. A newly graduated advanced practice professional within their first year of the role and includes a nurse practitioner or a physician assistant.

Nurse Practitioner. A person who treats and diagnoses illnesses, advises the public on health issues, manages chronic disease, and engages in continuous education to remain ahead of any technological, methodological, or other developments in the field (American Nurses Association, n.d.). A nurse practitioner holds at least a master's degree in addition to the initial nursing education and licensing required for all registered nurses (American Nurses Association, n.d.).

Objective Structured Clinical Examination (OSCE). Objective structured clinical examinations are very helpful in medical education because they allow a student to practice and demonstrate clinical skills in a standardized medical scenario. "Clinical interactions (in-person or virtual) with standardized patients: counseling, examination, history taking, examination of mannequins and interpretation of findings, computerized

cases, test Interpretation, order writing" (University of Washington School of Medicine, 2023, p. 1).

Patient Simulator. A lifelike, anatomically correct, computer-driven mannikin with physiologic responses that mimic real patients. High or low fidelity manikins are controlled by instructors to create a structured learning environment in a clinically realistic setting where learning can take precedence over patient care (Maxworthy et al., 2023, p. 909).

Physician Assistant or Physician Associate. A licensed clinician who practices medicine who can diagnose illness, develop, and manage treatment plans, and prescribe medications (American Academy of Physician Associates, 2023).

Post Graduate Training Program. For the purpose of this study, this term encompassed the terms residency or fellowship programs for APPs, physicians, pharmacists. For APP residency, see Advanced Practice Provider Fellowship.

Simulation. "The imitative representation of the functioning of one system or process by means of the functioning of another" (Merriam-Webster, 2023, n.p.).

Simulationist. A person who advances healthcare simulation practice with the use of tools, techniques, events, experiences, and methodologies (Park et al., 2020).

Standardized Patients. Interchangeable with standardized 'simulated patient' or 'simulated person.' Defined as a person formally trained to simulate a set of symptoms or problems used for healthcare education, evaluation, and research (Maxworthy et al., 2023, p. 923).

Task Trainer. "A model that represents a part or a region of the body such as an arm or abdomen. These devices are used to teach manual skills to support procedural skills training" (Kiernan, 2018, p. 46).

Transition to Practice. "Planned, comprehensive periods of time during which registered nurses can acquire the knowledge and skills to deliver safe, quality care in a specific clinical setting" (American Nurses Credentialing Center [ANCC], 2020, p. 2).

Validity. Validity "of an instrument determines the extent to which it actually reflects or is able to measure the construct being examined" (Gray et al., 2017, p. 393).

Virtual Reality. The use of computer technology to create an interactive, immersive three-dimensional world in which objects have a sense of spatial presence. Often refers to the three-dimensional head-mounted display in which the virtual world is projected. Virtual environment and virtual world are synonyms (Maxworthy et al., 2023).

Summary

This chapter described the study including the background, significance, and problem statement. Definitions of key terms used in the study were included in this chapter. Validity assessment of the developed APP-QSAT instrument could contribute to APP fellowship programs, aiding the standardization of assessments for APP fellows. This study is the foundation to inform future iterations of the modified instrument, reassessment of validity, and the establishment of the instrument's reliability.

CHAPTER II

LITERATURE REVIEW

The purpose of this exploratory study was to design, develop, and assess the content validity index of the developed instrument based on best evidence and resources available for the assessment of a simulation activity for advanced practice providers (APPs) within a fellowship program. This chapter presents the search strategy, theoretical frameworks, discussion of relevant findings of clinical competence in healthcare, competency-based education in simulation, validated assessment instruments within simulation, best practices of simulation, identification of gaps, and the development process of an instrument. An additional purpose of this literature review is to discover the necessary components for instrument development that assesses competence in simulation settings. According to Garrard (2020), the purpose of a literature review is become so familiar with the literature that you have ownership. Ownership of literature is aimed at becoming an expert on published research relevant to a particular phenomenon (assessment of competence in simulation for APP) through processes of analysis, dissection, and synthesis (Garrard, 2020).

Search Strategy

The databases used for the literature review included the Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, MEDLINE, Google Scholar, and ProQuest Dissertation databases. Studies were also found by searching the references of other literature. The following subject headings were used: ‘best practices in simulation,’ ‘simulation based learning,’ ‘simulation training,’ ‘healthcare simulation,’ ‘competency based education in

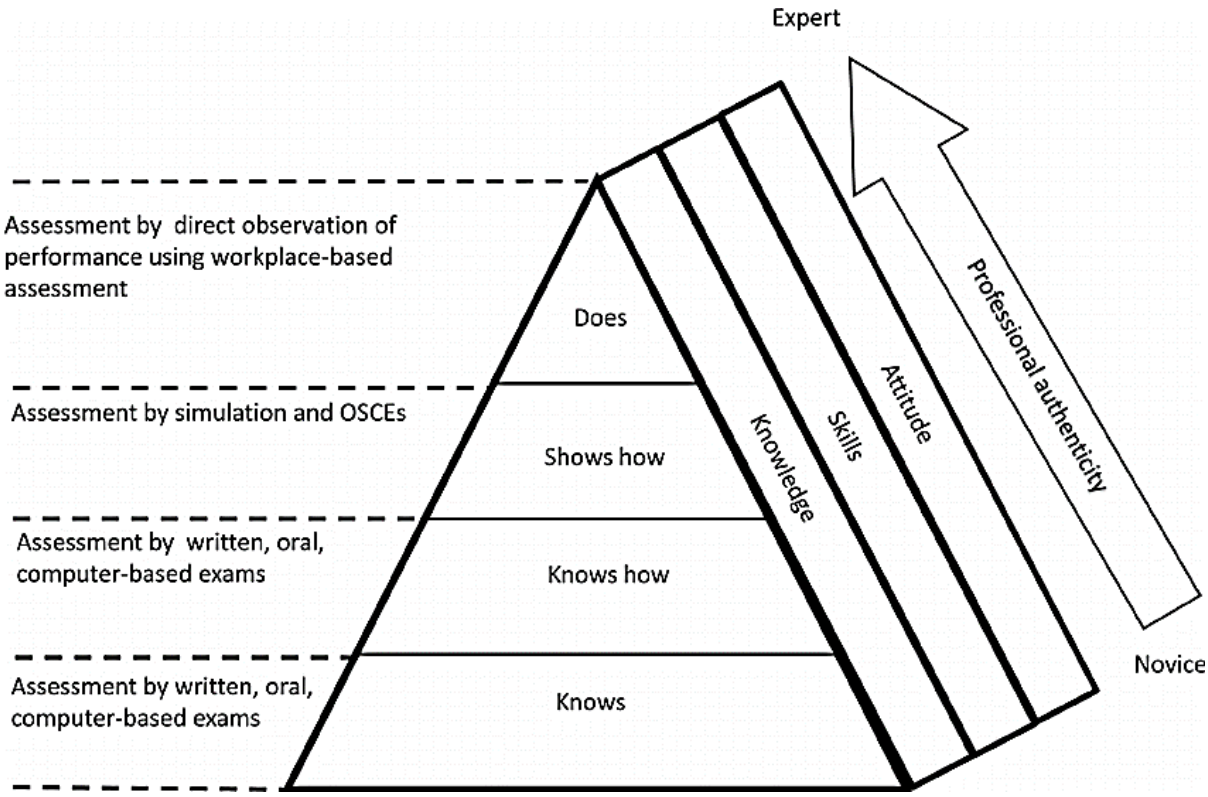
simulation,' 'assessment of competence,' 'instrument development for assessment in simulation,' 'advanced practice provider residency program with simulation,' and 'advanced practice provider fellowship program with simulation.' Inclusion criteria were (a) peer-reviewed articles from scholarly journals, (b) publications in the English language, (c) and studies that involved data about healthcare simulation training. Exclusionary criteria were (a) studies outside the healthcare field, (b) studies solely focused on procedural skills in simulation, and (c) studies that solely focused on augmented reality (AR) and virtual reality (VR) in simulation.

Theoretical Frameworks

Miller's (1990) assessment of competence theory provided a pyramid model **(**see Figure 1**)** for assessing clinical competence at four levels: knows, knows how, shows how, and does. Each level represents a different aspect of clinical performance and knowledge, and assessing competence at each level is crucial for accurate evaluation. The development of an instrument that aligns with Miller's theory is essential to ensure the assessment tool adequately measures the different dimensions of competence. By examining the development of an instrument through the lens of Miller's theory, researchers can ensure the instrument captures the breadth and depth of clinical competence. This alignment is critical for promoting effective assessment practices and ultimately enhancing patient care. Each level of the pyramid is explored in detail and emphasis on the significance of assessing competence at each stage.

Figure 1

Assessment of Competence Theory



Note. Reprinted with permission (see Appendix E). Hecker, K. G., Norris, J., & Coe, J. B. (2012). Workplace-based assessment in a primary-care setting. *Journal of Veterinary Medical Education*, *39*(3), 229-240.

In the first level, ‘the knows’ level, learners are evaluated on their knowledge and understanding of the subject matter (Miller, 1990). This includes the acquisition of information, theoretical concepts, and procedural guidelines. Moving up to the ‘knows how’ level, learners are assessed on their ability to apply their knowledge in practical situations. This level focuses on the ability of acquiring information, analyze and interpret data and translate into a diagnostic plan, demonstrating critical thinking skills (Miller, 1990). The ‘shows how’ level evaluates learners' proficiency in performing clinical tasks and procedures. This level involves not only the technical aspects of performance but also the ability to effectively communicate and interact with

patients and healthcare colleagues (Miller, 1990). Finally, the ‘does’ level measures learners' ability to deliver high-quality patient care independently and consistently. This level assesses the learner's capability to manage complex cases, make sound clinical judgments, and act autonomously in various clinical scenarios (Miller, 1990). The significance of Miller's assessment of competence theory lies in its ability to comprehensively assess learners' clinical competence across different dimensions, ensuring a holistic assessment approach that aligns with the demands of clinical practice (Miller, 1990).

Developing an instrument based on these assessments is essential as they capture different levels of clinical competence and provide an accurate representation of a healthcare professional's capabilities in their practice. Evidence in literature indicated that researchers emphasized the importance and validity of each level of assessment within the pyramid model Al-Eraky & Marei, 2016; Miller, 1990; Singh & Modi, 2013). This comprehensive approach to assessment ensures that healthcare professionals are fully competent in delivering the highest level of care.

Additionally, the assessment of teams within simulation at the 'does' level offers a paradigm shift in assessment from competitive ranking to norming and performing as teams, emphasizing the importance of collaboration and teamwork in healthcare settings. Assessing teams at this level acknowledges the significance of collaboration and teamwork in healthcare settings. This approach promotes a paradigm shift in assessment, moving away from competitive ranking and toward norming and performing as teams. By evaluating teams in this way, the assessment process highlights the importance of collective effort and cooperation, key traits in delivering quality healthcare. This has significant implications for healthcare education and training as it allows for the identification of areas where learners may require further

development and supports the delivery of high-quality patient care (Al-Eraky & Marei, 2016; Forsman et al., 2020; Miller, 1990; Ramani & Leinster, 2008; Singh & Modi, 2013).

Optimal methods for scoring encounters with standardized patients require reaching agreement on what aspects of the encounter to observe and how to combine and weight these observations to yield meaningful scores (Miller, 1990). Assessment in simulation provides a setting to focus on evidence based objectives and outcomes. Whereas assessing clinical competence in the context of clinical setting poses several challenges. One of the primary challenges is the lack of standardization in the clinical setting. Different institutions and educators may have varying methods and criteria for assessing clinical performance, resulting in inconsistent evaluations (Miller, 1990). This lack of standardization can lead to inequitable assessments and hinder the development of a comprehensive understanding of students' clinical competence. Furthermore, the sampling and observation of performance in clinical settings are often limited and infrequent. Due to time constraints and other practical considerations, educators may not have ample opportunities to directly observe students' clinical encounters and provide timely feedback. This limited sampling can be detrimental to the accurate assessment of clinical competence as it may not capture a full and representative picture of learners' abilities. Given these challenges, it is crucial to assess clinical competence at multiple levels. A comprehensive assessment should go beyond the mere acquisition of knowledge and skills and encompass other dimensions such as critical thinking, communication, professionalism, and ethical decision-making. By assessing learners' clinical competence at multiple levels, which can be performed within simulation activities, educators can gain a more holistic understanding of their abilities and better prepare them for the complex demands of clinical practice (Al-Eraky & Marei, 2016; Miller, 1990; Ramani & Leinster, 2008).

Another philosophical framework incorporated into the modified Advanced Practice Provider-Queen's Simulation Assessment Tool (APP-QSAT) was Benner's (1982) novice to expert theory to guide the educator to assess the level of the learner. As Miller's (1990) pyramid depicts the learner moving from novice to expert, Benner's depictions of the learner increasing nontechnical skills aligns with this framework. An APP fellowship program provides a year-long program for transition to practice where Benner's theory of novice to expert guides the competencies for the participants. This theory is adapted from the Dreyfus Model of Skill Acquisition, development of a skill, one journey through five levels of proficiency (Benner, 1982, p. 402). The American Nurses Credentialing Center (ANCC) program, Practice Transition Accreditation Program, and the APPFA adopted "Benner's theory as the backbone of the conceptual model, which aids organizations to create a robust, evidence-based transition-to-practice program" (Church et al., 2019, p. 174). Benner's novice to expert theory is a middle-range theory. The most salient interest in Benner's work is the value of both the didactic and experiential learning. "The Dreyfus model is developmental, based on situated performance and experiential learning" (Benner, 2004, p. 196). This is a key component for the purpose of developing an instrument to assess APP fellows in a simulation activity as an aspect of the didactic sessions.

As Benner (1982) depicts the competent stage, one to two years, where the [learner] can transition to the "upper limits of competent performance, the nurse may begin to apprehend the limits of formal and practical knowledge. Experience teaches the proficient [learner] what typical events to expect in a given situation and how to modify plans in response to these events" (p. 405). Benner's theory focuses on how one learns—how one moves from novice to expert. Competence is acquired through a process and over time. As the fellowship program is only a

year long, the goal is to transition the APP fellow beyond the competency level and move into the proficiency level with consistent experiential practice throughout the program.

Discussion of Relevant Findings

Clinical Competence

There have been several iterations of competency within the healthcare community. The word "competency" is "the ability to do something successfully or efficiently" (Cambridge Dictionary, 2023, n.p.). Competency is the integration of knowledge, skills, values, and attitudes (Pijl-Zieber et al., 2014). Competence "entails more than the possession of knowledge, skills and attitudes; it requires the ability to apply these in the clinical environment to achieve optimal results" (Ten Cate et al., 2010, p. 669). An APP deemed competent is one that reflects the ability to take actions that are successful. This section discusses the literature on clinical competence, competency-based education (CBE) in simulation, its history, the assessment of competence in simulation with validated instruments, an acknowledgment of the growing use of entrustable professional activities (EPAs) for assessment of competence, and best practices of simulation.

Clinical competence comprises several key components healthcare professionals must possess to deliver high-quality care: a solid foundation of knowledge, encompassing factual information, conceptual understanding, and procedural knowledge (Premalatha, 2019). In addition to knowledge, the development of clinical competence also relies on the acquisition of various skills, both technical and non-technical. Technical skills refer to the practical abilities required to perform specific procedures or tasks, while non-technical skills, such as communication and teamwork, are vital for effective collaboration and patient-centered care (Rekman et al., 2016). Attitudes including professionalism, empathy, and ethical behavior are also integral to clinical competence as they shape interactions with patients and contribute to

overall patient outcomes (Premalatha, 2019). In practice, clinical competence is demonstrated through the application of knowledge, skills, and attitudes in real-world patient care settings. This includes the ability to make sound clinical decisions, communicate effectively with patients and healthcare teams, and adapt to various clinical situations (Premalatha, 2019; Rekman et al., 2016). Various definitions of clinical competence have been proposed in the literature, highlighting the multidimensional nature of this concept.

In nursing, clinical competence has been defined as "the ability to perform clinical tasks as the application of skill, knowledge, characteristics, and attitude, measure as behavior, and as the skills to fulfill the tasks" (Gunawan et al., 2020, p. 624). The World Health Organization (2018) ascertained that clinical competence is the culmination of "skills, knowledge and behaviour of the health worker as assessed according to professional norms (or other guiding standards) and as perceived by users" (p. 5). This requires the healthcare professional to look to their governing bodies. The Accreditation Council for Graduate Medical Education (2020) does not provide a clear definition of clinical competence but rather delineates the measurements of competence of medical residents with milestones within sub-competencies of system-based practice, patient care, medical knowledge, practice-based learning and improvement, professionalism, and interpersonal and communication skills.

Benner's (1982) novice to expert theory states that the competent nurse is still in the middle range, can function safely, sees their actions as long-range goals, but lacks the flexibility to reach proficiency. More years of experience are required to develop through the stages of competence to expert according to Benner. However, other factors contribute to the growth of a clinician's clinical competence. There was little discussion in the literature discussing the factors that might influence clinical competence. One integrative review of the literature by DeGrande et

al. (2018) explored factors on the development of competence in critical care nurses and revealed that teamwork was essential to developing professional competence. Years' experience within the same environment, education, and certifications were contributing factors to developing clinical competence.

According to researchers, competence is a highly abstract phenomenon that is complicated to assess and measure (Flinkman et al., 2017). Despite variations in terminology and emphasis, these definitions shared a common goal of describing the abilities and attributes required for healthcare professionals to deliver safe and effective care to their patients. Analyzing the similarities and differences among these definitions could offer valuable insights into the core elements of clinical competence and could guide the development of a comprehensive and universally accepted definition in the healthcare professions. This review aimed to analyze similarities and differences among definitions to identify key components of clinical competence and understand how it is demonstrated in practice (Ten Cate & Taylor, 2021).

Assessing competency is crucial for APP fellows as it helps identify areas of strength and areas that might need further development (Polit & Beck, 2008). In the field of healthcare professions, clinical competence plays a crucial role in ensuring the delivery of high-quality care and patient safety. Without a standardized and comprehensive definition of clinical competence, it becomes challenging to assess and evaluate healthcare professionals' competency levels accurately. This could lead to variations in the quality of care provided and may have deleterious effects on patient outcomes (Premalatha, 2019; Rekman et al., 2016). Therefore, it was imperative to establish a clear and universally accepted definition of clinical competence in healthcare professions. The definition of competence "entails more than the possession of

knowledge, skills and attitudes; it requires the ability to apply these in the clinical environment to achieve optimal results" (Ten Cate et al., 2010, p. 669). Clinical competence serves as the foundation for healthcare professionals, a critical attribute to provide safe, optimal care to their patients (Flinkman et al., 2017; Ten Cate, 2017).

For the purpose of this study, CBE holds the assumption that the aim of a learning practice is one guided by the expected outcomes for the learner at specific temporal data point in their training, linked to assessment and the regulation of proficiency (Association of American Medical Colleges, 2024; Morcke et al., 2013; Noureldin et al., 2018; Pijl-Zieber et al., 2014).

History of Competency-Based Education

The history of CBE originated in the 1960s and was connected to the theoretical framework of behaviorism, the focus on observable behaviors of learners due to the teaching (Morcke et al., 2013). Bloom's taxonomy, developed in the 1950s, classified educational goals in domains of knowledge, skills, and attitudes; endorsing mastery learning (Morcke et al., 2013; Pijl-Zieber et al., 2014). Controversy ensued around CBE with arguments for optimizing learning and not outcomes. In the late 1990s, CBE was viewed as a performance-based approach, asking how to assess humanism and accountability (Morcke et al., 2013). Competency-based education has meta morphed to include professionalism, communication with practice, and feedback to provide a step wise developmental approach (Morcke et al., 2013). There remains controversy with CBE and the translation to clinical performance. Despite this, CBE remains the dominant framework in education for nursing and the medical professions for translation of practice (Grover & Howley, 2023; Scalese & Hatala, 2013; Ten Cate, 2017). Further, Imanipour et al. (2022) performed a meta-analysis on the effects of CBE and clinical performance and discovered that CBE enhanced clinical performance.

Competency-Based Education in Simulation

Competency-based education in patient simulation has been an important area of research and development in healthcare education over the past decade. This approach focuses on assessing and developing specific skills and competencies required for healthcare professionals through simulation-based training. Research has shown that simulation could be highly effective for learning technical and nontechnical skills (Hung et al., 2021; Nousiainen et al., 2016; Oh et al., 2015). Competency through simulation is a vehicle that has been successfully transferred to the actual environment, bridging the gap from theory to practice (Shinnick & Woo, 2020). This section explores literature that highlights the significance and evolution of simulation-based training and competence.

The literature review revealed overwhelming evidence for a positive impact of simulation on benefits such as clinical competence, self-efficacy, self-confidence, learning motivation, and learning satisfaction (Cooper et al., 2012; Hung et al., 2021; Oh et al., 2015). Self-confidence, self-efficacy, and learning motivation can directly affect knowledge and clinical skill acquisition (Oh et al., 2015). It is often forgotten that interdisciplinary teams learn from each other daily in and outside of institutions. Another beneficial side effect from simulation is the peer-to-peer learning that occurs. Simulation allows for collaboration between peers for the development of skills (Cooper et al., 2012; Shin et al., 2014).

High reliability organizations view simulation as an environment of learning tools and initiatives to practice and learn from safety incidents with debriefing (Serou et al., 2021). Similar is the field of aviation (military) where simulation is used as a mandatory activity for aircrew to learn from safety incidents (Kapur et al., 2015). Simulation in health care is consistently maintained to practice emergent scenarios, therapeutic communication, and

technical skill acquisition to shorten learning curves, improve patient care, in a low-risk environment (Nousiainen et al., 2016). In alignment with best practices, CBE requires that simulation education to learners is frequent, is consistent with assessment methods and instruments that meet the minimum requirements of quality, and garners multiple raters (Griswold et al., 2018). Despite simulation being considered a resource-intensive education activity, training and assessment of competence have the potential to translate to enhanced patient care (Griswold et al., 2018).

Assessment of Clinical Competence in Simulation

The overarching goal of CBE is to have a learner demonstrate the desired outcomes of a learning activity (Scalese & Hatala, 2013). In 2011, the U.S. Medical Licensing Examination (Scalese & Hatala, 2013) introduced a simulation of clinical skills to the Step 2 boards for physicians in training to include hands on performance of history taking, physical examination, and professionalism; it was scored with a checklist by standardized patients. The term assessment refers to gathering of data to determine progress and provide guidance toward attaining the desired outcomes (Billings & Halstead, 2016). The assessment of CBE within simulation is a growing need, one where the literature reflected a variety of valid and reliable assessments (Chiu et al., 2016; Cook et al., 2013; Salzman et al., 2018). Simulation along with objective structured clinical examinations (OSCEs) are performance-based assessments versus written and oral assessments of knowledge.

For APP fellowship programs, there are formative and summative assessments of learners. Formative assessments identify areas of weakness and direct continued learning (Scalese & Hatala, 2013). Summative assessments are usually at the end of a course or program. These can be utilized as high stakes for the learners such as advancement; however, this is not

always the case (Scalese & Hatala, 2013). Instruments that demonstrate robust validity evidence such as simulation activities could provide educators with the ability to accurately assess competence (Noureldin et al., 2018). Advanced practice provider fellowship programs that incorporate simulation, validity, and reliability considerations might trump the educational impact described in the literature. Despite the variability of instruments within health care, simulation appears to achieve competency-based assessments as well as being a useful tool for predicting future performances (Ryall et al., 2016).

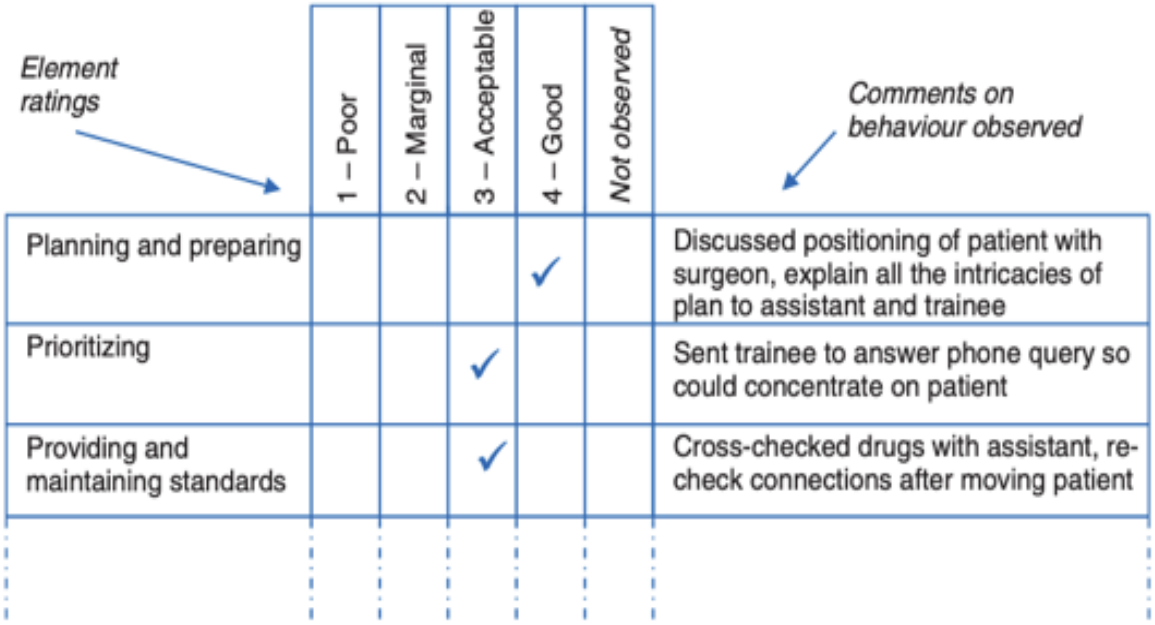
Validated Instruments for Assessment in Simulation

The use of "simulation as an assessment modality is much more controversial than is its utility as an educational tool" (Noureldin et al., 2018, p. 84). However, without valid simulation-based assessment tools, the ability to objectively assess non-technical skill competencies in a CBE framework remains challenging (Noureldin et al., 2018). The purpose of curriculum evaluation is to determine curriculum strengths, weaknesses, merits, redundancies, and gaps from the intent of the curriculum (Iwasiw et al., 2020). Since the 1970s, OSCEs have been used as assessment tools in medical education, physician training, and certification exams. There has been an increased interest in OSCEs in recent years in medical residents' education, evaluation, and certification (Akhigbe, 2018; Hastie et al., 2014). While there has been widespread acceptance of simulation as an educational training tool with evidence supporting its use in health education, the effectiveness of simulation-based assessments in evaluating competence and performance remains unclear (Ryall et al., 2016). In 2013, Canada formed a national task force to develop, implement, and evaluate a competency-driven assessment within simulation for their 17 anesthesia medical residencies (Chiu et al., 2016). The Canadian National Anesthesiology Simulation Curriculum Task Force (CanNASC) created custom scenarios with

checklists and the Anesthesia Non-Technical Skills (ANTS; see Figure 2). The ANTS tool is divided into (a) task management, (b) team working, (c) situation awareness, and (d) decision making with rating scores from one to four (Flin et al., 2010). The CanNASC utilized the ANTS and the scenarios with checklist to have the raters decide the learners' score on the Managing Emergencies in Paediatric Anaesthesia Global Rating Scale (see Figure 3; Everett et al., 2013).

Figure 2

Anesthesia Non-Technical Skills Tool



Note. Reprinted with permission (see Appendix F) from Elsevier Inc. Flin, R., Patey, R., Glavin, R., & Maran, N. (2010). Anaesthetists' non-technical skills. *British Journal of Anaesthesia*, *105*(1), 38-44.

Figure 3

Managing Emergencies in Paediatric Anaesthesia Global Rating Scale

1	2	3	4	5	6
Very poor (appears to be a novice)	Poor	Borderline & unsatisfactory	Borderline but satisfactory	Good	Excellent (appears to be highly expert)

Please rate the overall performance in this simulation scenario from 1-6

Scores of 1-3 are "unsatisfactory" for an anesthesiologist in independent practice and would constitute a failing performance in a high-stakes examination such as the Royal College exam

Scores of 4-6 are "satisfactory" for an anesthesiologist in independent practice

Note. Reprinted with permission (see Appendix G) from Blackwell Publishing. Everett, T. C., Ng, E., Power, D., Marsh, C., Tolchard, S., Shadrina, A., & Bould, M. D. (2013). The managing emergencies in paediatric anaesthesia global rating scale is a reliable tool for simulation-based assessment in pediatric anesthesia crisis management. *Pediatric Anesthesia*, *23*(12), 1117-1123.

The CanNASC Task Force demonstrated a passing rate of PGY5 (83%) was higher than the PGY4 (64%) group, which provided evidence for the discriminatory validity of the tools (Chiu et al., 2016). It is important to note that the original authors of the Managing Emergencies in Pediatric Anesthesia Global Rating Scale also utilized a Likert scale (0=*not done*, 1=*done poorly or late*, 2=*done correctly*) on each expected action point for every scenario in the performance checklists of observable behaviors while conducting validity and reliability tests on the simulation assessment tool (Everett et al., 2013). The checklists tended to overlook the more holistic components of clinical competence with the suggestion that global ratings of performance were appropriate.

The CBE model with assessment tools could be utilized to confirm competence for learners in a longitudinal stepwise approach (Noureldin et al., 2018). However, literature on instrument development including their validity and reliability for assessment of learners was sparse and there was a large gap in healthcare education (Noureldin et al., 2018). Cook et al.

(2013) reviewed over 217 articles focused on the assessment within simulation; 51% made no reference to validity of the instruments, 76% noted reliability, and 63% reported the use of expert panels.

In the world of nursing, several validated instruments assess undergraduate nursing students in simulation. One salient instrument over the last decade is the Creighton Simulation Evaluation Instrument, which was revised to the Creighton Competency Evaluation Instrument (Manz et al., 2022). Both instruments have been utilized in simulation and practice-based clinical experiences (Manz et al., 2022). The instrument assesses performance to the four core competencies: assessment, communication, clinical judgement, and technical skills (Manz et al., 2022). In alignment with best practices, both the Creighton Simulation Evaluation Instrument and Creighton Competency Evaluation Instrument instruments are valid and reliable to assess nurses and could be utilized within nurse residency programs to evaluate competency (Manz et al., 2022).

The QSAT (Hall et al., 2015) was developed with scoring using levels of competence based on specific observable actions as a global rating scale versus a traditional checklist. Each domain of primary assessment, diagnostic actions and therapeutic actions, and communication are individually scored. Hall et al. (2015) utilized the global rating scale on a continuum with a Likert scale from one being inferior to five being superior for each domain and for overall performance **(**see Figure 4**)**. The aim of this study was to supply APP educators with a valid instrument that is feasible for use in acute care settings.

Figure 4

Global Rating Scale

1	2	3	4	5
Inferior *All skills require significant improvement*	**Novice** *Most skills require moderate or significant improvement*	**Competent** *Some skills require moderate improvement*	**Advanced** *Some skills require minor improvement*	**Superior** *Few, if any skills require only minor improvement*

Note. Reprinted with permission (see Appendix B) from Wolters Kluwer Health, Inc. Hall, A. K., Dagnone, J. D., Lacroix, L., Pickett, W., & Klinger, D. A. (2015). Queen's simulation assessment tool: Development and validation of an assessment tool for resuscitation objective structured clinical examination stations in emergency medicine. *Simulation In Healthcare, 10*(2), 98-105.

In a similar vein of the Queen's Simulation Assessment Tool (QSAT; Hall et al., 2015), another instrument utilized by medical education is a mini-clinical evaluation exercise (Mini-CEX; American Board of Internal Medicine [ABIM], 2023). The Mini-CEX was designed as a clinical observation instrument to evaluate learners on the domains of communication, physical examination, professionalism, clinical judgement, efficiency, and overall clinical competence (ABIM, 2023). "The Mini-CEX is a 10- to 20-minute direct observation assessment or 'snapshot' of a trainee-patient interaction" (ABIM, 2023, para. 2). The QSAT possesses similar domains of primary assessment, diagnostic actions, therapeutic actions, communication, and overall competence which are individually scored. Key observable actions might be modified in relation to the clinical scenario at hand, allowing expert evaluators to make judgements related to the scoring of overall performance (Hall et al., 2015).

Entrustable Professional Activity

Ten Cate (2005) introduced the term 'entrustable professional activity' (EPA) to reconnect competency frameworks to the workplace. An EPA is a unit of professional practice; defined as a task or responsibility to be entrusted to a trainee once sufficient specific

competence, it is reached to allow for unsupervised practice. Over the last decade, the American Medical Association (Ten Cate, 2017) transitioned to evaluations focused on entrustable professional activities (EPAs). Entrustable professional activities evaluate the actions residents demonstrate in the practicum clinical setting. Entrustable professional activities are independently executable within a time frame, observable and measurable in their process and outcome, and suitable for entrustment decisions (Ten Cate, 2017). The measure of competence does not necessarily translate to a prediction of clinical performance (El-Haddad et al., 2016). Entrustable professional activities are a new approach to competency-based education with measurements to better assess a core set of behaviors (El-Haddad et al., 2016; Ten Cate, 2017). Entrustable professional activities are now being utilized in some post graduate training of physicians (El-Haddad et al., 2016). The scales of entrustment within medicine do vary. Examples of these scales are (a) Execution with Direct, Proactive Supervision and (b) Execution with Direct, Reactive Supervision (Ten Cate, 2017). These scales are focused more on the assessment of the daily activities of residents. Core EPAs still lack a true competency-based curriculum in medicine but the choice of scale alone does not appear to impact performance (Ryan et al., 2021).

Best Practices of Simulation in Health Care

Simulation education is a large growing modality in the field of health care. The days of learning under fire is no longer acceptable. Nursing programs across the country are now allowing portions of clinical hours to be replace with simulation practice (Fogg et al., 2020). The National Council of State Boards of Nursing (2016) recommended pre-licensure nursing programs utilize simulation as a clinical substitute for traditional clinical experiences but not to exceed 50% of its clinical hours. Evidence to support the 2:1 clinical to simulation hour ratio has

been validated in studies that examine completion of activities that demonstrate higher levels of clinical competence in significantly less time than traditional face-to-face clinical experiences (Jimenez, 2017; Sullivan et al., 2019). This is due to the robust, compressed nature of simulation, which enhances clinical reasoning by guiding learners through purposeful, guaranteed learning experiences (Fogg et al., 2020). Simulation involves high-fidelity mannequins, low-fidelity mannequins, role playing, standardized patients, virtual scenarios, and other advanced technologies to simulate real-life patient care situations. It allows learners to practice and refine their clinical skills in a controlled and safe environment before working with actual patients.

The International Nursing Association for Clinical and Simulation Learning (INACSL, 2021) and the Association of Standardized Patient Educators (ASPE; Lewis et al., 2017) both provided standards of best practice for patient simulation training including professional integrity, professional development, simulation design, outcomes and objectives, prebriefing, facilitation, debriefing process, evaluation of learning and performance, operations, and simulation-enhanced interprofessional education. The ASPE also had standards of best practice including a safe environment, case development, simulated patients training, program management, and professional development (Lewis et al., 2017). The Society for Simulation in Healthcare (SSH, 2018) also developed the Certified Healthcare Simulation Educator Examination© blueprint certification for simulation educators. The literature revealed growing best practices akin to the INACSL, SSH, and ASPE standards such as curriculum integration, clear learning objectives, scenarios with evidenced based principles, pre and debriefing sessions, interdisciplinary education, assessment and feedback, faculty training, and continuous improvement (Bryant et al., 2020; Disler et al., 2013). The best practices are presented here and discussed according to INACSL standards.

Simulation Design

The design of simulation is a dynamic part of curriculum integration as scenarios with evidenced-based principles are required to adjust to changes in technology of science and medicine adult learning principles, instructional design, and simulation pedagogy (Watts et al., 2021). Literature proposed that simulation design requires a range of difficulty, repetitive and distributed practice; cognitive interactivity; incorporation of multiple learning strategies; individualized learning; mastery learning; feedback; longer time; and clinical variation (Ryall et al., 2016). The design incorporates narrative case documents, supporting documents of image review, evaluation instruments with objectives, and training protocols in preparation (Lewis et al., 2017).

The curriculum integration of simulation activities into health care is of high importance as it provides learners with progressive and contextually relevant training. One of the key standards of design is purposefully creating a scenario that is learner-centered and aligns with the objectives of the modality for achievement of benchmarks in competence (Watts et al., 2021). Preparation is key and includes a plan of scenarios driven by the learners' objectives and evaluation, materials, and pre-briefing and debriefing (Jones & Potter, 2017; Lewis et al., 2017; Watts et al., 2021).

Outcomes and Objectives

Simulation scenarios require the development of broad and specific objectives to address learners' needs that guide the simulation outcomes (Miller et al., 2021; Motola et al., 2013). Broad objectives reflect the purpose of the experience with a lens of organizational goals. Specific objectives of the scenario are disclosed to the learner prior to the simulation to lay the groundwork of expectations to ensure successful learning outcomes (Ayaz & Ismail, 2022; Jones

& Potter, 2017; McGaghie et al., 2014). Zapko et al. (2018) provided the objectives and expectations a week prior to a simulation activity; outcomes demonstrated students indicated they felt the simulations were based sound educational practices and were important for their learning. The intention behind the simulation activity is set through the objectives and expected outcomes require a positive impact on learners' knowledge, skills, and/or attitudes due to the simulation activity (Miller et al., 2021). The INACSL (2021) best practices stressed the importance of clear objectives and expected outcomes of the activity or program were the guiding principles of the simulation.

Many organizations and programs have adopted the S.M.A.R.T. (specific, measurable, achievable, realistic, and time bound) framework (Swanwick et al., 2018). This framework allows the objectives of the simulation to meet the desired expected outcomes of skills, knowledge, and attitudes of the learners (INACSL, 2021). Progression of the learning process includes the ability to critically think, make appropriate clinical judgments, and develop strong assessment skills (Donovan & Mullen 2019; Shin et al., 2014; Slater et al., 2016).

Prebriefing and Debriefing

The simulation design includes a plan for both prebriefing and debriefing preparation for learners' success. Prebriefing and debriefing should be developed according to the objectives and expected outcomes of the simulation activity (Violato et al., 2023). The simulationist is required to have the competence related to the concepts of prebriefing and debriefing including an awareness of the learners' knowledge (Decker et al., 2021; McDermott et al., 2021). Providing both prebriefing and debriefing for learners allows the learners to feel safe; the brief-huddle model of communication is an effective way of organizing communication and gives opportunity to provide feedback and time for learners' questions (Gliva-McConvey et al., 2020).

The prebriefing is an introduction and orientation for learners to understand their expectations to accomplish the outcomes. The prebriefing may include a brief lecture, review of any educational materials, roles and responsibilities, and a script or storyboard (Moran et al., 2018). The best practice of prebriefing includes an agenda, time frames for the activity, the objectives and expected outcomes, common language, and debriefing expectations (INACSL, 2021; Jones & Potter, 2017; Moran et al., 2018). This preparation is also recommended to decrease cognitive load, increase psychological safety, and decrease learner anxiety (Jones & Potter, 2017; McDermott et al., 2021; Swanwick et al., 2018).

Debriefing occurs at the end of the simulation exercise, providing feedback of comparison between what occurred and the desired outcomes (Bryant et al., 2020; Gent & Kainth, 2022). Providing this feedback and reflection is an aspect of best practices to promote high quality patient care (Moran et al., 2018). “Debriefing should also be used in clinical practice after sentinel events within the hospital setting” (Bryant et al., 2020, p.4). The debriefing process might vary with a myriad of strategies for reflection. However, the final product should be interactive, insightful for improvement of future performance, and promote the integration of knowledge, skills, and attitudes for the learners (INACSL, 2021; Moran et al., 2018).

Interprofessional Education

In alignment with INACSL (2021) best practices, facilitators should participate in simulation-based education, preferably interprofessional to create a safe environment for simulation-based education (Bryant et al., 2020; Rossler et al., 2021). The design and facilitation of a real-life experience in practice could involve all perspectives of professional service lines such as practice as a team with modalities such as TeamSTEPPS®: “an evidence-based set of teamwork tools, aimed at optimizing patient outcomes by improving communication and

teamwork skills among health care professionals" (Rossler et al., 2021, p. 50). This framework builds strong teams that could translate that practice into the clinical setting. The climate in medicine has made a paradigm shift in the last decade, focusing on well-being, effective teamwork, TeamSTEPPS, burnout, and self-efficacy. "In medical education, it is a growing acknowledgement that a positive environment contributes to the quality of education" (Schönrock-Adema et al., 2012, p. 728).

These best practices of interprofessional education promote professional trust, respect, role identities, individualized objectives, and competencies to help build an effective team (INACSL, 2021; Moran et al., 2018; Murdoch et al., 2014). The Society of Simulation in Healthcare (SSH) was established in 2004 as an interprofessional global organization that has created standards of accreditation and certifications for simulation programs (Moran et al., 2018).

Mutual goals must be among all of the professions involved in the experience with theoretical or a conceptual framework. The framework could help create objectives, team communication, and evaluation tools. These interprofessional teams should collect data and investigate varied designs with reliable tools the effectiveness of the activity evaluation tools (Rossler et al., 2021).

Operations

The INACSL (2021) stated that operations encompass the infrastructure, staff, and processes necessary to implement an effective simulation-based experience. Operations include a strategic plan, job descriptions, logistics, and faculty development to build a sustainable simulation program (Motola et al., 2013). Another standard is the Simulation Operations, which was published in 2017 to address the criteria necessary to support and maintain simulation

operations (Moran et al., 2018). The literature suggested needs assessments, questionnaires, and small focus groups to develop and explore the success of a program (Jones & Potter, 2017).

A growing demand from the literature was to see a simulation program as its own entity, not a line of education, but one as a whole system with leadership with business acumen and faculty with technically knowledgeable personnel to achieve organizational goals and outcomes (Charnetski & Jarvill, 2021). Requirements of simulation personnel should include formally recognized simulation education and certifications embedded in the job descriptions, policies and procedures in place to maintain these competency-based training program, and staff who are knowledgeable to maintain the space, medical equipment, audiovisual equipment, and simulator equipment (Charnetski & Jarvill, 2021).

Integrity

In 2018, the SSH published a code of ethics that included integrity, transparency, mutual respect, professionalism, accountability, and results orientation (Park et al., 2020). The INACSL (2021) and ASPE (Lewis et al., 2017) also addressed a safe work environment with values of safety, quality, professionalism, accountability, and collaboration. All members of the team, including participants, are responsible for acting with professional integrity and developing self-awareness of how one's personal and professional behavior affects others (Bowler et al., 2021; Moran et al., 2018). The standard of professionalism mandated a community of professionals to adhere to a code of common ethics, values, and standards (Lewis et al., 2017). These exemplars also reflected the need for policies and procedures in sharing evaluations of learners, maintaining privacy and anonymity in reporting, remediations, and addressing violations (Bowler et al., 2021).

Professional Development

The best practice of faculty development is a core value with ASPE (Lewis et al., 2017), INACSL (2021), and SSH (2018), which is to provide adequate training and support for simulation facilitators to effectively run a simulation activity (Ayaz & Ismail, 2022; Lewis et al., 2017; Moran et al., 2018). Faculty who are educated in the practice of simulation are imperative to the success of the learners. As technology continues to grow and evolve, it is recommended that faculty who utilize simulation maintain membership in one professional organization for educational opportunities (Lewis et al., 2017; Moran et al., 2018). The SSH, an accrediting body, also published standards that require specific training for faculty.

The SSH (2018) had specific criteria for certification of simulationists: (a) professional values of leadership; (b) knowledge of educational principles, design, and simulation methods; (c) implementing educational interventions such as debriefing practices; and (d) scholarship and teaching (Eppich & Salzman, 2020). These key principles asked programs to design curricula with educational events, online, a strong focus on debriefing, or workplace-based approaches with role modeling, peer coaching, and mentoring from more experienced educators (Eppich & Salzman, 2020). Regardless of the methods, hybrid learning was recommended and plans ought to be individualized based on "level of participation, prior simulation and teaching experience, assessed educational competence, career trajectory, and faculty readiness" (Eppich & Salzman, 2020, p. 164).

Facilitation

Simulation facilitation is to provide a psychologically safe, noncompetitive environment—one where a "facilitator has the education, skills, and ability to guide learners in achievement of expected outcomes" (Persico et al., 2021, p. 22). This standard focuses on the

educator and their skill set to promote learner achievement of outcomes (Maxworthy et al., 2023). The INACSL (2021) documented specific criteria: (a) an effective facilitator who possesses the skills and knowledge in simulation pedagogy, (b) the approach is appropriate to the level of competence of the learner, (c) the experience follows INACSL best practices of prebriefing, (d) methods involve the delivery of cues to assist the learner, and (e) after the experience, there is facilitation to support learners. An "attentive debriefing facilitator can help the student re-configure their existing knowledge based on how they think and act within the simulation" (Ross, 2021, p. 3).

Evaluation

Evaluation is a process of "gathering and appraising data or placing a value on data gathered through one or more measurements" (Billings & Halstead, 2016, p. 385). It is often performed at the end of an activity, course, or program; it usually results with a final grade (Billings & Halstead, 2016). Assessment refers to gathering of data to determine progress and provide guidance toward attaining the desired outcomes (Billings & Halstead, 2016). For the aim of this study, assessment is discussed in alignment of the best practices of evaluation. The evaluation of learning and performance in simulation might be formative, summative, or high stakes for the learners (McMahon et al., 2021; Moran et al., 2018). Evaluation should be guided by the objectives expected outcomes, the level of the learner's knowledge, and incorporate the impact on patient safety (McMahon et al., 2021). A recording of the simulation activity in this study allowed evaluation by multiple faculty members. Evaluation of facilitators, simulation activity, environment, and support staff should also be included in the design of the activity (Bryant et al., 2020). Formative assessment of the learner is meant to foster long-term achievement of outcomes (Bryant et al., 2020; McMahon et al., 2021). Summative assessment is

often at the end of a program or a designated point in time. High-stakes evaluations are focused on specific objectives to determine clinical competence or gaps in knowledge skills and attitudes.

The best practice of utilizing a valid and reliable assessment instrument is highlighted here; an instrument that has been previously tested with simulation populations, incorporates interrater reliability, and standardized format to determine passing scores (McMahon et al., 2021; Moran et al., 2018). In this study, the goal was to provide a valid assessment instrument to allow APP fellows and APP educators to provide feedback and enhance the learning environment.

Identification of Literature Gaps

Simulation is a feasible modality to assess competency development for APPs. The majority of learning for APPs has occurred at the bedside with preceptors' guidance**.** Competency through simulation is a vehicle that has been successfully transferred to the actual environment, bridging the gap from theory to practice (Shinnick & Woo, 2020). The utility of simulation holds many benefits: strengths in knowledge acquisition, psychomotor development, self-efficacy, satisfaction, confidence, and critical thinking (Cant & Cooper, 2017; Hung et al., 2021).

A gap was revealed within the literature review concerning the frequency or the amount of simulation that would impact the many strengths claimed by simulation. It is unclear how many repetitions are required to attain these strengths. One study by Sullivan et al. (2015) examined simulation exercises to improve the retention of nurses in mock codes. The authors concluded that the best strategy of deliberate practice with simulation was implementing it every three months, which had a greater impact on retention compared to that of every six months. The Robert Wood Johnson Barnabas Health (2024) APP fellowship practices simulation monthly throughout the year. The healthcare community recently experienced a pandemic where clinical

hours of nursing and medical students were decreased drastically or completely ceased. Simulation was often utilized within the academic halls to substitute for clinical practice hours. Yet, throughout the literature, there was no clear evidence that simulation should replace clinical practice time (Breymier et al., 2015; Cooper et al., 2012).

A universal definition of clinical competence in healthcare professions is of paramount importance. It involves the integration of knowledge, skills, and attitudes to provide safe and effective care to patients. A standardized definition of clinical competence is essential for education, training, and assessment purposes. It enables the development of targeted interventions, consistent training programs, and reliable assessment methods. Future research should focus on the refinement and validation of the definition, explore the impact of emerging technologies, and establish the relationship between clinical competence and patient outcomes. By continuously advancing our understanding of clinical competence, healthcare professions could ensure the delivery of high-quality care and improve patient outcomes.

The literature of the assessment of competence revealed limitations regarding assessment instruments. Cook et al. (2013) demonstrated a systematic review of simulation-based assessment; articles had varied levels of validity, minimal content evidence in 34–55 % of studies, internal structure evidence in 40–74 %, and no evidence regarding response process and consequences. The largest gap was the lack of any instruments for APPs for simulation-based assessment. This study has the goal of closing that gap with a valid instrument for simulation-based assessment for APPs.

Summary

Factors to evaluate simulation activities for APPs include philosophical approaches, competencies, expected outcomes, and educational approaches to evaluate learners' achievement

(Iwasiw et al., 2020). Instruments developed for assessment within the realm of simulation are required to be valid and reliable instruments for the standardization of APP fellowship programs. Studies showed that simulation improved participants' affective interpersonal communication and yielded more empathic and adept professionals entering the workforce. A new model of medical education is necessary that has patient safety at its core, avoids the flaws of a purely apprenticeship training model, and provides unlimited opportunities to practice and perfect skills in a risk-free environment (Ayaz & Ismail, 2022; Nousiainen et al., 2016). Utilizing Miller's (1990) assessment of competence theory and Benner's (1982) novice to expert to guide development, the proposed APP-QSAT could enhance both learning and teaching for APP fellowship programs, thus promoting high quality patient care.

CHAPTER III

METHODS AND PROCEDURES

The purpose of this exploratory study was to design, develop, and assess the content validity index of the developed instrument based on best evidence and resources available for the assessment of a simulation activity for advanced practice providers (APPs) within a fellowship program. This chapter covers the specific components of the study's methodology including the design, sample population, sample size, inclusion and exclusion criteria, ethical considerations, data collection and handling procedures, instrument, data analysis, duration of the study, and limitations of the study.

Research Design

The design of this research was an exploratory, non-experimental field study. Exploratory studies attempt to identify phenomenon or relationships among study variables absent of manipulation or control (Creswell & Creswell, 2017). This dissertation study was designed as an exploratory study using primarily quantitative measures to describe relationships among non-academic and academic variables.

Sample Population

The target population of content experts was a convenience sample of colleagues who were in simulation training of medical professionals including medical residents, medical fellows, medical students, nurses, nursing students, NPs, NP students, PAs, paramedics, pharmacists, and pharmacy students.

Sample Size

It was recommended to have a panel between 3 and 20 experts; increasing the number of experts would decrease chance agreement (Almanasreh et al., 2019). The content validity index (CVI) was assessed and calculated from nine experts in simulation.

Inclusion and Exclusion Criteria

To be included, content experts must have had experience in the role of utilizing simulation for training of medical professionals. The exclusion criterion of the content experts was not being active in training medical professionals with simulation. Participants who did not complete the CVI were excluded from the study.

Ethical Considerations

No anticipated risks were associated with participation in this study other than those normally encountered when completing surveys about the assessment of competence for APPs. There was a $15 Amazon gift card as an incentive to the participants in the study. It was also possible what was learned would help APP educators better understand assessment in competence within simulation for APP fellowship programs. Participants were not anonymous as the researcher was able to see the participant given the nature of the study. However, the results of the participants in the content validity index were anonymized and no identifying data were collected or maintained that tied back to the participant. Participation was voluntary. Participants could decide not to participate in this study and if they began participation, they could withdraw at any time.

Data Collection and Handling Procedures

After Institutional Review Board approval was granted from the University of Northern Colorado (see Appendix H), an email (see Appendix I) with a link to Qualtrics, a commercially available, password secured, web-based survey tool to nine content experts was sent to complete the CVI tool (see Appendix J). The content experts rated the relevancy of each variable, the variable scoring, and the global rating scale. These data provided suggestions for iterations to the instrument. Minimal demographic data were collected from the content experts including age, gender, education level, board license, role within simulation, specialty, years of experience, and institution**.** Results of the study are presented in aggregate and all raw data were kept in a locked office within the hospital on a password protected personal computer. The researcher made every effort to protect the anonymity and confidentiality of the responses.

Development Process of the Advanced Practice Providers Queen's Simulation Assessment Tool

Psychometrics of any assessment tool can be evaluated along four measures: validity reliability, feasibility, and objectivity (Hastie et al., 2014). Validity is defined as "the degree to which evidence and theory support the interpretation of assessment scores for proposed uses of tests" (Noureldin et al., 2018, p. 85). The principle of validity applies to assessments including performance assessments; since the inception of competency-based education, these assessments have an impact on the education and learning (Messick, 1995). A way to ensure an instrument has acceptable validity is to compare it to existing and validated tools that assess the same skills for the same learners (Buléon et al., 2022). There is no established instrument for the assessment of APPs within simulation. Thus, there was difficulty with comparison of the QSAT since it was created for emergency room medical residents.

Phase One

Phase one consisted of the foundational development and design of the Advanced Practice Provider- Queen's Simulation Assessment Tool (APP-QSAT) instrument as a template in the acute care setting. In phase one of the study, an established working group of simulation experts was consulted to ensure the instrument accurately reflected the unique skills and competencies required of APPs. The working group consisted of educators of APPs, nurses, nursing students, physicians, and pharmacists in simulation. Modifications to the variables of the domains were created to demonstrate a template for the acute care setting. The global rating scale modifications were made to reflect Benner's (1982) theory of novice to expert, which guided the competencies and aligned with the goals of an accredited APP fellowship program through the American Nurses Credentialing Center (ANCC, 2020). Of note, the original author of the QSAT was contacted for approval of modifications **(**see Appendix D**)**.

Phase Two

In phase two, the CVI instrument was developed and sent to 13 content experts asking them to address the relevance and clarity of the concepts within the APP-QSAT (see Appendix J). The quantification of the CVI came from nine content experts within the field of simulation. Each study participant was asked to evaluate the relevance, clarity, and validity of the APP-QSAT instrument. Initial content-related evidence started with clearly defining the competence or construct within the instrument (Messick, 1995). The literature review provided a comprehensive examination of the construct of clinical competence. "The evaluation of content validity follows the same steps as test development, it must be established whether the content universe addressed by the test is appropriate" (Shepard,

1993, p. 413). A CVI was calculated from the evaluation of the content experts (Polit & Beck, 2021). The CVI tool consisted of a 4-point ordinal scale (1—*not relevant*, 2—*somewhat relevant*, 3—*quite relevant*, 4—*highly relevant*). The same ordinal scale was asked in relation to the clarity of each item. This study examined both the CVI and the modified Kappa statistic because, unlike the CVI, the modified Kappa adjusted for chance agreement (Polit et al., 2007). The letter sent to the content experts with the attached APP-QSAT for the content developed for this study is provided in Appendix J.

Phase Three

In phase three, the results of the content validity index from phase two were analyzed. The results were discussed and suggestions for possible future modifications of the APP-QSAT were based on the CVI. The feedback also provided a foundation for future studies on the reliability of the APP-QSAT. When items possessed a lack of relevance to the concept, requiring revision or elimination, a second round of content validation took place (Polit & Beck, 2021). This second round evaluated the revised set of items and computed a scale content validity (S-CVI; Polit & Beck, 2021). Polit and Beck (2021) recommended taking a subset from the first panel of content experts, ranging from three-five, to calculate the scale content validity index (S-CVI).

Instrument

The original QSAT format was modified to create a template for APPs in an acute care simulation activity (Hall et al., 2015). The APP-QSAT (see Appendix C**)** consists of five domains: primary assessment, diagnostic actions, therapeutic actions, communication, and an overall performance scale. The primary assessment domain has five criteria: (a) airway, breathing, circulation, disability, and environment; (b) request monitoring and vital signs; (c)

rhythm assessment; (d) identify problems; and (e) intravenous or intraosseous access. The diagnostic actions domain has five criteria: (a) obtain targeted history, (b) physical exam-focused assessment, (c) bloodwork, (d) imaging, and (e) extended data. The therapeutic actions domain has five criteria: (a) priority intervention, (b) medications, (c) lab results, (d) imaging results, and (e) appropriate consult. The communication domain has five criteria: (a) introduction of self, (b) communication among team, (c) prioritization, (d) leadership, and (e) consultation.

The developed variable scales and global rating scales are both on a continuum. For the individual domain scoring, Novice is all skills require significant improvement, Advanced Beginner is delayed or incomplete performance of many criteria, competent is delayed or incomplete performance of some criteria, Proficient is competent performance of most criteria, and Expert is competent performance of all criteria. For overall performance, the global rating scales differed from the individual domain scoring in the original QSAT (see Figure 5). For the global rating scale, Novice is where all skills require significant improvement, the Advanced Beginner is most skills require moderate or significant improvement, Competent is some skills require moderate improvement, Proficient is some skills require minor improvement, and Expert is few, if any, skills require only minor improvement.

Figure 5

Queen's Simulation Assessment Tool

Domain Rating Scale				
1	**2**	**3**	**4**	**5**
Inferior *Delayed or incomplete performance of all criteria*	**Novice** *Delayed or incomplete performance of many criteria*	**Competent** *Delayed or incomplete performance of some criteria*	**Advanced** *Competent performance of most criteria*	**Superior** *Competent performance of all criteria*

Global Rating Scale				
1	**2**	**3**	**4**	**5**
Inferior *All skills require significant improvement*	**Novice** *Most skills require moderate or significant improvement*	**Competent** *Some skills require moderate improvement*	**Advanced** *Some skills require minor improvement*	**Superior** *Few, if any skills require only minor improvement*

Note. Reprinted with the permission (see Appendix B) from Wolters Kluwer Health, Inc. Hall, A. K., Dagnone, J. D., Lacroix, L., Pickett, W., & Klinger, D. A. (2015). Queen's simulation assessment tool: Development and validation of an assessment tool for resuscitation objective structured clinical examination stations in emergency medicine. *Simulation In Healthcare*, *10*(2), 98-105.

Data Analysis Procedures

"Validity of an instrument determines the extent to which it actually reflects or is able to measure the construct being examined" (Gray et al., 2017, p. 393). There are several major types of validity such as face and content validity, criterion validity, and construct validity (Gray et al., 2017; Polit & Beck, 2021). "Face validity refers to whether the instrument looks like it is measuring the target content"; it is an empirical assessment of an instrument (Polit & Beck, 2021, p. 322). For the purpose of this study, face and content validity were examined and presented.

Face validity is a subjective assessment with no clear guidelines for making the judgment that the instrument visibly appears to measure what it is stating (Polit & Beck, 2021). While this is the weakest form of validity, it does suggest usefulness of the instrument (Polit & Beck, 2021). This is often the first step before or an aspect of content validity (Gray et al., 2017, p. 394; Polit & Beck, 2021).

Content validity refers to how a researcher comprehensively examines a measurement method to assess a particular domain or construct it intends to measure (Gray et al., 2017; Yusoff, 2019). Content validity is an important aspect of research methodology that ensures the accuracy and relevance of measurement instruments; this is of high importance when it comes to assessing the competence of highly skilled practitioners (Polit & Beck, 2006). It refers to the degree to which an instrument adequately represents the domain of content being measured (Polit et al., 2007). Without content validity, there is no point in establishing the reliability of an instrument (Beck & Gable, 2001; Polit & Beck, 2021). An instrument that assesses competency within a simulation activity provides a unique opportunity to evaluate performance in a controlled environment.

A way to assess content validity is through the use of a CVI **(**see Appendix J). The CVI is a method that involves content expert ratings of item relevance to determine the proportion of items on an instrument that achieved a certain level of relevance (Polit & Beck, 2006). Content experts are asked about the relevance, comprehensiveness, and balance of each of the variables within the instrument (Polit & Beck, 2021). The CVI tool allows researchers to quantify the content validity of an instrument, providing a valuable tool for ensuring the quality of measurement (Polit et al., 2007).

The CVI serves as a valuable method for assessing content validity in research. The CVI is calculated based on expert ratings of the relevance of each item in an instrument (Polit & Beck, 2006). This index is used to quantify the proportion of items on the instrument that achieve a certain level of relevance, providing a numerical representation of content validity (Polit et al., 2007). Compared to alternative indexes, the CVI offers several advantages; it is easy to compute, understandable, and focuses on agreement of relevance rather than agreement per se (Polit et al., 2007). Additionally, it allows for a focus on consensus rather than consistency among experts (Polit et al., 2007). However, it is important to acknowledge the limitations of the CVI. One major criticism is it fails to adjust for chance agreement (Polit et al., 2007). Nevertheless, the CVI remains a widely used and accepted indicator of content validity in research.

Advocating for the use of the CVI as an appropriate indicator of content validity, researchers and instrument developers recommend its continued utilization in assessing the quality of measurement instruments (Polit et al., 2007). To address the lack of adjustment for chance agreement in the CVI, a solution has been proposed. Translating item-level CVIs into values of a modified kappa statistic provides a method to determine good content validity (Polit et al., 2007). By establishing a threshold such as an I-CVI of .78 or higher for three or more experts, researchers can ensure that only items with strong content validity are included in the final instrument (Polit et al., 2007). This approach enhances the robustness and accuracy of content validity assessments (Polit et al., 2007). Therefore, incorporating the CVI alongside the modified kappa statistic could contribute to more reliable measurement instruments in research.

In this exploratory study, the analysis and computation of the descriptive statistics and the distribution of data for each variable were examined. The Statistical Package for the Social Sciences (SPSS) was used to analyze the data. The item-level content validity index (I-CVI) and

scale content validity index (S-CVI) were calculated to explore the content validity of the APP-QSAT. An I-CVI of 0.78 was sought for all items and an S-CVI of 0.90 overall was sought (Polit & Beck, 2021). Demographic data collected from content experts were analyzed using descriptive statistical analysis.

Duration of the Study

This study was conducted during the months of March 2024-May 2024. The researcher requested the participation of the content experts for the validity of the APP-QSAT after the Institutional Review Board approved this study (see Appendix I).

Limitations of the Study

An overarching limitation to the study was the sample size as nine content experts were included in this study. Increasing the number of content experts decreased chance agreement (Almanasreh et al., 2019). Kappa statistics might aid in eliminating the chance agreement, acceptable levels of kappa is a minimum of 0.60, and a value of 0.75 or higher is very good (Polit & Beck, 2021). Due to the risk of chance agreement, a CVI of 0.78 or higher was recommended (Polit & Beck, 2021; Polit et al., 2007). The selection of the content experts might have had a negative impact on the validity. Convenience sampling is the weakest form of sampling, yet it is the most commonly used method (Polit & Beck, 2021). Perhaps the identified content experts might not have understood the task, they might have had biases, or were not as familiar with the construct of clinical competence as expected (Polit & Beck, 2021). An attempt was made to create a diverse group of content experts who had trained varied populations of medical professionals in simulation; however, bias could still have existed. These factors were examined and are discussed in the results of the data.

Summary

This chapter discussed the methodology of the study including the design, setting, sample, data collection procedures, instrumentation, analysis, duration of the study, ethical considerations, and risks, discomforts, and benefits. The research design follows an exploratory approach for the design, development, and preliminary assessment of the developed APP-QSAT to capture formative and summative assessments of APP fellows for a simulation activity. Assessment of the APPs in simulation could provide valuable feedback for not only the APP fellows but for the improvement of teaching methods. The “ability to deliberately learn from experience is perhaps the most powerful source of adult learning” for both the learners and educators (Kolb, 2007, p. 28).

CHAPTER IV

RESULTS

The purpose of this exploratory study was to design, develop, and assess the content validity index of the developed instrument based on best evidence and resources available for the assessment of a simulation activity for advanced practice providers (APPs) within a fellowship program. The exploratory nature was appropriate due to no published instrument that specifically addressed the population of APPs and within an acute care setting could be discovered. This research study had the opportunity to review data from nine content experts within the field of simulation. In this chapter, the data analysis includes (a) an analysis of the variables, (b) face validity, (c) content validity, and (d) internal consistency of the Advanced Practice Providers Queen's Simulation Assessment Tool (APP-QSAT).

The following research questions guided this study:

Q1 What should be the essential concepts of the modified APP-QSAT for the assessment of competence in simulation for APPs within a fellowship program?

Q2 What is the content validity index (CVI) for the developed APP-QSAT calculated for the completed instrument as rated by the content experts?

The development of the APP-QSAT occurred in three phases. Phase one consisted of the foundational development and design of the APP-QSAT instrument as a template where it was taken to an established working group of simulation experts. This was an initial step for face validity. In phase two, a demographic survey (see Appendix K) and the content validity index (CVI; see Appendix C) were sent to 13 content experts who were invited to complete the CVI. Nine content experts completed the CVI. The CVI tool asked them to rate the relevance, clarity,

and validity of each of the 30 items on a 4-point Likert scale from 1—*Not at all relevant*/*clear* to 4—*Very relevant/clear*. Face validity was also examined through the CVI with the content experts. In phase three, the results of the CVI were analyzed and modifications to the APP-QSAT were made based on feedback of the CVI results and the open-ended question. A second round was also completed in this phase to assess these results with five of the original content experts and computed a scale content validity index (S-CVI) and the modified kappa (Polit & Beck, 2021). This chapter presents the findings from the content validity testing to establish levels of validity, a modified kappa to exclude chance agreement, and a Cronbach's alpha for internal consistency.

Description of the Sample

A convenience sample of nine content experts included colleagues and classmates who were experienced in simulation training of medical professionals. Four (44%) of the nine content experts identified as male and five (55%) identified as female. Five (55%) of the nine content experts were in the age range of 30-39, three (33%) were in the age range of 40-49, and one (11%) was in the age range of greater than 60 years of age. There were two (22%) nurse practitioners, two (22%) physicians, two (22%) registered nurses, two (22%) paramedics, and one (11%) physician assistant. There were three (33%) Ph.D. students, two (22%) with medical doctorates, one (11%) with Ph.D., one (11%) Doctor of Nursing, one (11%) with a master's degree in nursing, one (11%) with a master's degree in medical sciences, and two (22%) with Bachelor of Nursing Science. Seven (77%) of the content experts were affiliated with Rutgers University, one (11%) from University of Hartford, and three (33%) were affiliated with Robert Wood Johnson Barnabas Health system (RWJBH). Three (33%) of the content experts were

directors of a simulation center and six were (66%) educators in simulation. Four (44%) of the content experts received no education to be educators in simulation (see Table 1).

Table 1

Demographic Survey of Content Experts

	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Expert 8	Expert 9
Gender	M	F	M	F	M	F	M	F	F
Age	30-39	>60	30-39	40-49	30-39	30-39	40-49	40-49	30-39
Educational Level	DNP	PhD	BSN	MD	BSN	MD	BSN, PhD student	MSN, PhD student	MSN, PhD student
Board license	NP	NP	RN	MD	Paramedic	MD	Paramedic	PA	RN
Specialty	CC, hospitalist, Ed.	CC, Ed.	ER, Ed.	CC, Ed.	ER, CC, Ed.	ER, Ed.	ER, Ed.	ER, Ed.	Labor and Delivery, Ed.
Years' experience in specialty	6-10	26-30	6-10	11-15	11-15	16-20	21-25	16-20	6-10
Role in Simulation	Educator	Educator	Educator	Educator	Director of Sim Center	Director of Sim Center	Director of Sim Center	Educator	Educator
Education in Simulation	None	None	CHSE, CHSOS	None	CHSE SSH: Laerdal Operator course, Teaching with LLEAP, Debriefing, IMSH	CHSE	CHSE	SSIH; CMS Harvard Design and Debrief	None
Years' experience in simulation	1-2	>20	5-6	7-8	11-15	6-10	11-15	11-15	7-8
Institution	Rutgers/ RWJBH	Rutgers	RWJBH	Rutgers	Rutgers	Rutgers	Rutgers	Rutgers/ RWJBH	University of Hartford

Note. CC: critical care medicine, ER: emergency medicine, Ed.: education, RWJBH: Robert Wood Johnson Barnabas Health system

Analysis of Variables

The APP-QSAT consisted of the following domains: primary assessment, diagnostic actions, therapeutic actions, communication, and overall performance. Thirty items were analyzed by nine content experts on a 4-point Likert scale from 1—*Not at all relevant*/*clear* to 4—*Very relevant/clear* on the CVI tool (see Appendix J). Each variable within each of the domains was examined. If content experts responded with a 2 or less, experts were required to provide feedback. There were also questions for each domain. The responses were in binary format (yes/no), and the content experts were required to expand on feedback if they responded no. This qualitative review of the instrument helped to establish face validity for the APP-QSAT. The primary assessment domain included (a) airway, breathing, circulation, disability, and exposure (ABCDE); (b) monitoring; (c) rhythm assessment; (d) identify problems; (e) intravenous/intraosseous/central venous catheter access, and the following question—Do you feel these components are comprehensive to the domain of primary assessment? The diagnostic actions domain included (a) obtains targeted history, (b) physical exam-focus assessment, (c) bloodwork, (d) imaging, (e) extended data, and the following question—Do you feel these components are comprehensive to the domain of diagnostic actions? The therapeutic actions domain included (a) priority interventions, (b) medications, (c) labs, (d) imaging, (e) appropriate consult, and the following question—Do you feel these components are comprehensive to the domain of therapeutic actions? The communication domain included (a) introduction—introduces self and explains clinical situation (b) communication—clear and concise orders and directions, (c) prioritization—prioritizes tasks and anticipates further steps, (d) leadership—demonstrates leadership in managing crisis, (e) consultation—present consults clearly or instructs another member to call, and the following

question—Do you feel these components are comprehensive to the domain of communication*?*

The definitions of the individual domains and global rating scales differed in the original QSAT and were not changed in Round One of the content validation (see Appendix C). However, the verbiage of the scales was altered to include Benner's verbiage of Novice to Expert throughout the scales. Inferior was altered to Novice, Novice was altered to Advanced Beginner, Competent remained the same, Advanced was altered to Proficient, and Superior was altered to Expert. The domain scoring included (a) 1—Novice: delayed or incomplete performance of all criteria, (b) 2—Advanced Beginner*:* delayed or incomplete performance of many criteria, (c) 3—Competent*:* delayed or incomplete performance of some criteria, (d) 4—Proficient: competent performance of most criteria, (e) 5—Expert*:* Competent performance of all criteria, and the following question—Do you feel these five levels of scoring are comprehensive to the domain scoring? The Global Rating Scale domain included the following definitions: (a) 1— Novice: all skills require significant improvement, (b) 2—Advanced Beginner: most skills require significant improvement, (c) 3—Competent: some skills require moderate improvement, (d) 4—Proficient: some skills require minor improvement, (d) 5—Expert: few, if any skills require only minor improvement, and the following question—Do you feel these five levels of scoring are comprehensive to the global rating scale? At the end of the content validation form, there was one open ended question to the experts: Are there critical aspects of assessing APP competence that are not included in this survey? This feedback was also included into the APP-QSAT and sent to the content experts for a second round of content validity. In the second round, definitions of Novice to Expert for both the individual domains and global rating scale were adjusted to reflect the

feedback from the content experts' CVI scores and written feedback. The definitions were carried throughout the APP-QSAT, no longer differing from individual domains and global rating scales based on the CVI scores.

Face Validity Analysis

Face validity is a subjective assessment as it is the extent to which an instrument looks as though it is measuring what it proposes to measure (Polit & Beck, 2021). In each domain of the APP-QSAT, nine experts were asked in binary format (yes/no), do each of the components appear to be measuring its intended concept of primary assessment, diagnostic actions, therapeutic actions, communication, domain scoring, and global rating scale (see Appendix H). One expert (11%) answered No for the communication domain and three (33%) responded with No to both the domain scoring and global rating scale. This critical review by the content experts on the content validity index tool supported face validity of the APP-QSAT.

Open-Ended Question Analysis

There was also an open-ended question to the content experts at the end of the CVI tool: Are there critical aspects of assessing APP competence that are not included in this survey? One response stated, "Safety measures ought to be included within the domain of *Communication* [Item 18] for prioritization." Three content experts provided responses stating confusion regarding the rubric, which possessed different definitions for Novice, Advanced Beginner, Competent, Proficient, and Expert for scales in the domains and the global rating scale. All of these responses were addressed in round two of the content validation.

Content Validity Analysis

Content experts completed an electronic review of the instrument with results of the CVI, the universal agreement (UA), and scale content validity index (S-CVI). Polit and Beck (2021) suggested that for a scale to be considered as having excellent content validity, the item-level content validity index (I-CVI) should be a minimum of 0.78. The I-CVIs of "0.50 or less are excluded because these would always be unacceptable" (Polit et al., 2007, p. 465).

As illustrated in Tables 2 and 3, all items on the APP-QSAT had an I-CVI equal to 0.78 or greater; seven scored 0.67 for both relevance and clarity. The universal agreements are also presented in both Tables 2 and 3; these numbers reflected the content experts who scored each item as a 3—*Quite relevant*/*clear* to 4—*Very relevant/clear.* Item 19 (Leadership: Demonstrates leadership in managing crisis*)* had an I-CVI of 0.78 with ratings of *relevant* or *very relevant* by seven of the nine content experts. Item 22 (Advanced Beginner: Delayed or incomplete performance of many criteria) had an I-CVI of 0.67 with ratings of *relevant* or *very relevant* by six of the nine content experts. Item 23 (Competent: Delayed or incomplete performance of some criteria) had an I-CVI of 0.67 with ratings of *relevant* or *very relevant* by six of the nine content experts. Item 24 (Proficient: Competent performance of most criteria) had an I-CVI of 0.67 with ratings of *relevant* or *very relevant* by six of the nine content experts. Item 27 (Advanced Beginner: Most skills require moderate or significant improvements) had an I-CVI of 0.67 with ratings of *relevant* or *very relevant* by six of the nine content experts. Item 28 (Competent: Some skills require moderate improvement) had an I-CVI of 0.67 with ratings of *relevant* or *very relevant* by six of the nine content experts. Item 29 (Proficient: Some skills require minor improvement) had an I-CVI of 0.67 with ratings of *relevant* or *very relevant* by six of the nine content experts. These

items were examined along with the written feedback if they scored the items with a 2 or less, which was required. Items were modified for the second round with five of the original nine. The S-CVI was determined by calculating the average of the I-CVI results for all items in each scale. This method of calculating the content validity of a scale was defined by Polit and Beck (2021) who designated this method of the scale-content validity index/average (S-CVI/ave). These authors suggested that results above 0.90 could be considered as demonstrating excellent content validity. The average S-CVI/ave for the APP-QSAT was calculated resulting in a S-CVI/ave of 0.91, which demonstrated excellent content validity despite having items not meeting the minimum of 0.78 (Polit & Beck, 2021; Polit et al., 2007).

Table 2

Round 1 Content Validity: Relevance

	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Expert 8	Expert 9	UA[a]	I-CVI[b]
Domain: Primary Assessment											
Item 1	4	4	4	4	4	4	4	4	4	9	1.00
Item 2	4	4	4	4	4	4	4	4	4	9	1.00
Item 3	3	4	3	4	3	4	4	4	4	9	1.00
Item 4	3	4	4	4	3	4	4	4	4	9	1.00
Item 5	3	4	4	4	4	4	3	4	4	9	1.00
Domain: Diagnostic Actions											
Item 6	3	4	4	4	4	3	4	4	4	9	1.00
Item 7	4	4	4	4	3	4	4	4	4	9	1.00
Item 8	4	4	4	4	4	4	4	4	4	9	1.00
Item 9	3	4	4	4	4	4	4	4	4	9	1.00
Item 10	3	4	4	4	4	3	4	4	4	9	1.00
Domain: Therapeutic Actions											
Item 11	4	4	4	4	4	4	4	4	4	9	1.00
Item 12	3	4	4	4	3	4	4	4	4	9	1.00
Item 13	3	4	4	4	4	4	4	4	4	9	1.00
Item 14	3	4	4	4	4	4	4	4	4	9	1.00
Item 15	3	4	4	4	4	4	4	4	4	9	1.00
Domain: Communication											
Item 16	4	4	4	4	4	4	4	4	4	9	1.00
Item 17	3	4	4	4	4	4	4	4	4	9	1.00
Item 18	4	4	4	4	4	4	4	4	3	9	1.00
Item 19	1	4	4	4	4	4	4	2	4	7	0.78
Item 20	4	4	4	4	4	4	4	4	4	9	1.00
Domain Scoring											
Item 21	4	4	4	4	4	2	4	4	4	8	0.89
Item 22	2	4	4	2	4	2	4	4	4	6	0.67
Item 23	2	4	4	2	4	2	4	4	4	6	0.67
Item 24	2	4	4	2	4	2	4	4	4	6	0.67
Item 25	4	4	4	4	4	2	4	4	4	8	0.89
Global Rating Scale											
Item 26	1	4	4	4	4	4	4	4	4	8	0.89
Item 27	1	4	4	2	4	2	4	4	4	6	0.67
Item 28	1	4	4	2	4	2	4	4	4	6	0.67
Item 29	1	4	4	2	4	2	4	4	4	6	0.67
Item 30	1	4	4	4	4	4	4	4	4	8	0.89

Note. [a] The number of experts rating the item either a 3 (Relevant) or 4 (Very Relevant)
[b] Item Content Validity Index (I-CVI). The proportion of experts rating this item as Relevant or Very Relevant Highlighted scores identify items with I-CVI < .78

Table 3

Round 1 Content Validity: Clarity

	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Expert 8	Expert 9	UA[a]	I-CVI[b]
Domain: Primary Assessment											
Item 1	4	4	4	4	4	3	3	3	4	9	1.00
Item 2	4	4	4	4	4	4	3	4	4	9	1.00
Item 3	3	4	4	4	2	4	4	4	3	8	0.89
Item 4	3	4	2	4	3	3	4	4	4	8	0.89
Item 5	3	4	4	4	4	3	3	4	2	8	0.89
Domain: Diagnostic Actions											
Item 6	3	4	4	4	4	3	4	4	4	9	1.00
Item 7	4	4	4	4	3	3	3	4	4	9	1.00
Item 8	4	4	3	4	4	3	3	4	3	9	1.00
Item 9	3	4	4	4	4	3	3	4	3	9	1.00
Item 10	3	4	4	3	4	3	3	3	4	9	1.00
Domain: Therapeutic Actions											
Item 11	4	4	4	4	4	3	2	4	4	8	0.89
Item 12	3	4	2	4	3	3	4	4	4	8	0.89
Item 13	3	4	4	4	4	3	4	4	2	8	0.89
Item 14	3	4	4	4	4	3	4	4	2	8	0.89
Item 15	3	4	4	4	4	3	4	4	4	9	1.00
Domain: Communication											
Item 16	4	4	4	4	4	3	4	4	4	9	1.00
Item 17	3	4	4	4	4	3	4	4	4	9	1.00
Item 18	4	4	4	4	4	3	4	4	4	9	1.00
Item 19	1	4	4	4	4	3	4	3	4	8	0.89
Item 20	4	4	4	4	4	3	4	4	4	9	1.00
Domain Scoring											
Item 21	4	4	4	4	4	4	4	4	4	9	1.00
Item 22	2	4	3	2	3	2	4	4	4	6	0.67
Item 23	2	4	3	2	3	2	4	4	4	6	0.67
Item 24	2	4	3	2	3	2	4	3	4	6	0.67
Item 25	4	4	4	3	4	4	4	3	4	9	1.00
Global Rating Scale											
Item 26	1	4	4	4	4	3	4	3	4	8	0.89
Item 27	1	4	3	2	3	3	4	2	4	6	0.67
Item 28	1	4	3	2	3	2	4	3	4	6	0.67
Item 29	1	4	3	2	3	2	4	4	4	6	0.67
Item 30	1	4	4	4	3	3	4	4	4	8	0.89

Note. [a] The number of experts rating the item either a 3 (Relevant) or 4 (Very Relevant).
[b] Item Content Validity Index (I-CVI). The proportion of experts rating this item as Relevant or Very Relevant.

The second round was implemented to improve upon the content validity results. It consisted of five of the nine content experts (see Tables 4 and 5). Polit and Beck (2021) recommended taking a subset from the first panel of content experts, ranging from three to five. No items were removed but rather modified to meet the written feedback of the content experts for clarification of the items and calculate the I-CVI and S-CVI/ave again.

Item 19 (Leadership: Demonstrates leadership in managing crisis) was modified to read Leadership: Establishes workload distribution, ownership of the situation. Written feedback on the items revealed that the verbiage "some, most, or many" did not communicate clearly. Items 21-30 were modified in language to present with more objectivity and clarity in communication as sought by the content experts. Written feedback from a score of 1—*Not relevant*/*clear* or 2—S*omewhat relevant*/*clear* delineated the use of "competent" within the domain and global rating scale was not well-defined, not clearly communicated, and was not objective: Item 21 (Novice: Delayed or incomplete performance of all criteria), Item 22 (Advanced Beginner: Delayed or incomplete performance of 75% criteria), Item 23 (Competent: Delayed or incomplete performance of 50% criteria, Item 24 (Proficient: Delayed or incomplete performance of 25% criteria), and Item 24 (Expert: skills complete with no improvement needed). This second round yielded I-CVI of 1.0 and a S-CVI/ave of 1.0 for relevance to the construct. A modified kappa statistic that adjusted each I-CVI is seen in Table 4 to exclude chance agreement. The index is called a "modified kappa because it is an index of agreement of a certain type, namely agreement among the judges that the item is relevant" (Polit et al., 2007, p. 465). To compute the modified kappa, the probability of chance agreement was first computed in the second round.

Table 4

Round 2 Content Validity: Relevance

	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	UA[a]	I-CVI[b]	Pc[c]	K[d]
Domain: Primary Assessment									
Item 1	4	4	4	4	4	5	1.00	.041	1.00
Item 2	4	4	4	4	4	5	1.00	.041	1.00
Item 3	4	4	4	4	4	5	1.00	.041	1.00
Item 4	4	4	4	4	4	5	1.00	.041	1.00
Item 5	4	4	4	4	4	5	1.00	.041	1.00
Domain: Diagnostic Actions									
Item 6	4	4	4	4	4	5	1.00	.041	1.00
Item 7	4	4	4	4	4	5	1.00	.041	1.00
Item 8	4	4	4	4	4	5	1.00	.041	1.00
Item 9	4	4	4	4	4	5	1.00	.041	1.00
Item 10	4	4	4	4	4	5	1.00	.041	1.00
Domain: Therapeutic Actions									
Item 11	4	4	4	4	4	5	1.00	.041	1.00
Item 12	4	4	4	4	4	5	1.00	.041	1.00
Item 13	4	4	4	4	4	5	1.00	.041	1.00
Item 14	4	4	4	4	4	5	1.00	.041	1.00
Item 15	4	4	4	4	4	5	1.00	.041	1.00
Domain: Communication									
Item 16	4	4	4	4	4	5	1.00	.041	1.00
Item 17	4	4	4	4	4	5	1.00	.041	1.00
Item 18	4	4	4	4	4	5	1.00	.041	1.00
Item 19	4	4	4	4	4	5	1.00	.041	1.00
Item 20	4	4	4	4	4	5	1.00	.041	1.00
Domain Scoring									
Item 21	4	3	4	4	3	5	1.00	.041	1.00
Item 22	4	3	4	4	3	5	1.00	.041	1.00
Item 23	4	3	4	4	3	5	1.00	.041	1.00
Item 24	4	3	4	4	3	5	1.00	.041	1.00
Item 25	4	3	4	4	3	5	1.00	.041	1.00
Global Rating Scale									
Item 26	4	3	4	4	3	5	1.00	.041	1.00
Item 27	4	3	4	4	3	5	1.00	.041	1.00
Item 28	4	3	4	4	3	5	1.00	.041	1.00
Item 29	4	3	4	4	3	5	1.00	.041	1.00
Item 30	4	3	4	4	3	5	1.00	.041	1.00

Note. [a] The number of experts rating the item either a 3 (Relevant) or 4 (Very Relevant). [b] Item Content Validity Index (I-CVI). The proportion of experts rating this item as Relevant or Very Relevant [c] Probability [d] modified kappa

Table 5

Round 2 Content Validity: Clarity

	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	UA[a]	I-CVI[b]	Pc[c]	K[d]
Domain: Primary Assessment									
Item 1	4	4	4	4	4	5	1.00	.041	1.00
Item 2	4	4	4	4	4	5	1.00	.041	1.00
Item 3	4	4	4	4	4	5	1.00	.041	1.00
Item 4	4	4	4	4	4	5	1.00	.041	1.00
Item 5	4	4	4	4	4	5	1.00	.041	1.00
Domain: Diagnostic Actions									
Item 6	4	4	4	4	4	5	1.00	.041	1.00
Item 7	4	4	4	4	4	5	1.00	.041	1.00
Item 8	4	4	4	4	4	5	1.00	.041	1.00
Item 9	4	4	4	4	4	5	1.00	.041	1.00
Item 10	4	4	4	4	4	5	1.00	.041	1.00
Domain: Therapeutic Actions									
Item 11	4	4	4	4	4	5	1.00	.041	1.00
Item 12	4	4	4	4	4	5	1.00	.041	1.00
Item 13	4	4	4	4	4	5	1.00	.041	1.00
Item 14	4	4	4	4	4	5	1.00	.041	1.00
Item 15	4	4	4	4	4	5	1.00	.041	1.00
Domain: Communication									
Item 16	4	4	4	4	4	5	1.00	.041	1.00
Item 17	4	4	4	4	4	5	1.00	.041	1.00
Item 18	4	4	4	4	4	5	1.00	.041	1.00
Item 19	4	4	4	4	4	5	1.00	.041	1.00
Item 20	4	4	4	4	4	5	1.00	.041	1.00
Domain Scoring									
Item 21	4	3	4	4	3	5	1.00	.041	1.00
Item 22	4	3	4	4	3	5	1.00	.041	1.00
Item 23	4	3	4	4	3	5	1.00	.041	1.00
Item 24	4	3	4	4	3	5	1.00	.041	1.00
Item 25	4	3	4	4	3	5	1.00	.041	1.00
Global Rating Scale									
Item 26	4	3	4	4	3	5	1.00	.041	1.00
Item 27	4	3	4	4	3	5	1.00	.041	1.00
Item 28	4	3	4	4	3	5	1.00	.041	1.00
Item 29	4	3	4	4	3	5	1.00	.041	1.00
Item 30	4	3	4	4	3	5	1.00	.041	1.00

Note. [a] The number of experts rating the item either a 3 (Relevant) or 4 (Very Relevant). [b] Item Content Validity Index (I-CVI). The proportion of experts rating this item as Relevant or Very Relevant [c] Probability [d] modified kappa

Reliability

Internal consistency of an instrument has been the most widely used reliability measurement among nurse researchers (Polit & Beck, 2021). The internal consistency of the 30-

item APP-QSAT was calculated using the Cronbach's alpha coefficient after the completion of round two. Internal consistency serves as an estimate of reliability. Coefficient alpha "estimates the extent to which different sub parts of an instrument are reliability measuring the critical attribute, and greater internal consistency is obtained with a set of items that are highly inter-correlated" (Polit & Beck, 2021, p. 320). Higher values indicated the items were related and measured a similar construct, and alpha increased as the number of correlated items increased (Polit & Beck, 2021). The coefficient alpha is calculated by taking the average covariance or shared variance and dividing it by the average total variance. Meaning the high alpha value demonstrates the relationships between the items can account for most of the overall variability. Simply saying the items on the APP-QSAT measure clinical competence by the reliability of shared variance of the items. Generally, an alpha of greater than 0.80 is considered an indicator of good consistency and a coefficient alpha greater than 0.90 is considered excellent (Polit & Beck, 2021). The alpha coefficient was conducted using SPSS v.26 and calculated to be 1.00 for each of the domains of the APP-QSAT.

Summary

This chapter presented salient results from the validity and internal consistency testing of the APP-QSAT instrument. Content validity of the APP-QSAT was evaluated by nine content experts and revisions were made to the instrument based on content experts' review. Reliability of the instrument was supported through results of the Cronbach's alpha. Content experts provided responses to the open-ended question at the end of the content validation, which were analyzed and results further supported both face and content validity of the instrument. Chapter V discusses implications and conclusions drawn from these results.

CHAPTER V

DISCUSSION AND CONCLUSION

This chapter presents a discussion, major findings, the study strengths and limitations, and recommendations for further research. The chapter concludes with a summary of the evaluation and potential for implementing the modified Advanced Practice Providers- Queen's Simulation Assessment (APP-QSAT; see Appendix L).

Discussion

The purpose of this exploratory study was to design, develop, and assess the content validity index of the developed instrument based on best evidence and resources available for the assessment of a simulation activity for advanced practice providers (APPs) within a fellowship program. Through an extensive literature review, no published instrument that specifically addressed the population of APPs within an acute care setting could be uncovered.

Major Findings

The original QSAT was a valid and reliable modifiable instrument created by Dr. Hall as a modifiable anchored scoring tool for competence in simulation-based scenarios for emergency medicine residents (Hall et al., 2015). Content validity is "defined as the extent to which an instrument's content adequately captures the construct – that is, whether an instrument has an appropriate sample of items for the construct being measured" (Polit & Beck, 2021, p. 322). The measurement of validation was an 'evidence-building enterprise' and building the evidence was built with the content validity index (CVI) results. Despite six of the items (19, 21-24, 26-29) having an item-level content validity index (I-CVI) of 0.67 on both relevance and clarity of the

construct, the feedback from the scores of 2 or less provided insight for modification in round two of content validity. Due to the permission granted for the use of the instrument in this study, items were able to be altered based on the content validation research. Round two resulted in an increase in I-CVI from 0.67 to 1.00 in both relevance and clarity for the six items, which is the highest for excellent content validity. The scale content validity index/average (S-CVI/ave) also resulted with a 0.91 for round one and increased to 1.00 as well, demonstrating excellent content validity for the APP-QSAT. Dr. Hall's original QSAT held alternative definitions on the scales from the domain scoring to the global rating scale (see Figure 5). As seen in Chapter IV in the content validity analysis, the feedback created improved definitions that aimed to provide more objectivity and clarity for scoring both in the domains and the global rating scales (see Figure 6).

Figure 6

Advanced Practice Provider-Queen's Simulation Assessment Tool

Domain Rating Scale				
1	**2**	**3**	**4**	**5**
Novice *Delayed or incomplete performance of all criteria*	**Advanced Beginner** *Delayed or incomplete performanc e of 75% criteria*	**Competent** *Delayed or incomplete performance of 50% criteria*	**Proficient** *Delayed or incomplete performance of 25% criteria*	**Expert** *Skills completed with no improvement needed*

Global Rating Scale				
1	**2**	**3**	**4**	**5**
Novice *Delayed or incomplete performance of all criteria*	**Advanced Beginner** *Delayed or incomplete performanc e of 75% criteria*	**Competent** *Delayed or incomplete performance of 50% criteria*	**Proficient** *Delayed or incomplete performance of 25% criteria*	**Expert** *Skills completed with no improvement needed*

Note. Reprinted with the permission (see Appendix B) from Wolters Kluwer Health, Inc. Hall, A. K., Dagnone, J. D., Lacroix, L., Pickett, W., & Klinger, D. A. (2015). Queen's simulation assessment tool: Development and validation of an assessment tool for resuscitation objective structured clinical examination stations in emergency medicine. *Simulation In Healthcare*, *10*(2), 98-105.

The feedback from the open-ended question provided additional insight on the face validity as well as the new iteration of the APP-QSAT for round two of content validation. After round two, the modified Kappa was also computed and adjusted for each I-CVI for chance agreement. The "modified Kappa is an index of agreement of a certain type, namely agreement among the [content experts] that the item is relevant, agreement about non-relevance is not counted, because such agreement does not inform the research about the content validity" (Polit et al., 2007, p. 465). The probability was calculated to compute the modified Kappa, which should be equal to or greater than 0.74. The second round yielded a modified Kappa of 1.00, which demonstrated excellent agreement on relevance.

Strengths and Limitations

This study explored the literature for a valid, reliable instrument to assess competence for APPs within simulation. There were several strengths and limitations of this research study. One limitation to the study existed due to the lack of literature examining the assessment of competence within the population of APPs, both clinically and in simulation activities.

Convenience sampling is considered the weakest form of sampling (Polit & Beck, 2021). Although convenience sampling introduced the risk of sampling bias, this study mitigated those risks by including participants from varied professions. The selection of content experts was decided based on simulation experience and with varied populations; however, there was still potential for the identified content experts to not have understood the task or they might have had bias. The convenience sample of content experts was selected due to their experience in training healthcare professionals within simulation. The content experts served several medical professional populations such as nurses, nurse practitioners (NPs), NP students, physician assistants (PAs), PA students, medical physicians, medical residents, medical fellows, pharmacists, pharmacy students, paramedics, and paramedic students.

This study was strengthened by increasing the number of content experts to nine to decrease chance agreement (Almanasreh et al., 2019). Their collective knowledge was influential in developing the APP-QSAT; the modifications for round two were based directly on the I-CVI results, from the written feedback with scores of 2 or less by three of the nine content experts, and the open-ended question at the end of the CVI instrument. Polit and Beck (2021) recommended taking a subset of the original group of content experts for round two. “Data from the first round was analyzed with a view of evaluating the performance of the experts, not just the items” (Polit & Beck, 2021, p. 348). The measurement of validation was an “evidence-building enterprise” and

building the evidence with the CVI results, the validity could be inferred (Polit & Beck, 2021, p. 322). The strength of this study was revealed by I-CVIs of 1.00 for both the relevance and the clarity on the second round. The S-CVI also increased from .91 to 1.00. The modified Kappa provided a level of 1.00 to eliminate chance agreement amongst the content experts.

The salient limitation of this study reflected that only validation testing was performed and was limited due to the lack of reliability studies. Internal consistency was analyzed with a coefficient alpha of 1.00, which was considered excellent consistency. Despite the calculated coefficient alpha, examination of inter-rater reliability could enhance the reliability of the APP-QSAT. Reliability is the extent to which scores have not changed; they are the same for repeated measurements with different simulation activities and with different raters (Polit & Beck, 2021). Inter-rater reliability testing by two or more raters using the APP-QSAT had the potential to provide measurements that demonstrated its quality and internal consistency.

Recommendations for Research

Findings from this study finalized the development and content validity of the APP-QSAT, a modifiable template designed to measure competence for advanced practice providers (APPs) in acute care settings, particularly within APP fellowships. The APP-QSAT represents a novel approach to assessing clinical competence, moving beyond traditional checklist-based tools that often neglect the holistic aspects of APP practice. The templated instrument also can adapt from new learners to experienced ones.

Exploring the literature of competence, APP fellowships, and the assessment within simulation brought forth novel ideas and questions for future research. Reliability studies are necessary to determine the utility and quality of the APP-QSAT, going beyond the initial internal consistency. Inter-rater reliability is the gathering of a quantitative measure with two or more

raters utilizing the APP-QSAT. Intra-rater reliability is an assessment the same raters utilize with the APP-QSAT on more than one simulation activity. Examining inter-rater and intra-rater reliability ensures the instrument produces consistent and reproducible results. Future reliability studies are crucial as the best practice of simulation advocates for the use of valid and reliable instruments for the measurement of outcomes (Lewis et al., 2017).

The APP-QSAT confirms competence in learners through a longitudinal, stepwise process, offering both formative and summative evaluations to identify strengths and areas for improvement. This approach could be particularly beneficial for APP fellowship programs where the development and assessment of competence are critical for ensuring the readiness of graduates to provide high-quality patient care. The utility of the APP-QSAT might also be useful for both APP students and working APPs within simulation. Future studies would require exploration of modifying the APP-QSAT and focusing on other clinical settings such as primary care, midwifery, or for nurse anesthetists.

Future research should also investigate how receptive APP students, APP fellows, or APPs would feel being assessed through simulations. The debate continues over the use of simulation as an assessment tool versus an educational one (Noureldin et al., 2018). As simulation becomes more prevalent in healthcare training, including APP fellowships, this controversy should be further explored. The high stakes evaluations of written examinations could be in combination with real-world scenarios in simulation. Future research could explore these measurements for possible benefits if any to the learners. Additionally, future studies should compare competency-based assessments in simulations with those in clinical settings. Some literature indicated that simulation-based assessments could predict future clinical performance (Ryall et al., 2016). Yet,

studies need to utilize a valid, reliable instrument in both simulation and the clinical setting for comparison.

Overall, the development and validation of the APP-QSAT represented a significant step forward in the assessment of clinical competence for APPs. By moving beyond traditional checklists, the APP-QSAT might enhance the quality of APP education and training, ultimately improving patient outcomes and the delivery of healthcare services. The APP-QSAT is a modifiable template designed to measure competence for APPs in acute care settings, particularly within APP fellowships. The APP-QSAT aims to capture the full spectrum of clinical competence including not only technical skills but also critical thinking, decision-making, communication, and interprofessional collaboration. This novel assessment instrument goes beyond the limitations of traditional checklist-based instruments, which often neglect the multifaceted nature of APP practice. Future studies could explore comparison of checklists versus the APP-QSAT for comparison of learners' competency levels within simulation.

Summary

A review of the literature revealed no valid, reliable instrument to assess competence for the population of APPs within both simulation and clinical settings. The literature also highlighted the importance of best practices from the International Nursing Association for Clinical and Simulation Learning (2021) such as professional development of faculty within simulation, simulation design, outcomes and objectives, evaluation of learning and performance, operations, and simulation-enhanced interprofessional education (Lewis et al., 2017). The purpose of this exploratory study was to design, develop, and assess the content validity index of the developed instrument based on best evidence and resources available for the assessment of a simulation activity for APPs within a fellowship program. Simulation that enhances clinical

reasoning by guiding learners through purposeful, guaranteed learning experiences could use the APP-QSAT, which would provide assessments in alignment with best practices for learners (Fogg et al., 2020).

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APPENDIX A

QUEEN'S SIMULATION ASSESSMENT TOOL

Queen's Simulation Assessment Tool (QSAT)

Station # ___ - _____

Examinee Identification: _____ Date of Assessment: _____

Assessed by: _____

Primary Assessment

Vital signs (HP/BP/O2Sat/RR/Temp) + Glucose
Cardiac monitors
Intravenous access
LOC assessment
Airway assessment
Rhythm assessment

1	2	3	4	5
INFERIOR	***NOVICE***	***COMPETENT***	***ADVANCED***	***SUPERIOR***
Delayed or incomplete performance of all criteria	Delayed or incomplete performance of many criteria	Delayed or incomplete performance of some criteria	Competent performance of most criteria	Efficient and rapid performance of all criteria

Diagnostic Actions

History (HPI, PMHx, Meds, Allergies)
Physical exam
ECG, CXR, other:
Bloodwork:

1	2	3	4	5
INFERIOR	***NOVICE***	***COMPETENT***	***ADVANCED***	***SUPERIOR***
Delayed or incomplete performance of all criteria	Delayed or incomplete performance of many criteria	Delayed or incomplete performance of some criteria	Competent performance of most criteria	Efficient and rapid performance of all criteria

Therapeutic Actions

1	2	3	4	5
INFERIOR	***NOVICE***	***COMPETENT***	***ADVANCED***	***SUPERIOR***
Delayed or incomplete performance of all criteria	Delayed or incomplete performance of many criteria	Delayed or incomplete performance of some criteria	Competent performance of most criteria	Efficient and rapid performance of all criteria

Communication

Introduces self and explains clinical situation
Clear and concise orders and direction
Prioritizes tasks and anticipates further steps
Demonstrates leadership in managing crisis
Appropriate specialist consultation: Neurosurgery
Requests family presence

1	2	3	4	5
INFERIOR	***NOVICE***	***COMPETENT***	***ADVANCED***	***SUPERIOR***
Delayed or incomplete performance of all criteria	Delayed or incomplete performance of many criteria	Delayed or incomplete performance of some criteria	Competent performance of most criteria	Efficient and rapid performance of all criteria

OVERALL PERFORMANCE

1	2	3	4	5
INFERIOR	***NOVICE***	***COMPETENT***	***ADVANCED***	***SUPERIOR***
Delayed or incomplete performance of all criteria	Delayed or incomplete performance of many criteria	Delayed or incomplete performance of some criteria	Competent performance of most criteria	Efficient and rapid performance of all criteria

Queen's Simulation Assessment Tool (QSAT)

Station # 2 - Acute Sub-arachnoid Hemorrhage

Examinee Identification: _____ Date of Assessment: _____

Assessed by: _____

Primary Assessment

Vital signs (HP/BP/O2Sat/RR/Temp) + Glucose
Cardiac monitors
Intravenous access

LOC assessment (verbal/ pain / eyes), Pupils
Airway assessment
Rhythm assessment

1	2	3	4	5
INFERIOR	***NOVICE***	***COMPETENT***	***ADVANCED***	***SUPERIOR***
Delayed or incomplete performance of all criteria	Delayed or incomplete performance of many criteria	Delayed or incomplete performance of some criteria	Competent performance of most criteria	Efficient and rapid performance of all criteria

Diagnostic Actions

History (HPI, PMHx, Meds, Allergies)
Physical exam
ECG

Bloodwork: CBC, lytes, BUN/Cr, INR/PTT, lactate, VBG, ext. lytes
Stat CT-Head

1	2	3	4	5
INFERIOR	***NOVICE***	***COMPETENT***	***ADVANCED***	***SUPERIOR***
Delayed or incomplete performance of all criteria	Delayed or incomplete performance of many criteria	Delayed or incomplete performance of some criteria	Competent performance of most criteria	Efficient and rapid performance of all criteria

Therapeutic Actions

Neuroprotective rapid-sequence intubation
Elevation of head of bed
BP monitoring and control

DRUGS: (Mannitol/Hypertonic Saline, RSI Meds, Octaplex, Vitamin K, anti-HTN)
Ventilator settings (hyperventilation)

1	2	3	4	5
INFERIOR	***NOVICE***	***COMPETENT***	***ADVANCED***	***SUPERIOR***
Delayed or incomplete performance of all criteria	Delayed or incomplete performance of many criteria	Delayed or incomplete performance of some criteria	Competent performance of most criteria	Efficient and rapid performance of all criteria

Communication

Introduces self and explains clinical situation
Clear and concise orders and direction
Prioritizes tasks and anticipates further steps

Demonstrates leadership in managing crisis
Appropriate specialist consultation: Neurosurgery
Requests family presence

1	2	3	4	5
INFERIOR	***NOVICE***	***COMPETENT***	***ADVANCED***	***SUPERIOR***
Delayed or incomplete performance of all criteria	Delayed or incomplete performance of many criteria	Delayed or incomplete performance of some criteria	Competent performance of most criteria	Efficient and rapid performance of all criteria

OVERALL PERFORMANCE

1	2	3	4	5
INFERIOR	***NOVICE***	***COMPETENT***	***ADVANCED***	***SUPERIOR***
Delayed or incomplete performance of all criteria	Delayed or incomplete performance of many criteria	Delayed or incomplete performance of some criteria	Competent performance of most criteria	Efficient and rapid performance of all criteria

APPENDIX B

PUBLISHER PERMISSION TO USE QUEEN'S SIMULATION ASSESSMENT TOOL

WOLTERS KLUWER HEALTH, INC. LICENSE
TERMS AND CONDITIONS

Mar 01, 2024

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Institution name	University of Northern Colorado
Expected presentation date	May 2024
Order reference number	QSAT
Portions	Figure 2. pg. 100
Requestor Location	University of Northern Colorado 1203 Remsen Mill Road Neptune, NJ 07753 United States Attn: University of Northern Colorado
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APPENDIX C

ADVANCED PRACTICE PROVIDERS QUEEN'S ASSESSMENT TOOL TEMPLATE (ACUTE CARE SETTING)

PRIMARY ASSESSMENT				
ABCDE approach: (Airway, Breathing, Circulation, Disability-GCS, Exposure)				
Requests monitoring and VS: (HR, BP/Spo2/RR/Temp, blood sugar)				
Rhythm Assessment: identify rhythm				
Identify Problems: vocalize all differentials				
IV/IO access: assess the need				
1 **Nov ice** *Delayed or incomplete performance of all criteria*	**2** **Advanced Beginner** *Delayed or incomplete performance of many criteria*	**3** **Competent** *Delayed or incomplete performance of some criteria*	**4** **Proficient** *Competent performance of most criteria*	**5** **Expert** *Competent performance of all criteria*
DIAGNOSTIC ACTIONS				
Obtains targeted history: Gather HPI, PMH, Medication List, Allergies				
Physical Exam-Focus assessment:				
Bloodwork: order				
Imaging: order				
Extended Data: e.g., US, Flotrac, Aline:				
1 **Nov ice** *Delayed or incomplete performance of all criteria*	**2** **Advanced Beginner** *Delayed or incomplete performance of many criteria*	**3** **Competent** *Delayed or incomplete performance of some criteria*	**4** **Proficient** *Competent performance of most criteria*	**5** **Expert** *Competent performance of all criteria*
THERAPEUTIC ACTIONS				
Priority Intervention: e.g. Intubation:				
Medications: e.g. pressors, IVF vasodilators, antibiotics:				
Labs: address lab results: Address lab results				
Imaging: address imaging results: Address results				
Appropriate Consult:				
1 **Novice** *Delayed or incomplete performance of all criteria*	**2** **Advanced Beginner** *Delayed or incomplete performance of many criteria*	**3** **Competent** *Delayed or incomplete performance of some criteria*	**4** **Proficient** *Competent performance of most criteria*	**5** **Expert** *Competent performance of all criteria*
COMMUNICATION				
Introduction: Introduces self and explains clinical situation				
Communication: Clear and concise orders and directions				
Prioritization: Prioritizes tasks and anticipates further steps				
Leadership: Demonstrates leadership in managing crisis				

A.

Consultation: Present consults clearly or instructs another member to call				
1 **Novice** *Delayed or incomplete performance of all criteria*	**2** **Advanced Beginner** *Delayed or incomplete performance of many criteria*	**3** **Competent** *Delayed or incomplete performance of some criteria*	**4** **Proficient** *Competent performance of most criteria*	**5** **Expert** *Competent performance of all criteria*
OVERALL PERFORAMCE				
1 **Novice** *All skills require significant improvement*	**2** **Advanced Beginner** *Most skills require moderate or significant improvement*	**3** **Competent** *Some skills require moderate improvement*	**4** **Proficient** *Some skills require minor improvement*	**5** **Expert** *Few, if any skills require only minor improvement*

APPENDIX D

PERMISSION TO ADAPT QUEEN'S SIMULATION ASSESSMENT TOOL

Hi Dr. Hall,

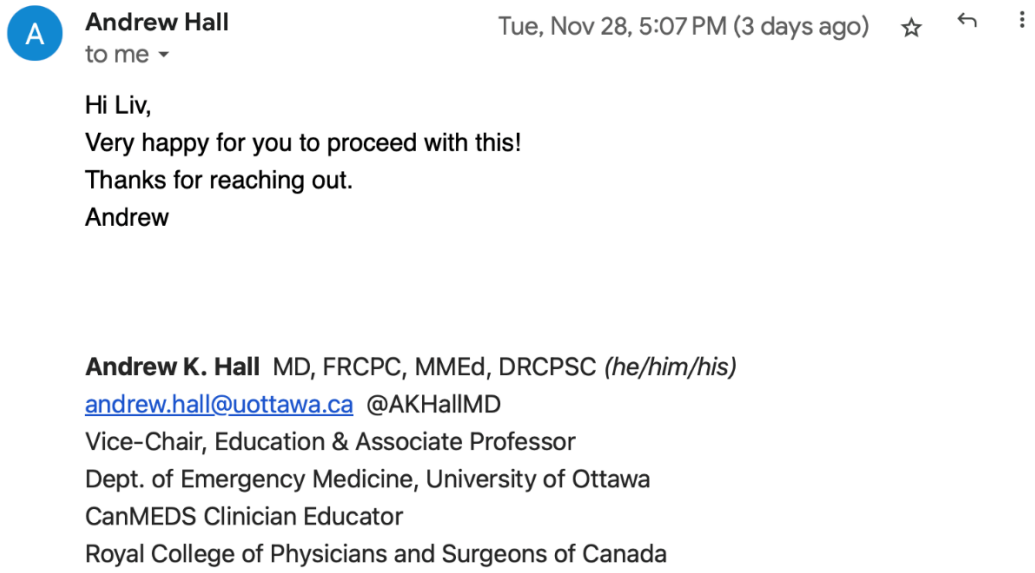
My name is Olivia Nicastro (Liv), I am a program director of a critical care postgraduate training program for advanced practice providers (APPs). APP is an umbrella term for nurse practitioners (NPs) and physician assistants (PAs).
I am also a PhD student focusing on my dissertation. I am looking to modify the QSAT for validity and reliability for the APP population. This email is seeking your permission for this endeavor. I will not move forward without your permission to modify the tool for APPs.
If you have questions or concerns please let me know.

I have attached the modification I am exploring.

Best,
Liv

Olivia Nicastro, ACNP-BC
Director, APP Critical Care Fellowship
Robert Wood Johnson University Hospital
c. 973-902-1288

Email: olivia.nicastro@rwjbh.org



Andrew Hall Tue, Nov 28, 5:07 PM (3 days ago)
to me

Hi Liv,
Very happy for you to proceed with this!
Thanks for reaching out.
Andrew

Andrew K. Hall MD, FRCPC, MMEd, DRCPSC *(he/him/his)*
andrew.hall@uottawa.ca @AKHallMD
Vice-Chair, Education & Associate Professor
Dept. of Emergency Medicine, University of Ottawa
CanMEDS Clinician Educator
Royal College of Physicians and Surgeons of Canada

Olivia Nicastro <omn2103@gmail.... Tue, Nov 28, 5:18 PM (3 days ago)
to Andrew

Hi Andrew,

Would you like me to keep the name of the QSAT? Like the APP-QSAT?

Best,
Liv

A

Andrew Hall Tue, Nov 28, 5:26 PM (3 days ago)
to me

Sure! That sounds good to me.
Thanks,
Andrew

APPENDIX E

PERMISSION TO USE FIGURE 1: ASSESSMENT OF COMPETENCE THEORY

Kent Hecker
to me

Mon, Feb 5, 4:35 PM (9 hours ago)

Hello Liv,
You may need publisher's permission, not just authors. This is also a variant on others which I think we cited. Regardless, you have my permission.

Good luck on writing the dissertation.

Regards,
Kent

Kent Hecker, PhD
Professor
Faculty of Veterinary Medicine
Department of Community Health Sciences | Cumming School of Medicine
University of Calgary | 3280 Hospital Drive NW | Calgary AB T2N 4Z6 | CANADA
e. kghecker@ucalgary.ca
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Article Title	Anaesthetists' non-technical skills.	**Start Page**	38
		End Page	44
Author/Editor	HighWire Press.	**Issue**	1
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		Expected Presentation Date	2024-05-20
Instructor Name	Dr. Kathleen Dunemn		

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PUBLISHER PERMISSION TO USE FIGURE 3: MANAGING EMERGENCIES IN PEDIATRIC ANESTHESIA GLOBAL RATING SCALE

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Article Title	The Managing Emergencies in Paediatric Anaesthesia global rating scale is a reliable tool for simulation-based assessment in pediatric anesthesia crisis management.
Author/Editor	Association of Paediatric Anaesthetists of Great Britain and Ireland., European Society for Paediatric Anaesthesiology., Association des anesthésistes réanimateurs pédiatriques d'expression française.
Date	01/01/1991
Language	English
Country	United Kingdom of Great Britain and Northern Ireland
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Instructor Name	Olivia Nicastro
Institution Name	University of Northern Colorado
Expected Presentation Date	2024-05-20

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APPENDIX H

INSTITUTIONAL REVIEW BOARD APPROVAL

UNIVERSITY OF
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Institutional Review Board

Date:	04/04/2024
Principal Investigator:	Olivia Nicastro
Committee Action:	**IRB EXEMPT DETERMINATION – New Protocol**
Action Date:	04/04/2024
Protocol Number:	2310053265
Protocol Title:	THE DEVELOPMENT AND CONTENT VALIDITY OF AN ASSESSMENT INSTRUMENT IN SIMULATION FOR ADVANCED PRACTICE PROVIDER FELLOWSHIP PROGRAMS: AN EXPLORATORY STUDY
Expiration Date:	

The University of Northern Colorado Institutional Review Board has reviewed your protocol and determined your project to be exempt under 45 CFR 46.104(d)(702) for research involving

Category 2 (2018): EDUCATIONAL TESTS, SURVEYS, INTERVIEWS, OR OBSERVATIONS OF PUBLIC BEHAVIOR. Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met: (i) The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects; (ii) Any disclosure of the human subjects' responses outside the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, educational advancement, or reputation; or (iii) The information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and an IRB conducts a limited IRB review to make the determination required by 45 CFR 46.111(a)(7).

You may begin conducting your research as outlined in your protocol. Your study does not require further review from the IRB, unless changes need to be made to your approved protocol.

As the Principal Investigator (PI), you are still responsible for contacting the UNC IRB office if and when:

APPENDIX I

RECRUITMENT COMMUNICATION

E-MAIL

To content experts,

I am pursuing a doctoral degree in nursing education. I am asking for your expert judgement to assess the content validity of the items on the Queens' Simulation Assessment Tool© (2015) modified for Advanced Practice Providers (APP-QSAT). Conceptualization of the modified items resulted from a comprehensive literature review to measure clinical competence of Advanced Practice Providers. Thank you for your time, I am offering to send you a $15 Amazon gift card if you complete the survey. Please read the information in the consent below carefully and ask questions about anything you do not understand before deciding whether to participate. Demographic information is requested for comparison between participants.

Study title: THE DEVELOPMENT AND CONTENT VALIDITY OF AN ASSESSMENT INSTRUMENT IN SIMULATION FOR ADVANCED PRACTICE PROVIDER FELLOWSHIP PROGRAMS: AN EXPLORATORY STUDY

Student Investigator: Olivia Nicastro **Research Advisor:** Dr. Kathleen Dunemn

PURPOSE OF THE STUDY. The purpose of this study is to determine the content validity and refine the items on the Advanced Practice Provider-Queen's Simulation Assessment Tool (APP-QSAT), an instrument used to measure competence in simulation.

PROCEDURES You will be provided a link to Qualtrics via email communication to complete a 10-question demographic survey along with completing a content validity index survey of the Advanced Practice Provider-Queen's Simulation Assessment Tool (APP-QSAT).

EXPECTED DURATION The total anticipated time commitment will be a 15-20 minutes or less. You will receive a $15 Amazon gift card if you choose to complete the survey.

RISKS OF PARTICIPATION There are no anticipated risks associated with participation in this study, other than those normally encountered when completing surveys about the assessment of competence for Advanced Practice Providers (APPs).

BENEFITS TO THE SUBJECT There are no direct benefits to you for participating in the study. The information obtained from the study may help evaluate competence of APP fellows within simulation.

CONFIDENTIALITY OF RECORDS Data collection will be collected using Qualtrics. I will take every precaution to protect your confidentiality. All identifying information will be removed from your responses and you will be assigned a numeric identifier. Data will be kept on a password-protected computer located in a locked office. However**,** due to the nature of an electronic survey, confidentially cannot be guaranteed. Qualtrics has specific privacy policies. You should be aware that these web services may be able to link your responses to your ID in ways that are not bound by this consent form and the data confidentiality procedures used in this study. If you have concerns, you should consult these services directly.

Voluntary Participation: Please understand that your participation is voluntary. You may decide not to participate in this study and if you begin participation, you may still decide to stop and withdraw at any time. Your decision will be respected and will not result in loss of benefits to which you are otherwise entitled.

Electronic consent: Please take all the time you need to read this document and decide whether you would like to participate in this research study. If you decide to participate, your completion of the research procedures indicates your consent. You may print this form for your records

CONTACT INFORMATION FOR QUESTIONS OR PROBLEMS If you have any questions about this research project, please feel free to contact Olivia Nicastro E- mail: omn2103@gmail.com. If you have any concerns about your selection or treatment as a research participant, please contact Laura Martin, Research Compliance Manager, University of Northern Colorado at laura.martin@unco.edu.

THE UNIVERSITY OF NORTHERN COLORADO (UNCO) COMMITTEE FOR PROTECTION OF HUMAN SUBJECTS HAS REVIEWED AND APPROVED THIS PROJECT. RESEARCH PROJECTS THAT ARE CARRIED OUT BY INVESTIGATORS AT UNCO ARE GOVERNED BY REQUIREMENTS OF THE UNIVERSITY AND THE FEDERAL GOVERNMENT.

If you decide to participate, your completion of the research procedures indicates your consent.
Please keep this form for your records.

QUALTRICS LINK WILL BE HERE

UNIVERSITY OF
NORTHERN COLORADO

Informed Consent Form for Participation in Research

Title of Research Study: THE DEVELOPMENT AND CONTENT VALIDITY OF AN ASSESSMENT INSTRUMENT IN SIMULATION FOR ADVANCED PRACTICE PROVIDER FELLOWSHIP PROGRAMS: AN EXPLORATORY STUDY

Researcher(s): Olivia Nicastro, PhD Graduate School of Nursing
Phone Number: 973-902-1288 email: omn2103@gmail.com
Research Advisor: Dr. Kathleen Dunemn
Phone Number: email: kathleen.dunemn@unco.edu

Procedures: You will be provided a link to Qualtrics via email communication to complete a 10-question demographic survey along with completing a content validity index survey of the modified Advanced Practice Provider-Queen's Simulation Assessment Tool (APP-QSAT).

Questions: If you have any questions about this research project, please feel free to contact Olivia Nicastro (973-902-1288 E-mail: omn2103@gmail.com). If you have any concerns about your selection or treatment as a research participant, please contact Laura Martin, Research Compliance Manager, University of Northern Colorado at laura.martin@unco.edu or 970-351-1910.

Voluntary Participation: Please understand that your participation is voluntary. You may decide not to participate in this study and if you begin participation, you may still decide to stop and withdraw at any time. Your decision will be respected and will not result in loss of benefits to which you are otherwise entitled.

Use this section if signed consent will NOT be obtained and delete the box above.
Please take all the time you need to read through this document and decide whether you would like to participate in this research study.

If you decide to participate, your completion of the research procedures indicates your consent. Please keep this form for your records.

APPENDIX J

CONTENT VALIDITY INDEX TOOL

Dear Experts,

I am asking for your expert judgement to assess the content validity of the items on the Queens' Simulation Assessment Tool© (2015) modified for Advanced Practice Providers (APP-QSAT). Conceptualization of the modified items resulted from a comprehensive literature review to measure clinical competence of Advanced Practice Providers. This modified tool will be used to rate APPs in the Acute Care Setting, using a simulated patient care scenario, to assess their competence using the Novice to Expert criteria.

Completion of the content validity index survey and participation in this research study is voluntary. If you complete the survey, you confirm that you voluntarily consent to participate in this research study. Your identity will be protected, and your name will not be shared with other participants. Your participation will assist in the development of a valid and reliable instrument for measuring clinical competence of Advanced Practice Providers.

The following definition is used in this study:

Clinical Competence: competence "entails more than the possession of knowledge, skills and attitudes; it requires the ability to apply these in the clinical environment to achieve optimal results" (Ten Cate et al., 2010, p. 669).

Novice: Delayed or incomplete performance of all criteria
Advanced Beginner: Delayed or incomplete performance of many criteria
Competent: Delayed or incomplete performance of some criteria
Proficient: Competent performance of most criteria
Expert: Competent performance of all criteria

Thank you for your participation,

Olivia Nicastro, ACNP-BC
Director, APP Critical Care Fellowship

Instructions:

The following Likert scale will be used to evaluate two components of content validity:
(1) relevance to the construct and (2) wording of the item is clearly communicated. Select one answer in each box.
If you score a 1 or a 2, you will be asked to provide additional comments as rationale for your response.

Likert Scale

1 = not relevant/clear
2 = somewhat relevant/clear
3 = quite relevant/clear
4 = very relevant/clear

Item	Relevant to Construct	Clearly Communicated	Comments for Consideration
PRIMARY ASSESSMENT			
ABCDE approach: : (Airway, Breathing, Circulation, Disability-GCS, Environment)	1 2 3 4	1 2 3 4	
Requests monitoring and VS: (HR, BP/Spo2/RR/Temp), blood sugar	1 2 3 4	1 2 3 4	
Rhythm Assessment: Identify the rhythm	1 2 3 4	1 2 3 4	
Identify Problems: Vocalize differentials	1 2 3 4	1 2 3 4	
IV access: assess need	1 2 3 4	1 2 3 4	
Do you feel these components are comprehensive to the domain of primary assessment?	Yes or No		If No, please provide comments
THERAPEUTIC ACTIONS			
Priority Intervention: e.g. Intubation	1 2 3 4	1 2 3 4	
Medications: administer	1 2 3 4	1 2 3 4	
Labs: address results	1 2 3 4	1 2 3 4	
Imaging: address results	1 2 3 4	1 2 3 4	
Appropriate Consult: vocalizes	1 2 3 4	1 2 3 4	
Do you feel these components are comprehensive to the domain of therapeutic actions?	Yes or No		If No, please provide comments
COMMUNICATION			
Introduction: introduces self and explains clinical situation	1 2 3 4	1 2 3 4	

Communication: Clear and concise orders and directions	1 2 3 4	1 2 3 4	
Prioritization: Prioritizes tasks and anticipates further steps	1 2 3 4	1 2 3 4	
Leadership: Demonstrates leadership in managing crisis	1 2 3 4	1 2 3 4	
Consultation: Present consults clearly or instructs another member to call	1 2 3 4	1 2 3 4	
Do you feel these components are comprehensive to the domain of communication?	Yes or No		If No, please provide comments

DOMAIN SCORING			
1 Delayed or incomplete performance of all criteria	1 2 3 4	1 2 3 4	
2 Delayed or incomplete performance of many criteria	1 2 3 4	1 2 3 4	
3 Delayed or incomplete performance of some criteria	1 2 3 4	1 2 3 4	
4 Competent performance of most criteria	1 2 3 4	1 2 3 4	
5 Competent performance of all criteria	1 2 3 4	1 2 3 4	
Do you feel these 5 levels of scoring are comprehensive to the domain scoring?	Yes or No		If No, please provide comments
GLOBAL RATING SCALE			
Novice *All skills require significant improvement*	1 2 3 4	1 2 3 4	
Advanced Beginner *Most skills require significant improvement*	1 2 3 4	1 2 3 4	
Competent *Some skills require moderate improvement*	1 2 3 4	1 2 3 4	
Proficient *Some skills require minor improvement*	1 2 3 4	1 2 3 4	
Expert *Few, if any skills require only minor improvement*	1 2 3 4	1 2 3 4	
Do you feel these 5 levels of scoring are comprehensive to the global rating scale?	Yes or No		If No, please provide comments

Are there critical aspects of assessing APP competence that are not included in this survey?

Thank you for participating in this study.

APPENDIX K

DEMOGRAPHIC SURVEY

CONTENT EXPERT DEMOGRAPHICS

* 1. WHAT IS YOUR GENDER?

- ◯ Female
- ◯ Male
- ◯ Other (specify)

* 2. WHAT IS YOUR AGE?

- ◯ 21-29
- ◯ 30-39
- ◯ 40-49
- ◯ 50-59
- ◯ 60 or older

3. WHAT IS THE HIGHEST DEGREE YOU HAVE RECEIVED?

- ☐ MASTERS
- ☐ DOCTORATE
- ☐ MEDICAL SCHOOL
- ☐ PHD
- ☐ CURRENT PHD STUDENT
- ☐ CURRENT DOCTORATE STUDENT
- ☐ BSN
- ☐ Other (please specify)

* 4. CURRENT BOARD LICENSE

- ☐ NP
- ☐ PA
- ☐ MD
- ☐ PARAMEDIC
- ☐ RN
- ☐ Other (please specify)

* 5. ROLE IN SIMULATION

- ◯ EDUCATOR WITHIN SIMULATION
- ◯ DIRECTOR OF A SIMULATION CENTER
- ◯ NOT CURRENTLY AN EDUCATOR IN SIMULATION

Other (please specify)

* 6. WHAT IS (ARE) YOUR SPECIALITY (IES)? (SELECT ALL THAT APPLY)

- ☐ EMERGENCY MEDICINE
- ☐ CRITICAL CARE
- ☐ HOSPITALIST MEDICINE
- ☐ PHARMACY
- ☐ EDUCATION
- ☐ Other (please specify)

* 7. YEARS IN YOUR SPECIALITY(IES)

- ◯ 1-5
- ◯ 6-10
- ◯ 11-15
- ◯ 16-20
- ◯ 21-25
- ◯ 26-30

* 8. DO YOU HAVE ANY CERTIFICATION AS A SIMULATION EDUCATOR?

- ☐ yes
- ☐ no

* 9. IF YOU HAVE CERTIFICATION, WHAT IS THE NAME OF THE ORGANIZATION WHO PROVIDED IT?

- ☐ NA
- ☐ Certification (please specify)

* 10. HAVE YOU TAKEN ANY COURSES OR CLASSES AS AN EDUCATOR IN SIMULATION?

- ☐ NA
- ☐ PLEASE SPECIFY

* 11. WHAT IS YOUR YEARS' EXPERIENCE IN SIMULATION?

- ◯ 1-2 YEARS
- ◯ 3-4 YEARS
- ◯ 5-6 YEARS
- ◯ 7-8 YEARS
- ◯ 9-10 YEARS
- ◯ 11-15 YEARS
- ◯ 16-20 YEARS
- ◯ 20 YEARS OR MORE

* 12. WHAT INSTITUTION(S) ARE YOU AFFILIATED WITH?

- ☐ (please specify)

APPENDIX L

FINAL ADVANCED PRACTICE PROVIDERS QUEEN'S SIMULATION ASSESSMENT TOOL TEMPLATE (ACUTE CARE SETTING)

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PRIMARY ASSESSMENT				
ABCDE approach: *specific to scenario*				
Monitoring: *specific to scenario*				
Rhythm Assessment: *specific to scenario*				
Identify Problems: *specific to scenario*				
IV/IO/CVC access: *specific to scenario*				
1 **Novice** *Delayed or incomplete performance of all criteria*	2 **Advanced Beginner** *Delayed or incomplete performance of 75% criteria*	3 **Competent** *Delayed or incomplete performance of 50% criteria*	4 **Proficient** *Delayed or incomplete performance of 25% criteria*	5 **Expert** *Skills completed with no improvement needed*
DIAGNOSTIC ACTIONS				
Obtains targeted history: *specific to scenario*				
Physical Exam-Focus assessment: *specific to scenario*				
Bloodwork: order *specific to scenario*				
Imaging: order *specific to scenario*				
Extended Data: *specific to scenario*				
1 **Novice** *Delayed or incomplete performance of all criteria*	2 **Advanced Beginner** *Delayed or incomplete performance of 75% criteria*	3 **Competent** *Delayed or incomplete performance of 50% criteria*	4 **Proficient** *Delayed or incomplete performance of 25% criteria*	5 **Expert** *Skills completed with no improvement needed*
THERAPEUTIC ACTIONS				
Priority Intervention: *specific to scenario*				
Medications: *specific to scenario*				
Labs: address lab results: *specific to scenario*				
Imaging: address imaging results: *specific to scenario*				
Appropriate Consult: *specific to scenario*				
1 **Novice** *Delayed or incomplete performance of all criteria*	2 **Advanced Beginner** *Delayed or incomplete performance of 75% criteria*	3 **Competent** *Delayed or incomplete performance of 50% criteria*	4 **Proficient** *Delayed or incomplete performance of 25% criteria*	5 **Expert** *Skills completed with no improvement needed*

COMMUNICATION				
Introduction: Introduces self, demonstrates situational awareness				
Communication: communicates concisely through SBAR, functions as a collaborative team member				
Prioritization: establishes resource utilization, prioritizes safety measures, anticipates next steps and plans				
Leadership: Establishes workload distribution, ownership of the situation				
Consultation: Present consults clearly or instructs another member to call				
1 **Novice** *Delayed or incomplete performance of all criteria*	2 **Advanced Beginner** *Delayed or incomplete performance of 75% criteria*	3 **Competent** *Delayed or incomplete performance of 50% criteria*	4 **Proficient** *Delayed or incomplete performance of 25% criteria*	5 **Expert** *Skills completed with no improvement needed*
OVERALL PERFORAMCE				
1 **Novice** *Delayed or incomplete performance of all criteria*	2 **Advanced Beginner** *Delayed or incomplete performance of 75% criteria*	3 **Competent** *Delayed or incomplete performance of 50% criteria*	4 **Proficient** *Delayed or incomplete performance of 25% criteria*	5 **Expert** *Skills completed with no improvement needed*