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Gwen Leigh*, Frances Stueben, Deedra Harrington and Stephen Hetherman

# Making the Case for Simulation-Based Assessments to Overcome the Challenges in Evaluating Clinical Competency

**Abstract:** The use of simulation in nursing has increased substantially in the last few decades. Most schools of nursing have incorporated simulation into their curriculum but few are using simulation to evaluate clinical competency at the end of a semester or prior to graduation. Using simulation for such high stakes evaluation is somewhat novel to nursing. Educators are now being challenged to move simulation to the next level and use it as a tool for evaluating clinical competency. Can the use of simulation for high-stakes evaluation add to or improve our current evaluation methods? Using patient simulation for evaluation in contrast to a teaching modality has important differences that must be considered. This article discusses the difficulties of evaluating clinical competency, and makes the case for using simulation based assessment as a method of high stakes evaluation. Using simulation for high-stakes evaluation has the potential for significantly impacting nursing education.

**Keywords:** simulation-based assessment, evaluation, clinical compentency, high stakes evaluation

## Introduction

One of the major challenges of the educator role is to evaluate the nursing student's performance, determine if the clinical learning objectives are being met, and validate that the student is a safe practitioner. Appraisal of clinical competency and the determination of acquisition of professional knowledge, skills, and attitudes (KSAs) can be a challenge. Of all of the duties of an educator, objectively evaluating students' clinical competency can be the most daunting (Walsh, Baily, & Koren, 2009). Ideally, evaluation of a student's clinical competency is based on sound measurement of practice and predetermined learning objectives that are clearly communicated and understood by both faculty and students. To be credible, evaluations need to reflect both validity, the measurement of what is intended to be measured, and reliability, that is, stable, consistent, dependable measurement regardless of by whom, when or where the evaluation is conducted.

Currently, most schools of nursing rely on a variety of methods for evaluating clinical competency. A portion of this evaluation is completed in the clinical skills laboratory, where students are expected to demonstrate skills through the use of task trainers, standardized patients and/or scenario-based simulations prior to entering the clinical setting. Demonstration of skills in this controlled environment helps to ensure that students have adequate competency prior to applying those skills in providing patient care. Then, in the clinical setting, the clinical instructor evaluates a student's KSAs based on his or her performance (O'Conner, 2015). As clinical evaluation is multifaceted, such assessment requires data from several different sources such as observations by both the clinical instructor and staff nurses in the clinical setting, self-evaluations, clinical journals, documentation in the electronic medical records, concepts maps, care plans and simulations (Bonnel, 2012). Normally, clinical evaluation includes both formative and summative assessments. Formative evaluation is ongoing, giving students timely feedback on areas that need improvement, thereby permitting the student the opportunity to improve their performance. At mid-term, a more formal formative evaluation normally is undertaken with both verbal and written feedback. The final clinical evaluation is summative in nature. In most schools of nursing, an unsatisfactory or failing grade in the clinical experience results in a failure in the course. Hence, clinical instructors need to be sure that evaluations are fair and unbiased (O'Conner, 2015).

Often, however, the evaluation of a student's clinical performance and competency relies primarily on an individual clinical instructor's subjective appraisal of the

*Corresponding author: Gwen Leigh, Nursing and Allied Health, University of Louisiana at Lafayette, P.O. Box 43810 Lafayette, LA 70504, USA, E-mail: prof21@cox.net
Frances Stueben, Deedra Harrington, Nursing and Allied Health, University of Louisiana at Lafayette, P.O. Box 43810 Lafayette, LA 70504, USA
Stephen Hetherman, Objectivity Plus-Psychometrics, 3909 Ambassador Caffery, Lafayette, LA 70503, USA

student's performance (Bonnel, 2012). The clinical instructor's values influence the observations and judgments made about the quality of this performance (Oermann & Gaberson, 2014). In fact, it is not uncommon for schools of nursing to use evaluation tools that have not been formally evaluated for reliability and validity (Brink & Louw, 2012; Collins & Callahan, 2014). In a study on the assessment practices of schools of nursing, researchers found many faculty expressed concerns there were no processes to improve the reliability and validity of the assessment methods currently being implemented (Oermann, Saewert, Charasika, & Yarbrough, 2009). The purpose of this article is to critically examine current approaches to evaluating clinical competency and the potential of simulation-based assessments (SBAs) to improve the reliability and validity of the evaluation process.

## Literature review

A literature search of manuscripts published between the years 2000 and 2015 was undertaken using multiple databases, including: Academic Search Complete, ProQuest Nursing and Allied Health, Medline Complete, CINAHL Complete, Health Source: Nursing/Academic Edition, PubMed and Health Technology Assessments. The databases selected contained publications from nursing journals, other healthcare discipline journals, abstracts, reviews, dissertations and theses. The key terms used were patient simulation, simulation-based assessment, clinical evaluation, high stakes evaluation, clinical competence and education measurement. Inclusion criteria for the literature review consisted of English language publications on nursing education, human patient simulation and high fidelity simulation. Computer-based and low fidelity simulation publications were excluded.

The literature selected brings to light many of the complexities and challenges involved in evaluating a students' clinical competency. These include: (1) clinical site challenges, (2) high student-faculty ratios, (3) the subjective nature of clinical evaluation, (4) the need to evaluate multiple learning domains, and (5) legal considerations.

### Clinical site challenges

The purpose of clinical education is to give students the opportunity to get hands-on educational experiences that help them to develop the necessary KSAs for competent practice (American Association of Colleges of Nursing

[AACN], n.d.). Clinical faculty are charged with the task of evaluating whether or not students have developed these competencies. Several issues inherent in the clinical setting can make it difficult for faculty to adequately evaluate all students' clinical competency. Competition for clinical learning sites among nursing programs and the increasing complexity of the health care system has led to a restricted availability of clinical opportunities. Restricted availability of sites for clinical education can limit students' opportunities for real life experiences, in turn, creating insufficient opportunity for students to acquire and demonstrate clinical competency (Weaver, 2011).

In addition to the clinical site availability problems, escalating attention to accountability and increased focus on patient safety has caused many institutions to be much more cautious about allowing students to provide patient care (Institute of Medicine, 2001). Along with the heightened attention to patient safety, the higher acuity of care needs, high patient turnover, and low patient census compound the problem of finding optimal clinical experiences for students (Richardson & Claman, 2014). Daily variations in patient census and care needs in clinical settings also add to the challenges faced with clinical education (Bonnel, 2012). Furthermore, patient diagnoses and acuity levels do not always coincide with the planned learning objectives and content of the didactic course which coincides with the clinical experience. Given all of these challenges, patient assignments may vary greatly among students, leading to inconsistent opportunities for students to have ample hands-on experiences for mastery of specified competencies (Isaacson & Stacy, 2009). These clinical site challenges make it difficult for clinical instructors to effectively evaluate all of their students in a fair and objective manner, thereby undermining the reliability and validity of' performance evaluations intended to determine their clinical competence.

### High student-faculty ratios

Student/faculty ratios normally range from 8 to 10 students per clinical faculty member (Spencer, 2012), but may be even higher. Higher student/faculty ratios limit faculty oversight of any one student's performance to small windows of time. Thus, high student-faculty ratios may lead to unfairly critical evaluation, or alternatively, lenient appraisals, made in an effort to compensate for inadequate opportunities either for students to demonstrate competence, or for faculty to observe performance (Isaacson & Stacy, 2009). Furthermore, high student: faculty ratios in a

fast paced chaotic environment make it challenging for faculty to complete a comprehensive and fair evaluation of all students (Isaacson & Stacy, 2009). Since faculty cannot be in two places at once, they frequently have to depend on the nursing staff regarding students' performance of nursing care. Nursing staff may be unwilling or incapable of critically evaluating patient care provided by a student. Staff nurses' expectations of students' performance may be too high or too low leading to incongruences in student evaluations (O'Conner, 2015). As well, students' self-reports or self-evaluations may sometimes be used to supplement or replace observed or demonstrated practice abilities (Ironside & McNelis, 2011; Yonge et al., 2005). These challenges and issues bring to question the rigor, consistency, and fairness of student evaluation in the clinical setting, undermining any claim of the validity and reliability of educators' assessment of professional competence.

## The subjective nature of clinical evaluations

One of the major challenges of determining clinical competency is that there is not one definitive definition of competency and interpretations of clinical competency among instructors vary (Yanhua & Watson, 2011). Although a student's clinical performance is evaluated against established standards of patient care, there always remains a certain amount of subjectivity. Varying views and inconsistent interpretations among faculty regarding the competency or incompetency of students and unclear program policies can adversely affect the evaluation process (Larocque & Luhanga, 2013).

Gaberson, Oermann, and Shellenbarger (2015) have identified several issues that may affect the reliability of the evaluation process. These issues include leniency or severity, the halo effect, central tendency and rater drift. Leniency or severity is the tendency for an evaluator to rate all students toward the high end or the low end of the scale. The halo effect occurs when an instructor's clinical judgment is based on a general impression of the student, thereby influencing the ratings of specific aspects of the students' performance toward a higher or lower rating than the student deserves. A central tendency error occurs when educators are reluctant to mark either end of the rating scale, and instead, use only the midpoint of the scale. Rating students only at the extremes or only at the midpoint of the scale limits the validity of the evaluation (Oermann & Gaberson, 2014). Rater drift occurs when clinical instructors redefine established performance behaviors that are to be observed and assessed (Oermann &

Gaberson, 2014). Despite the use of school-developed evaluation tools, these issues, as well as instructor biases, values and beliefs, can impact the objectivity and fairness of clinical evaluations.

Schools of nursing typically develop evaluation tools such as checklists and rubrics to keep the evaluation process as consistent and objective as possible but rarely are the reliability and validity of these tools verified through empirical testing. Establishing the validity and reliability of such instruments and providing information on rating guidelines to instructors are essential to credible assessment of competence (American Educational Research Association [AERA], American Psychological Association [APA], & National Council on Research in Education [NCME], 2014; Objectivity Plus, 2013). Both the validity and reliability of evaluation scores promote accurate determination of learning outcomes (AERA et al., 2014).

## Evaluation of multiple domains of learning

Clinical competency requires a mastery of skills from the cognitive, psychomotor and affective domains of learning. In the USA, these domains have been identified within Quality and Safety Education for Nurses (QSEN) (2014) as essential components of the provision of quality, safe, clinical practice. Evaluating students across these three domains makes evaluation of clinical competency a complex task.

Clearly, clinical evaluation is not simply the measurement of rote learning. Clinical faculty are expected to evaluate the student's application of higher-level cognitive learning, critical thinking, problem solving and clinical judgment within the clinical setting (Lasater, 2011). Comprehensive evaluation methods therefore must assess not only the student's implementation of stipulated care, but also the student's understanding and application of all knowledge relevant to the assigned patients, their diagnoses, and their care needs (Rowles, 2012).

The evaluation of competencies within the psychomotor domain consists predominantly of the assessment of technical skills. Many clinical faculty consider psychomotor competencies easier to evaluate because such skills can be more objectively defined. Traditionally, schools of nursing use a variety of checklists in which psychomotor skills are broken down into subunits, the performance of each assessed and graded as satisfactory (Gaberson et al., 2015).

But students also are expected to develop values, attitudes and beliefs that are consistent with standards of professional nursing practice (Gaberson et al., 2015). These

humanistic and ethical dimensions of nursing lie within the affective domain of learning and are generally considered to be essential components of professional behavior. While each country has a set of professional standards and/or code of conduct for students entering the nursing profession, professionalism can be ill defined and difficult to evaluate. Miller (2010) found many of the complaints to the boards of nursing in Australia and New Zealand involved the affective domain. Complaints of incompetence related to the affective domain, including unprofessional behavior, failure to take responsibility, fraud, and failure to communicate, have been recorded by professional oversight boards (Miller, 2010). Faculty report that it is more challenging to document problematic performance of competencies characterizing the affective domain (Miller, 2010). Unlike cognitive and psychomotor skills, affective behaviors are not immediately identified.

Overall, faculty members tend to measure students individually within each domain, with or without psychometric information on the evaluation tools, and then combine their observations into a student's overall performance profile. This approach calls into question the validity and reliability of the evaluation of the attainment of all required competencies, and ultimately, decisions permitting students to progress through the program and graduate (Bonnel, 2012).

## Legal considerations

As gatekeepers to the profession, nursing schools and their faculty have an obligation to society, employers, and the nursing profession to ensure that graduates of nursing programs are competent to provide safe, quality care (Larocque & Luhanga, 2013; Tanicala, Scheffer, & Roberts, 2011). Yet in cases of student failure or potential failure, it is also important that the due process needs of students are met (Objectivity Plus, 2013). Fear of legal implications may contribute to hesitance in failing students who have not met the required level of practice (Larocque & Luhanga, 2013).

Adequate documentation of student performance, timely student feedback, and provision of well documented reasons for failure are essential, should an appeals process or legal action be taken. Nevertheless, using valid and reliable evaluation instruments and practices together with supporting policies and procedures would provide structure to the evaluation process and help to address legal concerns (Objectivity Plus, 2013). Adoption of valid, reliable evidence-based assessment and evaluation practices with supporting policies and

procedures are essential to affording faculty the structure and support they need to identify and intervene when students are not able to meet the required level of competence (Heaslip & Scammell, 2012; Tanicala et al., 2011).

## Current use of simulation-based assessment in health care disciplines

The notion of using SBA for competency assessment is not new to healthcare. Many health professions in several countries already use simulation-based assessments (SBA) for the evaluation of competency. These include the medical profession in the United States, Canada, the United Kingdom and Israel, as well as the dental profession, emergency medical services, and respiratory therapy in the United States. The American Heart Association (AHA) has used SBA for decades in the Basic and Advanced Cardiac Life Support Courses and the Emergency Nurses Association for the Trauma Nurse Core Course.

The Medical Licensing Examination in the United States utilizes SBAs to evaluate knowledge and skills of candidates applying for medical licensure (Levine, Schwartz, Bryson, & DeMaria, 2012; United States Medical Licensing Examination [USMLE], 2014). The American Board of Surgery uses SBA to assess competence in the Fundamentals of Laparoscopic Surgery, Advanced Trauma Life Support (ATLS) and Advanced Cardiac Life Support (ACLS) for primary certification of surgical residents (Buyske, 2010). Both ATLS and ACLS are well established training programs using SBAs (American College of Surgeons, 2014; Bhanji et al., 2010).

In Canada, applicants who qualify to take the medical licensure exam are required to successfully complete the Medical Council of Canada's Qualifying Examination Parts I and II. Part II of the qualifying examination utilizes SBAs to assess candidate competency (General Medical Council, 2014; Li, 2007; Medical Council of Canada, 2014).

In the United Kingdom, international medical graduates are required to successfully complete The Professional Linguistics and Assessment Board Examination. This examination uses SBAs comprised of 14 clinical scenarios utilizing both standardized patients and human patient simulators to test knowledge and skills deemed essential to practice medicine in the United Kingdom (General Medical Council, 2014; Li, 2007).

Anesthesia was one of the first specialties to require simulation-based education to qualify for both primary board certification and for recertification in the United States (Levine et al., 2012). Israel was an early adopter of SBA and currently incorporates this strategy for

measuring competence in anesthesiology board exams, paramedic certification exams and advanced nursing licensing exams (Rizzolo, Barnes, & Kardon-Edgren, 2014).

The dental profession in the United States has been using simulation in all levels of education for decades. Not only are SBAs used to assess preclinical competency in dentistry's predoctoral and specialty programs, they constitute a significant component of the dental licensure examination (Holmboe, Rizzolo, Sachdeva, Rosenberg & Ziv, 2011). While requirements for licensure vary by state, all states have three common components: an education requirement, a written examination requirement, and a clinical examination requirement (American Student Dental Association, 2014). The clinical examination requirement is a SBA that utilizes standardized patients, simulations with human patient simulators and computer-based virtual reality technologies (Holmboe et al., 2011).

The American Heart Association has been using SBAs in their courses for many years. Both the Basic Life Support and the Advanced Cardiac Life Support courses require patient care management in a simulated environment for successful course completion (Levine et al., 2012). The Emergency Nurses Association in the United States also uses SBAs in the Trauma Nurse Core Course. Health care providers in the emergency medical services (EMS) who are certified through the National Registry of Emergency Medical Technicians (requirements vary by state) are required to successfully complete a psychomotor SBA (National Registry of Emergency Medical Technicians, 2014). The National Board for Respiratory Care (2015), which is the certifying body for the United States respiratory therapists also requires candidates to successfully complete a clinical simulation examination to obtain credentialing.

In contrast, the nursing profession has been slower to consider the use of simulation-based assessment. Internationally, most schools of nursing are using simulation predominately as a teaching and learning strategy (Gore, VanGele, Ravert, & Mabire, 2012; Hovancsek et al., 2009, McGarry, Cashin, & Fowler (2014); Roy, Kim & Kim, 2014; Willhaus, Burleson, Palaganas, & Jeffries, 2014). The use of SBAs as a summative evaluation method for mid-term, end-of-course, progression (entering the next course in the curriculum), or end-of-program is not commonplace and varies among nursing programs. United States licensure examinations for nurses do not currently include a SBA component. Both the National Council of State Boards of Nursing and the National League of Nursing (NLN) are engaged in studies which will lay the groundwork for the use of SBA in pre-licensure nursing programs (Holmboe et al., 2011).

# The advantages of adopting simulation-based assessments

SBAs could address many of the challenges and issues that are inherent in the evaluation of clinical competency of nursing students. Standardized scenarios designed and developed by experts to measure specific competencies and tested for validity and reliability could be an alternative to the traditional model of clinical assessment (Willhaus et al., 2014). SBA eliminates the many challenges to valid and reliable evaluation inherent in traditional assessment approaches. With SBAs, faculty could choose patient scenarios testing specific KSAs at the level of competence expected of students at any one evaluation point, increasing the validity of the evaluation (Adamson, Jefferies, & Rogers, 2012). Evaluation would no longer be dependent upon the number and nature of patient care experiences or other learning opportunities at clinical sites. The challenge of patient variability would be controlled with SBAs, enhancing the validity of clinical evaluation (Adamson et al., 2012; AERA et al., 2014). SBAs could be standardized so that all students have the same opportunities to demonstrate their clinical competency, in consistent clinical situations (AERA et al., 2014). Whereas the nature of the clinical setting constitutes a complex, sometimes chaotic environment that often requires multitasking, the simulation laboratory affords a controlled environment in which faculty could observe student performance uninterrupted and without concern for patient safety and students have undistracted opportunity to demonstrate competencies.

The challenges of conducting valid evaluations in programs with high student:faculty ratios also could be efficiently and effectively overcome. With SBA, both faculty and students would be scheduled for the conduct of evaluation in a controlled laboratory environment. Attention therefore could be focused solely on the student's performance of the competencies to be evaluated (Adamson et al., 2012).

The reliability of clinical evaluation also has the potential to be enhanced by the use of SBAs (Adamson et al., 2012; Willhaus et. al., 2014). With SBAs it is feasible to have two or more instructors independently evaluate a student, thereby enabling the determination of inter-rater agreement. When two or more instructors evaluate a student's performance, issues such as halo

effect, rater drift, central tendency, leniency and severity are diminished (Adamson et al., 2012; Willhaus et. al., 2014). The evaluation process may be conducted by instructors who do not have established relationships with the students to be evaluated, thereby decreasing the possibility of the halo effect (Bensfield, Olech & Horsley, 2012). SBAs also would preclude student complaints about inconsistencies in the evaluative judgments among instructors involved in the assessment of any specific clinical competence across numbers of students (Issacson & Stacy, 2009). Videotaping SBAs could allow for asynchronous evaluation, affording the use of multiple evaluators, and also the opportunity to re-evaluate student competencies when discrepancies among evaluators arise. Ballangrud, Persenius, Hedelin, & Hall-Lord (2014) found videotaping also allows for a more precise analysis of performance and enables the capturing of behaviors that may not have been identified during the initial observation of the scenario performance. Overall, while SBA does not totally eliminate subjectivity in the clinical evaluation process, it does constitute a more level playing field for students, enhance the objectivity of evaluative judgments, afford a more controlled evaluation setting, and enable the attainment of more valid and reliable documentation of student competence.

As well, SBAs have the potential to improve the effectiveness of learner evaluation across the cognitive, psychomotor and affective domains (Kardong-Edgen, Adamson, & Fitzgerald, 2010). SBAs allow students the opportunity to demonstrate their ability to integrate their KSAs in the provision of nursing care within a standardized setting and controlled environment. A standardized, more controlled environment, the use of multiple evaluators and videotaping also enhance the faculty's ability to more comprehensively determine student attainment of KSAs and their integration into patient care.

With regard to the legal considerations associated with nursing education, SBAs level the playing field for students, provide them with adequate opportunity to demonstrate skills, and enable the use of multiple evaluators and videotaping, thereby lending credibility to the evaluation process. The use of videotaping as part of the SBA process would provide documentation in support of evaluation decisions. When undertaken with valid, reliable evaluation tools and supported with sound policies, SBAs would therefore proactively address legal risks inherent in clinical evaluation processes that are essential to fulfilling nurse educators' mandate for ensuring the professional competence of program graduates.

## Conclusion

Nursing, and, indeed, all health professions, must acknowledge and address the difficulties presented in achieving a fair, objective, and accurate measurement of students' clinical competencies. Although faculty may use a variety of tools and methods to determine whether students' performance meets the establish criteria, clinical evaluation remains a complex and imperfect process (Bonnel, 2012; Shipman, Roa, Hooten, & Wang, 2012). SBAs have the potential to be an effective method for evaluating students' KSAs, problem solving ability, and clinical judgment.

While SBAs provide some significant advantages for attaining a comprehensive, fair and unbiased evaluation of clinical competence this approach is not a panacea. The validity and reliability of SBAs depend upon adherence to best practice guidelines, the use of evidence-based scenarios and the development and application of valid and reliable evaluation tools. Medicine, emergency medical services, respiratory therapy, dentistry and other emergency training programs have incorporated some form of SBA as a means for evaluating clinical competency for decades (Buyske, 2010; Holombe & et al., 2011; Levine et al., 2012), lending face validity to this approach.

With the clarion call to action for health care to implement changes that will result in a safer, better, quality health care system, nursing too needs to adopt evaluation approaches that help to ensure that graduates are safe, competent practitioners. Given the advantages that SBA affords the process of clinical evaluation, nurse educators need to consider using SBA as part of clinical evaluation to determine whether students are prepared to provide quality, safe care, with sound clinical judgment.

If nursing programs make the decision to move to SBAs for evaluation of clinical competence, nurse educators in all countries will need to develop psychometrically sound evaluation tools and standardized simulations to ensure that these SBAs are fair, valid and reliable. Two American entities, the NLN and Objectivity Plus®, are currently working on assessment tools and processes for the use of SBA for the evaluation of clinical competency in nursing education (Objectivity NLN, 2010; Plus, 2013). In 2013, Objectivity Plus® launched Quantam® a performance assessment system, to measure undergraduate student nurses' KSAs in simulated testing environments. The NLN (2010) is currently working on the development of tools and processes for the use of SBA for the evaluation of clinical competency in nursing education. Both entities may serve as resources for nurse educators around the world who choose to pursue this aim.

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